Association of Research Directors, Inc.

16th Biennial Research Symposium
April 9 – 13, 2011

Atlanta Marriott Marquis
Atlanta, Georgia

Program
&
Abstracts

1890 Research: Sustainable Solutions for Current and Emerging Issues

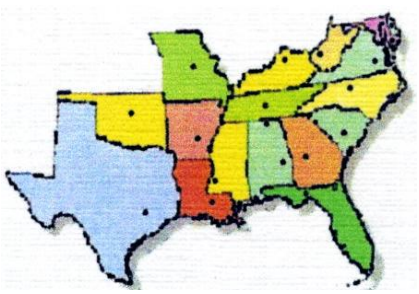
Table of Contents

Greetings from the Chair

It is with great pleasure that I welcome you to the Association of 1890 Research Directors' 16th Biennial Research Symposium. The Association of Research Directors, Inc. (ARD) is the official representative body of the agricultural research administrators of the eighteen 1890 Land Grant Universities. Through its role of supporting and enhancing 1890 research in the food and agricultural sciences, the ARD has held symposia for the sharing of knowledge since 1976. The 16th Biennial Research Symposium, with support, participation, and conscientious and excellent work of many from the 1890 universities, is an initiative that brings us much pride. We are overwhelmingly grateful for your participation in this major endeavor of the 1890 Family and also give our heartfelt thanks to the federal agencies and 1862 land-grant universities which provided both financial and programmatic support. Finally, we thank our students and colleagues who will be the symposium highlights – the providers of excellent poster and oral presentations in the food and agricultural sciences, as well as those who will speak at the general sessions and workshops. We look forward to our award ceremonies in which many will be honored for outstanding achievements, both through professional endeavors and award winning presentations.

The details of putting on such a massive endeavor were handled exceptionally well by the Symposium Steering Committee and associated subcommittees, the webmaster, and the Technology Committee and all of these individuals are gratefully acknowledged in the Symposium Proceedings. Of course, Dr. Orlando McMeans is thanked with great fervor for serving as the chair of the Steering Committee. The Research Directors and the Associate Research Directors provided excellent leadership and involvement and are commended for advancing excellent research, academic and outreach programs at respective 1890 institutions. As has been said consistently by Chairs of the ARD who preceded me, on behalf of the ARD, I am proud of the excellence demonstrated consistently at the member institutions.

I hope this symposium proves to be enlightening and enjoyable for all of you and that you will feel we have met our goal of "providing a forum for interactions, knowledge sharing, building networks for expanded partnerships and showcasing the talents and achievements of the 1890 community."



Sincerely,

Dyremple Marsh, Chair
Association of 1890 Research Directors, Inc.

1890 Land-Grant Universities

The 1890 Land-Grant Universities and Tuskegee University, commonly referred to as "the 1890s," are those institutions established under the Second Morrill Act of 1890. These Historically Black Institutions share the land-grant mission of teaching, research, and extension. The eighteen (18) 1890s are located in seventeen (17) states shown on the logo of the Association of 1890 Research Directors, Inc. (ARD).

Having as its motto "Progress through Research and Service," the ARD brings together the administrators of the 1890 Research Programs at these land-grant universities to conduct regional research projects and initiatives and to collectively promote the training of young researchers as well as the research goals of their institutions in a way that benefits their states, region and the nation. ARD members serve on state, regional, national and international bodies.

The Presidents & Research Directors for member 1890 universities are listed below:

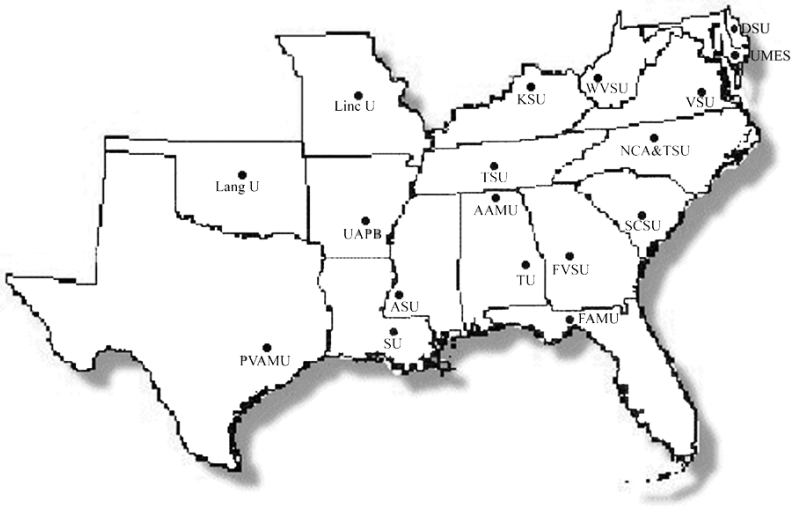
	President	**Director**
Alabama A&M University	Andrew Hugine	Robert Taylor
Alcorn State University	M. Christopher Brown	Barry L. Bequette
Delaware State University	Harry L. Williams	Dyremple Marsh
Florida A&M University	James H. Ammons	Samuel L. Donald
Fort Valley State University	Larry Rivers	Govindarajan Kannan
Kentucky State University	Mary E. Sias	Harold Benson
Langston University	JoAnn Haysbert	Marvin Burns
Lincoln University	Carolyn R. Mahoney	Steven Meredith
North Carolina A&T State University	Harold Martin	Donald McDowell
Prairie View A&M University	George C. Wright	Freddie L. Richards
South Carolina State University	George E. Cooper	Garlen Wesson
Southern University	Ronald Mason, Jr.	Kirkland Mellad
Tennessee State University	Portia Holmes Shields	Chandra Reddy
Tuskegee University	Gilbert L. Rochon	Walter A. Hill
University of Arkansas Pine Bluff	Lawrence A. Davis, Jr.	James Garner
University of Maryland Eastern Shore	Thelma B. Thompson	Jurgen Schwartz
Virginia State University	Keith T. Miller	Wondi Mersie
West Virginia State University	Hazo W. Carter, Jr.	Orlando F. McMeans

Officers of the ARD for 2010 - 2012 are:

Dyremple Marsh – Chair
Donald McDowell – Chair-Elect
Orlando McMeans – Secretary & Immediate Past Chair
Conrad Bonsi – Treasurer
Kirkland Mellad – Member-at-Large
Carolyn B. Brooks – Executive Director

ARD 2011

1890 Research:
Sustainable Solutions for
Current and Emerging Issues



Programs

Association of 1890 Research Directors, Inc.
Program of Events for the 16th Biennial Research Symposium

Event	Time	Location
Saturday, April 9		
Registration	1:00 p.m. – 6:00 p.m.	Imperial Reg. Booth (Marquis Level)
Judges and Moderators Meeting	6:00 p.m. – 8:00 p.m.	Atrium Level, rooms A – 601 & A – 602
Sunday, April 10		
Poster/Exhibit Setup	6:00 a.m. – 3:00 p.m.	International South Hall (Intl. Level)
Registration	8:00 a.m. – 5:00 p.m.	Imperial Reg. Booth (Marquis Level)
Student Competitive Paper Sessions	8:30 a.m. – 4:00 p.m.	International South Hall (1 – 6, B, C)
Break	10:00 a.m. – 11:00 a.m.	International South Hall (Intl. Level)
Lunch (**on your own**)		
Break	2:00 p.m. – 3:00 p.m.	International South Hall (Intl. Level)
Student Competitive Poster Judging	3:30 p.m. – 6:00 p.m.	International South Hall (Intl. Level)
Exhibit Hall Opening (ribbon cutting)	6:45 p.m. – 7:00 p.m.	Outside the glass doors of International South Hall (Intl. Level)
Welcome Reception	7:00 p.m. – 9:00 p.m.	Imperial Ballroom (Marquis Level)
Monday, April 11		
Continental Breakfast	7:00 a.m. – 8:15 a.m.	International South Hall (Intl. Level)
Registration	8:00 a.m. – 5:00 p.m.	Imperial Reg. Booth (Marquis Level)
General (Opening) Session (Welcome by government and university officials)	**8:30 a.m. – 10:00 a.m.**	Imperial Ballroom (Marquis Level)
Break	10:00 a.m. – 10:30 a.m.	International South Hall (Intl. Level)
Exhibit Viewing	10:00 a.m. – 11:45 a.m.	International South Hall (Intl. Level)
Posters with authors	10:00 a.m. – 11:45 a.m.	International South Hall (Intl. Level)
Student Awards Luncheon	**12:00 p.m. – 1:45 p.m.**	**Marquis C/D**
Exhibit Viewing	2:00 p.m. – 6:00 p.m.	International South Hall (Intl. Level)
Scientist Oral Presentations	2:00 p.m. – 6:00 p.m.	International South Hall (1 – 6, B, C)
Break	3:00 p.m. – 3:30 p.m.	International South Hall (Intl. Level)
Natural Resource Faculty Meeting	7:00 p.m. – 9:00 p.m.	International South Hall, Room B

Dinner (**On your own**)		
Student Social	9:00 p.m. – 12:00 a.m.	Marquis C/D
Tuesday, April 12		
Continental Breakfast	7:00 a.m. – 7:45 a.m.	International South Hall (Intl. Level)
Registration	8:00 a.m. – 4:00 p.m.	Imperial Reg. Booth (Marquis Level)
Plenary Session (two keynote presentations – Dr. Roger Beachy and Dr. Sanjiv Singh)	8:30 a.m. to 10:30 a.m.	Marquis A/B
Break	10:30 a.m. – 11:30 a.m.	International South Hall (Intl. Level)
Exhibit viewing	10:30 a.m. - noon	International South Hall (Intl. Level)
Lunch (on your own)	**12:00 p.m. – 1:00 p.m**	
Concurrent Sessions	1:30 p.m. – 5:00 p.m.	International South Hall (1 – 6, B, C)
Poster and Exhibit Breakdown	1:00 p.m. – 5:00 p.m.	International South Hall (Intl. Level)
Break	3:00 p.m. – 3:30 p.m.	International South Hall (Intl. Level)
Morrison-Evans & B.D. Mayberry Awards Banquet	**7:00 p.m. – 10:00 p.m.**	**Marquis A/B**

Wednesday, April 13 – TRAVEL DAY

Workshops will be concurrent and may be repeated.

1:30 – 2:45 P.M. and repeated from 3:00 – 4:15 P.M.

International 2 - ***1890 Capacity Building Grants*** – Ali Mohamed, USDA/NIFA

Salon 1 - ***Trends and Emerging Issues in Soil Microbial Ecology: Challenges and Opportunities*** – Zachary Senwo, Alabama A&M University and Ramble Ankumah, Tuskegee University (Moderators) Presenters: Drs. Acosta-Martnez, Gardner, Ibekwe, Omon, He, Tazisong

Salon 2 – ***Southern Region SARE Funding Opportunities*** – Jeff Jordan and James Hill

Salon 3 -***Writing Effective Impact Statements*** - Johnnie Westbrook, Alcorn State University

Salon 4 - ***A New Approach to Animal Disease Traceability*** – Vincent Chapman, Jr., USDA/APHIS/VS

Salon 5 - ***Overview of USDA Foreign Agricultural Service Capacity Building and University Partnerships*** – Larry Trouba
Overview of the APHIS International Services - Cheryle l. Blakely

APHIS International Capacity Building Efforts – Jessica Mahalingappa

1:30 – 3:00 P. M.

Salon 6 - Higher Education for Development: **International Opportunities** - Kellee Edmonds, Roy Zimmerman, and Teshome Alemneh

Imperial Ballroom (Marquis Level) - *Student Workshops:*

Resume Writing
Applying for Government Jobs
Summer Employment/internships (some may be by appointment)
Graduate School Information Sessions (some may be by appointment)
Media and Social Networking

Presenters: Veronica Robertson, EPA Diversity Program Manager,
Naima Halim-Chestnut, Lisa McKinley and Jason McDonald, EPA Office of Civil Rights

1:30 – 2:30 US jobs – Presentations on Resume Writing and Doing Well at Job Interviews

2:45 – 3:00 – Social Media

3:45 – 4:45 – repeat of 1:30 presentation

Association of Research Directors, Inc.
16th Biennial Research Symposium Program of Events
April 9 – 13, 2011

Program

O-FS-U[1]

Sunday Morning, April 10

Concurrent Student Oral Presentations – Undergraduate Competition

Food Safety and Global Food Security: International Room 1

8:30	1	**Determining Food Use Pattern of *Lasioderma serricorne* (L.) Using Trace Metal Analysis**. S. Alawy, South Carolina State University
8:45	2	**The Effects of Infection with *Haemonchus contortus* on Clinical Parameters and Performance of Goats.** B. M. Allen, Virginia State University
9:00	3	**Genetically Modified Salmon and Consumer Willingness to Pay.** A. Brewer, Fort Valley State University
9:15	4	**An Analysis of the Impacts of Regional Free Trade Agreements on U.S. State Vegetable Exports and Trade Flows.** K. P. Glasgow, South Carolina State University
9:30	5	**Consumers' Willingness to Pay for Clone-Free Labeled Meat Products**. S. M. Jennings, Fort Valley State University
9:45	6	**Syntenic Analysis of Cucurbit Cultivar Complex Using Fruit Specific EST Microsatellite Markers.** F. G. Lutz, West Virginia State University
10:00	7	**Textural Characteristics of Commercial Bovine Milk Yogurt Compared with Caprine Milk Yogurts Stored under Refrigeration for Four Weeks.** C. McGhee, Fort Valley State University
10:15	8	**Residues of Endosulfan Isomers and Endosulfan Sulfate on Field-Grown Pepper and Melon.** K. N. Ross, Kentucky State University
10:30	9	**Effects of Mineral Nutrients on the Concentration of Oleic and Linoleic Acids in Peanuts.** S. M. South, Prairie View A&M University
10:45	10	**Screening of 10-Nucleotide Long Random Primers for Goat Genotyping Using Polymerase Chain Reaction.** O. White, Fort Valley State University
11:00	11	**Food Safety: Consumer Demand and Behavior.** A. Whitter-Cummings, Florida A&M University

[1]Presentation code
Each presentation was assigned a code that identifies it as to:
Presentation type (O = oral, P = poster),
Topic area (FS = Food Safety and Global Food Security, RR = Renewable Resources, Biloenergy, and Environmental Setewardship, SP = Sustainable Plant and Animal Production Systems, FY = Family, Youth, community, and Econimic Development, and HH = Human Health, Nutrition, and Obesity Prevention)
Presenter (U = undergraduate, G = graduate student, and S = scientist
Abstract numbers
For example, P-HH-G-4 is the 4th poster by a graduate student in Human Health, Nutrition, and Obesity Prevention. The codes for oral presentations are listed on the top, right corner.

Sunday Morning, April 10

Concurrent Student Oral Presentations – Graduate Competition

Food Safety and Global Food Security
International Room 2

8:30	1	**Reduction of *E. coli* O157:H7 on Beef Surfaces Using a Household Steam Cleaner.** L. J. Alford, Fort Valley State University
8:45	2	**Effect of Storage Temperature on Antimicrobial Properties of Chicken Egg White Against *Salmonella typhimurium* in Liquid Egg.** S. Anderson, Prairie View A&M University
9:00	3	**Effect of Increased Frequency of Feeding of Channel Catfish, *Ictalurus punctatus*, on Growth, Yield, Survival, and Costs in Multiple-Batch Culture.** U. Bastola, University of Arkansas at Pine Bluff
9:15	4	**Effect of MAP in Combination with Phage Treatment to Control *Escherichia coli* O157:H7 on Lettuce.** O. Boyacioglu, North Carolina A&T State University
9:30	5	**Antimicrobial Resistance of *Enterococcus* in Convectional and Organic Chicken.** A. Brown, Tennessee State University
9:45	6	**Analysis of the Food Security Situation in Selected West African Countries.** J. Dumevi, Alcorn State University
10:00	7	**Effects of Alfalfa, Rhizoma Peanut and Sericea Lespedeza Chopped Hays on Milk Production and Composition in Lactating Dairy Does**. S. Dzimianski, Fort Valley State University
10:15	8	**Evaluation of the Distribution of Cigarette Beetles, *Lasioderma serricone*, in Food and Feed Processing Plants.** B. L. Gary, South Carolina State University
10:30	9	**Determinants of Food Insecurity in Alabama: A County Level Analysis.** B. Gill, Alabama A&M University
10:45	10	**Meat Goat Industry: Current Situation and Potential.** R. B. Golkonda, Tennessee State University
11:00	11	**Effect of Supplemental Sericea Lespedeza Leaf Meal Pellets on Gastrointestinal Nematode Infection in Grazing Goats.** S. Gujja, Fort Valley State University
11:15	12	**Evaluation of Fungal Myceliated Grains for Controlling *Eimeria* sp. Infection in Broiler Chickens.** J. Jackson, North Carolina A&T State University

Sunday Morning, April 10

Concurrent Student Oral Presentations – Undergraduate Competition

Renewable Resources, Bioenergy and Environmental Stewardship
International Room 3

8:30	1	**Potential Method for Reducing Ammonia Level in Aquaria and Ponds.** Z. Brown, Virginia State University
8:45	2	**Dynamics of Phosphorus Accumulation in an Organic Farming System.** K. Doss, Tuskegee University
9:00	3	**The Fiber Comparison of Lyocell, Rayon, and Cotton.** A. Draper, Delaware State University
9:15	4	**Evaluation of Growth Parameters in Predicting Yield of F_1 Hybrid Chestnuts (*Castanea mollissima* L.).** G. Hawkins, Florida A&M University
9:30	5	**A Study on How Lichens Affect the Atmospheric Pollution of Metals along Interstate Highway I-26 in the Midland and Low Country of South Carolina.** C. Jones, South Carolina State University
9:45	6	**Aquatic Insect Assemblages of Ephemeral Ponds in the Apalachicola National Forest, Florida.** J. L. Richardson, Florida A&M University
10:00	7	**Temperature Dependence of Solution Viscosity of Poly (3,5 dimethylphenylacrylate) in Toluene at 25°C and 30°C.** L. Sealey, South Carolina State University
10:15	8	**The Measurement of Radium-223 and -224 Isotopes by RaDeCC System.** S. Tan, South Carolina State University
10:30	9	**Soil Amendments Modified Capsaicin Content of Hot Pepper Fruits**. F. W. Turner, Kentucky State University

Sunday Morning, April 10

Concurrent Student Oral Presentations – Graduate Competition

Renewable Resources, Bioenergy and Environmental Stewardship
International Room 4

8:30	1	**The Potential Economic Benefit of White Flesh Sweetpotato for Vegetable Producers in Alabama.** E. Adzosii, Tuskegee University
8:45	2	**Understanding Population Dynamics of American Eel (*Anguilla rostrata*) through Mark-Recapture and Telemetry.** M. G. Brady**,** Delaware State University
9:00	3	**Marine Habitat Utilization and Movements of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) along the Eastern Seaboard of North America.** M. W. Breece, Delaware State University
9:15	4	**Warm Water Tolerance of the Weakfish, *Cynoscion regalis*.** M. Cinelli, Delaware State University
9:30	5	**Localization and Identification of Flavonoids/Phenolics in Selected Southern Tree Species Relative to Ultraviolet-B Protection.** V. A. Ferchaud, Southern University and A&M College
9:45	6	**Potential Roadblocks to Recovery: Human Development and Habitat Utilization of Gulf Sturgeon Overwintering in Choctawhatchee Bay, Florida.** K. M. Fleming, Delaware State University
10:00	7	**Sustainable Management of an Urban Forested Nature Trail at Grambling State University**. M. Ford, Southern University and A&M College
10:15	8	**DNA Sequencing for Lignin Content of Potential Hardwood Tree Species for Bio-Fuels in the Southeast United States.** A. Forde, Florida A&M University
10:30	9	**A Real-Time GIS/Hydrology Flood Warning System for First Time Responders in Rural Areas.** C. Forde, South Carolina State University
10:45	10	**Selected Aspects of Life History of Two Primary Parasitoids of the Passionvine Mealybug, a Serious Pest Threat to the United States of America.** A. Francis, Florida A&M University
11:00	11	**Effects of Manganese Nutrition on Longleaf Pine Seedling Growth, Appearance, and Physiology.** A. Gilliam, Southern University and A&M College
11:15	12	**Investigating the Relationship between Fungal Communities and Greenhouse Gas Efflux from a Secondary Forest in Central Missouri.** N. Hoilett, Lincoln University

Sunday Morning, April 10

Concurrent Student Oral Presentations – Undergraduate Competition

Sustainable Plant and Animal Production Systems
International Room 5

8:30	1	**Performance and Gastrointestinal Parasite Control by Small Ruminants Grazing Forages Containing Condensed Tannins.** E. A. Backes, Lincoln University
8:45	2	**Genetic Diversity in Kentucky Pawpaw Populations Using DNA Markers.** Y. Banda, Kentucky State University
9:00	3	**Screening of Field and Heirloom Tomato Varieties for Pathogen Resistance Using CAPS Markers.** D. W. Bright, West Virginia State University
9:15	4	**Determinants of the Adoption of Integrated Pest Management Programs among Delaware and Maryland Minority Farmers.** K. Brown, University of Maryland Eastern Shore
9:30	5	**Effects of Feeding Regimen on Growth, Survival and Proximate Composition of Fingerling Northern Bluegill, *Lepomis macrochirus*, Reared in a Recirculating Aquaculture System.** J. E. Callaway, Lincoln University
9:45	6	**Effect of Rumen By-Pass Fat Supplementation on Milk Composition of Hair Sheep Ewes.** A. P. Clary, Virginia State University
10:00	7	**Response of *Solanum retroflexum* Dun. to Organic and Inorganic Sources of N, P, and K.** A. Faison, Virginia State University
10:15	8	**Usage of Cellulase and Xylanase Alone or in Combination Improves Digestibility of Dietary Fiber.** A. J. Goode, North Carolina A&T State University
10:30	9	**HB-EGF Expression is Modulated by Progesterone and Estrogen in RL95-2 Cells.** C. Johnson, Prairie View A&M University
10:45	10	**Influences of Synthetic Peptide *D4E1* on Phosphodiesterase Activity.** J. Keith, Tuskegee University
11:00	11	**Antioxidants Content of Hot Pepper from the USDA National Collection.** M. Johnson, Kentucky State University
11:15	12	**Consumer Perception of Genetically Modified Food Products Risks: Survey Results from the 2010 Agricultural Exposition.** D. Menefee, Fort Valley State University

Sunday Morning, April 10

Concurrent Student Oral Presentations – Graduate Competition

Sustainable Plant and Animal Production Systems
International Room 6

8:30	1	**Characterization of Effluents from Commercial Baitfish Holding Facilities.** P. L. Adhikari, University of Arkansas at Pine Bluff
8:45	2	**Genotypic and Physiological Evaluation of Gladiolus Varieties for Flower Production in the Southeast Arkansas.** L. L. Anderson, University of Arkansas at Pine Bluff
9:00	3	**Furazolidone-Induced Cardiomyopathy in Broiler Chickens.** T. Boatswain, Tennessee State University
9:15	4	**Genetic Diversity and Geographic Differentiation in Pawpaw Populations from Six States as Revealed by DNA Markers.** J. B. Botkins, Kentucky State University
9:30	5	**Response of Corn and Mustard Greens to Nature's Fluid and Synthetic Fertilizers.** C. Butler, Southern University
9:45	6	**Studies Related to Establishment of Pigeonpea as an Alternate Crop in Virginia**. G. F. Chappell III, Virginia State University
10:00	7	**Efficacy of a Native Bee for Pollination of Eastern Orchards**. M. A. Cutter, Virginia State University
10:15	8	**Separating Self-Incompatibility from Self-Compatibility in Cultivated Tomato, *Solanum lycopersicum*, and a Wild Species, *S. pennellii*.** H. L. Dalton II, West Virginia State University
10:30	9	**Using Variable Rate Seeding to Maximize Corn Yield and Profit on a Field with Management Zones.** X. Henry, University of Maryland Eastern Shore
10:45	10	**Synergistic Effects of Organic Selenium and Zinc Single and Combined on Fertility and Hatchability.** K. Hickerson, Prairie View A&M University
11:00	11	**Developing Aquaculture Methods for *Fundulus heteroclitus*: Broodstock Management and Hatchery Techniques.** C. R. Janiak, Delaware State University
11:15	12	**Effect of Sun and Shade Conditions on Distribution and Herbivory Activity of a Biological Control Agent of TSA, *Gratiana boliviana* (Coleoptera: Chrysomelidae).** E. Kariuki, Florida A&M University

Sunday Morning, April 10

Concurrent Student Oral Presentations – Undergraduate Competition

Family, Youth, Community and Economic Development
International Room B

8:30	1	**Mayoral Leadership and the Distribution of Municipal Services in Small Towns in South Carolina.** S. Burke, South Carolina State University
8:45	2	**An Empirical Analysis of Factors Influencing Students' Nutritional Awareness, Food Label Use, and Perceptions of Health Status.** L. A. Collins, Southern University
9:00	3	**Impact of Irrigation Practices on Water Quality of Two Community Gardens in Nashville, Tennessee.** A. Frederick, Tennessee State University
9:15	4	**Analyzing Health Trends in Mississippi.** M. L. Griffin, Alcorn State University
9:30	5	**The Effectiveness of Using Community Action Research to Teach African American Boys.** D. Hodges, South Carolina State University
9:45	6	**Halal Market as a Niche for Goat Meat in Atlanta: A Logistic Approach.** L. Hooks, Fort Valley State University
10:00	7	**Using NVivo to Analyze Data Collected from the Barriers to Parents' Participation in Education in Rural South Carolina: Orangeburg District 5 Elementary Schools.** D. Jack-James, South Carolina State University
10:15	8	**The Influence of Demographics on Goat Meat Consumption.** A. Marzette, Fort Valley State University
10:30	9	**Will Consumers Pay More for "Georgia-Grown" Tomatoes? Evidence from the Georgia National Fair.** C. Myles, Fort Valley State University
10:45	10	**A Study of the Increasing Trend in Medical Bankruptcy Filings in the United States since 2001.** O. A. Omotosho, South Carolina State University
11:00	11	**Will Consumers Pay a Premium for Locally Grown Tree Nuts?** R. Phelps, Fort Valley State University
11:15	12	**The Delivery of Municipal Services in Small Towns in South Carolina: The Views of Municipal Elected Officials.** S. Taylor, South Carolina State University

Sunday Morning, April 10

Concurrent Student Oral Presentations – Undergraduate Competition

Human Health, Nutrition & Obesity Prevention
International Room C

8:30	1	**Dietary Quality of Meals and Snacks Available to Students Residing on the Delaware State University Campus**. C. Bethany, Delaware State University
8:45	2	**Nutraceutical Value of Synchronized *in vitro* Cell Cultures of American Native Grapes.** D. Branson, Florida A&M University
9:00	3	**An Effect of Three Months Refrigeration Storage on Free Fatty Acid Compositions of Low-Fat and Full-Fat Goat Milk Cheeses.** A. Lee, Fort Valley State University
9:15	4	**The Effect of Size of Sweet Potato Fries on Fat Uptake and Texture.** N. Moody, Florida A&M University
9:30	5	**Effects of *Hibiscus sabdariffa* Extracts and Compounds on Tumor and Vascular Smooth Muscle Cells.** W. D. Rollyson, West Virginia State University
9:45	6	**Polyphenol Profiles of Different Parts of Grape Pomace and Impacts of Drying Methods.** I. Smith, North Carolina A&T State University
10:00	7	**Prevalence of Metabolic Syndrome (MetS) in Young African American Adults in a Typical Historically Black Colleges and Universities (HBCU) Setting.** J. Walker, Kentucky State University

Sunday Afternoon, April 10

Concurrent Student Oral Presentations – Graduate Competition

Food Safety and Global Food Security
International Room 2

1:00	13	**Growth of Foodborne Pathogens in No-Knead Bread Dough during Prolonged Yeast Fermentation.** L. Jordan, Jr., Virginia State University
1:15	14	**Toxicity of Commonly Used Agricultural Chemicals to Copepods in Arkansas Aquacultural Ponds.** A. Kcgorkha, University of Arkansas at Pine Bluff
1:30	15	**Efficacy of Ozone Washers in Reducing Natural and Inoculated Microorganisms on Tomatoes and Scallions.** W. Long III, Virginia State University
1:45	16	**Monitoring for Resistance to Miticides in the Ectoparasitic Mite, *Varroa destructor*, Populations in Honey Bee, *Apis mellifera*, Colonies.** K. Marshall, Florida A&M University
2:00	17	**Effect of Grazed Sericea Lespedeza on Gastrointestinal Nematode Infection in Goats.** A. Mechineni, Fort Valley State University
2:15	18	**Biological Parameters of *Trichogramma fuentesi* (Hymenoptera: Trichogrammatidae), an Egg Parasitoid of *Cactoblastis cactorum* (Lepidoptera: Pyralidae).** O. Paraiso, Florida A&M University
2:30	19	**The Antimicrobial Stability of Muscadine Seed Extract.** D. Tice, Tuskegee University
2:45	20	**Effects of Lime Juice, Lime Oil, Citric Acid, Sodium Citrate, and Sodium Chloride on Reduction of *Salmonella typhimurium*.** K. Walker, Prairie View A&M University
3:00	21	**Evaluating Medicinal Mushrooms Usage at Different Levels of Supplementation on Broiler Performance.** D. Wall, North Carolina A&T State University

Sunday Afternoon, April 10

Concurrent Student Oral Presentations – Graduate Competition

Renewable Resources, Bioenergy and Environmental Stewardship
International Room 4

1:00	13	**Factors Impacting Production of Bioenergy Crops in Alabama.** B. A. Obembe, Alabama A&M University
1:15	14	**Relationship between Hydrology of the Arkansas River and the Resident Largemouth Bass *Micropterus salmoides* Population.** C. R. Peacock, University of Arkansas at Pine Bluff
1:30	15	**Screening Gulf Coast Forest Species for Susceptibility to *Phytophthora ramoru.*** J. Preuett, Southern University
1:45	16	**Arsenic Availability and Iron Redox Status in Soil.** J. Pyles, Lincoln University
2:00	17	**Oyster Gardening: Where in Delaware's Inland Bays to Focus Shoreline Oyster (*Crassostrea virginica*) Rehabilitation Efforts?** B. A. Reckenbeil, Delaware State University
2:15	18	**Biological Control of the Grape Root Borer with Entomopathogenic Nematodes**. R. Said, Florida A&M University
2:30	19	**Characterization of Vegetative Composition and Diversity of the Ephemeral Ponds in the Munson Sandhills, Apalachicola National Forest.** S. Sapp, Florida A&M University
2:45	20	**Natural Succession: Examining Vegetative Composition and Structure Progression on Restored Agricultural Land.** M. A. Schutte, Delaware State University
3:00	21	**Assessing the Effects of Land Use on Microbial Diversity and Phylogeny Across a Mixed Culture Agroecosystem.** R. Shange, Tuskegee University
3:15	22	**The Effects of Co-Digestion on Performance and Methanogen Population Structure in a Pilot Plant Thermophilic Anaerobic Digester**. D. Sharma, West Virginia State University
3:30	23	**Fast Growing *Paulownia elongata* Tree as a Potential Lignocellulosic Bioenergy Crop for the Southern U.S.** N. K. Yadav, Fort Valley State University

Sunday Afternoon, April 10

Concurrent Student Oral Presentations – Undergraduate Competition

Sustainable Plant and Animal Production Systems
International Room 5

1:00	13	**Evaluation of a New High Protein Distillers Grains with Solubles for Inclusion in Diets for Channel Catfish, *Ictalurus punctatus*.** L. Pires, Kentucky State University
1:15	14	**Evaluation of Eight Cultivars and Two Plant Types on Growth and Yield of Southern Blueberries (*Vaccinium* spp.)**. S. Sangster, Florida A&M University
1:30	15	**The Size Relationship of 12-Day, Post-Exodus Larvae with 56-Day, Post-Exodus Fingerlings Regarding Growth, Total Length, Weight and Survival in Bluegill, *Lepomis macrochirus*.** J. L. Schulte, Lincoln University
1:45	16	**Using Magnetically-Based Wireless Fencing for Containment of Goats in a Rotational-Grazing Situation.** M. J. Singer, Lincoln University
2:00	17	**Bone Morphogenetic Protein 6 Expression and Function in Ovarian Granulosa Cells in Laying Hens.** S. I. Smith, North Carolina A&T State University
2:15	18	**Developing a Mass-Trapping System for Sustainable Management of Cucumber Beetles.** T. G. Vehige, Lincoln University
2:30	19	**Effect of BA and Ferrous Sulfate/Chelate Solution on *in vitro* Propagation of Raspberry (*Rubus* spp.)**. R. Volcy, Florida A&M University
2:45	20	**Growth Comparison in Northern Bluegill, *Lepomis macrochirus macrochirus*, from Different Localities in a Commercial Recirculation System.** T. S. Wieberg, Lincoln University
3:00	21	**Effects of Source of Saturated Oils and Curing Time on pH, Hardness and Moisture of Goat Milk Soap**. H. Williams, Fort Valley State University

Sunday Afternoon, April 10

Concurrent Student Oral Presentations – Graduate Competition

Sustainable Plant and Animal Production Systems
International Room 6

1:00	13	**Antimicrobial Activities of Different Strains of Shiitake Mushroom (*Lentinula edodes*).** H. Kaur, Alabama A&M University
1:15	14	**Cost Benefit Analysis of Alternative Crop Production for Rural Communities.** R. Levochkin, Alcorn State University
1:30	15	**Characterizing Insect Pest Problems and Farmer Decision Making in Crucifer Crops in Low-Input and Organic Farming Systems in North Florida.** K. M. Lewis, Florida A&M University
1:45	16	**Activities of Copper Based Nanoparticles against Plant Pathogenic Fungus: *Bipolaris sorokiniana.*** Y. Li, Southern University and A&M College
2:00	17	**Cloning of a Soybean Sodium-Proton Antiporter and its Role in Abiotic Stress Tolerance.** C. Lyle, Virginia State University
2:15	18	**Viability of SSCP Technique in Diversity Study of Resistance Gene Analogs (RGAs) in Peanut (*Arachis hypogeal* L.).** I. Marong, Tuskegee University
2:30	19	**Evaluating the Interacting Effects of Progesterone, TNF Alpha and Cortisol on Early Loss of Transferred Embryo in Beef Cows.** M. Mason, Alcorn State University
2:45	20	**Assessment of Goat Parasite Load and Control Management in Select Alabama Counties.** S. Massey, Tuskegee University
3:00	21	**Comparative Botany of Roselle (*Hibiscus sabdariffa*) Accessions Grown in Louisiana**. R. C. Nicholas, Southern University and A&M College
3:15	22	**Effect of Soil Organic Carbon Level on the Erodibility of a U.S. Piedmont Soil.** J. S. Sedlock, North Carolina A&T State University
3:30	23	**Enhancing Urban Sustainability through the Application of Permaculture Principles.** A. Telligman, North Carolina A&T State University
3:45	24	**Effect of Row Covers on High Tunnel Soil Temperature.** M. J. Ward, Kentucky State University
4:00	25	**Optimization of Follicle Growth and Maturation Prior to Ovulation and Artificial Insemination.** D. R. Washington, Prairie View A&M University
4:15	26	**Organic Food Availability: Emerging Trends and Challenges.** A. M. Watson, Prairie View A&M University

Sunday Afternoon, April 10

Concurrent Student Oral Presentations – Graduate Competition

Family, Youth, Community and Economic Development
International Room B

1:00	1	**A Correlation Analysis between Education and Per Capita Income in Mississippi.** I. Bruster, Alcorn State University
1:15	2	**Exploring Economic Growth Indicators of the Black Belt Counties, 1970 - 2000.** A. Hill, Alabama A&M University
1:30	3	**Assessment of Risks and Risk Reducing Strategies of Small Farm Operators in Tennessee.** S. Pasirayi, Tennessee State University
1:45	4	**Does Increase in Entrepreneurship Lead to Employment and Economic Growth? Evidence from Alabama Data.** D. N. Starks, Alabama A&M University
2:00	5	**Recent Trends in Marketing of Aquaculture Products in the United States: Results from Store-Level Scanner Data Analysis.** P. Surathkal, University of Arkansas at Pine Bluff

Sunday Afternoon, April 10

Concurrent Student Oral Presentations – Graduate Competition

Human Health, Nutrition & Obesity Prevention
International Room C

1:00	1	**Spontaneously Hypertensive Rats' Response to Diets Containing Traditional and Novel Vegetable Greens on Gene Expression and Prevention of Lipid Peroxidation**. S. Attoh, Tuskegee University
1:15	2	**Evaluating the Effectiveness of Swine Waste Treatment System on the UAPB Farm.** W. Columbus, University of Arkansas at Pine Bluff
1:30	3	**Fatty Acid Profile of 'Jewel' Sweetpotato Leaves Collected during Four Collection Periods Evaluated Using Two Procedures.** M. Johnson, Tuskegee University
1:45	4	**Effect of Peaches in Reducing Azoxymethane-Induced Aberrant Crypt Foci in Fisher 344 Male Rats.** B. Kanda, Alabama A&M University
2:00	5	**Resveratrol Attenuates Hypertrophy of Vascular Smooth Muscle Cells**. R. P. Nagmal, West Virginia State University
2:15	6	**Conservation Strategies for a Rare Anti-Tumor Plant, *Scutellaria ocmulge* Small.** B. Richardson, Fort Valley State University
2:30	7	**Transgenic Sweetpotato Expressing Synthetic Lytic Peptide Genes as a Plant Based Treatment against HIV Replication.** S. Samuels, Tuskegee University
2:45	8	**Chemopreventive Potential of Coffee and Cocoa against Azoxymethane Induced Aberrant Crypt Foci in a Rat Model**. L. Shackelford, Alabama A&M University
3:00	9	**Antiproliferative Activity of Phytolacca Americana Extracts and Their Fractions on Cancer Cells.** L. M. Wishon, North Carolina A&T State University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Food Safety and Global Food Security
International Room 1

2:00	1	**Bioaccumulation of Seven Heavy Metals in Sweetpotato Grown in Sewage Sludge Amended Soil.** G. F. Antonious, Kentucky State University
2:15	2	**Impact of Marketing, Trade and Exchange Rate Policies on U.S. Catfish and Trout Markets: Results from Disaggregated Fish Sector Models.** M. M. Dey, University of Arkansas at Pine Bluff
2:30	3	**Nutritive Composition of Omega-3 Fatty Acid-Rich *Ricinodendron heudelotii* (ndjansang) and its Potential for Nutrition and Health.** M. O. Ezekwe, Alcorn State University
2:45	4	**A Multi-Faceted Education Program Improves Food Safety Knowledge and Reported Practices of Older Adults**. S. Godwin, Tennessee State University
3:00	5	**Will Female Channel Catfish Select Themselves for Artificial Spawning?** A. Haukenes, University of Arkansas at Pine Bluff
3:15	6	**Differential Responses of Breeding Strains to Straighthead in Natural Conditions.** B. Huang, University of Arkansas at Pine Bluff
3:30	7	**USDA Food-Borne Virus Research Initiatives at Delaware State University.** D. H. Kingsley, Delaware State University
3:45	8	**The Effect of Cash Flow and Credit Constraints on Financial Feasibility and Stocking Strategies on U.S. Catfish Farms: A Mixed-Integer Multi-Stage Programming Approach.** G. Kumar, University of Arkansas at Pine Bluff
4:00	9	**Dispersal and Host Use Pattern of *Lasioderma serricorne* (F.) and Synthetic Pheromone-Based Mating Disruption of Adult Beetles in Food and Feed Processing Facilities.** R. M. Mahroof, South Carolina State University
4:15	10	**A Glance at Microsatellite Motifs from the 454 Sequencing Reads of Genomic DNA of Watermelon.** P. Nimmakayala, West Virginia State University
4:30	11	**Internet Usage in Sub-Saharan Africa: Implications for Food Security.** Z. I. Olorunnipa, Florida A&M University
4:45	12	**Population Structure and Co-Localization of Fruit Related Quantitative Trait Loci in *Capsicum* Cultivated Complexes.** S. K. Ponniah, West Virginia State University
5:00	13	**AtPDR-13 is Involved in Arsenic Sequestration in *Arabidopsis*.** N. N. Renukdas, University of Arkansas at Pine Bluff

Monday Afternoon, April 11
Concurrent Scientist Oral Presentations

Food Safety and Global Food Security
International Room 1

5:15 14 **Molecular Genetic Analysis of Female Receptivity to Mating in *Drosophila melanogaster*.** D. Scott, South Carolina State University

5:30 15 **Characterization of Two Novel Polycyclic Aromatic Hydrocarbon Degrading Strains of the Soil Bacterium *Sphingomonas*.**
W. Simpson, South Carolina State University

5:45 16 **Establishment of Fibroblast Cell Lines from Goat Ear Skin Explants.**
M. Singh, Fort Valley State University

Food Safety and Global Food Security
International Room 2

2:00 17 **Building Public-Private Partnerships for Agrifood System Development: Linking Farmers to Markets.** S. P. Singh, Tennessee State University

2:15 18 **Evaluating the Sole Reliance on Biorational Pesticides for Pest Management on Specialty Crops.** H. O. Sintim, North Carolina A&T State University

2:30 19 **Development of an Integrated Pest Management Strategy for the Small Hive Beetle, *Aethina tumida*, a Serious Threat to Honey Bee, *Apis mellifera*.**
A. Somorin, Florida A&M University

2:45 20 **Near Real-Time Detection of *Escherichia coli* Using a Microfluidic-Based Biosensor.** M. Thomas, Florida A&M University

3:00 21 **Impact of U.S. Organic Certification Program on U.S. Trade Partners.**
S. L Tubene, University of Maryland Eastern Shore

3:15 22 **Comparative Performance of Diploid and Tetraploids of Watermelon in the Light of Ploidy Level Changes and Genome Perturbations**.
G. Vajja, West Virginia State University

3:30 23 **Development of Transgenic Rice Plants (*Oryza sativa* L. ssp. *japonica* cv. Nipponbare) with Soybean Chalcone Synthase Gene (*CHS*) Using *Agrobacterium*-Mediated Transformation.**
E. Vanjildorj, University of Arkansas at Pine Bluff

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Renewable Resources, Bioenergy and Environmental Stewardship
International Room 3

2:00	1	**Sustainable Urban Forestry Practice by Utilization of Urban Tree-Based Wood Waste as Mulch.** K. Abdollahi, Southern University
2:15	2	**Water and Sediment Quality Assessment of Development Lakes - A Case Study.** A. Atalay, Virginia State University
2:30	3	**Potential of Kentucky Freeway Rights of Way to Displace Fossil Fuel Consumption through Production of Prairie Switchgrass, *Panicum virgatum*.** M. K. Bomford, Kentucky State University
2:45	4	**The Groundwater Radionuclides in the Edisto River Basin, South Carolina.** Z. Chang, South Carolina State University
3:00	5	**Development and Testing of Novel Metal Catalysts for the Remediation of Agricultural Pollutants in Water.** A. T. Cooper, Florida A&M University
3:15	6	**1890 Institutions National Facilitation Project for Water Resources: An Overview of Deliverables.** S. O. Dennis, Tennessee State University
3:30	7	**Approaches and Challenges in Quantifying the Effectiveness of Agricultural Best Management Practices.** M. W. Gitau, Florida A&M University
3:45	8	**Use of Biochar from Chicken Manure as Soil Amendment in Weathered Soils.** A. Hass, West Virginia State University
4:00	9	**Dissipation of Clomazone Residues in Soil and Runoff Water**. R. R. Hill, Kentucky State University
4:15	10	**Arsenic Accumulation in Rice and Iron Transformation in Soil.** B. Hua, Lincoln University
4:30	11	**Differentially Expressed Proteins in MCF-10A Human Cells Induced by Endocrine Disruptor Atrazine.** P. Huang, Lincoln University
4:45	12	**Variation of Nitrogen and Phosphorus in Gans Creek Impacted by CAFO and Residential Wastewater Treatment Plant (WWTP) Discharges.** A. Ikem, Lincoln University
5:00	13	**NSF REU Site-Research Experiences for Undergraduates in Molecular Genetics and Genomics at Delaware State University.** V. Kalavacharla, Delaware State University
5:15	14	**Microalgae as Bio-Fertilizer.** G. Kandasamy, Lincoln University
5:30	15	**Variation of Stream Water Quality for the Past Decade in the Lower Missouri River.** F. Liu, Lincoln University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Renewable Resources, Bioenergy and Environmental Stewardship
International Room 4

2:00	16	**Applications of Genomics/Bioinformatics Sciences and Technology for BioEnergy.** C. Louime, Florida A&M University
2:15	17	**Factors Influencing Seasonal Pond Habitats in the Apalachicola National Forest.** K. Milla, Florida A&M University
2:30	18	**Internet Enabled Sharing, Distribution and Management of Environmental Spatial Data.** F. L. Namwamba, Southern University
2:45	19	**Quantify Urban Tree Growth and Physiological Response to Periodic Flooding.** Z. H. Ning, Southern University
3:00	20	**Sweetpotato as a Potential Feedstock for Biofuel Production.** K. Nyiawung, Tuskegee University
3:15	21	**Economic and Environmental Impact of Agricultural Land-Use Change.** O. A. Ojumu, Prairie View A&M University
3:30	22	**Monitoring Infestation and Impact of Live Oak Midge Gall.** Y. Qi, Southern University
3:45	23	**Performance of Five Sweet Sorghum, *Sorghum bicolor* (L.) Moench, Varieties in South-Central Virginia.** L. K. Rutto, Virginia State University
4:00	24	**Trends, Emerging Issues, Challenges and Opportunities in Soil Microbial Ecology.** Z. N. Senwo, Alabama A&M University
4:15	25	**Yield of Vegetables Grown in Sewage Sludge Amended Soil**. E. T. Turley, Kentucky State University
4:30	26	**Microalgae for Bio-Fixation of Flue Gas Carbon Dioxide and Sustainable Biomass Production.** T. Viswanathan, Lincoln University
4:45	27	**Sustainable Irrigation in Madison and Limestone Counties, Northern Alabama Region.** M. Wagaw, Alabama A&M University
5:00	28	**Collaborative Partnerships with China in Agricultural Research and Education.** Y. Wang, Alabama A&M University
5:15	29	**Atrazine Removal from Aqueous Phase by Activated Carbon and Ordered Mesoporous Carbon Materials**. J. Yang, Lincoln University
5:30	30	***Faecalibacterium*-Based Fecal Source Tracking.** G. Zheng, Lincoln University

Monday Afternoon, April 11
Concurrent Scientist Oral Presentations

Sustainable Plant and Animal Production Systems
International Room 5

2:00	1	**A Potential Alternative Income for Small Farmers: Shiitake Mushroom Production.** L. Anderson, Alcorn State University
2:15	2	**Composition of Whole Seed Canola.** H. L. Bhardwaj, Virginia State University
2:30	3	**pH Stress in Newly Filled Golden Shiner, *Notemigonus crysoleucas*, Ponds in Arkansas.** Y. Chen, University of Arkansas at Pine Bluff
2:45	4	**The Economic Benefits of TSA Biological Control.** N. Divate, Florida A&M University
3:00	5	**Bacterial Soft Rot Disease: Identification of the Players Involved in *Pectobacterium*-Host Interactions**. C. K. Dumenyo, Tennessee State University
3:15	6	**Nutrient Solution Concentration, Management, and Propagation Substrate Affects the Yield of Swiss Chard in Hydroponic Culture.** J. N. Egilla, Lincoln University
3:30	7	**Timing of Primocane Mowing Influences Flowering and Ripening Time in Primocane Fruiting Blackberry Selections in Kentucky.** K. L. Friley, Kentucky State University
3:45	8	**Comparing Fresh Market Yield of Collard Greens (*Brassica oleracea* L.) from Traditional and Non-Traditional Cultivation Techniques.** C. S. Gardner, Florida A&M University
4:00	9	**Evaluation of the Growth, Carcass Traits and Parasitic Load of Kids Produced under Mixed Species Grazing System.** S. Gebrelul, Southern University
4:15	10	**Soil and Forage Quality Changes in Joint Cattle and Goat Grazing Practices.** Y. T. Ghebreiyessus, Southern University
4:30	11	**Effect of Mixed-Species and Rotational Grazing Systems on Weights, Body Condition and FAMACHA Scores in Spanish Does.** L. Gray, Southern University
4:45	12	**Amaranth (*Amaranthus cruentus*) Evaluation in Southwest Mississippi.** P. E. Igbokwe, Alcorn State University
5:00	13	**Differences in Sugar Metabolic Activities during Muscadine Grape (*Vitis rotundifolia*) Ripening.** D. M. Kambiranda, Florida A&M University
5:15	14	**Comparative Analysis of Leaf Proteins from Selected Grape (*Vitis* spp.) Species.** R. Katam, Florida A&M University
5:30	15	**Effect of Greenhouse Temperature on Tomato Yield and Size.** M. E. Kraemer, Virginia State University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations
Sustainable Plant and Animal Production Systems
International Room 5

5:45 16 **Parboiled Rice Hulls Can Replace Perlite in Hydroponic Substrates.** B. E. Liedl, West Virginia State University

Sustainable Plant and Animal Production Systems
International Room 6

2:00 17 **Generation and Analysis of Expressed Sequence Tags from *Phaseolus vulgaris* Using Massively Parallel Pyrosequencing.** Z. Liu, Delaware State University

2:15 18 **Feeding Natural Zooplankton to Alligator Gar, *Atractosteus spatula*, Fingerlings in Tanks.** S. E. Lochmann, University of Arkansas at Pine Bluff

2:30 19 **The Mode of Host Resistance to Forage Diseases in Muscadine Grapes (*Muscadinia rotundifolia*).** J. Lu, Florida A&M University

2:45 20 **Utilizing Organic Mulches for Weed Control and Nutrient Management in Organic Cropping System.** R. N. Mankolo, Alabama A&M University

3:00 21 **The Control of Gastrointestinal Infections of *Haemonchus contortus* in Goats Using Mixed Grazing Systems.** R. Marshall, Southern University

3:15 22 ***In vitro* Shoot Organogenesis and Cell Shoot Commitment in Peanut (*Arachis hypogaea* L.) Hair-Like Structure Explant.** K. Matand, Langston University

3:30 23 **Identification of Molecular Markers Associated with the Rust Resistance Locus *Ur-3* in Common Bean (*Phaseolus vulgaris*).**
K. Melmaiee, Delaware State University

3:45 24 **Body Conformation, Testicular Morphormetry, Carcass Traits and Serum Insulin-Like Growth - I (IGF-I) Profiles in Pubertal Male Boer Goat (*Capra hircus*) Cross.** C. Okere, Tuskegee University

4:00 25 **Effects Of Diuron Drift on Hatchery Pond Plankton and Water Quality.**
P. W. Perschbacher, University of Arkansas at Pine Bluff

4:15 26 **Evaluation of Raspberries (*Rubus* spp.) for Growth Performance under North Florida Conditions**. B. R. Phills, Florida A&M University

4:30 27 **The Kentucky State University Pawpaw Program: Finding the Next Great Pawpaw Cultivar.** K. W. Pomper, Kentucky State University

4:45 28 **Status of Integrated Pest Management in Black Belt Counties in Alabama and Effects on Food Safety.** F. Quarcoo, Tuskegee University

5:00 29 **Managing a Piedmont Soil to Improve its Quality.**
C. W. Raczkowski, North Carolina A&T State University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Sustainable Plant and Animal Production Systems
International Room 6

5:15 30 **Vegetable Agroforestry Systems in Southeast Asia.**
M. R. Reyes, North Carolina A&T State University

5:30 31 **Analysis of Organic Foods of the Southeast.**
R. D. Robbins, North Carolina A&T State University

5:45 32 **Cost Analysis of Mobile Fish Nursery for Hybrid Striped Bass, *Morone chrysops x Morone saxatilis*, Fry.** P. Sapkota, University of Arkansas at Pine Bluff

Sustainable Plant and Animal Production Systems
International Room 2

3:45 33 **Beneficial Insects in Sweet Corn Baited with Methyl Salicylate Based Lures.**
J. D. Sedlacek, Kentucky State University

4:00 34 **Analysis of Leaf Proteome to Identify Drought Responsive Proteins in Peanut (*Arachis hypogaea* L.).** M. B. Sheikh, Florida A&M University

4:15 35 **Assessing Feed Intake, Growth Performance, Organ Growth, and Carcass Characteristics of Pure Boer and Kiko Male Kids.**
S. Solaiman, Tuskegee University

4:30 36 **Production Comparsion of Intraspecific Hybrids of the Freshwater Prawn (*Macrobrachium rosenbergii*).** J. H. Tidwell, Kentucky State University

4:45 37 **Determining Selected Physio-Chemical Characteristics among Blackberry Genotypes in North Florida.** G. Umar, Florida A&M University

5:00 38 **Development of Molecular Markers Linked to Low Chill/Heat Tolerance in Raspberry (*Rubus idaeus* L.).** H. K. N. Vasanthaiah, Florida A&M University

5:15 39 **Experimental Study of Peanut Immature Pod and Leaf Expression Profile to Identify Pod-Specific Expressed Gene(s).** N. Wu, Langston University

5:30 40 **Evaluation for Crown Gall Disease Resistance among Different Grapevine Genotypes**. X. Xu, Florida A&M University

5:45 41 **Improving Sustainability of Dairy Goat Operations through Research, Extension and International Collaboration.** S. S. Zeng, Langston University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Family, Youth, Community and Economic Development
International Room B

2:00	1	**A Study of Trends in Bankruptcy Filings in the District of South Carolina: A Following Enactment of the New Bankruptcy Law of 2005.** E. Beraho, South Carolina State University
2:15	2	**Students in Animal Sciences Attending 1890 Land Grant Institutions: Are They in the Count?** O. Bolden-Tiller, Tuskegee University
2:30	3	**The Effectiveness of Community Action Research and Professional Development Activities on the Classroom Roles and Partnerships of Rural Pre-Service and In-Service Teachers.** M. E. Fields, South Carolina State University
2:45	4	**Barriers to Parents' Participation in Their Children's Education in Rural South Carolina – Orangeburg, District 5 Elementary Schools.** M. Garvey, South Carolina State University
3:00	5	**Economic Development and Global Warming: An International Perspective.** H. Gedikoglu, Lincoln University
3:15	6	**Impact of Socioeconomic and Demographic Factors on Graduation Rates in Selected Mississippi School Districts.** T. Hargrave, Alcorn State University
3:30	7	**The Impact of Culturally Relevant Teaching on Rural African American Students' Achievement.** G. Johnson, South Carolina State University
3:45	8	**Exploring Lending Patterns in Rural North Carolina.** S. Lee, North Carolina A&T State University
4:00	9	**Municipal Officials and the Delivery of Municipal Services in South Carolina.** W. Legette, South Carolina State University
4:15	10	**Cut Flower Production in West Virginia – the Good, the Bad and the Possibilities.** B. E. Liedl, West Virginia State University
4:30	11	**Building Capacity in Family Consumer Sciences Education and Dietetics Programs: A Model for Recruitment, Retention, and Increased Graduation Rates at an 1890 HBCU.** N. Lyon-Bennett, University of Maryland Eastern Shore
4:45	12	**Does Easier Access to Nutritional Information Increase University Students' Nutritional Knowledge?** P. E. McLean-Meyinsse, Southern University
5:00	13	**An Analysis of the Role of Human Capital in Economic Development in Mississippi.** M. N. Mojica, Alcorn State University
5:15	14	**Dynamic Linkages among Investment Outlays, Business Climate, Employment and Income Growth in South Carolina: An Empirical Analysis.** M. Mustafa, South Carolina State University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Family, Youth, Community and Economic Development
International Room B

5:30 15 **Use of Inkjet Printing Technology to Deliver Finishes for Functional Textiles.**
G. W. Namwamba, Southern University

5:45 16 **Drinking Water Clinics and Outreach in Delaware Focused on Educating Rural Homeowners.** G. Ozbay, Delaware State University

6:00 17 **Demand for Seafood in the United States: Econometric Analysis for Major Seafood Categories and Seafood Canned Products.**
K. Singh, University of Arkansas at Pine Bluff

Family, Youth, Community and Economic Development
International Room C

5:30 18 **Strengthening the International Capacity of University of Maryland Eastern Shore Students Using International Service Learning.**
S. Tubene, University of Maryland Eastern Shore

5:45 19 **An Analytical Model to Select the Fleet Size for Rural Agriculture Transit Systems**. Y. C. Xie, South Carolina State University

6:00 20 **The Adoption of Orange Flesh Sweetpotatoes (OFS) by Ghanaian Small Farmers for Nutritional and Economic Well-Being.**
R. Zabawa, Tuskegee University

Monday Afternoon, April 11

Concurrent Scientist Oral Presentations

Human Health, Nutrition & Obesity Prevention
International Room C

2:00	1	**Glycoxidative Modification of 2'-deoxycytidine (dC) in Relation to Diabetes: Estimation of Carboxymethyl- 2'- deoxycytidine (CMdC) and Carboxymethyl-2'- deoxyadenosine (CMdA) in Fasting Human Urine.** M. Ahmed, South Carolina State University
2:15	2	**Molecular Assessment of Sincronized *in vitro* Red Cell Cultures of American Native Grapes**. A. O. Ananga, Florida A&M University
2:30	3	**Characterization of Physiological and Anatomical Parameters with Increasing Age in Male Japanese Quails.** K. L. Arora, Fort Valley State University
2:45	4	**Assessment of Pesticide Safety Practices and Nutritional Status of Certified Pesticides Applicators**. F. N. Bebe, Kentucky State University
3:00	5	**Antioxidant Activity, Induction of Apoptosis and Inhibition of Cell Proliferation by Peanut and Almond Extracts in Human Colon Cancer Cells.** J. Boateng, Alabama A&M University
3:15	6	**Formulation and Quality Evaluation of Weaning Foods Based on Orange-Fleshed Sweetpotato (OFS) Flour to Alleviate Infant Malnutrition in Ghana.** E. Bonsi, Tuskegee University
3:30	7	**Influence of Tomato and Broccoli on the Bone Status of Growing Female Rats with Different Levels of Calcium Intake.** L. Huang, Kentucky State University
3:45	8	**Perceptions and Implementation of Family Meal Messages by Low Income Families.** R. Idris, South Carolina State University
4:00	9	**Antioxidant Capacity and Anticancer Property of Pawpaw (*Asimina triloba*).** H. Kobayashi**,** Kentucky State University
4:15	10	**Engineering Solution to Global Malnutrition Problems.** Y. O. Li, Tennessee State University
4:30	11	**Sensory Properties, Nutritive Content and Glucosinolates Identification of Fresh, Canned and Frozen Turnip Greens (*Brassica rapa*) as a Functional Food in Deep-Dish Pizza.** O. G. Sanders, Alabama A&M University
4:45	12	**Assessment of Oxidative Stress in Young African American Population with Metabolic Syndrome (MetS): A College Study.** A. M. Topè, Kentucky State University
5:00	13	**Pedigree and Sibship Analysis in Peach (*Prunus persica* L. Batsch) Germplasm Using Single Sequence Repeats Markers.** G. Viji, Fort Valley State University
5:15	14	**Childhood Experiences with Vegetable Consumption Impacts Current Body Weight Status of Kentucky Adults.** C. Wang, Kentucky State University

Association of Research Directors, Inc.
16th Biennial Research Symposium

Poster Presentations
International South Hall

Sunday Afternoon, April 10: Student Poster Judging
Monday Morning, April 11: Authors with Posters

Food Safety and Global Food Security
Undergraduate Competition

P-FS-U-1 **A Preliminary Study on Infection Dose Levels of *Haemonchus contortus* in Studies with Hair Sheep.** B. M. Allen, Virginia State University

P-FS-U-2 **An *in vitro* Study to Assess the Pathogenicity of Various Strains of *Beauveria bassiana* (Bals.) Vuill. against the Southern Green Stink Bug, *Nezara viridula* L. (Hemiptera: Pentatomidae).** K. Barr, Florida A&M University

P-FS-U-3 **Control of *Escherichia coli* O157:H7 Using a Phage Cocktail in Laboratory Media.** R. R. Bristow, North Carolina A&T State University

P-FS-U-4 **Formation of Hydroxymethylfurfural in Oil-in-Water Emulsions Containing Hydrolyzed Milk Proteins: Effect of Buffer Type and Concentration.**
D. A. Elder, Prairie View A&M University

P-FS-U-5 ***In vitro* Propagation of Pecan [*Carya illinoinensis* (Wangenh) K. Koch] Rootstock.** L. N. Garner, University of Arkansas at Pine Bluff

P-FS-U-6 **Impact of Rodenticides on the Coagulation Properties of Milk.**
N. T. Georgette, North Carolina A&T State University

P-FS-U-7 **Evaluation of Lipolysis in Commercial Cow Milk Yogurt Compared with Goat Milk Counterparts during Refrigerated Storage.**
H. Ibidapo, Fort Valley State University

P-FS-U-8 **Mineral Nutrients-Mediated Down Regulation of Allergenic Protein in Peanut Seed.** D. L. Johnson, Prairie View A&M University

P-FS-U-9 **Sensors for Food and Water Safety.** D. Jones, Alcorn State University

P-FS-U-10 **Analysis of Novel *Sphingomonas* Strains Capable of Degrading Polycyclic Aromatic Hydrocarbons.** R. Lyles, South Carolina State University

P-FS-U-11 **Transformation of Educational Nanotechnology to Applied Research.**
A. Molitoris, Lincoln University

P-FS-U-12 **Recovered Oocytes from Slaughtered Goats Used for *in vitro* Fertilization during the Seasonal Anestrous Period.** S. Richardson, Fort Valley State University

P-FS-U-13 **Transformation of Tomato with C1 and R Transcription Factors through *Agrobacterium tumefaciens.*** A. Thompson, University of Arkansas at Pine Bluff

P-FS-U-14 **Antimicrobial Effect of Red, White and Yellow Onion on *Salmonella typhimurium* Stored at Room and Refrigeration Temperature.**
L. Wilburn, Prairie View A&M University

P-FS-U-15 **Body Signatures: Can They Tell Where Stored Product Insects are Originating?**
Z. J. Williams, South Carolina State University

P-FS-U-16 **Susceptibility of *Nezara viridula* (L.) to Different Isolates of *Beuaveria bassiana* and *Metarhizium anisopliae* under Laboratory Conditions.**
J. Williamson, Florida A&M University

Food Safety and Global Food Security
Graduate Competition

P-FS-G-1 **Isolation of Genomic DNA and Detection of *Bifidobacterium* spp. from Goat Rumen.** A. Abdalla, North Carolina A&T State University

P-FS-G-2 **Effect of Sanitizers on Food Quality of Fresh-Cut Sweet Potatoes (*Ipomoea batatas*) under Modified Atmosphere Packaging.**
K. Alexander, University of Arkansas at Pine Bluff

P-FS-G-3 **Use of Fluorescent *in situ* Hybridization (FISH) to Characterize Watermelon and its Wild Species.** N. Aryal, West Virginia State University

P-FS-G-4 **Isolation and Characterization of Prosaposin from Milk from Four Goat Breeds.** A. R. Byers, North Carolina A&T State University

P-FS-G-5 **Effect of High-Methoxyl Pectin on the Stability of Bovine and Caprine Caseins Dispersions.** N. Delahoussaye, Prairie View A&M University

P-FS-G-6 **Biorational versus Conventional Pesticides – Ecological Impact on Pests of Two Vegetable Crops.** J. A. Ewunkem, North Carolina A&T State University

P-FS-G-7 **Oxidant Stress in Airway Epithelial Cells Following Swine Confinement Facility Dust Exposure.** C. L. Gerald, North Carolina A&T State University

P-FS-G-8 **A Faunistic Survey of Mealybugs (Hemiptera: Pseudococcidae) and Their Natural Enemies Occurring on Coffee (*Coffea arabica* L.) and Cacao (*Theobroma cacao* L.) Agroecosystems in the Dominican Republic.**
E. German-Ramirez, Florida A&M University

P-FS-G-9 **The Impact of Wild Birds and Farm Management on *Campylobacter* and *Salmonella* in Small Ruminants.** B. Hagens, University of Maryland Eastern Shore

P-FS-G-10 **Lactic Acid Bacteria Could be Applied as a Biomarker to Detect Rodenticides in Milk.** M. H. Hathurusinghe, North Carolina A&T State University

P-FS-G-11 **The Magnesium, Cobalt, Nickel Transporter, CorA Affects Exoenzyme Production and Virulence in the Soft Rot Pathogen, *Pectobacterium carotovorum***. C. M. Kersey, Tennessee State University

P-FS-G-12 **Biocontrol of *Salmonella typhimurium* in Laboratory Media.**
K. McCain, North Carolina A&T State University

P-FS-G-13 **Comparative Proteomic Analysis of Porcine Airways from Genetically Distinct Breeds Reared Indoors.** C. J. McClendon, North Carolina A&T State University

P-FS-G-14 **Heavy Metal Accumulation in Selected Cruciferous Vegetables and Impact on Antioxidant Activities**. R. Miller, Alabama A&M University

P-FS-G-15 **Completing Evaluation of the Safety and Quality of Caged Egg Production versus Floor Layers.** D. Nelson, Prairie View A&M University

P-FS-G-16 **Trace Metal Contents in Fish Species.** J. Patterson, Alabama A&M University

P-FS-G-17 **Expression of Select Innate Immune Response Genes in Bovine Neutrophils.** A. R. Turner, North Carolina A&T State University

P-FS-G-18 **Molecular Characterization and Pathogenicity of Fungal Isolates for Use Against the Small Hive Beetle, *Aethina tumida*, a Destructive Pest of Honey Bee, *Apis mellifera* Colonies.** S. Wheeler, Florida A&M University

Food Safety and Global Food Security
Scientist Posters

P-FS-S-1 **Vegetables and Fruits from Farmers' Markets Are Not Free of Pesticide Residues.** B. N. Dingha, North Carolina A&T State University

P-FS-S-2 **Consumers Reported Handling Practices for Poultry in the Home.** S. Godwin, Tennessee State University

P-FS-S-3 **Effect of Broiler Litter Application Rates on Sweet Potato Storage Root Shelve Life in an Organic Farming System.** S. A. Hamido, Tuskegee University

P-FS-S-4 **Potentially Invasive Weevil Species from the Caribbean Countries to the United States.** M. Haseeb, Florida A&M University

P-FS-S-5 ***Escherichia coli* and *Salmonella* Deposition onto Fresh Produce after Dispersal from Poultry House Fan Ventilation Systems.** F. M. Hashem, University of Maryland Eastern Shore

P-FS-S-6 **Antimicrobial Activity of Lactic Acid, Acetic Acid, and Copper on Growth of *Enterobacter sakazakii*.** S. A. Ibrahim, North Carolina A&T State University

P-FS-S-7 **Antimicrobial Effect of Chitosan Coating Containing Rosemary Essential Oil against *Salmonella* Enteritidis on Fresh-Cut Apples.** S. Jongrattananon, University Arkansas at Pine Bluff

P-FS-S-8 **Prevalence and Antimicrobial Resistance of Enterobacteriaceae in Animal Manure and Soil from Local Farms in Tennessee.** A. Kilonzo-Nthenge, Tennessee State University

P-FS-S-9 **Biofortification of Peanut (*Arachis Hypogaea* L.) Using Genetic Modification.** K. Konan, Alabama A&M University

P-FS-S-10 **Detection of γ-Irradiated *Vibrio vulnificus* after Heat and Cold Shock Treatment by Using EMA Real-Time PCR.** J. Lee, Delaware State University

P-FS-S-11 **Recovery of Live Fibroblast-Like Cells in Sheep at Different Times Postmortem.** X. Ma, Fort Valley State University

P-FS-S-12 **Identification and Expression of Wnt Co-Receptor Low-Density Lipoprotein Related Receptor-6 in Goat Blood.** M. Worku, North Carolina A&T State University

P-FS-S-13 **Effect of Rice Seed Treatments with Thiamethoxam Insecticide on Rice Water Weevil Control in Rice.** S. Ntamatungiro, University of Arkansas at Pine Bluff

P-FS-S-14 **Molecular Analysis of *Salmonella* Recovered from Pre- and Post-Chill Whole Broiler Carcasses.** S. Parveen, University of Maryland Eastern Shore

P-FS-S-15 **Higher Education Partnership for Food Security and Poverty Reduction in South Africa.** H. A. Paul, Florida A&M University

P-FS-S-16 **Effect of Sweetpotato Variety and Cultural Practices on Insect Damage.** T. Rashid, Alcorn State University

P-FS-S-17 **Population Structure and Association Mapping in Watermelon Heirloom Collections**. U. K. Reddy, West Virginia State University

P-FS-S-18 **Effect of Sample Geometry on the Rheological Properties of Goat Milk Cheese.** E. Risch, Prairie View A&M University

P-FS-S-19 **Occurrence and Quantities of *Salmonella* and *E. coli* in Runoff Water from Soil Amended with Various Manure Types.** B. D. Smith, University of Maryland Eastern Shore

P-FS-S-20 **LD Mapping For Melon Fruit Related Traits**. Y. R. Tomason, West Virginia State University

P-FS-S-21 **The Effects of Infection with *Haemonchus contortus* on Clinical Parameters and Performance in Sheep.** A. Yousuf, Virginia State University

Renewable Resources, Bioenergy and Environmental Stewardship Undergraduate Competition

P-RR-U-1 **Carbon Nanotubes-Methyl Methacrylate Composites: Preparations and Characterizations.** G. Beharie, Prairie View A&M University

P-RR-U-2 **Remediation of Emerging Contaminants in Water**. M. Covin, Florida A&M University

P-RR-U-3 **Determining Optimal Design of Rain Gardens to Maximize their Ecological and Environmental Benefits.** J. Eisele, Florida A&M University

P-RR-U-4 **Utilization of Cellulosic Wastes by *Cytophaga hutchinsonii***. H. Fasanya, Florida A&M University

P-RR-U-5 **Chitosan: Potential Use in the Growth of Radishes.** T. Fisher, Prairie View A&M University

P-RR-U-6 **Utilizing Feed Overload Disturbances to Enhance Stability in a Thermophilic Anaerobic Digester**. R. Goodall, West Virginia State University

P-RR-U-7 **Synthesis of Water Dispersible Carbon Nanotubes as Silica Hybrids.** K. Hibbert, Prairie View A&M University

P-RR-U-8 **Uptake of Titanium Dioxide Nanoparticles in *Salix nigra*.** S. Hollingsworth, Florida A&M University

P-RR-U-9 **The Measurement of Radon Gas in Soil, Water, and Air by RAD7.**
D. Hyatt, South Carolina State University

P-RR-U-10 **Influence of Landuse on Phosphodiesterase Activity and Soil Chemical Properties.** S. Jones, Tuskegee University

P-RR-U-11 **Plant Regeneration and Efficient *Agrobacterium tumefaciens*-Mediated Transformation in Alfalfa.** K. Lawrence, Fort Valley State University

P-RR-U-12 **Influence of Fermentation Times on Ethanol (EtOH) Production from Eleven Sweetpotato Cultivars.** J. Madison, Tuskegee University

P-RR-U-13 **Isolation of Microalgae Strains and Screening for use in Wastewater Biorefinery.** E. Muhammad, Florida A&M University

P-RR-U-14 **Citrus Waste Characterization.** C. M. Neal, Florida A&M University

P-RR-U-15 **Evaluation of the Effects of Plastic Mulches on the Growth and Yield of Tomato.**
J. Sawtelle, Prairie View A&M University

P-RR-U-16 **Influences of Synthetic Peptide *D4E1* on Phosphomonoesterase Activity.**
M. Scott, Tuskegee University

P-RR-U-17 **Photovoltaic Cell and Nanotechnology.** J. Spillers, Lincoln University

P-RR-U-18 **Spatial Variability of Soil Metal Ions in Close Proximity to a Coal Fired Power Generation Unit in Central Texas.** C. Stewart, Prairie View A&M University

P-RR-U-19 **The Measurement of Terrestrial Radioisotopes in Soil Samples.**
M. Terry, South Carolina State University

P-RR-U-20 **The Effects of Iron on *Pistia stratiotes* (Water Lettuce) and *Eichhlornia crassipe* (Water Hyacinth) on Growth and Development.**
T. C. Tillman Jr., Tennessee State University

P-RR-U-21 **Novel BIO-MEMS for Detecting *E. coli* O157:H7 in Real-Time.**
L. White, Lincoln University

Renewable Resources, Bioenergy and Environmental Stewardship Graduate Competition

P-RR-G-1 **Lead Stabilization by Phosphate-Based Amendments of Shooting Range Soil.**
M. Bakari, Lincoln University

P-RR-G-2 **Effects of Select Surfactants on Soil Microbial Activity.**
M. L. Banks, Lincoln University

P-RR-G-3 **Dust Accumulation on Sandy Soils of the Texas Gulf Coast Prairie.**
A. R. Bryant, Prairie View A&M University

P-RR-G-4 **Soil pH, Ferrous and Ferric Iron, Manganese, and Redox Potential Measurements in Simulated Wetland Depressional Ecosystems.**
J. Crain, III, Prairie View A&M University

P-RR-G-5 **Reducing the Impact of Invasive Species on Urban Forest by Utilizing Geospatial Science to Monitor the Spread and Development of Native and Non-Native Species.** J. Danzy, Southern University

P-RR-G-6 **Impact of Climatic Variability on Water Quality under a Forest-Dominated Watershed.** D. Davis, Alcorn State University

P-RR-G-7 **Evaluation of Chlorophyll Meter Use in Sweet Sorghum Crop Yield and Leaf Nitrogen Estimation.** A. Devudigari, North Carolina A&T State University

P-RR-G-8 **Soil and Water Analyses from an East Central Texas Drainage Way Impacted by Runoff Water.** E. Dilworth, Prairie View A&M University

P-RR-G-9 **Identification of Swine Feces-Specific *Faecalibacterium* Phylogentic Types.** M. Farley, Lincoln University

P-RR-G-10 **Spatial Variability of Rainfall Patterns within an Agricultural Landscape in East Central Texas.** K. Ferguson, Prairie View A&M University

P-RR-G-11 **Quantify Ground Water Recharge Using Water Balance over No-Tillage Farming.** H. Han, Alabama A&M University

P-RR-G-12 **Arylamidase and Beta-Glucosidase Activities in the Presence of Biochar Samples Derived from Different Feedstocks.** N. O. Hoilett, Lincoln University

P-RR-G-13 **Trace Elements in Runoff after Subsurface-Applied Poultry Litter on Coastal Plain Soils.** L. C. Kibet, University of Maryland Eastern Shore

P-RR-G-14 **Enhancing Rhizodegradation for Remediating Undesirable Concentrations of Pyrethroid Insecticides in Soil.** X. Le, Tennessee State University

P-RR-G-15 **Effect of Transgenic Cotton Plants Transformed with Antimicrobial Synthetic Peptide *D4E1* on Cotton Seedling Disease, Soil Microbial Diversity, and Enzymatic Activity.** L. J. Odom, Tuskegee University

P-RR-G-16 **Micrometeorological Measurements of Carbon Dioxide Balance and Anthropogenic Air Pollutants in Huntsville.** Y. A. Omidiran, Alabama A&M University

P-RR-G-17 **Benthic Diatoms as Water Quality Indicators in the Blackbird Creek Watershed, Delaware: Molecular Approach Investigating Benthic Diatom Assemblages and Abundance.** A. Pappas, Delaware State University

P-RR-G-18 **Nutrient Content and Trace Elements in Biochar Samples from Different Feedstocks.** J. R. Pyles, Lincoln University

P-RR-G-19 **Chenopodium *(Chenopodium ambrosioides*) Extracts for the Suppression of Cogongrass (*Imperata cylindrica* L.).** L. D. Reid, Florida A&M University

P-RR-G-20 **Effect of Soil Type, Well Depth and Climate on Nitrate Contamination of Private Wells in Geneva County, Alabama.** E. Smith, Tuskegee University

P-RR-G-21 **Emergence of *Agrilus planipennis* from Trees Treated with *Beauveria.*** D. Williams, University of Arkansas at Pine Bluff

P-RR-G-22 **Thin Film Composite Membrane Used for Desalination and Water Softening.** J. Yin, Lincoln University

Renewable Resources, Bioenergy and Environmental Stewardship
Scientist Posters

P-RR-S-1 **Assessment of Water Quality with Pollutants from Two Creeks of the Collins River Sub-Watershed Dominated by Nursery Crop.**
A. Akuley-Amenyenu, Tennessee State University

P-RR-S-2 **Establishing an 1890s Land Grant Universities Water Center.**
A. Atalay, Virginia State University

P-RR-S-3 **Enrichment of Chromosome 17 Specific Molecular Markers of Pima Cotton Substituted in Upland Cotton Lines.** A. Aziz, Tennessee State University

P-RR-S-4 **Phosphorus Exchange Rates and Phosphorus Fractions of Wetland Sediments in the Upper St. Johns River Basin of Central Florida.**
G. C. Bugna, Florida A&M University

P-RR-S-5 **Phosphorous Phytoremediation from Poultry Manured Soils by Diverse Plant Species.** R. B. Dadson, University of Maryland Eastern Shore

P-RR-S-6 **Potential Impacts of Advanced Biofuels on North Carolina Agriculture.**
G. C. Ejimakor, North Carolina A&T State University

P-RR-S-7 **The Influence of Biochar on Physical and Hydraulic Properties of Soil.**
L. Githinji, Tuskegee University

P-RR-S-8 **Countering Lepidopteran Resistance with Indigenous Bacterial Toxins and Soybean Genotypes.** B. M. Green, University of Maryland Eastern Shore

P-RR-S-9 **Biological Control of an Invasive Aquatic Weed in the Wacissa Springs.**
R. Hix, Florida A&M University

P-RR-S-10 **Evaluation of Water Quality for Selected Ephemeral Ponds in Apalachicola National Forest** A. Jain, Florida A&M University

P-RR-S-11 **Use of the Tree Radar Unit (TRU) to Determine Root Growth Habit, Root Architecture, and Decline of Live Oak (*Quercus virginiana*) Trees on the Campus of Southern University.** A. Johnson, Southern University

P-RR-S-12 **Partial Correlation with Copula Modeling.** Y. S. Jung, Alcorn State University

P-RR-S-13 **Comprehensive Value Chain Analysis to Utilize Sensor and Automation for Enhanced Production and Efficiency of Bioenergy from Selected Crops.**
A. K. Mahapatra, Fort Valley State University

P-RR-S-14 **Soil Physical Properties around Ephemeral Ponds in Apalachicola National Forest.** O. Mbuya, Florida A&M University

P-RR-S-15 **Soil Erosion and Associated Nutrient Movement on a Peanut Crop Field: A Mesh-Bag Study.** D. Nemours, Florida A&M University

P-RR-S-16 **Sweetpotato Vine Growth Response to Prohexadione-Calcium.**
V. N. Njiti, Alcorn State University

P-RR-S-17 **Quantifying Soil Carbon in Ituri Forest, Democratic Republic of Congo.**
N. V. Nkongolo, Lincoln University

P-RR-S-18 **Selected Characteristics of Biochar from Different Feedstock and Pyrolysis Process.** D. Patel, West Virginia State University

P-RR-S-19 **Land, Labor, and Energy Efficiency of Alterative Biofuel Feedstock Crops at Three Farm Scales.** A. F. Silvernail, Kentucky State University

P-RR-S-20 **Anaerobic Digester Metagenome Reveals Microbial Community Structure and Genetic Potential**. A. M. Smith, West Virginia State University

P-RR-S-21 **Pest and Beneficial Insects Associated with Bionergy Crops in North Alabama.** R. Ward, Alabama A&M University

P-RR-S-22 **Quantification of TNT, RDX, HMX and Their Metabolites in Soils and Plant Tissues by Gas Chromatography-Mass Spectrometry and High Performance Liquid Chromatography-Mass Spectrometry.** J. Yang, Lincoln University

Sustainable Plant and Animal Production Systems
Undergraduate Competition

P-SP-U-1 **Promoting Seed Germination and Somatic Embryogenesis of Needle Palm with Plant Growth Regulators.** L. Bowie, Kentucky State University

P-SP-U-2 **Relationships among Body Conformation, Testicular Traits and Semen Output in Electro-Ejaculated Pubertal Kiko Goat Bucks (*Capra hircus*).**
P. Bradley, Tuskegee University

P-SP-U-3 **Validation of 454 Sequence Derived Transcription Factors and Role in Rust Resistance in Common Bean (*Phaselous vulgaris* L.)**.
A. Brown, Delaware State University

P-SP-U-4 **Identifying Factors That Determine the Demand for Goat Meat in Florida.**
N. S. Brown, Florida A&M University

P-SP-U-5 **Plant Regeneration and Genetic Transformation of *Stevia rebaudiana* Using Particle Bombardment.** P. N. Bumpus, Fort Valley State University

P-SP-U-6 **Effects of Grazing Forages Containing Condensed Tannins on Lamb Carcass Measurements.** N. E. Cahill, Lincoln University

P-SP-U-7 **The Growth and Mortality of Larval Sunfishes, *Lepomis* spp., Fed Diets of Various Aged Post-Harvest Brine Shrimp Nauplii, *Artemia* spp**.
J. E. Callaway, Lincoln University

P-SP-U-8 **Evaluating Protected Culture Tomato Breeding Lines for Improved Lycopene, Beta Carotene and Soluble Solids.** H. M. Cavender, West Virginia State University

P-SP-U-9 **Identification of Expressed Resistance Gene Analogs by Data Mining in 454 derived Transcriptomic Sequences of Common Bean (*Phaseolus vulgaris* L.).**
M. Crampton, Delaware State University

P-SP-U-10 **Verification of the Expression of *CHS* gene in *in vitro* Cell Lines of North American Native Grapes.** G. M. Davis, Florida A&M University

P-SP-U-11 **Effects of Auxins and Heat on Root Initiation in Various Succulent Plants.**
S. DeGraphenreed, Tennessee State University

P-SP-U-12 **Molecular Identification of Fungal Pathogens for Ectoparasitic Mite, *Varroa destructor*, of Honey Bee.** C. Eddington, Florida A&M University

P-SP-U-13 **Utilization of Sow Productivity Index (SPI) to Optimize Reproductive Efficiency in a Sow (*Sus scrofa*) Herd.** C. Ellis, Tuskegee University

P-SP-U-14 **Role of *Arabidopsis* Novel Jasmonic-Acid Responsive Mutants in Defending Bacterial Disease.** T. Ferrell, Virginia State University

P-SP-U-15 **Management Practice Awareness in Limited-Resources Associated Animal Production and Research Facilities.** S. Grant, Prairie View A&M University

P-SP-U-16 **Stink Bug Species Associated with Organic Blackberry Production in Central Kentucky.** M. L. Grayson-Holt, Kentucky State University

P-SP-U-17 **Lady Beetle Composition and Abundance in Sweet Corn Bordered by Pasture or Buckwheat and Sunflower Plantings.** R. S. Hayden, Kentucky State University

P-SP-U-18 **Utilizing Mushrooms to Enhance Health and Performance of Broiler Chickens in Pasture Production.** V. Hines, North Carolina A&T State University

P-SP-U-19 **Alternative and Traditional Marketing Strategies for Herbs.** L. D. Hughes, Tennessee State University

P-SP-U-20 **Micropropagation of Ginger (*Zingiber officinale*) Rhizomes Using Bud Explants.** L. Lee, University of Maryland Eastern Shore

P-SP-U-21 **Effects of Various Media and Growth Regulator on Root Initiation in Interior Tropical Plants.** L. Martin, Tennessee State University

P-SP-U-22 **Impact of Feeding Peanut Skins on Carcass Characteristics of Meat Sheep.** J. Matthews, Alabama A&M University

P-SP-U-23 **Effects of Row Spacing and Plant Population Density on Fruit Yield of Chili Pepper (*Capsicum* spp.) Genotypes.** C. Payton, Alcorn State University

P-SP-U-24 **Carcass Characteristics of Wether Lambs Fed Increasing Levels of Distillers Dried Grains.** M. Peterson, Alabama A&M University

P-SP-U-25 **Comparison of Temperature, Relative Humidity, and Dew Point between Two Different Types of Huts.** S. Routh, North Carolina A&T State University

P-SP-U-26 **Effects of Brine Shrimp Feeding Regimen on Growth in Bluegill, *Lepomis macrochirus.*** J. L. Schulte, Lincoln University

P-SP-U-27 **Effects of Sources and Levels of Dietary Fiber on Digestibility and Performances of Growing Pigs.** S. Smith, North Carolina A&T State University

P-SP-U-28 **Parity Effects on Reproductive Efficiency in Purebred Large White Sows (*Sus scrofa*).** J. Streeter, Tuskegee University

P-SP-U-29 **Effect of Shipping Environment and Extender Composition on Motility of Liquid-Stored Ram Semen.** S. D. Szabo, Virginia State University

P-SP-U-30 **Orexigenic Effects of Anti-Ghrelin Antibodies in Broad-Breasted White Turkeys.** A. Vizcarra, Alabama A&M University

P-SP-U-31 **Plant Regeneration and *Agrobacterium*-Mediated Genetic Transformation in Valeria (*Valeriana officinalis* L.).** A. L. Williams, Fort Valley State University

P-SP-U-32 **Clonal Propagation through Nodal Explants Culture of *Valeriana officinalis*, a Rare Medicinal Plant.** J. Williams, Fort Valley State University

P-SP-U-33 **Comparing On-line Marketing Strategies to Traditional Marketing Strategies for Herbs.** N. D. Williams, Tennessee State University

P-SP-U-34 **Effect of Passive Immunization Against Ghrelin on Animal Behavior.** H. Wright, Alabama A&M University

Sustainable Plant and Animal Production Systems
Graduate Competition

P-SP-G-1 **Pigeonpea: A Potential Vegetable, Grain and Forage Legume Crop in Alabama.** R. Baggett, Alabama A&M University

P-SP-G-2 **A Comparison of iPod Touch® and Paper-Based Field Data Collection Systems**. J. C. Cambron, Kentucky State University

P-SP-G-3 **Comparison of Physiochemical Properties of Goat Milk and Name Brand Soaps.** R. Drake, Fort Valley State University

P-SP-G-4 **Combining High Tunnel and Agroforestry Technologies for Vegetable Production in Small Farms of North Carolina.** A. Elobeid, North Carolina A&T State University

P-SP-G-5 **Effect of Garlic and Papaya Seed on Fecal Egg Counts in Sheep and Goats.** M. C. Gooden, University of Maryland Eastern Shore

P-SP-G-6 **Synergistic Effects of Organic Selenium and Zinc Single and Combined on Fertility and Hatchability.** K. Hickerson, Prairie View A&M University

P-SP-G-7 ***In vitro* Galax Seed Germination under Different Treatments.** R. C. Jackson, North Carolina A&T State University

P-SP-G-8 **Identification of Key Proteins Associated with Fat Accretion in Broiler Chickens Using a Proteomics Approach.** G. Kelley, Tennessee State University

P-SP-G-9 **Effect of Cydectin® (Moxidectin) Oral Drench for Sheep for Controlling *Haemonchus contortus* Infections in Goats.** R. Merriott, North Carolina A&T State University

P-SP-G-10 **Estrus, Mating and Fertility Response in Meat Goats following Estrus Synchronization Protocols.** K. K. Matthews, Delaware State University

P-SP-G-11 **Effect of Supplemental Grower/Finisher Ration Protein Level on Performance of Crossbred Meat Goats Grazing Joy Chicory Pasture.** S. Murray, Tennessee State University

P-SP-G-12 **Development of Gene-Based Markers for Diversity Study in Peanut Germplasm Using the Trap Marker Technique**. M. Omoaholo, Tuskegee University

P-SP-G-13 **Evaluation of Grape (*Vitis* L.) Germplasm for Downy Mildew (*Plasmopara viticola*) Resistance.** R. Pierre, Florida A&M University

P-SP-G-14 **Identification of Small RNAs in Common Bean (*Phaseolus vulgaris* L.) from 454 Transcriptome Sequencing.** Y. Thurston, Delaware State University

P-SP-G-15 **Use of Goats for Controlling Invasive Weeds in New Castle County, Delaware.** J. C. Warren, Delaware State University

P-SP-G-16 **Somatic Cell Counts and DNA Isolation for Gene Expression Studies in Dairy Cows.** J. William, North Carolina A&T State University

Sustainable Plant and Animal Protection Systems
Scientist Posters

P-SP-S-1 **A Novel Gold Nanoparticle Based Biosensor for Accurate Detection of Luteinizing Hormone.** Z. Afrasiabi, Lincoln University

P-SP-S-2 **Mitochondrial Function and Growth in Channel Catfish *Ictalurus punctatus*: Strain and Diet Effects**. M. F. Ashame, West Virginia State University

P-SP-S-3 **Total Polyphenols, Antioxidant Content, and Chemical Profiling in Leaves of Roselle (*Hibicsus sabdraiffa*) Accessions.** K. L. Chin, Southern University

P-SP-S-4 **The Effects of Mulches and Fertilizers on the Growth and Development of Various Herbs Varieties.** A. E. Clardy, Tennessee State University

P-SP-S-5 **Pole Lima Beans: A Mid-Atlantic, Niche-Market Crop.** J. Clendaniel, Delaware State University

P-SP-S-6 **Cytokine Gene Expression in Parasite Resistant Goats Pasture Exposed to *Haemonchus contortus.*** M. M. Corley, Virginia State University

P-SP-S-7 **Leaf Morphology and Stomatal Density Varies by Pawpaw (*Asimina triloba*) Variety.** S. B. Crabtree, Kentucky State University

P-SP-S-8 **A Possible Association of Mitochondrial Function with Feed Efficiency in Rainbow Trout *Oncorhynchus mykiss*: Diets and Full-Sib Family Effects**. J. C. Eya, West Virginia State University

P-SP-S-9 **The Red Palm Weevil, *Rhyncophorus ferrugineus,* in the Netherland Antilles: A New Threat to Florida and the Caribbean.** K. K. M. Fiaboe, Florida A&M University

P-SP-S-10 **Optimum Duration of Performance Testing Growing Boer Bucks for Growth Rate, Feed Intake, and Feed Efficiency.** T. A. Gipson, Langston University

P-SP-S-11 **Effects of Small Ruminant Type and Level of Intake on Metabolism.** A. L. Goetsch, Langston University

P-SP-S-12 **Selection of Heirloom Tomato Varieties for Future Grafting Trials.** S. Gu, Lincoln University

P-SP-S-13 **A Measure of Comparative Production Performance of Kiko and Boer Crossbred Goats under Pine-Silvopastoral Conditions.** N. K. Gurung, Tuskegee University

P-SP-S-14 **The Effects of Mixed-Species Grazing Systems on the Performance of Brangus Calves.** A. Harris, Southern University

P-SP-S-15 **Perceptions of Limited-Resource Producers towards Pasture-Raised Pork in Southwest Mississippi: A Survey.** A. Joseph, Alcorn State University

P-SP-S-16 **Extension Education and Research Needs of Livestock Farmers in Alabama.** U. Karki, Tuskegee University

P-SP-S-17 **Identification and Characterization of Grape Leaf Proteins with Relevance to Photosynthesis.** R. Katam, Florida A&M University

P-SP-S-18 **Clonal Propagation of Guava (*Psidium guajava* L.) on Nodal Explants of Mature Elite Cultivars.** X. Liu, North Carolina A&T State University

P-SP-S-19 **The Pawpaw Peduncle Borer (*Talponia plummeriana*): A Pest of the North American Pawpaw (*Asimina triloba*).** J. D. Lowe, Kentucky State University

P-SP-S-20 **Expediting Production of Alexandrian Laurel through Micropropagation**. Z. Lu, North Carolina A&T State University

P-SP-S-21 **Physical and Thermal Properties of Sericea Lespedeza Pellets.** A. K. Mahapatra, Fort Valley State University

P-SP-S-22 **Transitioning an Organic Site at UMES: The Process, Opportunities, and Challenges.** L. E. Marsh, University of Maryland Eastern Shore

P-SP-S-23 **The Effect of Synchronization Treatments on Estrus Response in Does During the Seasonal and Non-Seasonal Breeding Periods.** A. McKenzie-Jakes, Florida A&M University

P-SP-S-24 **Extending Information to Small Poultry Flock Owners through the Development of a Small Flock Education Series.** B. McCrea, Delaware State University

P-SP-S-25 **Change in Behavior of Goat Producers after On-Line Training in Health Practices.** R. C. Merkel, Langston University

P-SP-S-26 **Use of Geospatial Technologies to Understanding Invasion Processes to Mitigate the Invasion of Chilli Thrips (*Scirtothrips dorsalis*) in Florida.** K. Milla, Florida A&M University

P-SP-S-27 **Effects of Feeding Pine Bark on Gain Efficiency, Ammonia and Methane Production, and Parasite Load in Goats.** B. R. Min, Tuskegee University

P-SP-S-28 **Evaluation of Pelletized Chicken Litter as a Nitrogen Fertilizer Source for Sweet Potato Production**. S. Ntamatungiro, University of Arkansas at Pine Bluff

P-SP-S-29 **Enhancing Corn and Tomato Seedling Establishment and Disease Resistance Using Biocontrol Microorganisms.** L. M. Nyochembeng, Alabama A&M University

P-SP-S-30 **Relationships between Phenotypic, Testicular Traits and Serum Testosterone Profiles in Pubertal Male Boer Goat (*Capra hircus*) Cross.** C. Okere, Tuskegee University

P-SP-S-31 **Effect of Organic Farming Systems in the Performance of Rabbiteye Blueberry (*Vaccinium ashei* Reade var. Tifblue) on a Heavy Soil.** G. K. Panicker, Alcorn State University

P-SP-S-32 **Effects of Traditional and Alternative Diets with 28 or 32% Protein on Performance of Golden Shiners *Notemigonus crysoleucas* in Pools.**
H. Phillips, University of Arkansas at Pine Bluff

P-SP-S-33 **Use of Grape Festival to Highlight and Promote Center Research and Extension Programs.** B. R. Phills, Florida A&M University

P-SP-S-34 **Effects of Restricted Feed Intake on Energy Expenditure by Different Goat Breeds.** R. Puchala, Langston University

P-SP-S-35 **An *Arabidopsis* JA Signaling Suppressor Regulates Glucose Sensitivity and Heat Tolerance.** S. Ren, Virginia State University

P-SP-S-36 **A Color Rich and Stable Grape Selection of Red Wine Grape for Florida.**
Z. Ren, Florida A&M University

P-SP-S-37 **Conservation Agriculture for Food Security in Cambodia and the Philippines.** M. R. Reyes, North Carolina A&T State University

P-SP-S-38 **Effects of Level of Feeding on Energy Utilization by Angora Goats.**
T. Sahlu, Langston University

P-SP-S-39 **Differential Response of Grape (*Vitis* spp.) Genotypes to *Xylella* infection.**
M. Sheikh, Florida A&M University

P-SP-S-40 **Subsurface Transport of Leaching of Nutrients under a Conventionally-Tilled Corn Field Plot on a Natchez Silt Loam Soil.**
M. R. Silitonga, Alcorn State University

P-SP-S-41 **Determining the Genetic Divergence of Recombinant Inbred Line (RIL) Segregates of Pearl Millet for Photosynthetic and Water Use Efficiency Traits.** H. P. Singh, Fort Valley State University

P-SP-S-42 **Effect of Month, Medium, and Hormone Treatment on Rooting of Lavandin Cuttings.** A. O. Tucker, Delaware State University

P-SP-S-43 **Identification of Genes Associated with Pierce's Disease Tolerance in Grape (*Vitis* spp.).** H. K. N. Vasanthaiah, Florida A&M University

P-SP-S-44 **Effects of Garlic Supplementation on Performance of Grazing Goats**.
Z. Wang, Langston University

P-SP-S-45 **Evaluation of Weaning Time and Stocking Densities for Longear Sunfish, *Lepomis megalotis*, Reared in Low Cost Static System.**
J. E. Wetzel, Lincoln University

P-SP-S-46 **Impact of Gastrointestinal Parasite Management Training in North Carolina.**
N. C. Whitley, North Carolina A&T State University

P-SP-S-47 **Species and Breed Differences in Strongylid Parasite Egg Counts in Co-Grazed Hair Sheep and Goats.** S. Wildeus, Virginia State University

P-SP-S-48 **Managing Seasonal Outbreak of Foot Rot and Foot Scald in Sheep Flocks.**
T. Wuliji, Lincoln University

P-SP-S-49 **Enhanced Availability of Softwood Shoots for Propagation through Interaction of Season and Growth Regulators.** G. Yang, North Carolina A&T State University

Family, Youth, Community and Economic Development
Undergraduate Competition

P-FY-U-1 **The Persistence of Poverty in Forest County, Mississippi.**
R. Harris, Alcorn State University

P-FY-U-2 **Effect of Fabric Construction Method on Abrasion Resistance Properties of Textile Fabrics.** B. Matthews, Southern University

P-FY-U-3 **Effect of Fiber Content on Colorfastness of Textile Fabrics.**
C. Morton, Southern University

Family, Youth, Community and Economic Development
Graduate Competition

P-FY-G-1 **Performance in Animal Science Proficiency Test is Related to Student Class Standing, Farm or Non-farm Background.** D. Phillip, Tuskegee University

P-FY-G-2 **Business Closure in Southwest Mississippi Economic Impact on Selected Counties.** M. Thomas, Alcorn State University

Family, Youth, Community and Economic Development
Scientist Posters

P-FY-S-1 **Major Nutrition and Health Concerns among People Living in Rural Kentucky.**
C. Butler, Kentucky State University

P-FY-S-2 **University Collaboration with Secondary Education to Enhance Science Curricula.** C. P. Cotton, University of Maryland Eastern Shore

P-FY-S-3 **Utilizing Orange-Flesh Sweetpotato to Enhance Nutritional and Economic Prospects of Women in Rural Communities in Ghana.**
P. Doamekpor, Tuskegee University

P-FY-S-4 **Implementation of Educational Opportunities Focused on Biotechnology and Related STEM Areas at Kentucky State University.** L. Lu, Kentucky State University

P-FY-S-5 **Assessing Hispanic Participation in the Free and Reduced-Price School Lunch Programs for Piedmont and Midlands Regions of South Carolina during the Period of 2000-2003.** C. C. Mathis, Jr., South Carolina State University

P-FY-S-6 **The Impact of Economic Hardship on Clothing Purchasing Behavior**.
J. Oh, Delaware State University

P-FY-S-7 **Development and Evaluation of a Rapid Test to Assess Performance of PPE with Repellent Finish.** A. Shaw, University of Maryland Eastern Shore

P-FY-S-8 **Information Sources Used by Small Tennessee Farmers.**
F. Tegegne, Tennessee State University

P-FY-S-9 **Strengthening the Preparation of Underrepresented Minorities for Entrance into Family and Consumer Sciences Professions.**
A. P. Young, Alabama A&M University

Human Health, Nutrition & Obesity Prevention
Undergraduate Competition

P-HH-U-1 **Sensors for Analysis of Flavonoid Content in Foods.**
J. Burrell, Alcorn State University

P-HH-U-2 **Prodentia of the Rectum.** D. Campbell, Tuskegee University

P-HH-U-3 **A Myotonic Goat Calcium Signaling Gene as a Biomarker for Human Muscular Dystrophy.** J. E. Caviness, Virginia State University

P-HH-U-4 **Efficacy of Anti-Inflammatory Synthetic Peptide in a Murine Model of Ulcerative Colitis-Linked Colon-Cancer: IL-10-/- Mice**.
K. Cromwell, Tuskegee University

P-HH-U-5 **Efficacy of Anti-Inflammatory Synthetic Peptides in a Murine Fungal Infection: IL10 Deficient Mice.** D. Freeman, Tuskegee University

P-HH-U-6 **Sex, Stress, and Inflammation in a Murine Model of Ulcerative Colitis.**
D. Hampton, Tuskegee University

P-HH-U-7 **Effect of Processing on Chemopreventive Potential of Grapes and Beets in Azoxymethane-Induced Fisher 344 Male Rats.** J. Hull**,** Alabama A&M University

P-HH-U-8 **The Effects of Mineral Nutrients in Total Chlorophyll and Cellulose Content in Peanuts.** S. F. Hyllam, Prairie View A&M University

P-HH-U-9 **Vascular Smooth Muscle Cell Structure and Function are Altered by Resveratrol.** A. J. Johnson, West Virginia State University

P-HH-U-10 **Novel Implantable Optical Nanobiosensor for Diabetes.**
B. Moore, Lincoln University

P-HH-U-11 **Nanomaterial Sensors of DNA Structures Associated with Human Neurodegenerative Diseases.** A. Orridge, South Carolina State University

P-HH-U-12 **Genetic and Metabolomic Diversity in Bitter Melon (*Momordica charantia* L.).** Z. Perry, West Virginia State University

P-HH-U-13 **A Survey of Kaolin Consumption within Macon County, Alabama.**
T. Purdie, Jr., Tuskegee University

P-HH-U-14 **Free Radical Scavenging Capacity of Polyphenol Extracts from Different Parts of Grape Pomace.** I. Smith, North Carolina A&T State University

P-HH-U-15 **Application of Power Ultrasound to Improve Adhesion of Honey on Roasted Peanuts.** H. Tegete, Alabama A&M University

P-HH-U-16 **Selected Herbs and Spices Reduce Azoxymethane (AOM)-Induced Colon Tumors in Fisher 344 Male Rats**. J. Thomas, Alabama A&M University

P-HH-U-17 **A Role for IL-10 in Stress Response.** I. Tigner, Tuskegee University

Human Health, Nutrition & Obesity Prevention
Graduate Competition

P-HH-G-1 **Nanomaterials for Enhancing Bioavailability of Quality Nutrients.**
L. Brady, Alcorn State University

P-HH-G-2 **Assessment of Dietary Patterns Associated with Colon Cancer Risk among Selected Races in North Alabama.** K. Campbell, Alabama A&M University

P-HH-G-3 **Using Shiitake Mushroom Extract to Enhance the Growth of Lactic Acid Bacteria and Bifidobacteria.** O. Hassan, North Carolina A&T State University

P-HH-G-4 **Substituting Applesauce for Fat (Butter) in Chocolate Chip Cookies.**
S. Hayek, North Carolina A&T State University

P-HH-G-5 **Processing Effects on Phytochemical Content and Bioavailability of Carrots Using a Rat Model.** B. Kanda, Alabama A&M University

P-HH-G-6 **Establishing Physicochemical Profiles for High Nutrient Dense Purslane Pasta.**
J. D. Kelly, Tuskegee University

P-HH-G-7 **Dairy Consumption: A Potential Risk Factor For Prostate Cancer.**
A. Moore, Prairie View A&M University

P-HH-G-8 **Reduction of Azoxymethane-Induced Colon Tumors in Fisher 344 Male Rats Using Processed Dry Beans.** L. Mounts, Alabama A&M University

P-HH-G-9 **Changes in Biomarkers of Spontaneously Hypertensive Rats Fed Novel Sources of Vegetables.** M. Powe, Tuskegee University

P-HH-G-10 **Chemopreventive Potential of Almonds and Pecans Against the Development of Azoxymethane-Induced Tumorigenesis in Fisher 344 Male Rats.**
H. Reid, Alabama A&M University

P-HH-G-11 **Head Start: Jump Start on a Healthy Lifestyle Program/Pilot Study.**
M. A. Schwarz, University of Maryland Eastern Shore

P-HH-G-12 **Chemopreventive Effects of Bitter Melon (*Momordica charantia*) Against Colon Tumorigenesis.** L. Shackelford, Alabama A&M University

P-HH-G-13 **Primary Oxidation Products Produced during Low-Heat Thermal Oxidation of Dietary Oils Sold to Consumers**. D. Skeene, Prairie View A&M University

P-HH-G-14 **Genetic Transformation of Synchronized *in vitro Muscadinia* Grape Cell Cultures.** S. Sutton, Florida A&M University

P-HH-G-15 **Changes in Composition and Antioxidant Activities in Milled Flaxseed Periodically Exposed to Oxygen.** B. Taliaferro, Virginia State University

P-HH-G-16 **Establishing Micropropagation and *Agrobacterium*-Mediated Genetic Transformation Protocols for *Scutellaria barbata*: A Potential Anticancer Plant.** K. Venkatesan, Fort Valley State University

P-HH-G-17 **The Difference in the Impact of Oxidized Dietary Sunflower Oil on the Gluthione-Glutathione Enzyme Complex in Lean and Obese Piglets.**
H. White-Reese, Prairie View A&M University

Human Health, Nutrition & Obesity Prevention
Scientist Posters

P-HH-S-1 **Comparison of Health Benefits of Vegetables Commonly Consumed by African-Americans in Southwest Mississippi.** S. L. Barnes, Alcorn State University

P-HH-S-2 **Processing Effects on Phenolics in Selected Fruits.**
J. Boateng, Alabama A&M University

P-HH-S-3 **An Assessment of the Diet and Physical Activity of Children in Child Care Centers on Maryland's Eastern Shore.**
M. D. Cecil, University of Maryland Eastern Shore

P-HH-S-4 **Acceptability and Consumption Trends of Value-Added Meat Products.**
J. Gager, Southern University

P-HH-S-5 **Potential Anticancer Activities of Select Medicinal Plants.**
G. Hacisalihoglu, Florida A&M University

P-HH-S-6 **Impacts of Freezing and Subsequent Thawing on Texture Properties of Goat Sweet Cream Butter.** J. H. Lee, Fort Valley State University

P-HH-S-7 **Survey of Lactose Intolerance among Students at the University of Arkansas at Pine Bluff.** M. A. Lihono, University of Arkansas at Pine Bluff

P-HH-S-8 **Antioxidant Activity of Rice Bran Added to Goat Meat Sausages.**
F. Malekian, Southern University

P-HH-S-9 **Chemical Composition, Antioxidant Activity, and Cancer Antiproliferation Effects of Pomace.** J. Parry, Virginia State University

P-HH-S-10 **Sensory Quality of Canola (*Brassica napus*) Greens Grown in Huntsville, Alabama.** N. A. Sistani, Alabama A&M University

P-HH-S-11 **Exploring African American College Students' Health Orientations and Behaviors.** D. Staten, South Carolina State University

P-HH-S-12 **Extension Supervisors and Their Frontline Staff's Observations on Acceptance of Nutrition Education Messages to Prevent Childhood Obesity in Low Income Families in South Carolina.** K. Stephenson, South Carolina State University

P-HH-S-13 **Adoption of the Recommended Dietary Guidelines by African-American University Students in the Delta to Prevent Obesity.**
F. Stigger, University of Arkansas at Pine Bluff

P-HH-S-14 **Antimutagenic Effect of Fermented Soy Milk with *Bifidobacterium* Strains.**
M. Tajkarimi, North Carolina A&T State University

P-HH-S-15 **Anticancer Effects of Phytochemical Extracts from Sorrel Calyx.**
M. Verghese, Alabama A&M University

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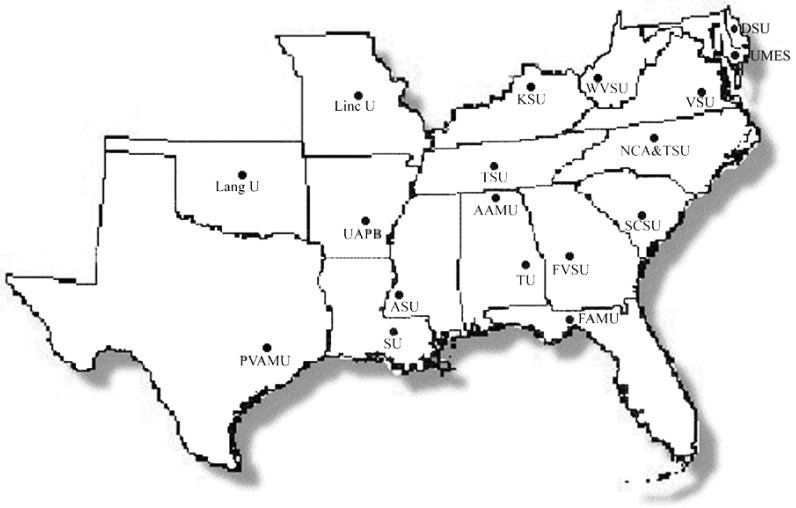

Abstracts of Food Safety and Global Food Security Papers

Undergraduate Students (11)

O-FS-U-1

Determining Food Use Pattern of *Lasioderma serricorne* (L.) Using Trace Metal Analysis.
S. Alawy*, D. Clark, and R. Mahroof, Department of Biological Sciences, South Carolina State University, Orangeburg, SC 29117.

Stored durable commodities and value added products are being damaged by different stored product insects, including the cigarette beetle, *Lasioderma serricorne* (L.) (Coleptera: Anobiidae). This insect is cosmopolitan in distribution and causes severe losses to numerous stored commodities. The aim of the study is to evaluate the food use pattern of *L. serricorne* by rearing them in different hosts in the laboratory, and then evaluate the trace metal composition in the body of adult insects. Forty eight hour-old eggs of *L. serricorne* were collected from the master colony and were reared in different diets comprised of chili powder, curry powder, tobacco, wheat flour, corn, rolled oats and cayenne pepper at 28^{o}C and 60% RH. Once adults emerged, beetles were collected from their respective hosts and were digested using a microwave digester. Then samples were analyzed for a series of trace metals. This paper further discusses results of trace metal composition of *L. serricorne* reared in different diets and how that information is valuable in determining movement pattern of adults.

O-FS-U-2

The Effects of Infection with *Haemonchus contortus* on Clinical Parameters and Performance of Goats. B. M. Allen*, and A. Yousuf, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

Infection by the gastrointestinal nematode (GIN) parasite, *Haemonchus contortus*, can cause substantial economic losses as a result of decreased productivity and utilization of feed in unthrifty animals to death. Proper meat goat nutrition can enhance the ability to regulate the GIN population as well as withstand the negative effects of GIN infection while maintaining reasonable levels of production and reducing the reliance on chemotherapy. The impact of GIN on clinical parameters and performance of meat goats was investigated using two breeds, five months old intact buckling, the Spanish (n=16 and 17 ± 1.9 kg) and the Myotonic (n=16 and 16 ± 1.4 kg), in a randomized complete block design in an indoor experiment for three months to test the effects of artificial infection with infective stage larvae (L3) of *H. contortus.* Half of the goats of each breed were left uninfected and the remaining half, the infected groups, were exposed to trickle infection with the dose level of 500 *L3* larvae of *H. contortus* three days a week (1500 L3 per week) for a duration of six weeks. Live weight, packed cell volume (PCV), fecal egg counts (FEC), FAMACHA score and feed offered and refusals measured. Feed intake and feed efficiency were depressed in the first few weeks of the experiment for infected animals, but was subsequently followed by a compensatory reaction. High establishment rates, based on actual worm counts, were observed for the infected group.

O-FS-U-3

Genetically Modified Salmon and Consumer Willingness to Pay. A. Brewer*, M. Ibrahim, and J. Whitehead, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Biotechnology has introduced novel techniques of improving and in some cases totally transforming both plant and animal organisms. One such technique is transgenesis. Transgenesis involves altering the characteristics of animals or fish by directly changing their genetic material. The idea that transgenic fish (salmon) are about to enter the human food chain seems scary to many consumers. Studies have shown that consumers who were initially apprehensive in accepting transgenic plant organisms often later accepted those products (e.g., genetically modified (GM) corn). Most studies that have examined willingness to consume or pay for transgenic meat have done so using GM feed. No one knows for sure how consumers will react to transgenic fish once it is on the market. The objective of this study is to determine consumers' willingness to pay for transgenic salmon. The data for this study were secured through a survey conducted at the 2010 Sunbelt Agricultural Exposition (Ag Expo) in Moultrie, Georgia. Questionnaires were hand-delivered to randomly chosen prospective respondents**.** A total of 134 completed surveys were collected on October the 20, 2010. The study employs a logit model to analyze consumer willingness to pay for genetically modified salmon. Preliminary results suggest that consumer trust in the biotechnology industry has a positive effect on their willingness to purchase GM salmon. This study contributes towards better understanding of consumer acceptance of food biotechnology by identifying factors that drive their willingness to consume GM food products.

O-FS-U-4

An Analysis of the Impacts of Regional Free Trade Agreements on U.S. State Vegetable Exports and Trade Flows. K. P. Glasgow*, and D. Karemera, Department of Accounting, Agribusiness and Economics, South Carolina State University, Orangeburg, SC 29117.

The potential for regional free trade blocs to increase trade among members has long been recognized in the international trade literature. Commodity trade flows are generally determined by economic and noneconomic factors affecting trade flows in both the sending and receiving states. However, trade flows may be enhanced by regional free trade agreements (RFTA) or distorted by government interventions. Vegetable trade flows may also be affected by alternative state export and trade promotion activities. Several studies have evaluated determinants of state trade flows using aggregate trade flows. This study derives commodity-specific models and uses state level panel data to address the impacts of RFTA on vegetables. This analysis is needed because regions or states within a country have differences in resource endowments and export activities. The findings will provide an assessment of impacts of the world major free trade agreements on US state vegetable exports and Southern agriculture. Specifically, the generalized gravity models are used to analyze the gross trade creation and diversion arising from the RFTA. The trade blocs include the European Union, North America Free Trade Agreement, the Asian Pacific Economic Cooperation, the Central America Common Market, the Common Market of the South (Mercosur), the Maghreb region, and the Common Market for Eastern and Southern Africa. The effectiveness of alternative RFTA in enhancing vegetable trade is examined. The models allow us to address the extent to which currency exchange rate volatility affects trade flows.

O-FS-U-5

Consumers' Willingness to Pay for Clone-Free Labeled Meat Products. S. M. Jennings*, M. Ibrahim, and J. Whitehead, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

The 2008 announcement by the United States Food and Drug Administration (FDA) that it is okay to consume meat and milk from most cloned animals had consumers fuming. Although there is no cloned meat in the food chain at this time, it may be coming in the near future. The issue that bothered consumers was that the agency said it will not require labels for cloned meat products because "there is no material difference between them and food produced by conventional methods". The question then is how can consumers tell the meats apart? This study will attempt to answer this question by examining factors that influence consumers' willingness to pay a premium for clone-free label meat products. The data for this study were secured through a survey conducted at the Sunbelt Agricultural Exposition (Ag Expo), October 20-22, 2009 in Moultrie, Georgia. Questionnaires were hand-delivered to randomly chosen prospective respondents**.** A logit model will be used to estimate consumer willingness to pay for clone-free labeled meat. Preliminary descriptive statistics show that 59% of the respondents said they were willing to pay for clone-free labels, while 41% indicated were not willing to pay for labels.

O-FS-U-6

Syntenic Analysis of Cucurbit Cultivar Complex Using Fruit Specific EST-Microsatellite Markers. F. G. Lutz*, S. K. Ponniah, Y. Tomason, P. Nimmakayala, and U. K. Reddy, Gus R. Douglass Land-Grant Institute and Department of Biology, West Virginia State University, Institute, WV 25112.

Microsatellites or Single Sequence Repeats (SSRs) are short repetitive nucleotide motifs found throughout the genome of all eukaryotes. These repeat motifs can be used as genetic markers. Microsatellite markers are co-dominant, multi-allelic and high polymorphic. Current research is focused to identify heterologous fruit related microsatellites that can be used to identify common fruit traits at molecular level across the Cucurbitaceae family. We used 176 fruit related EST specific SSRs developed from melon to amplify 750 different alleles across the 12 taxa that belong to the subfamily Cucurbitae (squash and pumpkin) and the subfamily Benincaseae (watermelon, melon, bottler gourd and bitter gourd). A phylogenetic tree clearly resolved various taxa according to their classical taxonomic relationships. Our study indicates that the heterologous (common) microsatellite markers can be used across the genera and since these are fruit related markers, they can be used to map fruit traits across the Cucurbitaceae family. The microsatellite markers that are characterized as heterologous can be of immense use for cucurbit-breeders community for use in marker-assisted selections and the other genetic and syntenic studies.

O-FS-U-7

Textural Characteristics of Commercial Bovine Milk Yogurt Compared with Caprine Milk Yogurts Stored under Refrigeration for Four Weeks. C. McGhee*, E. Griffin, A. Lee, H. Ibidapo, J. Oglesby, and Y. W. Park, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Texture plays an important role in the quality of dairy products. Regardless of species of milk, casein gels

are responsible for various rheological properties of dairy products. Textural characteristics of commercially marketed bovine and caprine milk yogurts, and a plain caprine milk yogurt of Fort Valley State University (FVSU) were evaluated during four week refrigerated storage. Commercial products were purchased from local retail outlets, and FVSU yogurt was manufactured using a yogurt culture. Textural properties of all yogurt samples were determined at 0, 2 and 4 weeks storage using a texture analyzer. Viscosity of the yogurts was measured by firmness (g force) and consistency, and adhesiveness or stickiness was measured by cohesiveness (g force) and index of viscosity. Firmness of commercial bovine, caprine and FVSU yogurts for the 0 and 4 weeks storage were: 54.5, 36.8; 42.8, 44.7; 31.1, 20.1, respectively, indicating firmness was decreased after 4 weeks storage for the commercial cow and FVSU goat yogurts, but not for the commercial goat yogurt. Viscosity was significantly higher for the commercial goat yogurt than for the commercial cow and FVSU goat yogurts. The respective cohesiveness of the corresponding products and storage periods were: -28.1, -15.3; -19.9, -21.1; -10.9, -6.17, suggesting a similar trend to firmness. The higher firmness and cohesiveness of the commercial caprine yogurt appeared to be attributable to addition of tapioca and pectin to the product, while firmness of caprine yogurt is expected to be lower than bovine products due to weak gel formation of goat milk caseins.

O-FS-U-8

Residues of Endosulfan Isomers and Endosulfan Sulfate on Field-Grown Pepper and Melon. K. N. Ross*[1], R. R. Hill[1], G. F. Antonious[1], and T. S. Kochhar[2], [1]Department of Plant and Soil Science, Land Grant Program, and [2]Department of Biology, Kentucky State University, Frankfort, KY 40601.

Demonstration of the effectiveness of a pesticide is not in itself sufficient to recommend it for commercial usage. Endosulfan, a mixture of α- and β-isomers, is a broad-spectrum insecticide and is one of the organochlorine insecticides used for control of insect pests on fruits and vegetables. Endosulfan was sprayed on field-grown pepper and melon plants at the recommended rate of 0.44 kg a.i. $acre^{-1}$. At harvest, pepper and melon fruits and leaves were collected from treated plants and untreated controls and analyzed for endosulfan α- and β-isomers. Plant tissue samples were blended with methylene chloride and acetone mixture to extract endosulfan. Residues were confirmed using gas chromatography-mass selective detection (GC/MSD). The results indicated the formation of endosulfan sulfate as the major metabolite of endosulfan and the relatively higher persistence of the β-isomer as compared to the α-isomer. The initial total residues (α- and β-isomers plus endosulfan sulfate) were higher on leaves than on fruits. On pepper fruits, the α-isomer, which is the more toxic to mammals, dissipated faster ($T_{1/2}$ = 0.9 d) than the less toxic β-isomer ($T_{1/2}$ = 2.5 d). Our results revealed the greater initial residues of endosulfan isomers on pepper leaves as compared to melon leaves. Pepper is a perishable crop that must be harvested frequently and regularly. The longer persistence of the total residues on pepper should be considered of great importance for timing the safe entry of pepper harvesters due to the high mammalian toxicity of endosulfan sulfate.

O-FS-U-9

Effects of Mineral Nutrients on the Concentration of Oleic and Linoleic Acids in Peanuts. S. M. South*, T. K. Brown, S. F. Hyllam, and G. Osuji, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Peanut is a globally important oil seed and protein crop. Increasing the ratio of oleic (18:1) to linoleic acid (18:2) in peanut significantly improves the nutritional and quality attributes of the crop. Desaturase is an enzyme found in most animals and plants that removes two hydrogen atoms from an organic compound, creating carbon to carbon double bond. Linoleic acid, a polyunsaturated fatty acid produced by plants is converted in humans to a more unsaturated fatty acid that is very important nutritionally and physiologically. Two fatty acids, oleic and linoleic comprise the majority of the oil content of peanuts. In order to improve the nutritional and quality attributes of peanuts the ratio of oleic acid and linoleic acid has to be improved. Peanuts were grown and treated with different mineral nutrients. At maturity, the seeds were harvested and the fatty acid composition was analyzed by reversed-phase high pressure liquid chromatography (HPLC). The mRNA encoding fatty acid desaturase in the peanut seed was analyzed by northern blot. The fatty acid synthesized from the NPKS treated peanuts had the best unsaturated/saturated ratio when compared to the control and the other mineral treatments. The NS treated peanuts had the lowest unsaturated/saturated ratio, the highest linoleic fatty acid content and the lowest oleic content. PK had the highest oleic content but the lowest linoleic content. The best mineral treatment for the increase in unsaturated/saturated ratio in peanut oil is NKPS although the highest fatty acid content was obtained from the NS treated peanuts.

O-FS-U-10

Screening of 10-Nucleotide Long Random Primers for Goat Genotyping Using Polymerase Chain Reaction. O. White*, X. Ma, and M. Singh, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Goats are small, domesticated ruminants. They contribute significantly to the economy of small farmers in United States (US) and many other countries. There are several breeds of domesticated goats in southern US, for example, Alpine, Saanen, Nubian, Spanish and Kiko. Due to indiscriminate breeding among the animals of different breeds, there has been a mixing of the germplasm, leading to decline in original breed attributes. It is, therefore, important to determine the genetic diversity among goats to assess the available breeding options for improving goat productivity as well as for preserving superior breed traits. The goal of this project was to screen small 10-nucleotide long random primers for goat genotyping using RAPD PCR amplification. To achieve this goal, we selected ten different dairy goats belonging to three different breeds, i.e. Alpine, Saanen and Nubian. Blood samples were collected from each goat. Their genomic DNA was extracted, quantified and tested on agarose gels. The purified genomic DNA from all the goats was then amplified in a PCR machine using a single 10-nucleotide long DNA chain as a PCR primer. Eighteen different primers were screened to determine differences in the goat genomes. Individual primers exhibited amplification of 3-11 bands. Out of 18 primers screened, six displayed greater than two polymorphic bands, including one primer that exhibited amplification of six bands. These results suggest that the RAPD amplification method, which is a simple PCR method and does not require any sequence information of the genome, can be used to evaluate genetic diversity in goats.

O-FS-U-11

Food Safety: Consumer Demand and Behavior. A. Whitter-Cummings*, V. Thomas, and L. Walters, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

In 1999, an estimated 5,000 deaths, 325,000 hospitalizations, and 76 million illnesses were caused by food borne illnesses in the United States of America. Food borne illnesses are caused by ingesting bacteria, fungi, parasites, viruses, toxins, or other harmful substances in contaminated food. When consumers perceive certain foods as unsafe, they may avoid purchasing them outright or choose safer alternatives. Even after the issue has been resolved, consumer perceptions about implicated food product and about the ability to produce safe food may be slow to change. Globalization of the food supply suggests that new food safety risks may be introduced into new areas or that previously controlled risks are reintroduced. Globalization has also allowed for contaminated food to be spread across greater geographic areas in relatively quick time frames. Food safety concerns may reduce demand for certain products, significantly change international food trade patterns, and limit market access. Using products that have been identified in recent food scares such as Bovine Spongiform Encephalopathy, Avian Influenza, and Swine Flu, the broad objective of this study is to examine the relevant factors that affect consumer demand.

Graduate Students (21)

O-FS-G-1

Reduction of *E. coli* O157:H7 on Beef Surfaces Using a Household Steam Cleaner. L. J. Alford*, A. K. Mahapatra, D. L. Harris, and G. Kannan, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Each year in the U.S., around 60 people die from *Escherichia coli* O157:H7 (*E. coli*) infections. Although this number is small compared to the U.S. population, this foodborne pathogen annually costs $405 million due to premature deaths, medical care, and loss of productivity. Foods that are widely consumed and identified as being contaminated are ground beef, milk and cheese products, lettuce, and spinach. There have been numerous studies done on reducing *E. coli* on different food surfaces. This study examines the possibility of using a household steam cleaner to inactivate *E. coli* on beef surfaces. Steam was applied to the inoculated beef samples for 30, 60, 90, and 120s at distances of 1, 1.5, 2, and 2.5". Microbial analysis was performed before and after steam treatment. The surface temperatures of beef samples before and after steam treatment were measured. Quality changes were determined by measuring beef surface color. Significant differences in *E. coli* reduction were observed between different treatment times and distances. Steam pasteurization treatment exposure time had a significant influence on beef surface color. The results indicated that the household cleaning system effectively reduced the levels of *E. coli* on beef surfaces.

O-FS-G-2

Effect of Storage Temperature on Antimicrobial Properties of Chicken Egg White Against *Salmonella typhimurium* in Liquid Egg. S. Anderson*, K. Walker, and S. Woldesenbet, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

The demand for liquid egg products in the food industry has been increasing in recent years. Some of the proteins in egg white are known to have antimicrobial properties. The objective of this study is to investigate the effect of antimicrobial properties of chicken egg albumen against *Salmonella typhimurium* at various storage conditions of liquid egg. The egg white and yolk was separated aseptically and grouped into 100% Albumen, 100% Yolk, 75/25%A Y, 50/50%AY and 25/75%AY. Samples were inoculated with 3.3-4.0 × 10^4 cfu/ml of *S. typhimurium* except control groups and groups that was prepared for pH measurement and stored at various temperatures (7°C, 22°C, and 35°C) for a period of 21 days. Antimicrobial property of egg content was then assessed by conducting standard bacterial enumeration methods on Day 1, 5, 10, 15 and 21. One ml of each sample was taken and serially diluted with 0.1% peptone water, followed by inoculation and incubation onto Brilliant Green Agar containing novobiocin and nalidixic acid at 37°C for 24 h. The results showed reduction of *S. typhimurium* in egg white stored at 22°C and 35°C compared to 7°C. The growth of *S. typhimurium* was not inhibited by any samples that contained yolk. The pH of egg albumen decreased in all days except Day1 at all storage temperatures. The growth of the *S. typhimurium* increased in all yolk containing samples at 22°C and 35°C temperatures. These results indicated that antimicrobial property of egg white is temperature dependent.

O-FS-G-3

Effect of Increased Frequency of Feeding of Channel Catfish, *Ictalurus punctatus*, on Growth, Yield, Survival, and Costs in Multiple-Batch Culture. U. Bastola*, C. R. Engle, and D. Freeman, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Channel catfish have been shown to have poorer growth and survival in winter months. Previous work suggested that feeding catfish more frequently and at lower temperatures than published recommendations might improve outcomes of catfish over the winter. Twelve 0.1-ha ponds were stocked with 987 kg/ha market-sized fish (> 0.54 kg; mean weight 1 kg) and 2,960 kg/ha sub-marketable fish (mean weight 0.23 kg) in November 2008. Treatments consisted of the following with four replications each: (1) Unfed; (2) Fed Daily; and (3) Fed less than daily (Fed LTD) based on feed consumption - temperature relationships developed in previous work. Fish in the Fed Daily treatment received feed for 90 days while those in LTD were fed for 62 days. Total feed fed was significantly higher in the Fed Daily treatment but the daily feeding rate was significantly lower than in LTD. Gross yields, net yields, survival, and mean weight at harvest of both market-sized and sub-marketable fish did not differ significantly among treatments. Net yield, though negative, was nominally improved in the LTD treatment. Fish did not lose weight in the LTD treatment, in contrast to results with previous recommendations. The partial budget analysis showed net loss of $151/ha of holding fish in winter. However, feeding less than daily resulted in a net positive change of $73/ha compared to no feeding. Increasing the frequency of feeding over the winter maintained the average weight of fish, but mortalities resulted in loss of overall yield.

O-FS-G-4

Effect of MAP in Combination with Phage Treatment to Control *Escherichia coli* O157:H7 on Lettuce. O. Boyacioglu*[1, 2], I. Goktepe[2], M. Sharma[3], and A. Sulakvelidze[4], [1]Energy and Environmental Systems Doctoral Program, [2]Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411; [3]USDA/ARS Environmental Microbial and Food Safety Laboratory, Beltsville, MD 20705; and [4]Intralytix, Inc., Baltimore, MD 21202.

A multi-state *Escherichia coli* O157:H7 (EHEC) outbreak linked to bagged spinach in 2006 has raised concerns about the safety of ready-to-eat vegetables. Current sanitizing methods have been ineffective in eliminating EHEC on fresh produce. One novel approach is to utilize lytic bacteriophages, which can kill enteric pathogens rapidly without affecting natural microflora on produce commodities. This study investigated the effectiveness of an EHEC-specific bacteriophage cocktail (EcoShield™) alone or in combination with modified atmosphere packaging (MAP) on contaminated green leaf lettuce. Pieces (2x2 cm^2) of lettuce were inoculated with 5-6 log CFU nalidixic acid resistant (Nal^R) strain of EHEC RM4407 and air-dried to promote bacterial attachment. EcoShield™ bacteriophage cocktail (8 log PFU/piece) was introduced by spraying on lettuce pieces. Lettuce pieces were stored in the dark at 4 and 10°C for 15 days under atmospheric air or modified (5% O_2/35% CO_2/60% N_2) atmosphere. EHEC levels were enumerated on MacConkey agar supplemented with 25 µg/ml Nal. The phage treatment significantly ($P<0.05$) reduced EHEC RM4407 Nal^R counts by 3-4 log CFU/cm^2 on the surface of experimentally contaminated

lettuce stored at 4 and 10°C under both MAP conditions. Oxygen levels in all packages did not fall below 3% during the 15-day storage period. Our results suggest that the EcoShield™ phage cocktail alone or in combination with MAP has the potential to control EHEC contamination on green leaf lettuce. Ongoing research is aimed at testing the efficacy of the phage cocktail on different leafy vegetables.

O-FS-G-5

Antimicrobial Resistance of *Enterococcus* in Convectional and Organic Chicken. A. Brown*, A. Kilonzo-Nthenge, D. Long, and C. Thompson, School of Agriculture and Consumer Science, Tennessee State University, Nashville, TN 37209.

Antimicrobial resistance in human pathogens is an escalating public health problem in the United States. The use of antimicrobials in commercial broiler poultry production results in the presence of drug resistant bacteria. This work aimed to isolate and characterize *Enterococcus* from chicken meat (ground chicken, wings, breasts) purchased from various local retail stores in Davidson County, Tennessee. Two hundred and ninety three samples consisting of organic and convectional chicken were analyzed for *Enterococcus* spp. Identification of *Enterococcus* was determined using convectional methods and API 20 Strep System. *Enterococcus*-like colonies were picked and tested for L-pyrrolidonyl-naphty-lamide using PYR and Eusclin tests. Kirby-Bauer disk diffusion test was used to determine antibiotic resistance. Out of 293 samples tested, 54% convectional and 46% organic chicken were *Enterococcus*-positive. Approximately, 12% of the isolates tested were resistance to all antibiotic tested. Most resistance was indicated in streptomycin, amikacin, and cefoxitin. The majority of the *Enterococcus* isolates were susceptible to amoxicillin/clavulanic acid, cefaclor, and Eryhromycin. With few exceptions, resistance against the different categories of antibiotics was more prevalent in strains from convectional chicken than in organic chicken. Thus, the presence of antibiotic-resistant *Enterococcus* on chicken meat retailed in markets may render a significant public health risk for humans.

O-FS-G-6

Analysis of the Food Security Situation in Selected West African Countries. J. Dumevi*, Department of Agriculture, Alcorn State University, Lorman, MS 39096.

Food security is described as a situation where all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs for an active and healthy lifestyle. A population is considered food secure when it has a reliable source of food and sufficient resources to purchase it. This research assesses why the issue of food insecurity has been prevalent in the West African region, despite it being one of the most fertile soils in the world. A well fed population is a precursor to economic growth and development, therefore identification of these factors is important in order to be able to provide policy guidance that could in the long run, alleviate the situation and promote regional economic growth and development. Six West African countries were studied in this research. They were Benin, Burkina Faso, Ghana, Niger, Nigeria and Senegal. Overall, the results indicated that some independent variables proved to be statistically significant in the explaining the situation, though they differed for each country. It could be deduced from the study that, with the right governmental and economic policies set in place, a population was more equipped to produce and be able to purchase food to meet their dietary needs. It also revealed that good governance was essential for the allocation and distribution of food aids from donor countries. This conclusion may have important implications for future policy making decisions to alleviate and improve the lives of people.

O-FS-G-7

Effects of Alfalfa, Rhizoma Peanut and Sericea Lespedeza Chopped Hays on Milk Production and Composition in Lactating Dairy Does. S. Dzimianski*, T. H. Terrill, B. Kouakou, J. H. Lee, and Y. Park, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

A study was performed comparing milk production and composition of twelve mid-lactation Alpine and Saanen dairy does fed alfalfa (*Medicago sativa* L.), rhizoma peanut (*Arachis glabrata* Benth.), and Sericea lespedeza [*Lespedeza cuneata* (Dum-Cours.) G. Don.] hay grown in Georgia or Alabama. Each doe was offered a 16% protein commercial ration at a rate based on milk production and then offered the chopped treatment hays *ad libitum*. Three groups of four goats were rotated through the diets in a diet x time Latin Square. For each rotation, each group was given ten days to adjust to the new feed, and then milk samples were collected and milk weights recorded over four days. Samples were analyzed for fat, protein, lactose, and total solids. Statistical analysis using the mixed procedure of SAS (including covariate analysis) was performed. There were no differences between goats fed alfalfa and rhizoma peanut in feed intake, production, percent fat, percent protein, percent lactose, or percent total solids. Goats fed alfalfa and rhizoma peanut produced more milk with a low percentage of fat than those fed

Sericea lespedeza. Actual fat produced was not different, while actual protein, lactose, and total solids were lower in Sericea than in the other two roughages. The results of this study indicate that rhizoma peanut serves as an excellent substitute for locally-grown alfalfa, and Sericea lespedeza, while not supporting the same production level as the other two roughages, may be a viable source of roughage if cost of production is lower.

O-FS-G-8

Evaluation of the Distribution of Cigarette Beetles, *Lasioderma serricone*, in Food and Feed Processing Plants. B. L. Gary*, and R. Mahroof, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

Cigarette beetle, *Lasioderma serricone* (L.) (Coleptera: Anobiidae), is a common pest of stored grain products, high value processed foods, tobacco and spices. With the phase out of methyl bromide in developed countries, a fumigant effectively used to control cigarette beetles, there is an urge find out viable alternatives to use in feed and food processing plants. In an effort to find out a viable alternative method to manage cigarette beetles, a study was conducted in selected food and feed processing facilities in South Carolina. Population of cigarette beetles were monitored using lures impregnated with synthetically produced sex pheromone serricornin in two types of sticky traps, Diamond and Thinline© from 2009-2010. Feed or food processing facilities were also monitored using absolute sampling methods by collecting product samples from tail ending, cracks-and-crevices, machineries and storage bins. This study further summarizes the results of monitoring and distribution of cigarette beetles in different facilities in South Carolina.

O-FS-G-9

Determinants of Food Insecurity in Alabama: A County Level Analysis. B. Gill*, J. O. Bukenya, B. Gyawali, and S. Banerjee, Department of Agribusiness, Alabama A&M University, Normal AL 35762.

The ability to obtain enough food for an active, healthy life is the most basic of human needs. Food insecure households cannot achieve this fundamental element of well-being. A high number of food insecure households in a nation with the United States' economic plenty means that the fruits of our economy, and the benefits of public and private programs for needy people, are not yet reaching millions of low-income people who are at great risk. In order to reach that portion of the population, states, counties and cities need to identify its hungry people, especially children, older Americans, and most recently, newly jobless people, so that provisions for nutritious food in adequate amounts are established. A close examination of Alabama data reveals that only 33 counties are food secure while the remaining 34 counties (50.7%) are food insecure. Among the food insecure counties, 21 (62%), which are mostly Black Belt counties, are extremely food insecure. The objectives in this paper are twofold. First, we develop and examine three aspects of food insecurity in Alabama, i.e. food availability, accessibility and absorption using county-level data drawn from the USDA-ERS Food Availability Data System. Second, we assemble county-level data from the US Census to examine the determinants of food security in Alabama. In selecting the variables that are hypothesized to affect food insecurity in Alabama, consideration was given to the fact that food security is a multidimensional phenomenon and its determinants are different at different levels of application, i.e. global, national, regional, household and individual level.

O-FS-G-10

Meat Goat Industry: Current Situation and Potential. R. B. Golkonda*, Department of Agricultural Sciences, Tennessee State University, Nashville, TN 37209.

In the United States, meat goat production has been gaining popularity in recent years because of a growing population of ethnic and faith-based groups who consume goat meat. The U.S. was a net exporter of goat meat up until 1990, but due to increased domestic demand, after 1994, imports now exceed exports. Over the past 15 years goat meat imports have increased on an average of 16% annually. The Food and Agricultural Organization statistics indicate that the U.S. in 2005 became the top importer of goat meat in the world with 18% of the world's market. In 2006, U.S. imported more than 11,000 million tons of goat meat valued at $ 41.8 million. Lack of organized markets and lack of understanding of consumer needs and preferences are some of the major issues faced by the U.S. meat goat industry. The goat meat market is unorganized and fragmented. One of the most popular markets in the meat goat industry today is the direct market. Producers cannot build an industry based solely on an off-the-ranch, holiday, and festival-oriented ethnic market. There are wide fluctuations in prices paid to produce and by customers, discouraging improvements in production. The purpose of this paper is to: (a) access the meat goat industry in the U.S. with a view to determine future outlook, and (b) to examine the markets and marketing structure to provide meat goat producers with information on the marketing of goat meat from the management perspective.

O-FS-G-11

Effect of Supplemental Sericea Lespedeza Leaf Meal Pellets on Gastrointestinal Nematode Infection in Grazing Goats. S. Gujja*[1], T. H. Terrill[1], J. A. Mosjidis[2], J. E. Miller[3], A. Mechineni[4], D. S. Kommuru[4], and J. M. Burke[5], [1]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; [2]Department of Agronomy & Soils, Auburn University, Auburn, AL 36849; [3]Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA 70803; [4]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; and [5]USDA, ARS, Dale Bumpers Small Farms Research Center, Booneville, AR 27927.

Feeding sun-dried Sericea lespedeza (SL; *Lespedeza cuneata*) reduces effects of gastrointestinal nematode (GIN) infection in goats fed in confinement, but effects when fed as a supplement under grazing are unclear. An 8-wk study was completed in which three supplemental complete rations (75 and 95 % SL leaf meal pellets and a 16% crude protein commercial pellet) were offered ad libitum to goats (Spanish, 9 months old, male, n = 10/treatment) grazing grass pastures in Fort Valley, GA, during September and October, 2010. Fecal and blood samples were taken from individual animals weekly to determine fecal egg count (FEC) and packed cell volume (PCV), respectively. The data were analyzed as repeated measures using SAS, with FEC data log transformed. There was no difference in FEC between goats fed the 75 and 95 % SL leaf meal pellets, but both groups had lower FEC than the goats fed the commercial pellets during weeks 5-8. The PCV values were not affected by the dietary treatments. Feeding supplemental SL pellets may be a useful tool for reducing GIN infection in grazing goats.

O-FS-G-12

Evaluation of Fungal Myceliated Grains for Controlling *Eimeria* sp. Infection in Broiler Chickens. J. Jackson*[1], D. Wall[1], W. Willis[1], O. S. Isikhuemhen[2], R. Minor[1], F. Anike[2], and S. Hurley[1], [1]Department of Animal Sciences, and [2]Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

An experiment was conducted to determine the effect of feeding different exotic mushroom forming fungi (EM1-5) as fungus myceliated grain (FMG) to broiler chickens for controlling field-strains of *Eimeria* sp. One hundred and eighty broiler chicks were subjected to the following treatments in a 28-d trial: 1) Control-1 (No *Eimeria* challenge); 2) Control-2 (No FMG, *Eimeria* challenged); 3) EM1 (no challenge); 4) EM1 (challenged); 5) EM2 (no challenge); 6) EM2 (challenged); 7) EM3 (no challenge); 8) EM3 (challenged); 9) EM4 (no challenge); 10) EM4 (challenged); 11) Combined exotoc mushrooms (CEM) (no challenge); and 12) CEM (challenged). Chicks were challenged with an *Eimeria* mixture with a target dose of 50,000 oocysts/chicks at 14 d of age. Weekly body weights, mortality, oocysts count, bursa weights, and antibody titer were measured between treatments. Significant body weight differences were observed at 21 and 28 d between challenged and unchallenged treated chicks, but no differences within treated groups were found except for treatment 7, which exhibited significantly lower body weights in the unchallenged chicks. Mortality was higher in treatment 4, with all chicks exhibiting similar bursa weights. *Eimeria* oocyst counts did not differ significantly between unchallenged treated chicks and only treatment 7 differed from the challenged chicks with the highest oocyst count. The challenged chicks receiving the fungal myceliated grains had the highest IgA titers. The results from this study suggest that differences in weight gain and oocyst shedding of coccidiosis is impacted by different species of mushrooms administered via fungus myceliated grain to broiler chicks.

O-FS-G-13

Growth of Foodborne Pathogens in No-Knead Bread Dough during Prolonged Yeast Fermentation. L. Jordan, Jr.*[1,3], W. Long III[1,4], P. Inserra[2], B. Sayre[3], C. Kim[1], and S. Pao[1], [1]Agriculture Research Station, [2]Department of Agriculture and Human Ecology, and [3]Department of Biology, Virginia State University, Petersburg, VA 23806; and [4]Environmental Science Program, Arkansas State University, Jonesboro, AR 72467.

A convenient bread making method involving prolonged fermentation of no-knead (nonkneaded) dough has become popular in recent years. However, data are lacking on the consumer safety aspect of this simplified practice. In the present study, the microbial safety of no-knead dough made with a 375:325:5:1 weight ratio of flour, water, salt, and bread yeast was investigated. Three brands of dehydrated yeast were used for this study. The growth of inoculated *Salmonella enterica* and *Staphylococcus aureus* in no-knead dough during fermentation was significant ($P<0.05$), regardless of yeast brand. The multiplication rates of *S. enterica* in the initial 12 h and *S. aureus* over the entire 24 h of fermentation were positively correlated with fermentation temperature from 21 to 38° C ($P<0.005$; $r\geq0.996$). Mean counts of *S. enterica* increased by 0.5, 1.5, 1.9, and 2.4 log CFU/g, respectively, after 6, 12, 18, and 24 h fermentation at 21° C. The level of *S. aureus* increased by 0.4, 1.1, 1.7, and 2.2 CFU/g, respectively; after 18 h

of fermentation at 21, 27, 32, and 38^{o} C. Because prolonged fermentation permits substantial growth of infectious and/or toxin-producing foodborne pathogens, the making of slow-rise, no-knead bread may compromise consumer kitchen sanitation and food safety. Findings from this study may contribute to future research for the development and validation of no-knead bread recipes that do not promote growth of foodborne pathogens.

O-FS-G-14

Toxicity of Commonly Used Agricultural Chemicals to Copepods in Arkansas Aquacultural Ponds. A. Kcgorkha*, and A. M. Kelly, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Elimination of predacious copepods from ponds prior to stocking larval fish is essential to their survival. One method of removing copepods is to treat the water with chemicals. This study determined the LC_{50} values of Dylox®, K-tea®, Brigade®, Micropur MP®, Dimlin® and Cutrine Plus® on cyclopoid and calanoid copepods in soft and moderately hard water at 20, 25 and 30 ^{0}C. Tests included six concentrations of the chemicals including a control. Ten copepods were stocked into test tubes of water mixed with the appropriate chemical with each concentration triplicated. Dead copepods in each test tube were counted and recorded. Data were analyzed using probit analysis to estimate the LC_{50} value. In this study, Brigade® was the most toxic chemical to copepods at all temperatures and water hardnesses. Brigade® was significantly more toxic to cyclopoid copepods in soft water at 20 and 25 ^{0}C versus 30 ^{0}C. The LC_{50} value of Brigade® to calanoid copepods in moderately hard water at 20 and 25 ^{0}C was significantly higher than at 30 ^{0}C. This study is the first study to demonstrate that cyclopoid and calanoid copepods have different tolerances when exposed to Brigade® at different temperatures and water hardness.

O-FS-G-15

Efficacy of Ozone Washers in Reducing Natural and Inoculated Microorganisms on Tomatoes and Scallions. W. Long III*[1,3], E. Westbrook[1], P. Inserra[2], S. Ahn[3], and S. Pao[1], [1]Agriculture Research Station and [2]Department of Agriculture and Human Ecology, Virginia State University, Petersburg, VA 23806; and [3]Environmental Science Program, Arkansas State University, Jonesboro, AR 72467.

Contaminated produce is a major cause of bacterial-related foodborne illnesses in the United States. To meet consumer's demand for safer produce, effective sanitizing methods need to be developed and verified. This study investigated the efficacy of ozone washing appliances for microbial decontamination of tomatoes and green onions. Produce were submerged for light or heavy washing in ozone Washer-A or –B (Washer-B generates higher levels of ozone and agitation) or non-ozone Washer–C. Ozone washings reduced total aerobic mesophile counts on whole tomatoes but not green onions when compared to unwashed samples. Washer-B at heavy setting reduced coliform numbers on whole tomatoes by 1.9 CFU/g. Furthermore, Washer-B yielded more than 2.0 log reductions of *Escherichia coli* (inoculation level at ~6.3 log CFU/g) on the edible portions of tomatoes than Washer-A at comparable settings. A follow-up study using Washer-B showed that ozone application can significantly reduce *E. coli* and *Salmonella* in produce wash water to prevent cross-contamination. However, when compared to non-ozone washing of produce, improved reduction of natural and artificially inoculated microorganisms by ozone applications was not found. Microscopic observation corroborates microbial enumeration showing that removing non-edible portions (stem-scars or root-bulbs) of washed tomatoes and green onions is beneficial for microbial decontamination.

O-FS-G-16

Monitoring for Resistance to Miticides in the Ectoparasitic Mite, *Varroa destructor*, Populations in Honey Bee, *Apis mellifera*, Colonies. K. Marshall*[1], L. H. B. Kanga[1], and J. Adamczyk[2], [1]College of Engineering Sciences, Technologies and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]USDA/ARS/BIRU, Weslaco, TX 78596.

The occurrence of resistance to pesticides in *Varroa* mite populations is a serious threat to the beekeeping industry and crops that rely on honey bee for pollination. The present study was undertaken to monitor the evolution and spread of resistance in *Varroa* mite and to develop a resistance management strategy. *Varroa* mites collected from several apiaries were screened using the glass vial bioassay procedure to determine their susceptibility to insecticides. Thus, diagnostic concentrations needed to separate susceptible genotypes from resistant individuals were determined for cypermethrin (0.1 µg per vial), fluvalinate (5 0. µg per vial), malathion (0.01 µg per vial), coumaphos (10.0 µg per vial), diazinon (5.0 µg per vial), methomyl (0.5 µg per vial), propoxur (0.1 µg per vial), and endosulfan (2.5 µg per vial). Resistance to organophosphorus insecticides (malathion, coumaphos) and pyrethroids (cypermetrhrin, fluvalinate) was widespread in both Florida and Texas from 2007 to 2010. There was no resistance to endosulfan, diazinon, methomyl and propoxur in field populations of *Varroa* mite in both states. The seasonal

patterns of resistance in Florida were different from those of Texas, where the frequencies of resistance to all insecticides tested decreased significantly from 2007 to 2010. Resistance levels were unstable, suggesting that resistance could be successfully managed. The study led to the development of a fast, simple and user-friendly resistance monitoring technique needed to maximize the likelihood of success in resistance management programs for *Varroa* mite populations. It enabled beekeepers to make informed decisions on an overall integrated pest management strategy.

O-FS-G-17

Effect of Grazed Sericea Lespedeza on Gastrointestinal Nematode Infection in Goats. A. Mechineni*[1], T. H. Terrill[1], J. A. Mosjidis[2], J. E. Miller[3], S. Gujja[1], D. S. Kommuru[1], and J. M. Burke[4], [1]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; [2]Department of Agronomy & Soils, Auburn University, Auburn, AL 36849; [3]Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA 79803; and [4]USDA, ARS, Dale Bumpers Small Farms Research Center, Booneville, AR 272927.

Grazing Sericea lespedeza (SL; *Lespedeza cuneata*) may reduce gastrointestinal nematode (GIN) infection in goats and provide an alternative to mature perennial grass pasture for autumn grazing. An 8-wk study was completed at Fort Valley State University in Fort Valley, GA, comparing goats (Spanish, 9 months old, male, n = 10/treatment) grazing bermudagrass (BG, *Cynodon dactylon*) pasture only, BG + SL pasture, or SL pasture only during September and October, 2010. Fecal and blood samples were taken from individual animals weekly to determine fecal egg count (FEC) and packed cell volume (PCV), respectively. The data were analyzed as repeated measures using SAS, with FEC data log transformed. Goats grazing SL only pastures had lower FEC than those grazing the BG + SL or BG only pastures during wk 2 and wks 5-8 of the trial, while the BG + SL pasture goats tended to have lower FEC than the BG only animals in wks 7-8. The PCV values were not affected by the grazing treatments. Grazing SL pasture in autumn is a useful alternative to perennial summer grass pasture for goats.

O-FS-G-18

Biological Parameters of *Trichogramma fuentesi* (Hymenoptera: Trichogrammatidae), an Egg Parasitoid of *Cactoblastis cactorum* (Lepidoptera: Pyralidae). O. Paraiso*[1], M. T. K. Kairo[1], S. D. Hight[2], S. Bloem[3], and J. Carpenter[4], [1]Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; [2]USDA-ARS, Center for Medical Agricultural and Veterinary Entomology, Tallahassee, FL 32308; [3]USDA-APHIS-PPQ-CPHST, Plant Epidemiology and Risk Analysis Laboratory, Raleigh, NC 27606; and [4]USDA-ARS, Crop Protection and Management Research Unit, Tifton, GA 31793.

Cactoblastis cactorum is a serious pest of prickly pear cactus, *Opuntia* spp., in Florida, including the common prickly pear cactus (*Opuntia ficus-indica*). Presence of *C. cactorum* is of great concern because of its potential adverse impacts to ecological systems and to native and endangered *Opuntia* spp. in southwestern U.S. Two egg parasitoids from the *Trichogramma* genus, *T. pretiosum* and *T. fuentesi*, were identified attacking *Cactoblastis cactorum*, a pest of *Opuntia* spp. in North Florida. To examine the potential of *T. fuentesi* as an agent for inundative control of *C. cactorum*, its biological parameters were assessed under laboratory conditions. *Trichogramma fuentesi* females used in this study were isolated from a rearing colony originating from field-collected material. The cultures were maintained in growth chamber at 28 +/- 1°C, 16:8 L:D and 60-80% RH. Influence of the nutritive quality of rearing diet on longevity, the mating experience, and the parasitoid and host age on level of parasitism was evaluated. Results from the experimental study demonstrated that the presence of a source of energy had an impact on the female longevity. Female parasitoids supplemented with a diet composed of pure honey lived the longest with an average of 13 days. Mated female parasitoids parasitized a higher number of *C. cactorum* host eggs. The percentage of parasitism significantly decreased as the female age increased. One to two-day old female parasitoids had the highest level of parasitism. The optimal age for host eggs for *T. fuentesi* parasitism ranged from one to five-day old.

O-FS-G-19

The Antimicrobial Stability of Muscadine Seed Extract. D. Tice*, and B. Min, Department of Food and Nutritional Sciences, Tuskegee University, Tuskegee, AL 36088.

Foodborne outbreaks and recalls have increased consumer demand for safe foods in the market. To inhibit microbial growth on foods, synthetic antimicrobials have been used. Due to concerns about synthetic food additives, natural antimicrobials are a useful application for food safety. Plants have their own defense systems including natural antimicrobials. Our previous study determined that the antimicrobial activity of muscadine (*Vitis*

rotundifolia) seed extract was higher than that of flesh or skin extract. Therefore, in this study muscadine seed extract was tested for its stability of antimicrobial effect against *E. coli* O157: H7 and *Salmonella typhimurium*. Bronze muscadines were harvested, washed and the seeds were collected. The seeds were vacuum freeze dried and ground into a fine powder. Extraction was performed using 70% ethanol in a 1: 5 mixture and agitated overnight on a shaker. The extract was then centrifuged and filtered using a 45µm pore syringe filter. Antimicrobial activity of the extract was tested during six weeks of storage at 4 and 21°C. Inhibition zone assay was conducted using soft tryptic soy agar (TSA) inoculated with 3~4 Log CFU/mL of *E. coli* O157: H7 and *S.* typhimurium respectively. Sterile paper circles were placed on the soft agar and .01mL of extract was dispensed onto each circle and incubated at 37°C for 48h. Sterile paper without antimicrobial agents was used as a control. The results suggest that the active components of muscadine seed extract are still viable after six weeks of storage.

O-FS-G-20

Effects of Lime Juice, Lime Oil, Citric Acid, Sodium Citrate, and Sodium Chloride on Reduction of *Salmonella typhimurium.* K. Walker*, S. Anderson, L. Wilburn, G. Mackey, D. Nelson, and S. Woldesenbet, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

The objective of this experiment is to determine the effects of lime juice, lime oil, citric acid and sodium citrate with and without sodium chloride on the reduction of *S. typhimurium* attached on chicken skin. Chicken skin sections (2.0 cm^2) were inoculated with 3.3 - 5.5 × 10^8 CFU /cm^2 at 22°C for 30 min. Skin sections were then treated with solutions of PBS (control), two levels of lime oil and sodium citrate (1.2%, 1.5%), four levels of citric acid, one level of sodium chloride (2%), two level of lime juice (10%, 15%) and incubated at 7°C and 22°C for 2 and 24 hours. The pH was measured using uninoculated solutions. Skin samples were homogenized in 0.1% peptone water for 2 min. The growth of *S. typhimurium* was assessed by recovering the bacteria from serially diluted homogenizing water, followed by inoculation and incubation onto Brilliant Green Agar containing novobiocin and nalidixic acid at 37°C for 24 h. The results showed that the numbers of viable population of *S. typhimurium* on the chicken skins were reduced by > 6.0 $\log_{10}$ in citric acid at 1.2 and 1.5% with and without sodium chloride solution. Similar results were found with lime juice of 15% with and without NaCl. Lime oil and sodium citrate showed no significant difference at these concentrations compared to control groups. These results indicated that bacterial reductions following treatment with lime juice and citric acid with and without NaCl appeared to relate with low pH values these chemicals generated.

O-FS-G-21

Evaluating Medicinal Mushrooms Usage at Different Levels of Supplementation on Broiler Performance. D. Wall*[1], J. Jackson[1], W. Willis[1], O. S. Isikhuemhen[2], R. Minor[1], S. Hurley[1], and F. Fnike[2], [1]Department of Animal Sciences, and [2]Department of Natural Resources & Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

A 49-day trial was conducted to evaluate the performance response of broiler chickens after administration of different medicinal mushrooms (MM1-4) given at two levels via fungus myceliated grain (FMG). Two hundred seventy day-of-hatch chicks were randomly placed in a factorial arrangement as follows: 1) Control-No MM; 2) MM1-5%; 3) MM1-10%; 4) MM2-5%; 5) MM2-10%; 6) MM3-5%; 7) MM3-10%; 8) MM4-5%; and 9) MM4-10%. Body weights, mortality, oocyst count, and blood differential parameters were measured. There were significant differences in body weights on day 28 and 49. Body weights in treatments 2, 6, 7, 8 and 9 did not differ on day 28 from the control, whereas on day 49, treatment 2, 6, 7, and 9 differed. Treatment 8 had the higher body weight (3.21kg) and treatment 5 had the lowest (2.33kg). There were significant differences in oocyst counts between treatments. Treatment 6 had the highest oocyst count which differed significantly from all other treatments. Mortality and blood differential did not differ significantly. The result from this study indicates that the different fungi and level of inclusion into the ration can impact the performance responses significantly.

Scientist (23)

O-FS-S-1

Bioaccumulation of Seven Heavy Metals in Sweetpotato Grown in Sewage Sludge Amended Soil. G. F. Antonious*[1], S. O. Dennis[2], J. M. Unrine[3], and J. C. Snyder[4], [1]Department of Plant and Soil Science, Land Grant Program, Kentucky State University, Frankfort, KY 40601; [2]Department of Agricultural Sciences, Tennessee State University, Nashville, TN 37209; [3]Department of Plant and Soil Sciences and [4]Department of Horticulture, University of Kentucky, Lexington, KY 40546.

Municipal sewage sludge (MSS) is currently used for land farming as an alternative to synthetic fertilizers to alleviate the escalating production costs associated with the increasing costs of energy and fertilizers and problems of soil deterioration and erosion associated with intensive farming systems. MSS contains heavy metals that might impact crop quality and human health. The objectives of this investigation were to study the impact of MSS and yard waste (YW) on: 1) sweet potato yield and quality and 2) concentration of seven heavy metals (Cd, Cr, Mo, Cu, Zn, Pb, and Ni) in sweet potato plant parts (edible roots, leaves, stem, and feeder roots). Soil samples were collected and analyzed for total and extractable metals using nitric acid (to extract total metals from soil) as well as $CaCl_2$ solution (to extract soluble metals that are available to plants). Elemental analyses were performed using inductively coupled plasma mass spectrometry (ICP-MS). Overall, plant available metals were greater in soil amended with MSS compared to control plots. Concentration of Pb was greater in YW than MSS amendments. Total concentrations of Pb, Ni, and Cr were greater in plants grown in MSS+YW treatments compared to control plants. MSS+YW treatments increased sweet potato marketable yield compared to plants grown in native soil. Except for Cr, concentration of heavy metals in MSS amended soil and in sweet potato roots were below their respective permissible limits. Monitoring heavy metals in edible plants should be regarded as a requirement for the safe use of MSS in agricultural fields.

O-FS-S-2

Impact of Marketing, Trade and Exchange Rate Policies on U.S. Catfish and Trout Markets: Results from Disaggregated Fish Sector Models. M. M. Dey*, and K. Singh, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff AR 71601.

Catfish and trout aquaculture have grown into industries of significant importance in several regions of the United States. Dynamics of the national economy, federal and state policies, and international trade can have significant and unanticipated effects on the competitiveness of the U.S. catfish and trout markets. Quantitative models are often used to forecast industry trends, effects of anticipated macroeconomic factors, and impacts of proposed policy initiatives. The University of Arkansas at Pine Bluff has recently constructed models for the U.S. catfish and trout markets for assessing the impact of various policy options. This presentation gives the structural version of the model, outlines the estimation strategy for specifying its parameters, and reports the results from simulations. Both of the models (US-Catfish Model and US-Trout Model) consist of three cores: consumer core, producer core and trade core. The models integrate common features of partial equilibrium and gravity models to assess effects on prices and quantities demanded and supplied under a variety of alternative policy options. The US-Catfish Model differentiates among U.S. farm-raised catfish, imported catfish and imported basa/tra, and assesses the impact of changes in feed price, generic advertisements, import tariff, country of origin labeling, exchange rates, and national income on demand for and supply of these products in U.S. market. The US-Trout Model considers imported trout and U.S. domestic trout as distinct products, and simulates the affects of changes in import tariffs and exchange rates on demand for and supply of domestic trout and imported trout in U.S. market.

O-FS-S-3

Nutritive Composition of Omega-3 Fatty Acid-Rich *Ricinodendron heudelotii* (ndjansang) and its Potential for Nutrition and Health. M. O. Ezekwe*[1], S. A. Besong[2], and R. Johnson[1], [1]Alcorn State University, Alcorn State, MS 39096; and [2]Delaware State University, Dover, DE 19901.

Ricinodendron heudelotii (ndjansang) is a forest tree found in tropical forest of Cameroon, West and Central Africa. The tree seeds or kernels have characteristic flavor, and are used as spices, and thickening for soups by the population. The present day western diet has shifted to unproportional consumption of omega-6 fatty acids abundant in oil seeds with little or no omega-3 fatty acids, leading to increased risks of certain forms of cancer and cardiovascular diseases. A compositional analysis of ndjansang oil seed revealed a unique nutrient presence of long chain omega-3 fatty acids not usually associated with plant materials. The oil seed had 31.4% crude protein and 44.7% lipid. Of the lipid component, saturated and unsaturated fatty acids were 13.5 and 86.5%, respectively. Seventy-three percent of unsaturated fatty acids was composed of polyunsaturated fatty acids (PUFA), almost entirely composed of eicosapentaenoic acid with 6.89, 24.9, 0.8, and 0.7% oleic, linoleic, α-linoleic and docosahexaenoic acids, respectively. Antioxidant vitamin content of the seed was expectedly high, with 192 and 2.79 iu/100g of vitamin A (from carotenes) and E. The presence of PUFA fatty acids from land-based sources not usually associated from long chain omega-fatty acids, as well as rich crude protein and antioxidant levels, promises a sustainable supply of these fatty acids for human and animal nutrition.

O-FS-S-4

A Multi-Faceted Education Program Improves Food Safety Knowledge and Reported Practices of Older Adults. S. Godwin*[1], R. Harrison[1], R. Stone[1], L. Speller-Henderson[1], and S. Cates[2], [1]Department of Family and Consumer Science, Tennessee State University, Nashville, TN 37209; and [2]RTI International, Research Triangle Park, NC 27709.

Because of their weakened immune system, older adults are at a higher risk for foodborne illness. This project examined seniors' food handling knowledge and practices in order to develop and evaluate the effectiveness of educational material delivered via two methods. Risky practices were identified using a Web-enabled survey. An educational booklet and website were developed. Pretests were completed through in-person surveys with different senior groups in middle Tennessee. Seniors who participated in the survey received educational information via the Internet or by mail. Six weeks later participants completed the post-test, which, in addition to knowledge and practice questions, contained items used to evaluate the educational materials. For those who reported reading the materials, there was an increased awareness of recommended food safety practices. Significantly more respondents had a refrigerator thermometer and had checked it recently, refrigerated leftovers within the recommended time, and reheated leftovers to boiling or steaming. Use of food thermometers was still limited. Most said the educational booklet was helpful and kept it for future use. The printed booklet was revised, has been published and is in the process of distribution. The website is available for viewing at http://agfacs.tnstate.edu/srsfoodsafety.

O-FS-S-5

Will Female Channel Catfish Select Themselves for Artificial Spawning? A. Haukenes*, and D. Heikes, Aquaculture Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71603.

Hybrid-catfish fingerling production is reliant upon artificial spawning practices that select female fish ready to ovulate. We evaluated a system designed to concentrate female catfish and determined whether the system selected fish more likely to ovulate. Mesh fencing separated the shallow end from deeper end in this preliminary study. Two points in the pond barrier permitted one-way fish travel from the deep to the shallow end of the pond. We stocked 50 female fish into the deep ends of both ponds. Caged male channel catfish were placed across the baFSier in one pond. After 10 days, the ponds were seined, the number of female fish crossing the barrier tallied, and a sub-sample of these fish injected with carp pituitary extract to induce spawning. A larger proportion of females crossed the barrier in the pond containing males; these females ovulated at higher rates than females held with no males. In both ponds, females crossing the barrier ovulated at slightly higher rates than fish that failed to cross. This approach was able to concentrate catfish and provide marginal increases in ovulation rates among graded fish. We are currently adapting this technique to include a means of 'seine-less' capture with more testing scheduled.

O-FS-S-6

Differential Responses of Breeding Strains to Straighthead in Natural Conditions. B. Huang*, and Z. Yan, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Straighthead disorder is the most important non-fungal disease of U.S. rice and the oldest rice disease in Arkansas. When a highly susceptible variety is grown under conditions conducive to Straighthead, yield losses can be significantly high. Reducing the impact of Straighthead to rice or improving germplasm of tolerance to Straighthead will greatly increase yield and reduce rice production costs. Three cultivars and nine breeding strains of long grain rice were selected to evaluate the effect of Straighthead disease of rice in natural field. Experiments were set up on the University of Arkansas Pine Bluff (UAPB) farm (Latitude: 34° 15' N, Longitude: 92° 01' W, Elevation: 232 feet). Rice was planted on April 28 in 2008, and repeated on April 28, May 8, and May 18 in 2009. Grain yields of cultivars and strains that were affected by Straighthead were greatly reduced. Breeding strains PB-11 and PB-12 showed good tolerance to Straighthead in both years. Strain PB-2 showed good tolerance to Straighthead in 2008 and little increase in 2009. However, as same as PB-11 and PB-12, its yields were significantly greater than control cultivar Francis in both years ($P<0.001$). Strain PB-13 showed an unstable resistance to Straighthead with season in 2009, and the yields were greatly reduced by the increased Straighthead levels on April 28th 2009. Our findings may indicate the presence of genetic variation of Straighthead resistance, and may well suggest a possibility for genetic improvement towards tolerance of Straighthead in rice production.

O-FS-S-7

USDA Food-Borne Virus Research Initiatives at Delaware State University. D. H. Kingsley*, USDA Seafood Safety Lab, Delaware State University, Dover, DE 19901.

The USDA ARS Microbial Safety of Aquaculture Products Center of Excellence located on the campus of Delaware State University is conducting research geared toward: 1) improving detection methods for virus

contamination of shellfish; 2) understanding how and why viruses persist within shellfish; and 3) identifying non-thermal methods to eradicate or inactivate viruses from raw shellfish. Recent research findings include demonstration that hepatitis A virus (HAV) and murine norovirus (MNV) can readily persist within oyster hemocytes (blood cells), and demonstration that these hemocytes can be used as a basis for an expedient virus detection method. High pressure processing (HPP) has been identified as a potential method for inactivating food-borne viruses within raw shellfish. Research has demonstrated that HPP can inactivate HAV, MNV, and most recently human norovirus, directly within shellfish.

O-FS-S-8

The Effect of Cash Flow and Credit Constraints on Financial Feasibility and Stocking Strategies on U.S. Catfish Farms: A Mixed-Integer Multi-Stage Programming Approach. G. Kumar*, and C. Engle, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

The availability of credit for aquaculture businesses historically has been problematic in the U.S., but little attention has been paid in the aquaculture economics literature to effects of restricted credit and cash flow deficits on the feasibility and optimal management of fish farms. An existing multi-stage mathematical programming model of catfish production was extended to include cash flow, lending, and repayment constraints and activities for various farm sizes and levels of equity. Cash flow constraints affected the optimal management plan for catfish farms, with greater changes occurring in the optimal plans for smaller farms. Smaller farms generally were affected more severely than larger farms by restricted access to capital. Sales restrictions (that reduce cash inflow due to a decrease in sales) of only 5% caused small farms to become infeasible (when debt servicing of long-term debt was considered), while the largest farm sizes considered could withstand only a 20% reduction in sales before becoming infeasible. New startup catfish farms would improve cash flow (but not profits) by purchasing large stockers for Year 1, but would need to transition to other management plans to maximize profits in subsequent years. However, use of stockers in Year 1 requires maximum levels on operating capital lines of credit that are much higher than if fingerlings only are stocked. Under-capitalization of catfish farms increases financial risk because the cash flow constraints force farms to operate at sub-optimal levels, leaving them more vulnerable financially to adverse production and/or market conditions. Results of this study confirm suggestions that tight credit for catfish farms may have contributed to recent contractions in the industry.

O-FS-S-9

Dispersal and Host Use Pattern of *Lasioderma serricorne* (F.) and Synthetic Pheromone-Based Mating Disruption of Adult Beetles in Food and Feed Processing Facilities. R. M. Mahroof*[1], and T. W. Phillips[2], [1]Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117; and [2]Department of Entomology, Kansas State University, Manhattan, KS 66506.

The cigarette beetle, *Lasioderma serricorne* (F.)(Coleoptera: Anobiidae), infests milled products, packaged or processed value added goods, animal feed, and processed spices which caused significant damage to multi-billion dollar food and feed industries each year. Because of the adverse effects of methyl bromide on stratospheric ozone layer, a common fumigant used in managing stored products insects is being phased out in the USA. There is an urge to seek alternative management strategies that are non-chemical and environmentally benign to use in stored products environment. In the process of developing reduced-risk management strategies for Anobiidae, a study was designed to investigate the dispersal of *L. serricorne* among habitats by defining the food resource use pattern and the dietary history, as well as to evaluate the effectiveness of synthetic pheromone-based mating disruption in food and feed processing facilities. Natural stable carbon and nitrogen isotopes and trace elements were used to track the dietary history of adult beetles. Synthetic serricornin was used in lures along with traps that were deployed in several food and feed processing facilities located in the state of South Carolina for monitoring of *L. serricorne* populations and then a mating disruption study was conducted in the summer of 2010. In this paper, results were summarized on these studies that suggest variation in dispersal and food use patterns with promising a future for pheromone-based mating disruption of *L. serricorne.*

O-FS-S-10

A Glance at Microsatellite Motifs from the 454 Sequencing Reads of Genomic DNA of Watermelon. P. Nimmakayala*[1], S. K. Ponniah[1], J. Thomson[1], A. Levi[2], Y. Tomason[1], and U. K. Reddy[1], [1]Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112; and [2]USDA, ARS, U.S. Vegetable Laboratory, Charleston, SC 29414.

We report large-scale isolation of SSR markers from a single run of watermelon (*Citrullus lanatus*) genomic DNA using 454 Life Sciences sequencing technology. We have characterized a total of 2143 contigs that

contain a total of 2727 SSRs from a pool of 13,176 contigs of 454 sequencing reads. We identified 587 SSR motifs that could be used as potential molecular markers based on their longer repeat lengths and quality of flanking sequence for primer design. We further calculated the proportions of di, tri, tetra, penta and hexa nucleotide repeats in the total repeat pool. A subset of 24 primer pairs from the database of 587 pairs was randomly picked for amplification. When amplified in eight reference collections of *Citrullus lanatus*, *Citrullus citroides*, *Citrullus colocynthis*, *Lagenaria*, *Cucumis melo*, *Cucumis sativus* and *Cucurbita pepo*, a sizable degree of transferability of repeat motifs across the Cucurbitaceous family was revealed.

O-FS-S-11

Internet Usage in Sub-Saharan Africa: Implications for Food Security. Z. I. Olorunnipa*, Agribusiness Program, Florida A&M University, Tallahassee, FL 32307.

Food insecurity, with its attendant multitude of problems such as hunger, poverty, malnutrition, political instability, wars, death, etc. continues to defy solution despite global efforts of both the developed and developing worlds. In 1974, during the first World Food Summit, the US secretary of state, Henry Kissinger, declared that global hunger would be eradicated by 1984. Paradoxically, the number of people lacking access to the minimum diet has risen from 824 million in 1990 to 1,020 million in 2009. This intractable food insecurity is most severe in Sub-Saharan Africa and in Asia. In Sub-Saharan Africa, between 33 to 35% of the population are said to be malnourished. The current economic crisis threatening all parts of the world may exacerbate the food insecurity problem unless numerous approaches are taken to combat the problem. That is why this paper explores the potential of the current fastest growing technology, the Internet, in promoting food security and standard of living in Africa. The paper seeks to understand the current usage status of the Internet in the continent and statistically identify factors that influence its adoption. Based on the results, policy implications are drawn for the use of the Internet in dealing with food security issues in Africa.

O-FS-S-12

Population Structure and Co-Localization of Fruit Related Quantitative Trait Loci in *Capsicum* Cultivated Complexes. S. K. Ponniah*, G. Hankins, U. K. Reddy, and P. Nimmakayala**,** Gus R. Douglass Land-Grant Institute and Department of Biology, West Virginia State University, Institute, WV 25112.

Quantitative Trait Loci (QTLs) controlling the morphological differences between two major *Capsicum* complexes, such as *Capsicum annuum* and *Capsicum baccatum*, were investigated in two different F_2 populations by means of AFLP markers. As various pepper complexes are the products of different countries, ecologies and cultures, the natural history of pepper domestication appears to be highly reticulate. Molecular marker characterization of 62 different genotypes helped to identify the contrasting parents from each complex used as a source material for mapping populations. We used 6+6 cutter restriction enzyme combinations to avoid the clustering and to resolve the map positions. Twenty-eight primer combinations used for AFLP analysis produced 1158 polymorphic bands, a number sufficient to resolve with high confidence relations between the various *Capsicum* taxa. In our study, 108 common markers were mapped in both linkage groups and co-linear relationships were established, which helped to identify 12 co-linear QTL that are conserved in both cultivated complexes.

O-FS-S-13

AtPDR-13 is Involved in Arsenic Sequestration in *Arabidopsis*. N. N. Renukdas*, and M. Manoharan, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Agricultural practices and industrial processes contaminate soil and environment with heavy metals. Among heavy metals, arsenic is an extremely toxic metal which adversely affect plants, animals, and human health, and the development of phytoremediation technologies for the plant-based clean-up of arsenic contaminated soils is therefore of significant interest. *Arabidopsis* contain approximately 130 ATP-binding cassette transport proteins, which includes PDR and MRP subfamilies. Members of the PDR genes are known to play a role in the sequestration of toxic compounds in plants. We have cloned the full length *AtPDR13* gene and over-expressed in *Arabidopsis* to test arsenic sequestration. Wild-type, *AtPDR13* over-expression, *AtPDR13* RNAi, and *AtPDR13* mutant T_2 seeds were cultured on half strength MS medium with sodium arsenate (100µM). The shoot fresh weight of *AtPDR13* RNAi and mutant lines were higher than *AtPDR13* over-expression and wild-type lines in samples treated with sodium arsenate. Mutant lines showed highest root fresh weight. Arsenic was found less in RNAi than over-expression and wild-type lines. The results indicated that *AtPDR13* may have a role in arsenic uptake and the over-expression of *AtPDR13* may help in phytoremediation.

O-FS-S-14

Molecular Genetic Analysis of Female Receptivity to Mating in *Drosophila melanogaster.* D. Scott*[1], and H. Singh-Dhillon[2], [1]Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117; and [2]Department of Biological Sciences, Delaware State University, Dover DE 19901.

We used DNA microarrays from female *Drosophila melanogaster* to identify genes that potentially affect mating receptivity and mate choice. *D. melanogaster* is ideal for this kind of molecular genetic analysis because commercial DNA microarrays are available, and these flies are genetically similar to pest species such as tsetse flies and mosquitoes. We tested females from two wildtype *Drosophila* strains that differ in their normal mating receptivity. Females from each strain were paired with males for 30 minutes and then grouped according to whether they mated quickly (within a specified time) or did not mate. A control group of naïve virgin females was never exposed to males. RNA from each of the six groups was extracted, and the cDNA was hybdridized to GeneChip DNA microarrays. From approximately 13,800 genes in the *Drosophila* genome, there were about 500 differences among treatments in one strain and about 250 in the other. We focused on genes that differed between the controls and at least one experimental group for both strains and that had relatively large differences in magnitude. Genes that were unlikely to be behavior related genes such as egg chorion genes and cuticular protein genes were excluded. Several candidate genes had been considered to be male-specific. Ten "finalist" genes were chosen for a behavior analysis in which transposable element insertion mutants, or RNAi knockdowns, were tested for differences in receptivity to mating. One of these mutants has been tested and shows a mating receptivity difference consistent with the variation in gene expression.

O-FS-S-15

Characterization of Two Novel Polycyclic Aromatic Hydrocarbon Degrading Strains of the Soil Bacterium *Sphingomonas*. W. Simpson*[1], R. Lyles[1], D. Powell[1], S. Jones[1], and R. L. Brigmon[2], [1]South Carolina State University, Department of Biological and Physical Sciences, Orangeburg SC 29117; and [2]Savannah River National Laboratory, Aiken SC 29808.

Polycyclic aromatic hydrocarbons (PAHs) are serious pollutants and health hazards that are found in the complex mixture of oil and as components of pesticides. Many natural microorganisms, such as *Sphingomonas*, can utilize these hydrocarbons. Two novel *Sphingomonas* strains, designated BPF and BPH, were isolated from a large refinery waste lagoon, based on their ability to grow in the presence of PAHs. Transpositional mutagenesis of *Sphingomonas* BPH led to the identification of three mutants that were slower at degrading phenanthrene. Two of three BPH mutants could not grow in the presence of the phenanthrene. Several biodegradation products were detected in the BPH wildtype and mutants including 3-methyl-butanal, styrene, benzeneacetaldehyde, 2-methyl-N-(2-methylbutylidene)-1-butanamine, 1,2-diphenylcyclobutane, phenanthrene, and 9-anthracenecarbonitrile. Transpositional mutagenesis of *Sphingomonas* strain BPF resulted in the production of 10 mutants deficient in their ability to utilize pyrene. These BPF mutants had slower growth rates, longer lags and lower cell densities relative to wildtype. Benzenacetaldehyde, 1,2-diphenylcyclobutane, fluorene, 9,10-dihydroanthracene, and 2-methyl-9H-fluorene were detected as pyrene byproducts with both the wildtype and mutants. Southern blot analysis revealed that two genes involved in BPH phenanthrene catabolism are located on the genome, while one is located on the plasmid. In strain BPF, Southern blot analysis indicated that all disrupted genes involved in pyrene catabolism are located on an endogenous plasmid(s). Studies are currently being performed to identify the disrupted genes in both strains.

O-FS-S-16

Establishment of Fibroblast Cell Lines from Goat Ear Skin Explants. M. Singh*[1], and A. Sharma[2], [1]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; and [2]Department of Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN 55901.

Three different commercially available media, known to support human and porcine-specific fibroblast cell cultures, were tested for their growth potential for goat skin explants. Three individual goats belonging to two different breeds were used as the source of skin explants. Although outgrowth of fibroblast-like cells was observed in all three media tested, irrespective of breed, porcine-specific media exhibited higher rate of growth. Using this media, three fibroblast cell lines (GSF289, GSF737 and GSF2010) from ear skin explants of normal healthy dairy goats, of Kiko and Saanen breeds, were successfully established in culture. Liquid nitrogen stocks of these frozen cells had a viability rate of 96.2% in in-vitro cultures. These cells were morphologically indistinguishable from the cell stocks prior to freezing. Analysis of the growth of a fifth passage culture revealed an 'S' shaped growth curve with a population-doubling time of 25 hours. The cell lines were found negative for microbial, fungal and mycoplasma contamination. These goat skin fibroblast lines and the simple method of their isolation and freezing,

with a high rate of viability, will provide additional tools to study molecular mechanisms that regulate fibroblast function and for genetic manipulation of small ruminants.

O-FS-S-17

Building Public-Private Partnerships for Agrifood System Development: Linking Farmers to Markets. S. P. Singh*, F. Tegegne, and E. Ekanem, Department of Agricultural Sciences, Tennessee State University, Nashville, TN 37209.

The phenomenon of globalization is rapidly changing how the world food system operates. Multinational firms are rapidly moving to capture major urban markets in both developed and developing countries. In this process small farmers in developing countries are further marginalized resulting in increased rural poverty. Indian agricultural marketing system is undergoing transformation. Traditional marketing systems, dominated by ad hoc transactions and intermediaries, are gradually giving way to organized market systems such as contract farming. At the same time increases in per capita income, urbanization, changes in life styles and increased awareness about food nutrients among customers are fueling rapid growth in demand for high value food products and convenience. There are other trends that indicate significant opportunities for small holders who are the majority in India. At the same time food retailing in India is developing faster than many other developing countries. Sales of food/groceries through food retail chains were only $140 million in 2001, but jumped to $5.8 billion by 2008. This supermarket revolution is not without problems as it can create challenges for small retailers, farmers and processors who are not equipped to meet the new competition and requirements from supermarkets. In this context, the purpose of this paper is to present a case study of Public-Private partnership to link farmers with markets and processors to increase their margins and also lower prices to consumers. Secondly, the paper discusses impacts of the development of supermarket as food system on traditional retailers, farmers, and processors. Thirdly, the paper presents some models that different retailers are initiating/experimenting for fresh produce procurement. The paper in the end recommends some policy options that may encourage "competitiveness with inclusiveness" with focus on small farmers.

O-FS-S-18

Evaluating the Sole Reliance on Biorational Pesticides for Pest Management on Specialty Crops. H. O. Sintim*[1], L. E. N. Jackai[1], and B. N. Dingha[2], [1]Department of Natural Resource and Environmental Design, and [2]Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Crop pest management must take into consideration farmer safety, sustainability of methods, likelihood of adoption, and potential food safety risks especially among farmers who grow most of our vegetables. In this report we present preliminary findings on the challenges of using exclusively OMRI-listed biorational pesticides in the control of pests on a number of specialty crops. We applied five commercially available biorational insecticides (Agroneem®, Trilogy®, Neemix®, Mycotrol-O® and Spinosad®) and a neonicotinoid insecticide (Provado®) at the manufacturers' recommended rates in 7-14 day spray cycles on vegetables in small field plots during July and October 2010. Data collected on insect population fluctuation, plant damage and yield suggest the existence of crop-specific variations in insecticide performance among the biorational insecticides and the neonicotinoid. The pest arthropod species recorded included: *Empoasca* sp., *Halyamorpha halys*, *Leptoglosus* spp., *Acrosternum hilare*, *Heliothis* sp., *Melanoplus* spp., *Diabrotica undecimpunctata* (on cowpea and pigeon pea), *Lygus* sp., *Heliothis* sp., *Disonycha glabrata, Diabrotica undecimpunctata, Spodoptera* spp. (on amaranth), *Leptinotarsa decemlineata, Tetranychus* sp., *Heliothis* sp., *Spodopdtera* spp., *Gargaphia solani*, and *Aphis* sp. (on eggplant). None of the insecticides successfully suppressed insect pests across the spectrum. Beneficial species such as *Harmonia axyridis, Perillus bioculatus* and *Collops* genus were also recorded. We conclude that the sole dependence on biorational insecticides by small growers is unsustainable and ill advised. We propose combining biorational insecticides having different modes of action, or alternating them with low risk insecticides (such as Actara), and use these with resistant cultivars and natural enemy enhancements, according to a scouting-driven demand.

O-FS-S-19

Development of an Integrated Pest Management Strategy for the Small Hive Beetle, *Aethina tumida*, a Serious Threat to Honey Bee, *Apis mellifera.* A. Somorin*, and L. H. B. Kanga, College of Engineering Sciences, Technologies and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The honey bee is responsible for 80% of insect pollination and is therefore vital to sustaining a profitable

agriculture industry in North America. The added value of crops pollinated by honey bees was estimated at $14.6 billion. Despite increasing dependency on honey bees, the numbers of managed hives in the U.S. have been drastically declined over the few years because of pests such as the invasive species of the small hive beetle (SHB). The substantial damage of the SHB to the honey bee threatens honey production, as well as the crops that rely on honey bees for pollination. Currently, there is no effective control measure for SHB. This study intends to develop a sustainable pest control strategy for the new and invasive SHB. To assess the susceptibility of SHB to xenobiotics, larvae and adult SHB were exposed to 14 selected insecticides and four insect growth regulators (IGR). In addition cadavers of SHB collected from several apiaries were investigated to determine the primary microbial causal agents for use in biological control of SHB. Data indicated that the insecticides fenitrothion, chlorpyrifos and methomyl were more toxic to SHB than coumaphos that is currently used for control of SHB populations. The IGRs fenoxycarb and cyromazin were most effective on early instar larvae of SHB. The analysis of DNA sequences from unknown fungal pathogens from cadavers of SHB revealed two highly pathogenic fungi, *Metarhizium anisopliae* and *Beauveria bassiana*, that could serve as a major component in an integrated pest management program for SHB.

O-FS-S-20

Near Real-Time Detection of *Escherichia coli* Using a Microfluidic-Based Biosensor. M. Thomas*, and J. Davis, Biological and Agricultural Systems Engineering Program, Florida A&M University, Tallahassee, FL 32307.

The ability to rapidly detect and identify pathogenic bacterial species is an invaluable tool in the food processing industry, in monitoring the quality control of farm produce and in testing the quality control of ready to eat meals. Here we present work on the development of a miniature portable microfluidic-based biosensor that provides near real-time detection of *Escherichia coli* (*E. coli*). The biosensor will utilize antibodies against *E. coli* that were conjugated to the surface of a microfluidic device with biological functionality preserved. The microfluidic device was fabricated from the soft polymer, poly (dimethyl siloxane) (PDMS) with the surface of device made from glass. Detection and immobilization of *E. coli* was rapid with the cells needing less than 5 minutes to equilibrate in the channel prior to detection. Bacterial cells were first imaged and then counted. The results from each experiment are available within 10 minutes from the start of the experiment. The detection limit for the device was in the range $5x10^0 – 5x10^3$ cells, spanning three orders of magnitude. The development of this biosensor could potentially serve as a model for rapid bacterial species detection and identification in the areas of food science, agriculture quality control and medicine.

O-FS-S-21

Impact of U.S. Organic Certification Program on U.S. Trade Partners. S. L Tubene*, Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Organic farming has experienced changes across the U.S. in the last decade. While the number of U.S. organic farmers has increased since 1992, the percentage of organic farmers is still minimal compared to conventional farmers. Based on the U.S. Department of State Speaker and Specialist Program, this research seeks to explore the fundamentals of the U.S. Organic Certification Program and its impact on the U.S. trade patterns with foreign countries. This paper attempts to: (1) document U.S. organic certification programs, (2) present organic certification programs in other U.S. trading partners, and (3) analyze trade patterns between the U.S. and its trade counterparts. Total certified organic operations increased by 40% from 1992 to 1997, 46% from 1997 to 2002, and 16% from 2002 to 2005. However, about 5,021 certified organic operations in 1997 represented only 0.26% of total U.S. farm operations in 1997 and approximately 0.29% of U.S. small farmers. Factors such as the level of organic certification, trade fairness, and comparative advantage affect international trade between the U.S. and its trade partners. According to the U.S. national standards, agricultural products labeled “100% organic” must contain only organically produced ingredients. Products labeled “organic” must consist of at least 95% organically produced ingredients. The USDA organic seal—the words “USDA organic” inside a circle—may be used on agricultural products that are “100% organic” or “organic.” However, these requirements might not be the same in a country like South Korea, creating therefore a trade imbalance between the two countries.

O-FS-S-22

Comparative Performance of Diploid and Tetraploids of Watermelon in the Light of Ploidy Level Changes and Genome Perturbations. G. Vajja*, S. K. Ponniah, A. Rahman, U. K. Reddy, and P. Nimmakayala, Gus R. Douglass Land-Grant Institute and Department of Biology, West Virginia State University, Institute, WV 25112.

Seedless triploid watermelons are produced by crossing the diploids with tetraploid lines, which is a unique ploidy construction that has to be laboriously carried out every growing season. Consequently, triploid breeding has become very challenging and the seed is very expensive. Confirmation of diploids and tetraploids were carried out

by both flow cytometry and counting the chloroplasts per guard cell pair. The absolute DNA content ranged from 1.69 to 1.84 pg among the tetraploids in comparison with the standard diploid DNA content of 0.88 pg. The number of chloroplasts per guard cell pair was 1.7 times more in tetraploid progeny (15.5) as compared to diploid progeny (8.9). Morphological traits such as shape and size of leaf and flower were noted to be larger in tetraploids. Progeny of diploids and tetraploid populations were evaluated under the field conditions. Number of fruits per plant, soluble solids, endocarp pressure, mesocarp pressure, rind thickness, rind hardness and total fruit yield were significantly higher in tetraploids in comparison with the diploid progeny grown in all three locations. Fruit length, fruit diameter, fruit length and diameter ratio were not significantly different between diploids and tetraploids. Genome wide perturbations and DNA methylations were found to be widespread across the ploidy levels warranting further functional and epigenetic studies to understand manifestations of polyploidy in watermelon.

O-FS-S-23

Development of Transgenic Rice Plants (*Oryza sativa* L. ssp. *japonica* cv. Nipponbare) with Soybean Chalcone Synthase Gene (*CHS*) Using *Agrobacterium*-Mediated Transformation.

E. Vanjildorj*, N. N. Renukdas, and M. Manoharan, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Rice (*Oryza sativa* L.) is one of the most important cereal grains with regard to human nutrition. However, rice does not contain all human nutrients needed for a balanced diet. Phytochemicals such as isoflavones play an important role in human health as a dietary component. Therefore, the expression of isoflavone content in rice is seen as a strategy for improving human health. Isoflavone is synthesized from phenylalanine, and one of the key enzymes in the phenylpropanoid pathway is chalcone synthase (CHS), which catalyzes the formation of the central intermediate, naringenin, the substrate for isoflavone synthase (IFS). The objective of this study was therefore to transform rice with chalcone synthase gene (*CHS*) from soybean using *Agrobacterium*-mediated transformation. In total seventeen individual transgenic lines were generated from the callus on hygromycin-containing medium. Among these transgenic lines, twelve lines showed 3:1 segregation ratio in the T_1 progenies after self-pollination, suggesting single copy integration of the trangene. Five lines showed 15:1 ratio, suggesting two copy integration of the transgene. The results of PCR and Southern blot analyses of T_1 progenies showed that the *CHS* transgene was stably integrated into the rice genome and also inherited to their progenies. RT-PCR analysis confirmed that *35S::CHS* was expressed in T_1 progenies of each transgenic line. Transgenic plants were all fertile and exhibited neither growth inhibition nor visible vegetative phenotypic alternations.

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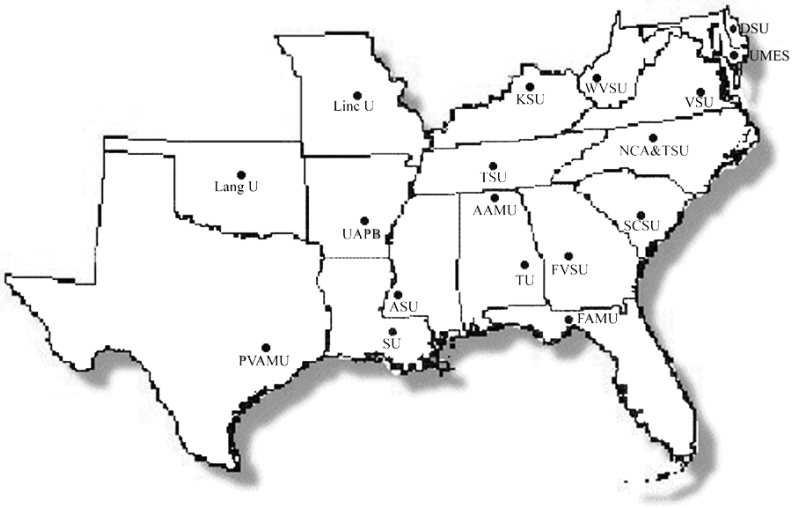

Abstracts of Food Safety and Global Food Security Posters

Undergraduate Students (16)

P-FS-U-1

A Preliminary Study on Infection Dose Levels of *Haemonchus contortus* in Studies with Hair Sheep. B. M. Allen*, and A. Yousuf, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

Sixteen Barbados Black Belly female sheep, approximately five months of age (n=16 and 17.4 ± 1.3 kg, initial live weight) were each separately placed in an indoor feeding pen in a completely randomized block design experiment for three months to test the artificial infection dose levels of the infective stage larvae (L3) of the gastrointestinal nematode (GIN) parasite *Haemonchus contortus.* Four levels of *H. contortus* larval burden HCL0 (Control-0 larvae), HCL1500 (1500 larvae), HCL3000 (3000 larvae) and HCL1500 (4500 larvae) were administered every week. Feed consumed and ort were recorded daily, whereas live body weight change, packed cell volume (PCV), eggs per gram of feces (EPG), and FAMACHA score were measured every week. The rationale for the experimental design was to establish an infection dose level to be utilized at a future experiment involving infection with L3 of *H. contortus*. Results indicated feed intake was depressed in the first few weeks of the experiment for infected animals, but was subsequently followed by a compensatory reaction. Lower establishment rates, based on actual worm counts, were observed for the higher infection level, but in both infection levels establishment rates tended to decrease with time.

P-FS-U-2

An *in vitro* Study to Assess the Pathogenicity of Various Strains of *Beauveria bassiana* (Bals.) Vuill. against the Southern Green Stink Bug, *Nezara viridula* L. (Hemiptera: Pentatomidae). K. Barr*, A. Somorin, M. Haseeb, and M. T. K. Kairo, Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The southern green stink bug, *Nezara viridula* (Hemiptera: Pentatomidae), is a polyphagous pest of economic importance on many crops. As part of efforts towards the development of environmentally sustainable control measures, five Floridian isolates of *Beauveria bassiana*, a cosmopolitan entomopathogen were assessed for pathogenicity against *N. viridula.* The insects used in the study were derived from a sustainable culture established from various local sources. Using spore suspension bioassays, the susceptibility of adult *N. viridula* was assessed in the laboratory. Preliminary data from *in vitro* screening revealed varying degrees of virulence, measured as lethal and/or sub-lethal effects from the different isolates. The results suggest that there is potential for entomopathogenic fungi to be developed as an alternative tool for the control of *N. viridula* but additional research is required.

P-FS-U-3

Control of *Escherichia coli* O157:H7 Using a Phage Cocktail in Laboratory Media. R. R. Bristow*[1], I. Goktepe[1], O. Boyacioglu[2], M. Sharma[3], and A. Sulakvelidze[4], [1]Department of Family and Consumer Sciences, [2]Energy and Environmental Systems Doctoral Program, North Carolina A&T State University, Greensboro, NC 27411; [3]USDA/ARS Environmental Microbial and Food Safety Laboratory, Beltsville, MD 20705; and [4]Intralytix, Inc., Baltimore, MD 21202.

Bacteriophages are natural enemies of bacteria, and therefore, promising candidates to evaluate as agents for the control of foodborne pathogens. The effect of a bacteriophage treatment on the survival of *E. coli* O157:H7 was investigated in a laboratory medium. *E. coli* O157:H7 strains RM1918 and RM4407 were cultured in Tryptic Soy Broth (TSB) overnight. Fresh TSBs were inoculated with EHEC concentrations of 4-5 log CFU/ml. EHEC-specific EcoShield™ phage cocktail was added at 7-8 log PFU/ml. The tubes were incubated at 4 and 37°C. EHEC levels in tubes were enumerated at 2, 24, and 48h on Sorbitol MacConkey (SMAC) Agar. Phage treatment significantly reduced the growth of both EHEC strains by 4-log compared to control samples incubated at 37°C after 2h. However, the growth rate of the bacteria at 37°C was able to mask the phage effect by reducing the difference to 1-log by 24 and 48-h. A 4-log reduction was also achieved in all EHEC strains stored at 4°C. These results show that EHEC-specific phage cocktail used in this study is effective in controlling EHEC in TSB at 4°C. Future studies will concentrate on investigating the effect of the phage cocktail on *E. coli* O157:H7 on fresh leafy vegetables.

P-FS-U-4

Formation of Hydroxymethylfurfural in Oil-in-Water Emulsions Containing Hydrolyzed Milk Proteins: Effect of Buffer Type and Concentration. D. A. Elder*, N. Delahoussaye, S. Chaney, J. M. Kirven, and A. Mora-Gutierrez, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

The Maillard reaction is important during the heating and storage of foods for its contribution to food

quality. Therefore, the determination of hydroxymethylfurfural (HMF) is mainly achieved for the evaluation of parameters related to food processing and storage. Hydrolyzed milk proteins are extensively used in infant and specialized adult nutritional formulations. Buffering agents are added to many food and beverage products to control the pH of the system. However, limited data exist on the effect of these buffers on HMF formation in food emulsions. The objective of this study was to investigate the effect of buffer type and concentration on the formation of HMF in oil-in-water (O/W) emulsions containing hydrolyzed milk proteins during storage at 40 and 60°C. Emulsions were prepared by homogenization of mixtures of corn oil and aqueous solutions containing bovine or caprine casein phosphopeptides (CPP), maltodextrin and Tween 20 at pH 7 using various concentrations of phosphate and citrate buffer. The formation of HMF was monitored spectrophotometrically at 420 nm. The rate of HMF formation was higher in O/W emulsions containing caprine CPP than those formulated with bovine CPP in 0.2 and 0.5 M phosphate or citrate buffer at 40 and 60°C. However, the O/W emulsions formulated with citrate buffer were less susceptible to the Maillard reaction i.e., formation of HMF. It was concluded that O/W emulsions containing hydrolyzed milk proteins i.e., bovine or caprine CPP are less likely to lose nutrients, suffer from discoloration, and produce off-flavors if formulated with citrate buffer.

P-FS-U-5

***In vitro* Propagation of Pecan [*Carya illinoinensis* (Wangenh) K. Koch] Rootstock.** L. N. Garner*, N. Renukdas, M. Manoharan, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Pecan is usually propagated by budding or grafting improved cultivars onto open-pollinated seedling rootstocks. However, rootstock improvement strategies have not been developed for pecan. The main objective of this study was to use the *in vitro* propagation techniques to identify the superior clonal rootstock in pecan. We have cultured the nodal explants from *in vitro* grown seedlings of Riverside on modified liquid woody plant medium (WPM) supplemented with 13.32 µM of 6-benzylaminopurine (BAP). At least 3-5 shoots per explants were induced after three weeks of culture. The multiple shoots were proliferated and/or elongated on plant growth regulator free liquid WPM. Subsequently, the multiple shoots were separated and successfully rooted in liquid WPM containing 49.20 µM indole-3-butyric acid. The efficiency of rooting was over 90%. The pecan plantlets were initially transferred to peat pellets and subsequently to the greenhouse. This is a simple and efficient protocol that may be used to propagate pecan rootstocks through tissue culture for rootstock improvement.

P-FS-U-6

Impact of Rodenticides on the Coagulation Properties of Milk. N. T. Georgette*, T. Tse, S. A. Ibrahim, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Cheese is a widely consumed dairy product with a long processing chain, making it a potential target for intentional contamination. This study investigates the impact of the rat poisons strychnine, bromadiolone, and brodifacoum on milk coagulation properties, including rennet coagulation time and gel strength. Significant changes in these coagulation parameters could help reveal the presence of these toxins. Each tested toxin was dissolved in acetone (10 mg/ml) and an equivalent volume of acetone was added to each milk control. Bromadiolone and brodifacoum at sub-LD50 levels did not cause milk pH to drop out of its normal range. Rheometer data demonstrated that contamination with these toxins increased rennet coagulation time ($P< 0.01$). The toxins also significantly reduced the crosslink density of the gel network ($P< 0.05$). Strychnine significantly reduced gel strength at concentrations as low as 5% LD50. Bromadiolone and brodifacoum had minimum detection thresholds of 15% and 70% of LD50, respectively. Strychnine at 20% of the median lethal dose (LD50) increased the milk pH out of its normal range with an increase of 0.15. This study suggests that the toxins may interact with the surface of casein micelles and interfere with micelle aggregation. Based on the toxins' impact of milk coagulation properties, it may be possible to develop cost-effective early warning measures for detecting the presence of rat poisons in milk.

P-FS-U-7

Evaluation of Lipolysis in Commercial Cow Milk Yogurt Compared with Goat Milk Counterparts during Refrigerated Storage. H. Ibidapo*, C. McGhee, A. Lee, E. Griffin, J. Oglesby, and Y. W. Park, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Yogurt has been a popular cultured dairy food in many parts of the world. Its popularity and high consumption is attributed to nutritional value and beneficial effects on human health by its two major culture bacteria, *Lactobacillus* and *Bifidobacteria*. Commercial cow yogurt (CCY) and goat milk yogurt (CGY) were purchased in local retail stores, and Fort Valley State University plain goat milk yogurt (FVGY) were manufactured using direct vat set lactic culture. The caprine milk used was late lactation bulk milk from the University dairy goat herd, consisting of Saanen, Alpine, and Nubian breeds. All experimental yogurt samples were subjected to 4°C

refrigerated storage for 4 weeks, and pH and acid degree value (ADV) were measured bi-weekly to determine lipolytic changes in yogurts of two species' milk. Mean dry matter and fat contents (%) of CCY, CGY and FVGY products were 11.28, 3.05; 13.1, 3.65; 11.03, 3.40, respectively, indicating that commercial goat yogurt contained the highest total solids and fat contents among the tested yogurt varieties. The initial and final mean pHs of CCY, CGY and FVGY were: 4.05, 4.10; 4.02, 4.04 and 4.14, 4.12, respectively, suggesting that no significant changes occurred in acidity of all yogurts during 4 weeks refrigerated storage. However, the respective initial and final ADVs of CCY, CGY and FVGY were 0.503, 1.009; 0.756, 0.685; 0.707, 1.094, implying that significant lipolysis occurred in the CCY and FVGY, while CGY revealed minimal lipolytic changes.

P-FS-U-8

Mineral Nutrients-Mediated Down Regulation of Allergenic Protein in Peanut Seed. D. L. Johnson*, S. M. South, S. F. Hyllam, T. K. Brown, and G. Osuji, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Peanut (*Arachis hypogaea* L.) seeds are extremely rich in protein. However peanut allergy is one of the most frequent causes of death resulting from food allergy. The protein found in peanut seeds that is responsible for peanut allergy is known as arachin. In order to decrease peanut allergy, the arachin content must be reduced. Mineral nutrients used to treat peanuts will decrease the arachin content. Peanut seeds were cultivated and treated with mineral nutrients in ten experimental plots at Prairie View A&M University field plots in Waller County. Peanut seeds were harvested at maturity and homogenized in distilled water to extract the arachins. The concentrations of arachin present in different samples of mineral treated peanut seeds were determined by the Lowry assay and electrophoresis. Data suggested that the peanut seeds that were treated with Phosphorus and Potassium (PK) and Ammonium Chloride (NH_4CL) reduced the concentration of arachin in the peanut seeds. PK also increased the unsaturated fatty acid composition in the peanut seeds, which are healthy for human consumption as opposed to hydrogenated fatty acid. Peanut seeds treated with Phosphorus and Sulfur (PS) and Potassium Chloride (KCl) increased the arachin concentrations. Therefore PS and KCL would not be suitable mineral nutrients for treating peanuts consumed by individuals who are allergic to peanuts. PK is the best mineral nutrient to decrease the arachin content. Future projection is to suppress the genes that codes for the arachin protein.

P-FS-U-9

Sensors for Food and Water Safety. D. Jones*, Y. Jones, and S. Barnes, Department of Chemistry and Physics, Alcorn State University, Lorman, MS 39096.

Pesticides are in widespread use worldwide to protect agricultural commodities against insects, molds, fungi, and other agents that may adversely affect crops. The potential human health impact of residual pesticides and other endocrine disrupting chemicals necessitates measures to ensure that the population is not exposed to these compounds through accidental or malicious means. Due to the enormity and complexity of our food and water distribution systems, it is of great importance to have reliable methods to quickly test for the presence of these compounds in food and water. Standard methods for analysis of these compounds are expensive, time consuming, and require large cumbersome equipment and skilled technicians. This research investigates the development of portable sensors for detection of selected high priority pesticides. The sensors are based on mass sensitive and optical transduction platforms and coupled with nanomaterials specifically tailored to recognize the selected pesticides. Full optimization of this technology is expected to have significant impact on food safety and security, and environmental quality monitoring.

P-FS-U-10

Analysis of Novel *Sphingomonas* Strains Capable of Degrading Polycyclic Aromatic Hydrocarbons. R. Lyles*[1], S. Jones*[1], D. Powell[1], W. Simpson[1], and R. L. Brigmon[2], [1]Department of Biological and Physical Sciences, South Carolina State University, Orangeburg SC 29117; and [2]Savannah River National Laboratory, Aiken SC 29808.

Bioremediation involves the use of microorganisms and/or their enzymes to restore an environment damaged by contaminants to its original state. Serious environmental contaminants, known as polycyclic aromatic hydrocarbons (PAHs), are found in pesticides, the complex mixture of oil, and are formed when fossil fuels are burned. Some microorganisms can utilize these hydrocarbons. Two novel *Sphingomonas* PAH-degrading strains, designated BPF and BPH, were isolated from a large refinery waste lagoon in Poland. In an effort to identify genes involved in PAH degradation, transpositional mutagenesis of both strains was performed. Transpositional mutagenesis of *Sphingomonas* BPH produced three mutants that were slower at degrading phenanthrene. Two of three BPH mutants could not grow in the presence of the phenanthrene. Transpositional mutagenesis of

Sphingomonas strain BPF produced 10 mutants deficient in their ability to utilize pyrene. These BPF mutants had slower growth rates, longer lags and lower cell densities relative to wildtype. Southern blot analysis revealed that two genes involved in BPH phenanthrene catabolism are located on the genome, while one is located on the plasmid. PCR analysis suggests that the genes that have been disrupted may differ in sequence from the recently identified phenanthrene utilization genes *pbh*A, *pbh*B and *pbh*C. In strain BPF, Southern blot analysis indicated that all disrupted genes involved in pyrene catabolism are located on an endogenous plasmid(s). Studies are currently being performed to identify the disrupted genes in both strains. This may allow for the enhanced expression of the genes and application of the strains to PAH-contaminated sites.

P-FS-U-11

Transformation of Educational Nanotechnology to Applied Research. M. Dweik, L. White, A. Molitoris*, Nanotechnology Research Laboratory, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101.

Nanotechnology covers a wide range of applications. Understanding fundamentals of investigated nanotechnology through Hands-On-Experimentations (HOE) has transformed this knowledge to applied research. These experiments are based on the execution of protocols and observation of outcomes. HOE covers four areas. The first area covers fundamentals from physics, chemistry, and biology experiments. The second area investigates the fabrication of nanomaterials. In the third and fourth areas, the properties and characterization of nano-materials are examined through use of different modalities such as Atomic Force Microscopy (AFM). This project resulted in two developed courses added to Biotechnology minor program and one course required for all agriculture majors. In addition, it has transformed the gained experience to obtain three funded projects from NSF, NIH and NASA. There were a total of 19 students who participated in this project, two of whom were from K-12. Eight of those students have advanced to work on the funded applied research. This research has gained and continues to gain interest from different student levels.

P-FS-U-12

Recovered Oocytes from Slaughtered Goats Used for *in vitro* Fertilization during the Seasonal Anestrous Period. S. Richardson*, S. Samake, and E. A. Amoah, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Temperate breeds of goats have an extended anestrous season (January-July) when breeding is inefficient and can negatively affect profitability. Immature cumulus oocytes complexes (COC) were recovered from ovaries obtained from slaughtered goats at the Fort Valley State University's Georgia Small Ruminant Research and Extension Center slaughter facility. The COCs were processed with the objective of determining whether oocytes recovered from slaughtered does in the anestrous season can be matured and fertilized successfully in vitro, and to examine the survival rate of 8-cell, morula and blastocyst embryos during the anestrous season. Thirty-nine COCs were selected, based on the homogeneous nature of the cytoplasm and cumulus cell cover, from 456 immature COCs recovered by slashing 2-6mm diameter follicles. The selected COCs were matured *in vitro* for 24h in TCM-199 medium supplemented with 10% fetal bovine serum (FBS); 100mg LH/ml; 0.5mg FSH/ml and 1mg estradiol 17b/ml at 38.5^{o}C in humid 5% CO_2 in air. The COCs were matured and fertilized as described by Parrish and others. Ninety-eight percent of oocytes recovered were matured, of which 100% were fertilized; 82% cleaved to the 8-cell stage and 91% were cultured to morula/blastocyst stage. Results indicate that immature goat oocytes may be cultured to maturity and fertilized successfully *in vitro* up to the expanded blastocyst, during the anestrous season for transfer to synchronized goats. Thus, *in vitro* fertilization could be a viable technique to enhance goat embryo production in order to alleviate the inefficient productivity in seasonal breeds of goats during the anestrous period.

P-FS-U-13

Transformation of Tomato with C1 and R Transcription Factors through *Agrobacterium tumefaciens.* A. Thompson*, N. N. Renukdas, M. Manoharan, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Anthocyanins are produced as part of phenylpropanoid pathway (PPP). By manipulating the genes involved in PPP, it may be possible to increase the anthocyanin content in tomato. The objective of the present study was to test whether genes in the phenylpropanoid pathway are activated by the maize transcription factors C1 and R for enhanced synthesis and accumulation of anthocyanins in tomato. We have transformed tomato with a chimeric transcription factor containing maize C1 and R coding regions, called CRC, using *Agrobacterium tumefaciens*. Tomato cotyledons were cut into pieces, infected with *Agrobacterium* and placed on the co-cultivation medium (MS with 1.0 mg/L Zeatin) for three days. Subsequently, the cotyledon explants were transferred to the regeneration

medium (MS with 1.0 mg/L Zeatin, 50 mg/L Kanamycin and 300 mg/L Timentin). Green shoots were observed at the cut edges of cotyledon within ten days of culture. After three weeks, the cotyledons were transferred to MS with 0.1 mg/L Zeatin for further shoot development. Fully developed shoots were separated from cotyledon explants and transferred to rooting medium (1/2 MS with 50 mg/L Kanamycin and 300 mg/L Timentin). Rooted plantlets were initially transferred to peat pellets for one week for acclimatization and subsequently to the green house. Transformed tomato plants were confirmed using PCR amplification and Southern hybridization.

P-FS-U-14

Antimicrobial Effect of Red, White and Yellow Onion on *Salmonella typhimurium* Stored at Room and Refrigeration Temperature. L. Wilburn*, M. Garrett, S. Anderson, and S. Woldesenbet, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

The objective of this study was to determine the effect of onion against foodborne pathogen, *Salmonella typhimurium*, stored at different temperatures. Red, white and yellow onions were purchased from the local grocery store. Each onion type was blended individually in food processor and was inoculated with *S. typhimurium* 3.3 - 4.5 x 10^4 log cfu/g onion and incubated at 7 and 22^{O}C for 24, 48, 72, 96 and 192 hours. The samples' pH was measured on all test dates. The effects of onion on *S. typhimurium* growth was then assessed by recovering the bacteria from serially diluted samples with 0.1% peptone water, followed by inoculation and incubation onto Brilliant Green Agar containing novobiocin and nalidixic acid at 37^{O}C for 24 h. The results showed that the numbers of viable population of *S. typhimurium* onions stored at 22^{O}C inhibited the growth of *S. typhimurium* over 48 h storage period. Onions stored at 7^{O}C showed no inhibitory effect on the growth of *S. typhimurium* throughout the test dates. Red and white onions showed more bacterial reduction compared to yellow onion, but with no significant difference. The pH values on Day 0 for red, white and yellow onion were 5.15, 5.19 and 5.22 respectively, which gradually changed to 4.6, 4.58 and 4.61 at 22^{O}C; and 4.72, 4.84 and 4.78 at 7^{O}C. These results showed the effect of onion as antimicrobial agent is not pH but temperature dependent.

P-FS-U-15

Body Signatures: Can They Tell Where Stored Product Insects are Originating? Z. J. Williams*, and R. Mahroof, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

The cigarette beetle, *Lasioderma serriocone* (L.) (Coleptera: Anobiidae), is associated with various forms of stored food products including grain-based products, dried fruits and nuts, spices, and other durable stored commodities. Adult *L. serriocone* were collected from four food and feed processing plants in the state of South Carolina. Adults were trapped using synthetically produced pheromone lures. Insects were then prepared in the laboratory using standard protocol to analyze nine different trace metal compositions in their body signatures. By determining trace element compositions in the body signatures of adult *L. serriocone* collected in various stored products environment and comparing results with the standard laboratory marker provide host use information in outdoor conditions.

P-FS-U-16

Susceptibility of *Nezara viridula* (L.) to Different Isolates of *Beuaveria bassiana* and *Metarhizium anisopliae* under Laboratory Conditions. J. Williamson*, M. Haseeb, A. Somorin, and M. T. K. Kairo, Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The southern green stink bug, *Nezara viridula*, is a major pest of many economically important crops. The most destructive stage of the pest is the adult, which devours plant species in over 30 families. As a consequence, there is interest to develop sustainable approaches for its management. Because of problems associated with overuse of insecticides, there is need for the development of environmentally friendly control measures against the insect. Mycopathogens such as *Beuaveria bassiana* and *Metarhizium anisopliae* are two highly cosmopolitan entomopathogens that infect different kinds of insects. Studies have shown varying degrees of pathogenicity of these fungi to stink bugs, and therefore there is potential for development of cheaper and friendlier options that can be used solely, or in conjunction with existing approaches. This study was therefore focused on evaluating the lethal and sub-lethal effects of different isolates of *Beuaveria bassiana* and *Metarhizium anisopliae* on different stages of the stink bug.

Graduate Students (18)

P-FS-G-1

Isolation of Genomic DNA and Detection of *Bifidobacterium* spp. from Goat Rumen. A. Abdalla*, H. H. Mukhtar, N. Whitley, S. Ibrahim and M. Worku, North Carolina A&T State University, Department of Animal Science, Greensboro, NC 27411.

Rumen microorganisms are important to animal health and impact food and environmental safety. A highly diverse collection of microorganisms has been identified in the goat rumen. Bifidobacteria are important in the physiology of the gastrointestinal tract and in food microbiology. The objectives of this study were to use the QIAMP DNA mini kit developed for isolation of pathogens from fecal samples, to isolate microbial DNA for identification of Bifidobacteria from goat rumen. Female goats from the NC A&T State University goat herd were used. Rumen contents were collected at slaughter and stored, sterile at -20C. Microbial DNA was isolated from 200-220 mg of frozen rumen samples (N= 15) using the QIAamp DNA kit (Qiagen). The concentration and purity of DNA was determined using a nanodrop spectrophotometer. The 16SrDNA-targeted genus- and species-specific PCR primers for *Bifidobacterium longum* were used to amplify specific DNA. Amplified samples and DNA markers were separated by electrophoresis on a 2% agarose gel, stained with ethidium bromide and visualized by UV illumination. An average of 36 ug of DNA with an average purity of 1.86 was isolated from 200-220 mg of frozen rumen samples. The QIAMP DNA mini kit is easy to use and allows for the isolation of high quality DNA of sufficient quantity. The primers used amplified a fragment of ~ 580 bp. This approach may be useful in studies to assess the significance of Bifidobacteria in the physiology of the goat rumen and efforts to enhance innate immunity.

P-FS-G-2

Effect of Sanitizers on Food Quality of Fresh-Cut Sweet Potatoes (*Ipomoea batatas*) under Modified Atmosphere Packaging. K. Alexander*, J. Koo, and J. Garner, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Sweet potatoes are highly nutritious vegetables. However, they are only marketed on a very limited scale. Recently, the market has had an increased demand for pre-cut/fresh-cut fruits and vegetables due to fresh-like character, convenience and health benefits. Fresh-cut produce is a perishable commodity with a shorter postharvest shelf-life, and needs better and safer postharvest quality maintenance. The objective of this study was focused on effect of sanitizers and antioxidants on color, polyphenol oxidase (PPO), headspace gas composition (O_2, and CO_2), and bacterial counts. Trisodium phosphate (4%), sodium hypochlorite (1000 ppm), and Tsunami 200 were used as sanitizer. Sliced sweet potatoes from two cultivars (Beauregard and Covington) were treated with sanitizers and packed in high-O_2 permeable bag and low-O_2 permeable bag flushed with gas composed of 4% O_2, 10% CO_2, 86% N_2, respectively. The sweet potatoes were stored at 5°C and analyzed every 4 days for up to 20 days. The surface color (L, a, and b values) of sliced sweet potatoes was measured. PPO activity was assayed to determine enzymatic darkening of sweet potatoes during storage. Headspace gas composition of O_2, and CO_2 was determined in the bags containing sliced sweet potatoes. Total plate counts and yeast and mold counts were analyzed for shelf life. The application of different sanitizers is necessary to maintain microbial quality and safety of fresh-cut produce during storage prior to reaching the consumers.

P-FS-G-3

Use of Fluorescent *in situ* Hybridization (FISH) to Characterize Watermelon and its Wild Species. N. Aryal*[1], N. I. Faridi[2], P. Nimmakayala[1], and U. K. Reddy[1], [1]Gus R. Douglass Institute and Department of Biology, West Virginia State University, Institute, WV 25112-1000; and [2]Forest Tree Molecular Cytogenetics Laboratory, Southern Institute of Forest Genetics, Southern Research Station, Texas A&M University, College Station, TX 77843.

The genus *Citrullus* of Cucurbitaceae family has four species, of which *Citrullus lanatus* var. *lanatus* (Thunb.) is the domesticated watermelon. Its sister species, *C. lanatus* var. *citroides,* is wild but its rind is widely used as pickle and food for livestock. *Citrullus colocynthis* (L.) is an ancestral species. The species *C. ecirrhosus* and *C. rehmii* are two other southern African species. As these species are freely crossable among themselves and further known to have undergone considerable extent of introgression, molecular markers alone cannot clearly resolve phylogenetic relationships. Current study is the first attempt of FISH applied in cultivated watermelon using 18S-28S rDNA and 5SrDNA probes. Well separated somatic chromosomes were prepared from root meristems, using enzyme digestion technique for *in situ* hybridization following the standard technique. We have observed different organizational features in these species. In *lanatus* and *colocynthis*, we have identified two major 18S-28S

rDNA sites and these are located on two different homologous pairs of chromosomes. A two-color FISH (dual FISH) showed the 5S rDNA site was located interstitially and was syntenic to one of the 18S-28S rDNA. In contrary, only one 18S-28S rDNA site and two copies of 5S rDNA sites were observed in *Citroides* (PI 244018) and in the species *rehmii*, we noted only one each of 18S-28S rDNA and 5S rDNA sites. These results indicated major structural rearrangements in this genus.

P-FS-G-4

Isolation and Characterization of Prosaposin from Milk from Four Goat Breeds. A. R. Byers*, and M. Worku, Department of Animal Science, North Carolina A&T State University Greensboro, NC 27411.

Increased scientific knowledge related to the nutritional, functional and biological activities and health benefits of goat milk is needed to further promote goat farming, goat milk and traditional or innovative neutrceuticals as a basis for socio-economic benefit. Prosaposin, a protein in goat milk, is the precursor of the sphingolipid activator proteins. Saposins are small lysosomal proteins required for the hydrolysis of sphingolipids. Prosaposin is important in development and maintenance of the nervous system. Genetic variation may impact nutraceutical properties of milk by altering the biological function of bioactive peptides and antigens. The objectives of this study were to detect prosaposin and the sphingolipid activator proteins (saposins A, B, C, and D) in milk from different breeds of goats. Raw milk was collected at North Carolina A&T State University farm from Alpine, Spanish, Boer, Spanish X Boer goats and from a Holstein Friesian cow. Whey fractions were separated by centrifugation. Extracts were analyzed by electrophoresis and immunoblotting with anti-prosaposin and anti-saposin HRP conjugated antibodies. Specific proteins were identified using a tetramethylbenzidine substrate. Multiple proteins were observed in whey fractions from all animals tested. Antibodies detected a 65 kda prosaposin band and a 29kDa Saposin C band. Saposins and their precursor Prosaposin are present in milk from different breeds of goats. The possible effect of genetic variation on concentration need further study. These studies will contribute to our knowledge of the therapeutic benefits of goat milk to aid producers in maintaining breeds with the potential to produce Prosaposin.

P-FS-G-5

Effect of High-Methoxyl Pectin on the Stability of Bovine and Caprine Caseins Dispersions. N. Delahoussaye*, D. A. Elder, S. Chaney, J. M. Kirven, and A. Mora-Gutierrez, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Low pH dairy drinks including acidified beverages, drinkable yoghurts, fruit juice containing milks and protein fortified drinks are popular and nutritious beverages for optimal health and weight management, but are prone to sedimentation and wheying off. High methoxyl pectin (HMP) is widely used to stabilize acidified milks but the amount of pectin required for stabilization is variable. The objective of this study was to determine the stability of acidified bovine and caprine caseins dispersions at different concentrations of HMP and the influence of pH on the minimum amount of pectin needed to stabilize bovine and caprine caseins dispersions. Seven levels of pectin (0.0, 0.0025, 0.005, 0.01, 0.015, 0.02 and 0.025%, w/v) and four levels of pH (3.0, 4.0, 4.8 and 6.8) were employed in the study. Influence of the pH and HMP concentration on the stability of bovine and caprine caseins dispersions (0.25%, w/v) to aggregation was evaluated by light scattering measurements. At pH 4.8, which is near the isoelectric point (pH 4.6) of casein, HMP stabilizes the bovine and caprine caseins particles against aggregation. The pectin effect on the stabilization of acid-treated caprine casein dispersions was more pronounced than in acid-treated bovine casein dispersions at a pH level of 4.8 and at all levels of HMP. At pH 3.0 and pH 4.0, extensive flocculation was observed in bovine and caprine casein-pectin dispersions at all levels of HMP. However, the caprine casein-pectin complex was more resistant to aggregation than the bovine casein-pectin complex at pH 3.0 and pH 4.0.

P-FS-G-6

Biorational versus Conventional Pesticides: Ecological Impact on Pests of Two Vegetable Crops. L. E. N. Jackai[1], J. A. Ewunkem*[1], H. O. Sintim[1], K. Taylor[1], and B. N. Dingha[2], [1]Department of Natural Resources and Environmental Design, and [2]Department of Family and Consumer Science, North Carolina A&T State University, Greensboro, NC 27411.

Cowpea (*Vigna unguiculata* L. Walp.) and tomato (*Lycopersicon esculentum* L. Karst.) are two of the vegetable crops grown in North Carolina. They are both damaged by pests that can be controlled with pesticides, many of which pose food safety, health and environmental risks. A pest management strategy that will minimize these risks would include biorational, low risk pesticides. This study compared arthropod population fluctuations under two different pesticide management plans: a conventional (Provado®) insecticide and the biorational OMRI-listed Agroneem® on two cowpea varieties (Mississippi Silver and Pink eye Purple Hull) and two of tomato

(German Johnson and Mariana). The two pesticides were each applied following manufacturers' recommendations, (a 10-14 day cycle) to determine the impact of each on arthropod species during the 2010 season. The most dominant species recorded on cowpea were in the families: Chrysomelidae, Pentatomidae, Cicadellidae and Noctuidae. On tomato, the most frequent pests were in the Thripidae, Sphingidae, Noctuidae and sporadically Pentatomidae families. A Shannon-Weaver Diversity Index calculated for insect families in the biorational treatments was 1.1-8.5 and 1.3-6.9 for plots that received the conventional pesticide, which implies that the insect family distributions were slightly higher in the biorational treatments. The results obtained indicate that Provado® reduced both pest and natural enemy populations more drastically than Agroneem®; this did not, however, result in significant and commensurate increase in the yield of both crops. Based on these findings, we do not recommend sole reliance on Provado® for pest management on both crop systems by small growers.

P-FS-G-7

Oxidant Stress in Airway Epithelial Cells Following Swine Confinement Facility Dust Exposure. C. L. Gerald*[1, 2], R. J. Pender[1], C. Y. Watson[1, 2], K. B. Adler[3], and J. T. Waterman[1], [1]Department of Animal Sciences, and [2]Energy and Environmental Sciences, North Carolina A&T State University, Greensboro, NC 27411; and [3]Department of Molecular Biomedical Sciences, North Carolina State University Raleigh, NC 27606.

Swine confinement facility (SCF) workers have emerged as a subpopulation with increasingly high risk of developing chronic respiratory conditions (e. g., chronic bronchitis), due to chronic exposure to SFC dust. However, less attention has been devoted to investigating the impact of SCF dust on pig respiratory health. Swine confinement facility dust is comprised of particles such as animal dander, feed, feces and bacterial endotoxin (lipopolysaccharide, LPS). Dust levels are typically highest during winter months, but may increase any time animals are fed, handled or moved. Many of the respiratory conditions associated with SCF dust are characterized by inflammation. However, underlying mechanisms governing these processes are unclear. We hypothesized that SCF dust may activate transcription of pro-inflammatory genes, such as nuclear factor kappa B (NF-κB) and inducible nitric oxide synthase (iNOS) in porcine airways. To evaluate this hypothesis, confluent cultures of primary porcine tracheobronchial epithelial (PTBE) cells were stimulated with 1% SCF Dust Extract (DE) for various times (0-24 hours) using lipopolysaccharide (LPS, 100 ng/ml) as a positive control. Western blot analysis revealed that DE induced activation of NF-κB and expression of iNOS protein. We also observed DE-mediated modulation of NF-κB and iNOS gene expression in porcine cell cultures. Acute oxidant stress is associated with exposure to SCF dust evidenced by enhanced protein carbonylation in cells stimulated with DE. These findings demonstrate that SCF dust may induce its pro-oxidative and pro-inflammatory effects, at least in part, via activation of the immune response regulator NF-κB and downstream effector molecules in airway epithelial cells.

P-FS-G-8

A Faunistic Survey of Mealybugs (Hemiptera: Pseudococcidae) and Their Natural Enemies Occurring on Coffee (*Coffea arabica* L.) and Cacao (*Theobroma cacao* L.) Agroecosystems in the Dominican Republic. E. German-Ramirez*[1], M. T. K. Kairo[1], A. Roda[2], and M. Haseeb[1], [1]Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]USDA, APHIS, Plant Protection & Quarantine, Center for Plant Health Science & Technology, Subtropical Horticulture Research Station, Miami, FL 33158.

Mealybugs are among the most important invasive pest threats to ornamental plants and agricultural crops. The Dominican Republic is an exporting country of commodities to U.S., therefore developing an official list of the native and exotic mealybugs and their natural enemies in the country are important. The biological control played by natural enemies provides an immediate domestic response capability to new quarantine pest outbreak. As part of efforts to develop mitigation measures against species identified as serious threats to the U.S., the research objectives were to collect and identify the mealybugs and their natural enemies in coffee and cacao agroecosystems, and to confirm the presence or absence, and the host range of *Planococcus lilacinus* Cockerell, one of the high risk mealybug pest threats which is reported unofficially as present in the Dominican Republic. Surveys were carried out in the country on those crop area locations during the summer of 2010. Preliminary results show that the existence of *P. lilacinus* has not been confirmed yet. The species of mealybugs that had been found and recorded are classified as confirmed or new report are *Dysmicoccus neobrevipes* Beardsley, *Puto barberi* (Cockerell), *Planococcus* sp: cf. *P. citri* or *P. minor* and *Hypogeococcus pungens* Granara de Willink; natural enemies as *Procheilonerus* sp. and *Leptomastix* sp. (Hymenoptera: Encyrtidae); and larvae predators (Diptera: Syrphidae).

P-FS-G-9

The Impact of Wild Birds and Farm Management on *Campylobacter* and *Salmonella* in Small Ruminants. B. Hagens*[1], J. G. Schwarz[1], N. C. Whitley[2], M. Wilson[3], J. Luchansky[4], S. Wildeus[5], C. Kim[5], M. Ettinger[5], and S. Pao[5], [1]Department of Agriculture Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853; [2]North Carolina A&T State University, Cooperative Extension Program, Greensboro, NC 27420; [3]Center for Conservation Biology, College of William and Mary, Williamsburg, VA 23187; [4]USDA/ARS/ERRC, Wyndmoor, PA 19038; and [5]Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

Wild-birds are potential sources of enteric disease infections in farm animals. This study was designed to evaluate the potential pathways and control of foodborne pathogen transmission between wild birds and farm animals. At two farms, a total of 14 one-acre pastures were each fenced to host twelve sheep and goats. For the control group, pastures were set up with open water tubs and grain pans to feed animals and attract wild birds. In contrast, the treatment group used nipple waterers and custom feed pans. Fecal and water samples were taken every two weeks, May-June and October-November, for two years. The samples were analyzed for the presence of *Salmonella* and *Campylobacter* using selective plating, immunoassays, and/or biochemical confirmation techniques. From small ruminants and captured wild birds, respectively, 2880 and 440 fecal samples were collected for pathogen detection. *Campylobacter* spp. were found in 5% and 8.2% of the fecal samples from small ruminants and wild birds, respectively. *C. jejuni* was isolated from 86% and 97% of corresponding positive samples. *Salmonella* spp. were found in only 0.9% of feces from small ruminants and 0.2% of wild birds. However, the pathogens were not detected in any water samples. Although wild birds seem to be more attracted to the feeding areas in some pastures with open water tubs and grain pans in autumn, there was no significant difference in pathogen prevalence between the control and treatment animal groups when analyzed by season or location. Pathogens isolated during this study were preserved for further characterization and evaluation.

P-FS-G-10

Lactic Acid Bacteria Could be Applied as a Biomarker to Detect Rodenticides in Milk. M. H. Hathurusinghe*, S. A. Ibrahim, R. Gyawali, M. Tajkarimi, and D. Song, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Simple and robust on-farm bioassay techniques for detecting harmful toxins in milk before it leaves the farm have both practical and economic benefits. The objective of this study was to determine if lactic acid bacteria could be applied as a biomarker to detect the presence of rodenticides. To test this possibility, serially diluted rodenticides were added (500 µl/tube) to tubes containing MRS broth and five commercial yogurt cultures (A, B, C, D, and E), and then incubated at 37°C, 40°C, and 42°C for 6 hours. The optical density (OD) of the broth was recorded at 2, 4 and 6 hour intervals. According to the results, all of the yogurt cultures showed highest sensitivity to diphacinone at the level of 0.005 mg/ml. Yogurt cultures C, D, and E showed detectable sensitivity to brodifacoum at the level of 0.02 mg/ml, whereas A and B showed detectable sensitivity at the level of 0.04 mg/ml and 0.01 mg/ml respectively. All the cultures were sensitive to bromadiolone at 0.04 mg/ml except D (0.02 mg/ml). None of the cultures were found to be sensitive to strychnine. The maximum sensitivity of the yogurt cultures towards rodenticides was observed after 4 hours of incubation at 42°C. Our results indicate that lactic acid bacteria could be used as biomarker for the early detection of the presence of rodenticides in milk. Further studies will be carried out to select the most sensitive strains, which could be used as a universal marker for early detection of rodenticides in dairy foods.

P-FS-G-11

The Magnesium, Cobalt, Nickel Transporter, CorA Affects Exoenzyme Production and Virulence in the Soft Rot Pathogen, *Pectobacterium carotovorum*. C. M. Kersey*, and C. K. Dumenyo, School of Agriculture and Consumer Science, Tennessee State University, Nashville, TN 37209.

Pectobacterium carotovorum (*Pc*) is a gram negative plant pathogenic bacterium that causes plant tissue maceration or soft rot disease in over 80 cultivated plant species. A major determinant of this disease is the production and secretion of plant cell wall degrading exoenzymes. Exoenzyme production is tightly linked to pathogenesis and results from a coordinated regulatory system made up of a complex network of positive and negative regulators. In a search for uncharacterized genes that are involved in exoenzyme production, we isolated a mini-Tn5 *lacZ1* mutant of *Pc Ecc 71* that was altered in both exoenzyme production and in virulence. The mutant, KD101, was reduced in all of the major exoenzymes including pectate lyase, polygalacturonase, cellulase, and protease as compared to the parent and reduced in virulence in both celery and carrot. The mutation in KD101 was in *corA*, a gene which encodes a magnesium, cobalt, nickel transporter. Complementation of $corA^-$ KD101 with a functional $corA^+$ from *Pc Ecc* 71 restored exoenzyme production as well as virulence. While the intracellular levels

of cobalt and nickel in $CorA^+$ KD100 and $CorA^-$ KD101 were below detection, the level of magnesium was not reduced in the *corA* mutant. The mechanism(s) by which CorA is influencing exoenzyme production and virulence in *Pc* is still not clear, but our data, like that in *Salmonella enterica* Serovar Typhimurium, indicate that this phenotype is not brought upon by a magnesium deficiency in the cell.

P-FS-G-12

Biocontrol of *Salmonella typhimurium* in Laboratory Media. K. McCain*[1], B. Hardy[1], M. Sharma[2], A. Sulakvelidze[3], and I. Goktepe[1], [1]Food and Nutritional Sciences Program, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411; [2]USDA/ARS Environmental Microbial and Food Safety Laboratory, Beltsville, MD 20705; and [3]Intralytix, Inc., Baltimore, MD 21202.

Salmonella typhimurium (ST) is one of two types of *Salmonella* spp. that accounts for all human infections in the United States. Recent outbreaks of *Salmonella* spp. have raised more concerns about the safety of food products and accelerated research on different measures to eliminate such a foodborne pathogen. Bacteriophages can be considered as natural enemies of bacteria, and therefore, are logical candidates to control foodborne pathogens, such as *Salmonella*. This study investigated the effect of bacteriophage treatment on the survival of *Salmonella typhimurium* (ST-1984) in liquid media. ST-1984 was cultured in Brain Heart Infusion (BHI) media overnight. Fresh BHIs were inoculated with ST-1984 (4 log CFU/ml). A *Salmonella*-specific bacteriophage cocktail (STP-102) was added at 7 log PFU/ml into BHI tubes containing ST-1984. All tubes were incubated at 4 and 10°C for 48 h. The efficacy of STP-102 phage cocktail against ST-1984 strain was determined by enumerating ST-1984 cells on XLT4 media after 30 min, 2 h, 24 h, and 48 h. Bacteriophage treatment significantly ($P \leq 0.05$) reduced the growth of ST-1984 by 3 log compared to control samples incubated at 10°C after 30 min and 2 h. The effect of STP-102 cocktail was tapered off after 24 and 48 h. At 4°C, a 3 log reduction was achieved at all incubation times. The results of this study indicate that Salmonella-specific phage cocktail (STP-102) used in this study is highly effective in inhibiting the growth of ST-1984 in liquid media at 10 and 4°C.

P-FS-G-13

Comparative Proteomic Analysis of Porcine Airways from Genetically Distinct Breeds Reared Indoors. C. J. McClendon*, S. H. Oh, and J. T. Waterman, Animal Sciences, North Carolina A&T State University, Greensboro, NC 27411.

North Carolina is the second leading contributor to America's pork production industry; producing over 10 million hogs annually. Therefore, the health and well-being of pigs is integral to North Carolina's agricultural economy. Commercial (indoor) operations and pasture-based (outdoor) operations are the two main management practices in swine production. We are interested in comparing the impact of these two swine management approaches on airway morphology and proteomic profiles among different breeds of pigs. This work investigated the impact of genotype on airway anatomy and protein expression of pigs reared indoors. Airway morphology and proteome analyses were conducted on 14 porcine tracheas from indoor pigs having three distinct genotypes; progeny of: Berkshire to Berkshire (BB), Tamworth to Berkshire (TB) and Hampshire to Berkshire (HB) crosses. For analyses, porcine tracheas (n = 4-5) from each genotype were collected at random from freshly slaughtered animals. Metrics of the intraluminal airspace and diameter were determined and recorded for each trachea. A one-way analysis of variance (ANOVA) was performed to detect variations between means followed by Bonferroni post-tests to compare all groups. Airway epithelial protein levels were determined and equal amounts of protein were separated via two-dimensional (2D) gel electrophoresis. Results showed that indoor crossbreeds, TB & HB had larger intraluminal airspaces than the indoor purebred (BB). However, BB tracheas had larger overall diameters than TB and HB genotypes. Proteomic analysis revealed subtle differences in airway epithelial proteomes amongst the breeds. It appears that genetic background may have a role in respiratory health of pigs.

P-FS-G-14

Heavy Metal Accumulation in Selected Cruciferous Vegetables and Impact on Antioxidant Activities. R. Miller*, M. Verghese, J. Boateng, E. Cebert, S. Ogutu, and L. T. Walker, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Trace amounts of metals are needed in the diet, however, when consumed at toxic levels may result in neurological disorders and degenerative diseases. A potential source of these heavy metals is the cruciferous family of vegetables. Therefore, in this study, we investigated aluminum (Al) and selected heavy metals (chromium (Cr), copper (Cu), zinc (Zn), cadmium (Cd), arsenic (As), iron (Fe)) accumulation in canola (*Brassica napus* L.) leafy greens, turnip greens (*Brassica campestris* var *rapifera*), cabbage (*Brassica oleraceae* L. var. *capitata*) and collard greens (*Brassica oleraceae* var. *viridis*). In addition, total phenolics using Folin-Ciocalteu method and antioxidant

activity using the radical DPPH scavenging assay was determined. The minerals/heavy metals were determined using Inductively Coupled Plasma (ICP) following ashing. Turnip greens had significantly higher ($p<0.05$) levels (mg/g) of Al (0.084) and Fe (0.055) compared to the other greens evaluated, but its Cu content was significantly lower (0.002) compared to collard (0.001). Zn level (mg/g) in collard greens was significantly higher (0.037) compared to the other mineral/heavy metals. There were no significant differences in As, Cd and Cr levels among all the greens analyzed. In the case of total phenolics, significant differences were observed among collard greens (74.09 mg/100g) and cabbage (23.76 mg/100g). No significant differences were observed in DPPH (%) activity among the cultivars studied. The variations in metal and phenolic content in edible tissues of *Brassica* vegetables vary by species. The effects of these metals on antioxidant enzymes in normal human cells will be investigated.

P-FS-G-15

Completing Evaluation of the Safety and Quality of Caged Egg Production versus Floor Layers. D. Nelson*, M. Thornton, and V. G. Stanley, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Two studies were designed to evaluate the quality and safety of eggs produced by caged layers versus flood egg production. Phase one concentrated on quality measured by egg production, size, exterior, and interior qualities. Phase two examined the safety of these eggs as determined by total bacteria enumeration. With a total of 180 hens separated into two groups, the duration of each phase was seven days. The data from Phase one indicated that caged hens had significantly higher production and larger eggs, compared to the floor hen production. However, eggs collected from the floor hens had significantly higher number of cracks, broken eggs, and less albumen compared to the caged hens. Data from Phase two are not yet analyzed, but will be available for presentation. The conclusion from Phase one study, suggested that caged hen are more productive than floor layers.

P-FS-G-16

Trace Metal Contents in Fish Species. J. Patterson*, T. P. Wilson, D. Spencer, and M. Verghese, Food Toxicology, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

The seafood industry is a multi-billion dollar industry in the U.S. with retail sales of over $25 billion annually. Of particular interest to consumers is the ingestion of heavy metal contaminants through the consumption of commercially available or recreationally captured fish that may be contaminated by local populations with a history of utilizing locally obtained fish species as a food source. Heavy metals are regarded as toxic to living organisms because of their tendency to accumulate in selected tissues. Local populations are known to utilize fish species from the Tennessee River as a food source resulting in potential for impaired health of these populations by the ingestion of fish products contaminated by harmful elements. The purpose of this research is the rapid determination of concentration and accumulation of heavy metals in edible tissue of various fish species taken from the Tennessee River by Inductively Coupled Plasma (ICP) analysis. Samples of various fish species (Buffalo, Bass, Brim) were collected from Tennessee River system in Northern Alabama. Edible tissue samples were prepared for analysis by conventional wet digestion methods and the levels of trace metal Cr, Cd, Cu, Fe, Pb, and Se were determined using inductively coupled plasma-optical emission spectroscopy (Perkin-Elmer DV 3300 ICP-OES). Results indicate that ICP-OES is an effective method for rapid determination of trace metals in fish species. Preliminary trace metals concentrations (95% confidence) in fish taken from the Tennessee River are 0.03±0.01 ppm for chromium, 0.00±0.01 ppm for cadmium, 0.02±0.03 ppm for lead, and 0.27±0.07 ppm for iron.

P-FS-G-17

Expression of Select Innate Immune Response Genes in Bovine Neutrophils. A. R. Turner*, and M. Worku, North Carolina A&T State University, Department of Animal Science, Greensboro, NC 27411.

Activation of toll-like receptors (TLRs) and polymorphonuclear leukocyte (PMN) accumulation at infection sites are critical events in innate host defense. Concerns for animal welfare, food safety and security fuel interest in the use of plant based extracts to modulate innate immunity. The objective of this study was to evaluate the effect of a commercially available quebracho extract on neutrophil activation. The expression of TLR2, TLR4, natural resistance-associated macrophage protein 1 (Nramp1) and the cytokines TNF-alpha and IL-10 genes in bovine peripheral blood neutrophils were studied. Blood was collected from Holstein Friesian cows at the NC A&T State University dairy farm. Neutrophils were isolated by differential centrifugation and hypotonic lysis of red blood cells. Isolated neutrophils (10^7cells/ml) were stimulated with (100ng) Lipopolysaccharide (LPS) or Pepitodglycan (1μg), or maintained in PBS in the presence or absence of 1.5X concentration of quebracho (for 0, 15, 30 or 60 min., 37C). Total RNA was isolated using a Trizol reagent. Oligo-dT primers were used to make cDNA and specific primers were used to amplify NRAMP-TLR2, 4, TNF-α and IL-10 using the Qiagen One Step RT-PCR kit. The

gene encoding GAPDH was used as a control. All the genes were expressed in isolated neutrophils. Exposure to bacteria derived ligands LPS and PGN resulted in increases in gene expression for all genes, except IL-10 at all time points tested. Exposure to quebracho diminished expression of all genes. In addition to its ability to inhibit bacterial growth, quebracho extracts may aid in modulating the innate immune response to bacteria in cows.

P-FS-G-18

Molecular Characterization and Pathogenicity of Fungal Isolates for Use Against the Small Hive Beetle, *Aethina tumida*, a Destructive Pest of Honey Bee, *Apis mellifera* Colonies. S. Wheeler*, and L. H. B. Kanga, College of Engineering Sciences, Technologies and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The small hive beetle (SHB), *Aethina tumida*, an invasive species from sub-Saharan Africa, entered the United States through Florida in 1998 and has become a serious pest of honey bee. This destructive insect has already invaded more than 30 states, and threatens the honey bee industry in southern U.S. The chemicals currently used for control of SHB are not effective and leave residues in honey products. This study was designed to identify unknown fungal pathogens from dead SHB and develop a sustainable and environmentally friendly alternative control strategy for SHB. Dead SHB were collected from several commercial apiaries in Florida; they were surface-sterilized and plated in Petri dishes containing Sabouraud Maltose Agar, and incubated for 3-10 days to investigate the recovery of primary causal agents. The unknown fungi from dead SHB were identified using DNA fingerprinting techniques and were tested against SHB in spray tower and soil-based bioassays. The analysis of DNA sequences from unknown fungi revealed a mixture of saprobes and two potential primary entomopathogens, *Metarhizium anisopliae* and *Beauveria bassiana*. Spray tower bioassays indicated the LC_{50} for *M. anisopliae* was 0.8 x 10^6 and 1.0 x 10^4 conidia ml^{-1} for larvae and adults respectively. The LC_{50} for *B. bassiana* was 1.0 x 10^7 and 2.0 x 10^4 conidia ml^{-1} for larvae and adults respectively. In soil bioassays, 100% mortality of SHB occurred within 21 days post treatment for both fungi. Thus, these fungal pathogens offer new and environmentally sound avenues for successful control of SHB in honey bee colonies.

Scientists (21)

P-FS-S-1

Vegetables and Fruits from Farmers' Markets Are Not Free of Pesticide Residues. B. N. Dingha*[1], L. E. N. Jackai[2], V. B. Shirley[2], and H. O. Sintim[2], [1]Department of Family and Consumer Science, and [2]Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

Food safety concerns continue to be important in US agriculture. Many farmers use pesticides to control insect pests to obtain increased yield and high quality fruits and vegetables. Pesticide residues may still be present on produce on sale, and this has raised widespread concerns about food safety. In this study, we used imidacloprid (Provado®) insecticide and the southern green stink bug (*Nezara viridula*) to establish a baseline for pesticide residue. From a dose-response study, the LD_{50} at 24 and 48h was 0.1195mg/ml and 0.0580mg/ml, respectively. Mortality increased with increased dose to 100% after 72h in all doses tested. Another bioassay was conducted on fresh fruits and vegetables (tomatoes, peaches, apples, cucumber, squash, okra, and green beans) from farmers' markets in Greensboro, (NC), Gaffney (SC), Auburn, Tuskegee and Montgomery (AL). Produce were infested with stink bugs after 24 and 48h; no mortality was observed on tomatoes, okra, squash and green beans from all locations. After 24h, mortality for Auburn cucumbers was (11%); Montgomery and Auburn peaches (22%); and 33% for Tuskegee peaches. This is below the 24h LD_{50} level for imidacloprid. After 48h, mortality on peaches from Tuskegee was (67%); Auburn and Montgomery (56%); Gaffney (22%); Greensboro (11%) and 33% for apples from Greensboro. The Tuskegee, Auburn and Montgomery mortality were above the 48h LD_{50} for imidacloprid. Further studies will determine the pesticides involved. These results emphasize the need for an IPM approach that produces safe food and acceptable yields.

P-FS-S-2

Consumers Reported Handling Practices for Poultry in the Home. S. Godwin*, F. Chen, A. Kilonzo-Nthenge, and R. Stone, Department of Family and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

Consumers are the least studied link in the food safety chain; however they represent the last critical control point against foodborne illness. Most feel it is unlikely they would contract a foodborne illness within their homes; despite the fact many cases of foodborne illness likely result from such practices as cross contamination and poor temperature control. Many of the microorganisms that cause foodborne illnesses are everywhere in the environment. Consequently, contamination of food is possible at any step in the food chain. A total of 150 households in Middle

Tennessee participated in this study. Researchers contacted the subjects and used a script/screener to determine eligibility. In each household, the person mainly responsible for food purchase, storage, and preparation, and at least 18 years old, was interviewed. Consumers completed a questionnaire concerning their food safety practices. Risky behaviors were identified. Types of poultry consumed and handling practices during preparation were also assessed. The results showed that chicken (98%) was the most widely consumed meat, and 87.1% of those who consumed chicken cooked it at home. Only 4.1% used a thermometer when cooking the chicken and 47.8% placed the chicken in the sink to thaw. When asked about washing hands and utensils after contact with raw poultry, 89.5% answered always to washing hands and 87.3% answered always to washing utensils. This study demonstrated that consumers are putting themselves at risk for a foodborne illness. A targeted educational program that reaches a large number of consumers is needed.

P-FS-S-3

Effect of Broiler Litter Application Rates on Sweet Potato Storage Root Shelve Life in an Organic Farming System. S. A. Hamido*[1], K. Kpomblekou-A[1], P. N. Gichuhi[2], and A. C. Bovell-Benjamin[2], [1]Department of Agricultural and Environmental Sciences; and [2]Department of Food and Nutritional Sciences, Tuskegee University, Tuskegee, AL 36088.

Nitrogen (N) is one of the most important nutrients needed for plant growth and development. The N required could be provided in organic or inorganic form but varies considerably from crop to crop. Alabama vegetable growers have reported that application of broiler litter (BL) reduces shelve life of sweet potato (SP) storage roots. Thus, from 2008 to 2010, we tested on a farmer's field the effect of BL application rates on SP storage root yield and quality. The experimental plot was a randomized-complete-block design with four replications and six treatments. Each year late in the fall, with the exception of the control plot (no cover crop), a mixture of cover crop (crimson clover, *Trifolium incarnatum* L and black oat, *Avena strigosa*) was planted. Early in the spring of the following year, the cover crop was rolled over and SP slits were planted for 120 days. Before planting the slits, BL was applied at rates of 0, 0.5, 1.0, 2.0, or 3.0 Mg ha^{-1} to the cover crop plots. The control plot without cover crop received 1.0 Mg BL ha^{-1}. On an average, the maximum sweet potato storage root yield (18.0 t ha^{-1}) was obtained at cover crop + 1.00 Mg BL ha^{-1} but was not significantly different from that obtained at 1.00 Mg ha^{-1} without cover crop. Application rates of BL above 1.00 Mg ha^{-1} significantly reduced sweet potato storage yield and shelve life. Curing alone or vacuum sealing following curing improved storage root shelve life.

P-FS-S-4

Potentially Invasive Weevil Species from the Caribbean Countries to the United States. M. Haseeb*, and M. T. K. Kairo, Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Potentially invasive weevil species from the Caribbean countries to the United States is a multi-commodity-based resource developed in 2010 by the CBC team to provide accurate electronic identification of 25 genera and 40 weevil pest species on the web. These weevils are capable of causing serious damage to numerous commodities of international trade importance including citrus, sugarcane, banana, palms, sweet potato, rice, coffee, beans, cassava, pineapple, mango, stored grains, pine, mahogany, tamarind, Dahlbergia, etc. Individuals responsible for supporting detection and identification of potential pests for the food security are depending more and more on electronic identification resources to support their activities and for the sharing of knowledge. The tool developed by us includes dorsal and lateral habitus and diagnostic character images of adult weevil species; no immature stages of these species are included in this identification tool at this time. In addition, related information available in literature on each species distribution, hosts, damage, biology, ecology, etc. are also provided. A number of species provided in this tool are not native to the Caribbean countries. However, these species were first reported in these countries and either already reached the United States via international agricultural trade or remained serious threat from the Caribbean countries to the United States.

P-FS-S-5

***Escherichia coli* and *Salmonella* Deposition onto Fresh Produce after Dispersal from Poultry House Fan Ventilation Systems.** B. D. Smith[1], F. M. Hashem*[1], C. P. Cotton[1], L. E. Marsh[1], and P. Millner[2], [1]University of Maryland Eastern Shore, Princess Anne, MD 21853; and [2]USDA-ARS, Beltsville, MD 20705.

In recent years, widespread interest has developed for determining sources of fresh produce contamination events that have caused many persons to become ill. Among several possible sources of fresh produce contamination, the potential for pathogenic microorganisms found in animal manure to become airborne and deposited onto fresh produce surfaces growing in the field is very high. This study examined the dispersal of

aerosolized fecal bacteria (*Salmonella* and *E. coli*) from two different poultry house ventilation systems onto lettuce and spinach leaf surfaces. Lettuce and spinach plants, grown in flats in a greenhouse, were placed four times during the growing season at 0- 7.5- 15-, and 30-meter distances downwind from a poultry house containing 91.4 cm ventilation fans and 0- 7, .5-15, and 11.1-meter distances downwind from a poultry house containing tunnel fans. Plant leaf samples along with poultry litter samples were collected and analyzed four times for the presence of *E. coli* and *Salmonella*. *Salmonella* was not detected in poultry litter or plant leaf samples. *E. coli* was detected in the litter at an average concentration of 1.04 $x10^7$ CFU/ml, and was found on produce leaf surfaces 11.1 meters downwind of the tunnel fans. Only sporadic detection of this organism was detected at a maximum of 7.5 meters downwind of the 91.4 cm fans. This study indicates that the maximum distance for aerosol dispersal of *E. coli* can vary among poultry houses, and this variation may depend on the type of ventilation system used in the poultry houses.

P-FS-S-6

Antimicrobial Activity of Lactic Acid, Acetic Acid, and Copper on Growth of *Enterobacter sakazakii*. S. A. Ibrahim*, R. Gyawali, D. Song and L. Williams, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Cronobacter spp. (*Enterobacter sakazakii*) is an opportunistic pathogen that poses a health risk to neonates. *E. sakazakii* has been associated with cases of necrotizing enterocolitis and infant meningitis. The objective of this study was to determine the effect of lactic acid (0.2%), acetic acid (0.1%) and copper sulfate (50ppm) as natural antimicrobials on the survival and growth of *E. sakazakii* in laboratory medium (Brain Heart Infusion Broth) as well as fluid food products (skim milk, 2% fat milk, 3.5% fat milk, and apple juice). Bacterial growth was monitored during the incubation period of 8h at 37° C. Lactic acid (0.2%) or acetic acid (0.1%) alone retarded the growth of *E. sakazakii*. However, the growth of *E. sakazakii* was significantly inhibited when 0.2 % lactic acid or 0.1% acetic acid in combination with 50 ppm copper sulfate was added into BHI broth and food model within the time frame of this study. The death rate of *E. sakazakii* was more rapid in the apple juice samples in the presence of copper in combination with either 0.2% lactic or 0.1% acetic acid. These findings indicated that lactic acid, or acetic acid in combination with copper sulfate, could be used as natural ingredients to inhibit the growth of pathogens. Natural ingredients, such as lactic acid and low dose of copper ions, can potentially be used to improve the safety of food products.

P-FS-S-7

Antimicrobial Effect of Chitosan Coating Containing Rosemary Essential Oil against *Salmonella* Enteritidis on Fresh-Cut Apples. S. Jongrattananon*, and J. Koo, Department of Agriculture, University Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Processing involved in preparing fresh-cut products increases the risk of bacterial growth and contamination by breaking the natural exterior barrier of the produce. Chitosan and essential oils are widely used as antimicrobial agents against a wide range of target organisms. The objective of this study was to assess the antimicrobial effect of chitosan (CH) coating containing rosemary essential oil (RO) against *Salmonella* Enteritidis on fresh-cut apples. *S*. Enteritidis was inoculated onto the surface of fresh-cut apples to give an initial inoculation of approximately 6.3 log CFU/g. Apple samples were dipped in solutions of glacial acetic acid (AA, pH 5.6), 1% CH, 0.1% RO, and mixture of 1% CH and 0.1% RO (CH+RO), respectively. Inoculated samples without any treatment were used as control. All samples were stored at 5°C for 15 days. *S*. Enteritidis counts of CH and CH+RO treated samples were reduced by 3.0 to 3.5 logs on day 0 and did not grow back throughout the study, while *S*. Enteritidis counts of control, AA and RO treated samples were reduced by 2.0 to 3.0 logs after 15 day storage. Total plate counts of CH and CH+RO treated samples were reduced by 2.0 logs on day 0 and showed additional 1.5 to 2.0 log reduction after 15-day storage, whereas total plate counts of control, AA and RO treated samples showed 1.0 to 1.5 log reduction after 15-day storage. The results of this study indicate that chitosan coating has a potential to inhibit the growth of *S*. Enteritidis in fresh-cut apples.

P-FS-S-8

Prevalence and Antimicrobial Resistance of Enterobacteriaceae in Animal Manure and Soil from Local Farms in Tennessee. A. Kilonzo-Nthenge*, E. Rotich, and C. Thompson, School of Agriculture and Consumer Science, Tennessee State University, Nashville, TN 37209.

The use of antimicrobials in animal production results in the presence of drug resistant bacteria in our environment and has raised concern about transmission of zoonotic pathogens to humans. This work aimed to isolate antibiotic reactant bacteria from animal manure and soil collected from local farms. A total of 34 animal manure and

34 soil samples were collected and analyzed for antimicrobial resistance. Isolates were tested for sensitivity to ciprofloxacin, ampicilin, streptomycin, kanamycin, nalidixic acid, tetracycline, colistin, gentamicin, and cefoxitin using Kirby-Bauer disk diffusion test. Our study indicated that cow manure and soils from local farms were contaminated with Enterobacteriaceae within the range 3.95 cfu/g to 6.93 cfu/g and 4.30 cfu/g to 9.85 cfu/g, respectively. Antibiotic-resistant *Escherichia coli, Yersnia enterocolitica, Enterobacter cloacae, Klebsiella terrigena, Enterobacter sakazakii,* and *Flavimonas oryzihabitans* were some of the microbes isolated. Among the isolates tested, no gentamicin resistance was observed. Enterobacteriaceae showed resistance prevalence values reaching 5%, 32%, 45%, and 65% for antibiotics ciprofloxacin, colistin, streptomycin, and tetracycline, respectively. Further studies involving larger sample sizes over time are desirable to better monitor and evaluate the trend of frequency and antimicrobial susceptibility among microbes in farm environment.

P-FS-S-9

Biofortification of Peanut (*Arachis Hypogaea* L.) Using Genetic Modification. N. Diby, and K. Konan*, Food Biotechnology Laboratory, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Plants are the primary source of dietary protein consumed by humans and livestock. Plant proteins, when used as dietary protein, are generally incomplete in nutrition due to their deficiency in several essential amino acids. Peanut is a legume rich in proteins, and a major source of plant protein worldwide. Its annual protein harvest is over 4.5 million tons. Peanut in the form of flour, protein isolates, and meal is used in several foods as protein supplements to alleviate protein malnutrition. However, peanut protein is deficient in certain essential amino acids (EAA) including tryptophan, methionine, lysine, threonine. The objective of this work is to enhance the essential amino acid content in peanut protein, in order to optimize the utilization of peanut to increase protein value of foods, mainly in less developed regions of the world where the prevalence of protein deficiency is particularly high. A synthetic ASPx gene encoding an enriched storage protein in essential amino acids (methionine, lysine, tryptophan, threonine, Isoleucine, leucine, valine and phenylalanine) was introduced into peanut via Agrobacterium-mediated gene transfer. Ten (10) independent kanamycin resistant plants were regenerated from transformed peanut hypocotyl cells. The phenotypic characteristics were similar to control non-transformed plants. Molecular analysis using PCR and Southern hybridization indicate the stable integration of the ASPx gene in the peanut genome. The presence of the 15 KDa ASPx protein in peanut crude extracts was confirmed in SDS-PAGE and 2D gel. Work is still in progress to evaluate the nutritive quality of transgenic peanut.

P-FS-S-10

Detection of γ-Irradiated *Vibrio vulnificus* after Heat and Cold Shock Treatment by Using EMA Real-Time PCR. J. Lee*[1], and R. Levin[2], [1]Department of Human Ecology, Delaware State University, Dover, DE 19901; and [2]Department of Food Science, Massachusetts Agricultural Experiment Station, University of Massachusetts, Amherst, MA 01003.

Gamma (γ)-irradiation can be used to control pathogens such as *Vibrio vulnificus* in seafood. Several detection methods have been developed to detect irradiated foods. However, there is a need for a rapid and specific method in order to discriminate between γ-irradiated and non-irradiated *V. vulnificus* in seafood. The effects of irradiation on microbial cell populations (%) have been studied in order to develop detection methods for irradiated foods. The method used in this study was the EMA real-time PCR, using *V. vulnificus* specific primer, EMA, and SYBR Green to discriminate between γ-irradiated and non-irradiated cells. Confocal microscope examination showed that γ-irradiation damaged portions of the cell membrane, allowing EMA to penetrate cells of irradidated *V. vulnificus* γ-irradiation at 1.08 KGy resulted in log reduction (93.2 %) in genomic targets derived from EMA real-time PCR. The combination cold/heat shock resulted in the highest (98.2 %) discrimination of dead irradiated *V. vulnificus* by EMA real-time PCR. In this approach, real-time PCR could provide a new screening method for discrimination of gamma-irradiated and non-irradiated *V. vulnificus* in seafood.

P-FS-S-11

Recovery of Live Fibroblast-Like Cells in Sheep at Different Times Postmortem. M. Singh, X. Ma*, S. Richardson, E. Amoah, and G. Kannan, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Live animals have been produced recently from animal tissues preserved for decades by freezing with or without cryoprotectants. It is not clear as to how long tissues can remain unfrozen after animal death to obtain live cells. To understand this phenomenon, ear skin samples from individual sheep (n=3) were procured from a slaughter

plant and stored at 4°C. After various intervals (2, 8, 24, 32, 48 and 56 h after slaughter), 2-3 mm^2 pieces (n=10) of skin samples (explants) were cultured for 12 days on 2 dishes (60 mm) for each sheep. Dishes were examined each day for any contamination, explant dislodging, and any growth of cells. Outgrowth of fibroblast-like cells was observed on all dishes, except for 56 h samples, by day nine of culture. Outgrowth of cells in the explants for the 56 h interval was seen only after day nine of culture. The number of outgrowing cells decreased with increasing time interval between animal slaughter and culture. Passage one cells from all time points proliferated well and were apparently normal. Passage two cultures of 2 h and 56 h intervals for one of the three sheep were compared for their morphology and proliferation rates. The population doubling time (PDT) for the 2 h and 56 h intervals was 33.12 and 34.8 h, respectively, and both the lines exhibited similar cell morphology. These results suggest that sheep and perhaps other animal species with superior traits can be effectively preserved at cellular level after up to 56 h at normal refrigerating conditions, without need of complicated cryopreservatives/cryotanks that are usually not available on small farms.

P-FS-S-12

Identification and Expression of Wnt Co-Receptor Low-Density Lipoprotein-Related Receptor-6 in Goat Blood. H. Mukhtar, and M. Worku*, North Carolina A&T State University, Department of Animal Science, Greensboro, NC 27411.

Low-density lipoprotein-related receptor (LRP) 5 and 6 are components of the wingless (wnt) gene signaling pathway. They play a key role in bone development and disease. Human mutations in LRP6 cause early onset coronary disease, osteoporosis, late onset Alzheimer's and cancers. In goats, osteoporosis has been reported to occur due to mineral deficiency and gastrointestinal parasitism. Further, the goat has been developed as a large osteoporotic animal model that resembles human osteoporotic changes. The objectives of this study were to detect the LRP-6 gene and evaluate its expression in goat peripheral blood. Blood was collected from goats on FTA elute cards for DNA extraction and in PAXgene Blood tubes for RNA extraction. RNA samples were reverse-transcribed and the cDNA was obtained. Specific LRP6 primers were used for PCR amplification. The amplified product was run on a 1% agarose gel. GAPDH was used as loading control and primers in the absence of DNA were used as negative controls. Gels were stained with ethidium bromide and visualized. An ~400 bp fragment of LRP6 was present in genomic DNA and expressed at the RNA level. The amplicon was sequenced commercially and the NCBI BLAST tool was used to compare the sequence with the NCBI sequence Database. The amplified sequences had 100% similarity to human LRP6. The results of this study show that the LRP-6 is conserved between goats and humans. This gene will be a useful tool for studies in skeletal development and diseases of goats and humans.

P-FS-S-13

Effect of Rice Seed Treatments with Thiamethoxam Insecticide on Rice Water Weevil Control in Rice. S. Ntamatungiro*[1], J. Bernhardt[2], and R. Mazzanti[1], [1]Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601; and [2]Rice Research and Extension Center, Stuttgart, AR 72160.

Seed treatments with insecticides may reduce the number of insects feeding on rice (*Oryza Sativa* L.) plants and minimize yield losses. A study was conducted at the Rice Research and Extension Center, near Stuttgart, Arkansas to compare the effects of seed treatments with thiomethoxam on plant and rice water weevil (*Lissorhoptrus simplex* (Say)) (RWW) populations after flooding, and grain yields. Treatments were arranged in a split-split plot design with four replications with seed treatments (untreated and treated with 3.3 oz of thiamethoxam per 100 lbs of seed) as main plots, cultivars (conventional RoyJ and hybrid CLXL745) as subplots, and seeding rates (45, 67.5, and 90 lbs/A for RoyJ, and 20, 30, 40 lbs/A for CLXL745). Treated seeds had a similar effect as untreated seeds on yields and RWW's averaged over cultivars and seeding rates. For each unit increase in seeding rate, the number of seedlings per foot decreased by 3.3 for RoyJ (R^2 = 0.348, p=0.002), and by 3.9 for CLXL745 (R^2 = 0.424, p=0.0006). As the number of RWW's increased, the number of tillers (r = -0.377, p=0.07) and plant dry weight (-0.461, p=0.023) decreased for CLXL745 only. Due to the high tillering capacity and yielding potential, CLXL745 compensated for reduced initial plant population and the apparent tillering reduction by RWW's better than RoyJ. Yields decreased as seeding rate increased regardless of seed treatments by 523 to 655 lbs/A for CLXL745, and by 128 lbs/A for RoyJ. Only untreated seeds of RoyJ resulted in yield increase of 434 lbs/A.

P-FS-S-14

Molecular Analysis of *Salmonella* Recovered from Pre- and Post-Chill Whole Broiler Carcasses. S. Parveen*, and T. Mohamed, Food Science and Technology Program, Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Salmonella causes 1.4 million cases of salmonellosis and over 500 deaths annually in the United States.

Salmonellosis is mainly caused by food of animal origin. *S.* Typhimurium (ST) and *S.* Kentucky (SK) have been isolated from pre- and post-chill whole broiler carcasses. Limited information is available about the association between the presence of virulence factors in these serotypes and their potential of causing human illness. The objective of this study was to address this data gap. A total of 309 (146 pre- and 163 post-chill) isolates were tested for the presence of *Salmonella* virulence genes *inv*A, *pag*C, and *spv*C by Polymerase Chain Reaction. Bioassays were used to evaluate aerobactin and colicin production. All isolates contained *inv*A and *pag*C but only 1.3% contained *spv*C. All *spv*C positive isolates were ST (one pre-chill and three post-chill). Overall, 30.7% of the isolates were aerobactin producers, and 41.1% were colicin producers. Among the 21.4% of aerobactin producers, 10.4% and 11% of SK isolates were from pre- and post-chill. Five percent of pre- and 4.2% of post-chill ST isolates were aerobactin producers. Among the 38.5% colicin producers, 20.7% and 17.8% of SK isolates were from pre- and post-chill. Two percent of pre- and 1% of post-chill ST isolates were colicin producers. There was no significant difference in the presence of virulence factors between pre- and post-chill isolates. The results suggest that *Salmonella* isolates recovered from pre- and post-chill carcasses can possess virulence factors, and thus have the potential to cause salmonellosis.

P-FS-S-15

Higher Education Partnership for Food Security and Poverty Reduction in South Africa. H. A. Paul*[1], and D. Alexander[2], [1]Office of International Agriculture Programs, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]AgriPark Cooperatives Project, University of Fort Hare, Alice – Eastern Cape Province, South Africa.

The University of Fort Hare (UFH) is the oldest historically black university in South Africa, and has served as one of the key institutions for educating Africans throughout the continent during the first half of the twentieth century. The institution confronts many challenges, currently, in its effort to equip faculty and prepare students for agricultural development engagement to address rural poverty in the Province where the average household income of rural poor approximates R6,000 annually, and unemployment rates near 28%. The UFH's vision is to create agribusiness empowered communities in the Eastern Cape (EC) to combat the extreme rural poverty and unemployment among previously disadvantaged individuals (HDIs) where agriculture has the potential to promote food security and increased incomes for more than 3.4 million. Through the School of Agriculture and Agribusiness, the Rural Enterprise Advancement Program for the EC, has been developed to create opportunities for greater participation in agriculture through innovative production models, technologies and methods to promote sustainable self-employed jobs for the poor and unemployed. Florida A&M University (FAMU) has developed a strategic partnership with the UFH to promote the creation of sustainable agricultural & agribusiness systems. FAMU is providing 32 Farmer to Farmer technical assistance assignments from 2009-13 to build the institution's capacity in agricultural education and extension and support service delivery to HDI clients in communities surrounding the former homeland region of the Ciskei. Year 1 inputs provided five technical assignments resulting in new agricultural knowledge and methods impacting 380 HDIs, 86 of who were women.

P-FS-S-16

Effect of Sweetpotato Variety and Cultural Practices on Insect Damage. T. Rashid[1]*, and L. C. Adams[2], [1]Alcorn State University Extension/Research Demonstration Farm & Technology Transfer Center, Mound Bayou, MS 38762; and [2]USDA-ARS Southern Insect Management Research Unit, Stoneville, MS 38776.

Eight sweetpotato (*Ipomoea batatas*) varieties were compared in the field for insect damage and yield. Sweetpotatoes were also planted in a field with three-year history of ryegrass and compared with field incorporated with HumaSoil based soil conditioner and a field in sweetpotato production for the past five years. Insect populations were monitored in sweetpotato fields by weekly sweep net sampling and biweekly counts of insects collected on two different sizes of purple sticky traps and Pherocon™ AM yellow sticky traps. Four sweep net samples, each consisting of 25 sweeps were taken from each of four different locations. Eight replications of each purple and yellow sticky traps were installed around sweetpotato fields at different locations. Traps were checked every other week. Insect samples were collected and identified. The sticky traps attracted more insect pests than those captured by sweep net sampling. Several species of click beetles (adult wireworms, mostly *Conoderus vespertinus*), *Cerotoma trifurcata*, *Lygus lineolaris*, *Diabrotica undecimpunctata*, tortoise beetles and flea beetles were collected in purple/yellow sticky traps or sweep net samples. A 25 ft row of sweetpotatoes from each replication was harvested to evaluate insect damage and marketable yield. Mean weight of marketable sweetpotatoes significantly differed under different growing conditions. Different sweetpotato varieties showed varied susceptibility levels to insect damage. Marketable yield of sweetpotatoes also significantly differed among varieties. Use of resistant sweetpotato varieties and an effective insect monitoring system, such as sticky traps may play a

significant role in pest management of sweetpotatoes in Mississippi.

P-FS-S-17

Population Structure and Association Mapping in Watermelon Heirloom Collections. U. K. Reddy*[1], Y. R. Tomason[2], G. Vajja[1], S. K. Ponniah[1], and P. Nimmakayala[1], [1]Department of Biology and Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112-1000; and [2]Department of Plant Breeding, Dnepropetrovsk State Agrarian University, Voroshilov 25, Dnepropetrovsk 49600, Ukraine.

Thirty-five watermelon heirlooms from the USA, Ukraine and Russia were evaluated for three seasons for their growth and fruit traits. The genotypic data generated by SSRs and several hundreds of AFLPs were utilized to resolve population structure using STRUCTURE program. This analysis was conducted assuming two subpopulations (K=2) to five subpopulations (K=5) using the SSR data and assuming two subpopulations (K=2) to eight subpopulations (K=8) using the AFLP data. The results indicated presence of subpopulation structure within the heirlooms that ranged from 3 to 6 clusters. In all the three runs with the K=3 assumptions with the SSR and AFLP data, there were three clusters: one with mixture of heirlooms from all the countries and the second with the US and the third with the Russian and Ukraine heirlooms showing a sub structure of 18, 8 and 9 heirlooms separately. In all the three runs of K=6 assumptions using the AFLP data, there were six clusters. The clustering based on the assumptions K=8 was not additionally informative but conferred to the same pattern of clustering. The clustering results (six subgroups) were used as covariates in the association test (MLM procedure with TASSEL software). For the traits with high heritability values (> 0.5), i.e. rind pressure and soluble solids, 4 to 8 markers were identified showing significant associations in up to 2 out of 3 seasons, with R^2 values ranging from 5 to 10%. As to fruit yield and yield components, the majority of the markers could be identified with R^2 values lower than 5%. Detailed results, including co-location of markers significant for different traits will be presented.

P-FS-S-18

Effect of Sample Geometry on the Rheological Properties of Goat Milk Cheese. E. Risch*, and A. S. Hubbard, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Compressive moduli of elasticity and stress relaxation characteristics of goat milk cheese were studied and compared with those of cow milk judged to be of comparable consistency. Goat milk cheeses were prepared from fresh milk and also from reconstituted dehydrated milk. Cylindrical samples were used and true stress was applied to the cheeses. The true stress applied to a cheese sample was determined from the variation of cross-sectional area of a cylindrical specimen during compression. Stress relaxation data were developed from the force decay resulting from imposed compression levels of 5, 10, 20 and 40% of original sample dimension. Crosshead speeds of 2.5 and 25 cm/min were used. Stress relaxation for the various compression levels was determined by measuring the force decay for up to 15 min under constant strain. The compressive elastic moduli for goat milk cheese were found to be generally lower than those for comparable cow milk cheeses. For cheese prepared from fresh goat milk, at least two distinct periods of stress relaxation were found for each compression level. Cheese prepared from reconstituted dehydrated goat milk showed one period of stress relaxation for each compression level.

P-FS-S-19

Occurrence and Quantities of *Salmonella* and *E. coli* in Runoff Water from Soil Amended with Various Manure Types. B. D. Smith*[1], F. M. Hashem[1], A. L. Allen[1], L. E. Marsh[1], C. P. Cotton[1], P. Millner[2], P. Kleinman[3], and R. Bryant[3], [1]University of Maryland Eastern Shore, Princes Anne, MD 21853; [2]USDA-ARS, Beltsville, MD 20705; and [3]USDA-ARS, University Park, PA 16802.

Rainfall stimulated runoff water is an avenue for contamination of water bodies and fresh produce by pathogenic microorganisms. This study assessed the potential for *E. coli* and *Salmonella* to travel through rainfall-simulated runoff from soil amended with dairy slurry, liquid swine manure, poultry litter, and composted poultry litter. Two rainfall-simulation events were conducted four days apart with manure-amended soil contained in stainless-steel boxes. Rainfall was delivered at approximately 7 cm h^{-1} for 40 minutes. Runoff water was collected from soil boxes and analyzed for the presence of *Salmonella* and *E. coli*. Initial concentrations of *E. coli* and *Salmonella* in dairy slurry were 6.61 and 4.60 $\log_{10}$ CFU/g, respectively, whereas initial concentrations in liquid swine manure were 5.08 and 4.08 $\log_{10}$ CFU/ml, respectively. *Salmonella* and *E. coli* were both detected in runoff water from dairy slurry, and liquid swine manure-amended soil during the first rainfall simulation at concentrations of approximately 4.0-4.3 $\log_{10}$ CFU/ml and 2.0-3.2 $\log_{10}$ CFU/ml for *E. coli* and *Salmonella*, respectively. *Salmonella* was not detected in runoff water from the second rainfall simulation, but *E. coli* was detected from dairy slurry, and liquid swine manure-amended soil at concentrations of approximately 2.6 $\log_{10}$ CFU/ml. Pathogen levels were higher in runoff water immediately after manure was applied to soil, indicating that over time, soil retention

can occur for some of the pathogen populations. This study suggests that manure types and initial concentrations of pathogens may affect the quantity of pathogens that may be carried in runoff water.

P-FS-S-20

LD Mapping For Melon Fruit Related Traits. Y. R. Tomason*[2], P. Nimmakayala[1], G. Vajja[1], and U. K. Reddy[1], [1]Department of Biology and Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112; and [2]Department of Plant Breeding, Dnepropetrovsk State Agrarian University, Voroshilov 25, Dnepropetrovsk 49600, Ukraine.

Thirty-eight melon types belonging to Ukraine and other world collections that were selfed for four consecutive generations were evaluated for their growth and fruit traits for five seasons (2003-2007). Conventional breeding approaches focusing on improvement for yield and fruit quality parameters lacked precision and power as these traits are typically represented by poly genes with lot of environmental interaction. The genotypic data generated by mapped SSRs gathered from published reports and several hundred of AFLPs together with information on various morphological traits were utilized to resolve population structure using STRUCTURE program. The population structure was explored to identify discrete subpopulations based on allele frequencies. Clustering and population structure showed three major groups based on their existing convar characterization. The phenotypic variability analyzed through univariate statistics showed high amount of genetic variance for the fruit yield and other quality traits. The ANOVA revealed 76% within population and 8% among population variance. Putative polymorphisms were used to analyze genotype-phenotype associations to identify several QTLs, using TASSEL software. The stability of QTLs across the seasons and across the models (GLM with PCA, GLM with structure, MLM with PCA and MLM with structure) were compared. The significance and complexity of marker-trait associations for all the traits investigated will be presented and discussed.

P-FS-S-21

The Effects of Infection with *Haemonchus contortus* on Clinical Parameters and Performance in Sheep. A. Yousuf*[1], A. L. Goetsch[2], and A. M. Zajac[3], [1] Agricultural Research Station, Virginia State University, Petersburg, VA 23806; [2]American Institute for Goat Research, Langston University, Langston, OK 73050; and [3]Virginia/Maryland Regional College of Veterinary Medicine, Virginia Tech, Blacksburg, VA 24061.

The study was carried out in well-controlled animal house environments on sixteen, 247 days old intact male Barbados Black Belly hair sheep (n=16 and 34 ± 2 kg, initial live weight) artificially infected with the third stage infective larva (L3), of the gastrointestinal nematode parasite *Haemonchus contortus*. The aim of the study was to estimate clinical parameters, packed cell volume (PCV), eggs per gram of feces (EPG), FAMACHA score, performance as feed consumption, body weight gain or loss, feed conversion ratio (feed consumed per unit of body weight) and feed efficiency (gain to feed) and carcass characteristics. Two levels of *H. contortus* larval burden, no larvae (HCL0), and 3000 larvae (HCL3000) were administered every week. The weekly dose was divided into three and administered on Monday, Wednesday, and Friday of each week. Representative numbers of rams were slaughtered at the beginning and end of the experiment and carcass composition analyzed. Dressing percentage was also determined. Feed intake and feed efficiency were depressed in the first few weeks of the experiment for infected animals, but was subsequently followed by a compensatory reaction. Lower establishment rates, based on actual worm counts, were observed for the infected group, but the levels of establishment rates tended to decrease with time. Dressing percentage and carcass composition was similar.

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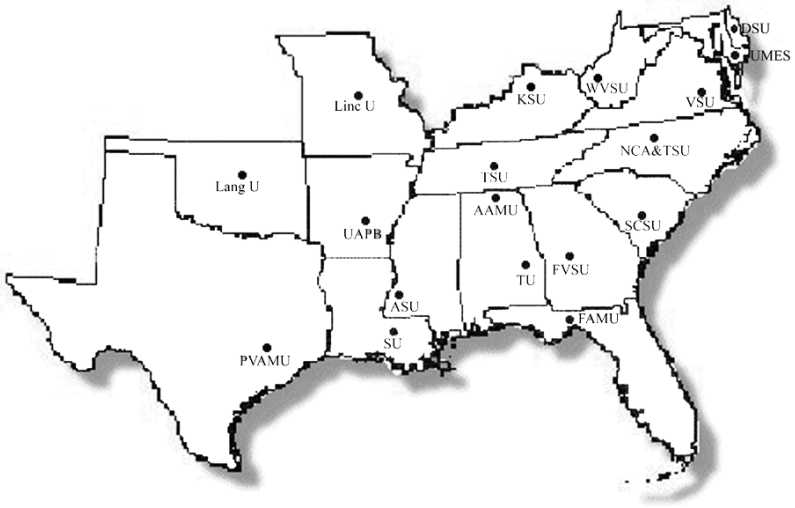

Abstracts of Renewable Resources, Bioenergy, and Environmental Stewardship Papers

Undergraduate Students (9)

O-RR-U-1

Potential Method for Reducing Ammonia Level in Aquaria and Ponds. Z. Brown*, A. Atalay, and B. Whitehead, Virginia State University, Agricultural Research Station, Petersburg, VA 23806.

High concentration of ammonia is toxic to fish, especially in aquarium and pond settings. The decomposition of feed and other biological forms contribute to the buildup of ammonia and the reduction of dissolved oxygen in the water. This condition produces strain on fish often leading to onset of disease. In such circumstances, fish in aquaria are often observed hovering near the surface gasping for air; eventually becoming comatose followed by death. The dilemma is associated with high feed input by farmers to promote faster growth and to induce high protein content to produce high quality fish. Therefore, feed management should be used as a primary means of controlling toxic ammonia in ponds and aquaria. Frequent monitoring of the ammonia level in the water will indicate if buildup is eminent, thus providing a clue for remedial steps. Perhaps another method that can be employed is chemical precipitation of ammonia as struvite. Preliminary results have indicated that ammonia can be precipitated out of solution as ammonium phosphate or ammonium sulfate provided the initial solutions contain high concentration of each species. In the presence of magnesium, ammonia can be precipitated as struvite ($MgNH_4PO_4$). This occurs when the water pH approaches neutral and beyond. The simultaneous measurements of pH, dissolved oxygen (DO), ammonia, and temperature are necessary to ascertain that water conditions for fish growth have not been compromised. In production ponds, farmers need to properly gage feed quantity and quality to avoid a catastrophic situation due to high ammonia buildup.

O-RR-U-2

Dynamics of Phosphorus Accumulation in an Organic Farming System. K. Doss*, S. O'Garro, and K. Kpomblekou-A, College of Agricultural, Environmental and Natural Sciences, Tuskegee University, Tuskegee, AL 36088.

Soil phosphorus (P) is made of inorganic and organic P that with active participation of soil microorganisms and enzymes (phosphatases) mineralize organic P into inorganic P that becomes readily available for crop uptake. Every year broiler litter (BL) is added to organic farming systems to supply nutrients for growing crops. However, not all the P contained in the BL is used by the crops and therefore, accumulates in topsoil and may move with runoff into surface waters. An experiment was conducted at the GWC Experiment Station at Tuskegee University at an organic farming site. The treatments were weed-control (no cover crop and no fertilizers); crimson clover alone (no fertilizer); crimson clover + BL; and crimson clover + NPK fertilizers. Sweet potato slits were transplanted and grown for 120 days. Each year, after harvest, soil samples were collected at 0-15 cm depth. The samples were air-dried, sieved, and analyzed for total and available P. Results showed that application of NPK or BL did not affect water-soluble P concentration in the treatments between 2002 and 2007 (54.4 mg P kg^{-1}). However, the Bray P-1 extracted increased significantly in the NPK and BL plots as compared with the control weed plot or the crimson clover plot alone. No significant build-up P was observed in the BL plot between 2002 (47.8 mg P kg^{-1}) and 2007 (70.9 mg P kg^{-1}). In the NPK plots, Bray P-1 increased from 57 mg in 2002 to 99.4 mg kg^{-1} in 2007.

O-RR-U-3

The Fiber Comparison of Lyocell, Rayon, and Cotton. A. Draper*, and J. Oh, Department of Human Ecology, Delaware State University, Dover, DE 19901.

This study contributes to the understanding of how lyocell fiber compares to cotton and rayon fibers, especially when used to make garments. To some, Lyocell may be better known by its brand name, Tencel. In this study, lyocell is investigated as a more eco-friendly or sustainable replacement for rayon. This study also investigates what college students know about lyocell and how they feel about it as opposed to cotton or rayon. To answer these questions, secondary research has been conducted to determine the actual differences among lyocell, rayon, and cotton. Research has also been conducted in order to show whether or not lyocell is indeed a more sustainable alternative to rayon. In addition, a survey has been conducted among college students to determine how average college students feel about these three fibers and to determine how many have even heard of lyocell. The survey was also used to explore the students' depth of knowledge about this particular fiber. Based on the results of the survey, most college students know very little about the fibers used to make their clothes and most do not really care about the fiber content of what they are wearing. In addition, the importance of fiber as a clothing purchasing criterion is discussed.

O-RR-U-4

Evaluation of Growth Parameters in Predicting Yield of F_1 Hybrid Chestnuts (*Castanea mollissima* L.). G. Hawkins*, B. R. Phills, G. Umar, S. Sangster, and S. Leong, Center for Viticulture and Small Fruit Research, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Chinese chestnut is the preferred species by southern growers because of its ideal horticultural characteristics coupled with its hardiness to the hot humid climate of the South. The problem is that 99% of all southern plants are derived from seedlings of the Dunstan hybrid that suffers from severe inbreeding depression. The purpose of this study was to evaluate F_1 hybrids from nine improved commercial cultivars for their ability to exhibit vigor using foliage growth components as indicators of potential yield. Nine cultivars were selected for use in this study**:** Quing, Peach, Gideon, Sleeping Giant, Shing, Luvall's Monster, Hong Kong, Eaton, and Auburn. These cultivars were selected because of their excellent plant vigor, large nut size, earliness, and excellent pollination properties. Preliminary results showed that plant height, and number of shoots can be used to predict yield of F_1 hybrid selections. Data showed that plant height, length and number of shoots and male and female flowers were excellent traits in predicting yield. Even though the data is preliminary, Quing, Sleeping Giant, and Hong Kong offered the greatest promise. With respect to flowering, all cultivars produced an abundant amount of male flowers, but only three cultivars actually produced edible nuts that denote exceptional earliness considering that it generally takes 4 to 5 years for cultivars currently used seedlings to begin the flowering and fruiting process. Further evaluations are needed to pinpoint the best methodologies for measuring growth components as predictors of yield and subsequent quality of edible nuts.

O-RR-U-5

A Study on How Lichens Affect the Atmospheric Pollution of Metals along Interstate Highway I-26 in the Midland and Low Country of South Carolina. C. Jones*, J. Olives, and Z. Chang, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

Lichens are slowly growing organisms frequently found on tree trunks, tree branches, and soil surfaces under the warm and wet weather of South Carolina. Lichens do not possess roots and depend on the atmospheric input for nutrition. Numerous studies have shown that lichens uptake heavy metals from the aerosols in the air. This property of lichens makes them excellent bio-indicators to observe average air pollutions from various human activities and natural processes in a relative long period of time. The atmospheric pollution from heavy metals (Pb, Zn, and Cu) and radionuclides were studied along Interstate Highway I-26 in the section from Columbia to Charleston in South Carolina. The uptake of the heavy metals and radionuclides were measured by ICP-MS and Gamma Spectroscopy. The origin of the pollution was also studied by the isotopic ratios of the lead absorbed on the lichens. The gamma spectroscopic analysis showed that the radioisotopes were mainly from the natural sources. The variation of the heavy metal concentration and radioactivity along the distance from the highway were also studied. The results were discussed in detail.

O-RR-U-6

Aquatic Insect Assemblages of Ephemeral Ponds in the Apalachicola National Forest, Florida. J. L. Richardson*, A. K. Rasmussen, and M. L. Pescador, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

In this research study we investigated aquatic insect assemblages of four ephemeral ponds in the Apalachicola National Forest (ANF) near Tallahassee, Florida. Recently, the use of ORVs (Off Road Vehicles) in the ANF has been restricted due to possible environmental impacts caused by these vehicles. By determining the diversity of aquatic insects within the ponds, we hope to provide the US Forest Service with important baseline data that can be used to monitor and assess the health of these sensitive ecosystems. Samples of aquatic insects from the four ponds were collected seasonally for two years. Aquatic insects from the samples were sorted in the laboratory, and the specimens were identified to family/genus level. These data were used to characterize the aquatic insect assemblages of the ponds and describe how insect populations changed from season to season and over the course of the two years the study was conducted. Results indicate that the orders Coleoptera (aquatic beetles), Odonata (dragonflies and damselflies), and Heteroptera (aquatic bugs) are the dominant groups of aquatic insects. All of the ponds contained healthy assemblages of aquatic insects, and none of the ponds appeared to be currently impacted by ORV use. Our overall goal is to help the US Forest Service manage and protect these biologically diverse ephemeral ponds.

O-RR-U-7

Temperature Dependence of Solution Viscosity of Poly (3,5-dimethylphenylacrylate) in Toluene at 25°C and 30°C. L. Sealey*, and N. Hamidi, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

3,5-dimethylphenol, a member of xylenol family, is a water soluble, toxic compound. The polymer derived from the xylenol is solid water insoluble; therefore, it is less toxic. In this work, the investigation of the dilute solution properties of Poly (3-5 dimethylphenol acrylate) (35PDMA) in Toluene was carried throughout the study of its viscosities at 25 °C and 30°C. The viscosity samples were measured with a capillary viscometer thermostated in a water-bath of 25°C and 30 °C ± 0.01. The Huggins and Kraemer relationship was used graphically to determine the intrinsic viscosities of the samples. Within the report the dependence of viscosity with molar mass by the Mark-Houwink-Kuhn-Sakurada relationship (MHS) was investigated. At 25°C, 0.6258 was the value of the exponent and 0.0233 was the value of the intercept. At 30C, 0.511 was the value of the exponent, and 0.117 was the value of the intercept. The Stockmayer-Fixman relationship was also applied which presented at 25°C, a value of K (θ) of 0.114 while the value of the slope was 4.0×10^{-5} and at 30°C, the value of K (θ) was 0.116 with a slope of 3.0×10^{-5}. It is a known fact that the K (q) is directly proportional to the unperturbed dimensions of the polymer in the solution. In this case, the unperturbed dimensions of the polymer were slightly increasing with the increase of temperature.

O-RR-U-8

The Measurement of Radium-223 and -224 Isotopes by RaDeCC System. S. Tan*, B. Bett, Z. Chang, and W. S. Moore, Department of Physical and Biological Sciences, South Carolina State University, Orangeburg, SC 29117.

Short-lived radium isotopes, Ra-223 (half life = 11.4 days) and Ra-224 (half life = 3.63 days), provide valuable information on estuarine/ocean mixing, submarine groundwater discharge, and water/soil interactions. We employed a state-of-the-art technique, RaDeCC system, to study the isotope contents in groundwater. The radium in groundwater is first extracted onto MnO2 impregnated acrylic fibers loaded on a column with an efficiency of 100%. After the decay equilibrium is arrived, the decay daughters of the radium isotopes, Rn-220 and Rn-219, are circulated in the system and counted in a Lucas cell by a delayed coincidence counting algorithm. Compared with other techniques, the RaDeCC is easy to operate and quick to complete. In this study, we prepared three calibration sources to measure the counting coefficients of the RaDeCC system for Ra-223 and Ra-224. The parameters, such as the water content on the MnO2-fibers, the flow rate, and the length of the tubing, were found to affect the counting efficiency and were carefully studied. Then, a number of groundwater samples were measured.

O-RR-U-9

Soil Amendments Modified Capsaicin Content of Hot Pepper Fruits. F. W. Turner*[1], R. R. Hill[1], G. F. Antonious[1], and R. L. Jarret [2], [1]Department of Plant and Soil Science, Land Grant Program, Kentucky State University, Frankfort, KY 40601; and [2]USDA/ARS Plant Genetic Resources Conservation Unit, Griffin, GA 30223.

At the present time, 90% of U.S. chili pepper production occurs in New Mexico, eastern Arizona, and western Texas. Pungent chili varieties are grown for their food value, health-promoting properties, and also as a source of capsaicinoids that have variety of medicinal uses. Studies at KSU on screening hot pepper genotypes of *Capsicum* sp. indicated that PI 438649 of *C. annum* exhibited the greatest concentrations of capsaicin and dihydrocapsaicin among 23 genotypes tested. Hot pepper seeds of PI 438649 were grown under four soil management practices (sewage sludge, chicken manure, yard waste, and no-mulch control treatment) to monitor and quantify capsaicin and dihydrocapsaicin content in pepper fruits at different stages of maturity (green, yellow, orange, and red pepper) in relation to four soil management practices. Fresh fruits at four stages of development were collected, extracted with methanol, and analyzed for capsaicin (trans-8-methyl-N-vanillyl-6-nonenamide), dihydrocapsaicin (8-methyl-N-vanillylnonanamide), and nordihydrocapsaicin. Mass spectrometry of the fruit crude extracts indicated that the molecular ions at m/z 305, m/z 307, and 293 which correspond to capsaicin, dihydrocapsaicin, and nordihydrocapsaicin, respectively have a common benzyl cation fragment at m/z 137 that can be used for monitoring capsaicinoids in hot pepper extracts. Capsaicin and dihydrocapsaicin were the dominant capsaicinoids detected in *Capsicum* species. Regardless of fruit color, capsaicin was higher than dihydrocapsaicin. Red fruits contained the highest concentrations of capsaicinoids. Fruits of plants grown in yard waste compost had the greatest concentrations of capsaicin (120 μg g^{-1} fresh fruit) and dihydrocapsaicin content (27.4 μg g^{-1} fresh fruit) compared to other three treatments.

Graduate Students (23)

O-RR-G-1

The Potential Economic Benefit of White Flesh Sweetpotato for Vegetable Producers in Alabama. E. Adzosii*, E. Kebede, C. Bonsi, and D. Mortley, Tuskegee University, Tuskegee, AL 36088.

The current U.S. energy policy is established to substitute fossil fuel with renewable energy to reduce carbon emission, import of fossil fuel and enhance rural economies. Ethanol is one of the renewable energies that increased significantly in the last decade. Ethanol is corn based in the U.S. and the demand for corn has increased the price of corn and farmers income. Sweetpotato is one of the potential ethanol feedstock. In 2007, about 2,800 acres of the farmland was under sweetpotato cultivation in Alabama and it ranked fifth nationally after North Carolina, California, Mississippi and Louisiana. It also accounted for about $9.2 million cash receipts. Alabama vegetable producers grow orange and white flesh sweetpotatoes. Experiments in G.W.C.A.E.S compared the crop yield per acre and dry matter essential for ethanol production and indicated that white flesh sweetpotato has a higher yield per acre and higher dry matter. This study is an extension of the sweetpotato experiment to assess the potential economic impact of the introduction of white flesh sweetpotato for ethanol by vegetable producers in Alabama. The white flesh sweetpotato was introduced into a whole farm analysis and the result showed that the introduction of white flesh sweetpotato would increase the revenue of vegetable producers without affecting the present production of the orange flesh sweetpotato.

O-RR-G-2

Understanding Population Dynamics of American Eel (*Anguilla rostrata*) through Mark-Recapture and Telemetry. M. G. Brady*[1], P. B. Conn[2], L. Bailey[3], K. W. Shertzer[2], and D. A. Fox[1], [1]Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901; [2]NOAA Center for Coastal Fisheries and Habitat Research, Beaufort, NC 28516; and [3]Fish, Wildlife and Conservation Biology, Colorado State University, Fort Collins, CO 80523.

Recently, fishery managers have begun to combine mark-recapture and telemetry modeling approaches to provide estimates of survival, mortality and emigration. In the spring of 2009, a combined mark-recapture and telemetry study was initiated in the St. Jones River, Delaware. Monthly mark-recapture events took place using fixed locations stratified by commercial fishing practices (i.e. intense, occasional, and rarely harvested). One American eel (*Anguilla rostrata*) was implanted with an acoustic transmitter at each sampling location, released, and monitored through both active and passive telemetry. The vast majority of telemetered individuals were detected during the study. During the summer months, site fidelity was very high for the majority of detected eels, which remained at the site of initial tagging. In the late fall, detected American eels moved to higher saline waters of the Delaware Bay, possibly for thermal refugia. This project is relatively unique, as we have developed a formalized partnership with commercial harvesters to build a better understanding of the impact of harvest on American eel behavior. We are currently developing multi-state models to provide estimates of emigration, survival, and seasonal habitat use for American eels.

O-RR-G-3

Marine Habitat Utilization and Movements of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) along the Eastern Seaboard of North America. M. W. Breece*[1], D. A. Fox[1], T. Savoy[2], and D. Erickson[3], [1]Delaware State University; [2]Connecticut Department of Environmental Protection; and [3]Pew Institute for Ocean Science, University of Miami, FL.

Atlantic sturgeon were plentiful along the Atlantic seaboard prior to their precipitous decline in the early 20th century. The recent proposed ruling to grant Atlantic sturgeon protection under the Endangered Species Act by the NMFS has increased the importance of understanding all aspects of this species' life history. Over 100 Atlantic sturgeon were collected utilizing new capture techniques allowing the implantation of 90 long lived acoustic transmitters in 2009 and 2010. Standardized telemetry equipment enabled cooperation with researchers from other regions (i.e. Hudson River, Long Island Sound, North Carolina), allowing for the monitoring of an additional 39 telemetered Atlantic sturgeon and compatible receiver arrays. Migratory Atlantic sturgeon arrived off the Delaware-Maryland coast in spring (April 2 to June 23) and slowly made their way northward exiting the array by early summer (April 6 to June 29). In the fall, Atlantic sturgeon exhibited more directed southerly movements with most fish transiting the array in 2 days in November and early December. Polyhaline marine waters near the mouth of the Delaware Bay were occupied by a large number of telemetered Atlantic sturgeon from multiple river systems during the summer months. Atlantic sturgeon primarily utilized state jurisdictional waters while making their coastal migrations, emphasizing the importance of state and federal cooperation. This research is providing a better

understanding of marine movements and habitat use, thereby enabling managers to develop conservation and recovery strategies for Atlantic sturgeon.

O-RR-G-4

Warm Water Tolerance of the Weakfish, *Cynoscion regalis*. M. Cinelli*, and D. McIntosh, Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901.

Young of the year weakfish, *Cynoscion regalis*, had been housed in the Delaware State University Aquaculture Research & Demonstration Facility since the summer of 2009 when they were collected from the wild as fingerlings. Trials were conducted to study the upper thermal limits of the species. Each trial utilized five fish, individually stocked into one of five 40-L containers. A purpose-built flow through system housing the 40-L containers was added to an existing recirculating system in the Facility in order to utilize its pump, heater and filters. Each day, the temperature was increased by 1 °C until all fish showed signs of reaching their limit as evidenced by their loss of equilibrium. Container temperatures were recorded twice daily at 12-h intervals along with dissolved oxygen and salinity. When each individual fish lost equilibrium, the temperature was recorded and the fish was removed from the experimental container and sampled for length and weight. Data suggests that *C. regalis* begin to reach their upper thermal limit at 34 °C, with some individuals surviving to 35.5 °C. Fish used in these trials ranged in length from 176 mm to 224 mm and weighed from 44 g to 111 g. The knowledge gained from this study will contribute to the existing body of information on temperature tolerances of weakfish. As a possible candidate species for aquaculture, the temperature tolerance of *C. regalis* is an important piece of information when considering any studies focusing on growth rates and in optimizing production system parameters.

O-RR-G-5

Localization and Identification of Flavonoids/Phenolics in Selected Southern Tree Species Relative to Ultraviolet-B Protection. V. A. Ferchaud*[1], Y. Qi[1], and K. L. Chin[2], [1]Urban Forestry Program and [2]Plant and Soil Science Department, Southern University and A&M College and Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Plant tolerance to UV-B radiation is largely due to its possession of UV absorbing compounds, mainly flavonoids and related phenolic compounds. Relatively little information exists on the UV-B tolerance characteristics in urban trees. This study involves identification of flavonoids/phenolics in twelve broadleaf southern tree species during a growing season. Species include American elm (*Ulmus americans)*, Chinese elm (*Ulmus parvifolia*), Chinese tallow (*Sapium sebiferum*), green ash (*Fraxinus pennsylvanica)*, nuttall oak (*Quercus nuttallii*), pecan (*Carya illinoinensis*), river birch (*Betula nigra*), shumard oak (*Quercus shumardii)*, Southern live oak (*Quercus virginiana*), Southern magnolia (*Magnolia grandiflora*), Southern red oak (*Quercus falcate*), and willow oak (*Quercus phellos*). These species are widely used in urban and community forestry across the south in the U.S. Flavonoids/phenolics were found existing in young leaves of all the species. The concentration of these compounds varied significantly among the species and increased as the leaves grew and developed. Green ash had the highest increase from leaf emergence to mature stage while American elm and Chinese tallow showed the least increase. The UV-B absorbing compounds were found to be located mainly in leaf epidermises of all the species and in the palisade tissues of some species. The ability of these species to synthesize and accumulate UV absorbing compounds as secondary metabolites will allow them to tolerate continuous UV exposure during the growing season and make them adapt to harmful UV-B environments. The results will provide a better understanding to scientists, educators and arborists of UV-B tolerance mechanism and adaptation strategies in southern trees.

O-RR-G-6

Potential Roadblocks to Recovery: Human Development and Habitat Utilization of Gulf Sturgeon Overwintering in Choctawhatchee Bay, Florida. K. M. Fleming*[1], D. A. Fox[1], and S. K Bolden[2], [1]Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901; and [2]Office of Protected Resources, NOAA Fisheries Southeast Regional Office, St. Petersburg, FL 33701.

Choctawhatchee Bay serves as important foraging habitat for Gulf sturgeon (*Acipenser oxyrinchus desotoi*) during periods of estuarine residence. Such habitats are critical to Gulf sturgeon, as they largely depend on them for growth. In recent years, the Choctawhatchee watershed has undergone significant landscape-level changes concurrent with dramatic rises in human population. Associated habitat transitions from rural/forested to urban/suburban, coupled with apprehension over climate change, have lead to management concerns regarding modifications in water quality and degradation of benthic communities. Ninety-five adult and juvenile Gulf sturgeon were captured in the Choctawhatchee River and outfitted with acoustic transmitters in 2009-2010. Monitoring is being conducted through active and passive telemetry to examine size-specific patterns of residency and habitat use.

Most telemetered adults were documented entering the Gulf of Mexico in November and December, while the majority of juveniles appear to have overwintered exclusively in the Bay. Telemetered Gulf sturgeon were distributed non-randomly within Choctawhatchee Bay with most relocations in nearshore areas 2-4m deep. Findings are compared with existing data to assess alterations in estuarine habitat use resulting from landscape-level changes. This study provides managers with quantitative estimates of habitat change and resulting impacts on Gulf sturgeon habitat utilization.

O-RR-G-7

Sustainable Management of an Urban Forested Nature Trail at Grambling State University. M. Ford*, and Z. H. Ning, Urban Forestry Program, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

With the increase in population, the city of Grambling and Grambling State University have begun to expand. How to effectively manage the urban forested natural trail and blend its designs with both man-made and the natural settings is crucial for sustainable city design and university expansion. The objectives of this study are to: 1) Assess current condition of the urban forested natural trail, 2) Examine people's perception on urban forests, and 3) Make sustainable management recommendations that can benefit Grambling State University as well as the city of Grambling. The nature trail assessment identified potentially hazardous trees and made recommendations on proper maintenance procedures and management strategies. The study addressed many natural wildlife habitats in the nature trail that are being disturbed by the community population. The study helped the community to raise awareness on the benefits and proper utilization of the urban forested nature trail for outdoor learning, outdoor recreation, air quality, wind and sound buffering, temperature regulation, wildlife habitats, and aesthetics. The study provided recommendations on effective design of the nature trail to maximize its utilization. The study suggested that establishing a city tree board or forestry department, and a tree ordinance would benefit the urban forest, the urban inhabitants, and the urban wildlife for the present and future development of the urban fringe.

O-RR-G-8

DNA Sequencing for Lignin Content of Potential Hardwood Tree Species for Bio-Fuels in the Southeast United States. A. Forde*, and O. Onokpise, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

There is a global consensus that biofuels will provide cleaner and cheaper alternatives to greenhouse gas emitting fossil fuels. Benefits such as helping to reduce global warming and creating jobs for the rural poor have been heralded for years; but lately alarms have been raised about potential negative impacts of this technology. Corn is the substrate of choice for biofuels production. This agricultural technique is known to be associated with significant biodiversity loss, soil erosion and nutrient leaching. In addition, rapid growth in liquid biofuel production will make substantial demands on land availability, water resources and offset the carbon content of soils and carbon stocks in forests and peat lands. We seek to evaluate fast growing tree species such as sweetgum (*Liquidambar styraciflua*), eastern cottonwood (*Populus deltoides*) and eucalyptus (*Eucalyptus grandis*) as potential biofuels substrates in the Southeast. Coppices were taken from the field and grown in the greenhouse. The young shoots were then used to collect DNA sequence. The sequence was used to determine the lignin percentage in species. An energy plantation that take advantage of the growth potential of up to 12 – 15 feet per year as well as high coppicing genetic characteristics make these species excellent candidates for bioenergy production in the region.

O-RR-G-9

A Real-Time GIS/Hydrology Flood Warning System for First Time Responders in Rural Areas. C. Forde*, T. Whitney, S. Katzberg, and M. Hubbard, Civil and Mechanical Engineering Technology, South Carolina State University, Orangeburg, SC 29117.

Recent advances in near-real-time RADAR precipitation estimates have made available a powerful new remote sensing capability. Coupled with geographical information systems (GIS) and PC-hydrology models, the RADAR data makes it possible to monitor accumulated surface water levels and most particularly the water levels in creeks and streams in rural areas that would otherwise be unknown. First-responder resources are limited in any case, but during severe precipitation events such as tropical storms or other rain events, these resources cannot be allowed to become lost in roads that are impassable. This paper reports the successful efforts to integrate real-time precipitation RADAR data with GIS and hydrology models (WMS/GSSHA). The result is a tool that makes it possible to monitor flooding of roads via a web-based tool that would be visible to any web-enabled communication modality. Suggestions and requirements for field demonstration are also presented.

O-RR-G-10

Selected Aspects of Life History of Two Primary Parasitoids of the Passionvine Mealybug, a Serious Pest Threat to the United States of America. A. Francis*, and M. T. Kairo, Center for Biological Control, College of Engineering Sciences, Technology & Agriculture, Florida A&M University, Tallahassee, FL 32304.

Leptomastix dactylopii Howard and *Coccidoxenoides perminutus* Girault are primary encyrtid parasitoids used for biological control of several mealybugs. Recently, these two parasitoids were recovered during a survey for natural enemies of the passionvine mealybug in Trinidad. This mealybug is considered a high priority pest and is frequently intercepted at US ports-of-entry. However, little information exists on host-parasitoid relationships between these species and *P. minor*; and therefore, their efficacy in a biological control program against this invasive pest. To address these concerns, the life history parameters of these parasitoids were evaluated at 25 ^{o}C, 65±5 %RH, and 12:12 (L:D) h photoperiod. The mean developmental time for *L. dactylopii* females was slightly longer (17 days) than for *L. dactylopii* males (16 days) using recently molted adult female mealybugs as hosts. Mean fecundity was 162 live progeny and the sex ratio was female-biased (69%). Mean adult longevity for females was longer (28 days) than for males (18 days) when provided with honey solution. Mean developmental time for *C. perminutus* females, a thelytokous species, was 27 days using recently molted 2nd instar mealybugs as hosts. Mean fecundity was 240 live progeny, while mean adult longevity was 6 days when given the same food source. The knowledge gained will allow for implementation of pre-emptive actions before this invasive mealybug pest becomes established in the US and other countries.

O-RR-G-11

Effects of Manganese Nutrition on Longleaf Pine Seedling Growth, Appearance, and Physiology. A. Gilliam*, M. Sword, and A. Johnson, Urban Forestry Program, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

In Louisiana, forests cover 48% of the state's land area (14 million acres) and forestry is the state's second leading manufacturing employer and the leading crop grown in the state. In recent years, loblolly and longleaf pine forests on isolated sites in AL, GA, FL, and NC with resource deficiencies have shown signs of poor crown health, and root disease. Poor crown health and root disease often occur when foliar Mn is elevated; these negative effects are often alleviated by calcium and magnesium. The objectives of this study were to investigate longleaf pine seedling responses to three nutrition treatments: (1) Control (C)- adequate macro- and micro-nutrient nutrition, (2) Imbalanced (I)- adequate nutrition with elevated Mn but not elevated Ca and Mg, and (3) Balanced (B)- adequate nutrition with elevated Mn and elevated Ca and Mg. Preliminary results after 12 weeks of treatment indicate that the first flush Mn concentrations averaged 30 ppm for the (C) treatment and 100 ppm for the (B) and (I) treatments. Seedling appearance after 16 weeks of treatment indicated that there was a trend for (B) and (I) treatments to cause some flush abnormality and fascicle chlorosis. Net photosynthesis and foliar chlorophyll concentrations were not affected by the treatments after 16 weeks. After harvesting, the relationships between foliar Mn, Ca, and Mg concentrations and growth and physiology will be assessed. This information will lead to a better understanding of how elevated Mn affects long leaf pine and how Ca and Mg alleviate these effects.

O-RR-G-12

Investigating the Relationship between Fungal Communities and Greenhouse Gas Efflux from a Secondary Forest in Central Missouri. N. Hoilett*[1], F. Eivazi[1], N. Nkongolo[1], and R. J. Kremer[2], [1]Cooperative Research Programs, and Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101; and [2]USDA-ARS, Cropping Systems and Water Quality Research Unit, Columbia, MO 65211.

The efflux of greenhouse gases (GHG) in general is affected by various soil biological, physical, and chemical properties. For example, denitrification is carried out by both fungal and bacterial species; fungal populations have the capability to conduct denitrification under both aerobic and anaerobic conditions versus bacteria that require anaerobic conditions. Knowledge of the population dynamics (quality and quantity) of soil biota is therefore important to understand their role in soil ecosystems. However, extensive search of the literature has identified a lack of sufficient information relating microbial community profile with GHG efflux. Our objectives for this research are: to determine if phospholipid fatty acid (PLFA) and polymerase chain reaction (PCR) techniques will give comparable results in characterizing the fungal community; to determine the relationship(s) existing between soil fungal population dynamics and GHG efflux in this secondary forest in mid-Missouri. Examination of the microbial profile bacterial to fungal ratio and the dominant bacterial and fungal species present may enhance our understanding of the role fungal biomass plays in GHG efflux within this secondary forest.

O-RR-G-13

Factors Impacting Production of Bioenergy Crops in Alabama. B. A. Obembe*, S. Banerjee, J. O. Bukenya, B. R. Gyawali, and B. Gill, Department of Agribusiness, Alabama A&M University, Normal, AL 35762.

The demand for bioenergy derived from woody plants, perennial grasses, conventional crops, and waste is expected to increase rapidly over the next decade as a result of the need to address concerns related to climate change, rising fuel prices, and security of energy supply. The composition of Alabama's soil is well suited for growing switchgrass and corn, making the state a potential site for the installation of more bioenergy plants. Alabama is the "sixth" top producer of energy from wood resources within the United States (U.S. Energy Information Administration). The state also contains one of the world's largest solid biofuel plants, which are designed to produce over 500,000 metric tons of wood pellets per year (U.S. EIA). There are, however, fears that the expansion in the production of bioenergy crops could have a serious impact on the environment and may be a factor keeping many farmers from adopting those crops. The overall objective of this paper is to examine the factors impacting the production of bioenergy crops in Alabama. The renewable energy potential in Alabama based on social, economic, and environmental factors is thus assessed. County-level data from U.S. Energy Information Administration Independent Statistics and Analysis are being utilized to study the factors that affect the adoption (and/or non-adoption) of bioenergy crops in Alabama.

O-RR-G-14

Relationship between Hydrology of the Arkansas River and the Resident Largemouth Bass *Micropterus salmoides* Population. C. R. Peacock*, and M. A. Eggleton, University of Arkansas at Pine Bluff, Aquaculture/Fisheries Center, Pine Bluff, AR 71601.

Hydrology can affect sport fish populations by influencing their rates of recruitment and growth. Long-term electrofishing data, collected in the Arkansas River's Lake Dardanelle, from 1991-2009 suggested a strong inverse relationship between largemouth bass (*Micropterus salmoides*) catch per unit effort (CPUE) and mean adjusted flow from the previous year. Although this relationship suggests a link between largemouth bass recruitment and annual hydrology, the effects that hydrology may have on annual growth rates through the life of cohort have not been intensively studied. During 2004, 2005, and 2010, annual growth increments were generated from back-calculated length at age data using largemouth bass collected across different navigation pools of the Arkansas River. Using age-1 through age-6 cohorts from 2004-2005 (n = 1,728), growth increments of largemouth bass were positively correlated to years with longer low-water (<15,000 ft^3/s) periods, especially during fall months. Conversely, annual growth increments of largemouth bass were negatively correlated to years with sustained periods of high flow (>50,000 ft^3/s). During the period 2007-2009, the lower Arkansas River experienced hydrological extremes each year, with 29% of the days annually exceeding 100,000 ft^3/s. Population data collected during 2010 indicated a general decrease in bass growth throughout the river compared to 2004-2005 both in terms of mean length and mean weight at age. Specifically, age-4 and age-5 largemouth bass were significantly ($P<0.05$) smaller than corresponding cohorts from 2004 and 2005, with weight differences being more dramatic. Additionally, CPUE was 50% decreased in 2010. This suggests weak 2007 and 2008 year classes.

O-RR-G-15

Screening Gulf Coast Forest Species for Susceptibility to *Phytophthora ramoru.* J. Preuett*[1], D. J. Collins[1], T. Widmer[2], and D. Luster[2], [1]Southern University Agricultural Research and Extension Center, Urban Forestry Program, Baton Rouge, LA 70813; and [2]USDA ARS Foreign Disease-Weed Science Research Unit, Fort Detrick, MD 21702.

Phytophthora ramorum, the causal agent of sudden oak death is a new and emerging pathogen of California oak woodlands which poses a threat to woody plants in the rest of the nation and the US Gulf Coast area is a high threat location. Several woody plant species native to the Gulf Coast forest was tested for reaction to *P. ramorum.* The species tested included: Yaupon (*Ilex vomitoria*), Spice Bush (*Lindera benzoin*), Southern Magnolia (*Magnolia grandiflora*), and Eastern baccharis (*Baccharis halmifolia*). This study was conducted at the USDA ARS Biosafety Level 3 containment greenhouse facility at Ft. Detrick, Maryland. Foliage of the test plants was inoculated with 50,000 zoospores per milliliter with three replications per plant species. Inoculated plants were placed in a dew chamber at 20°C for 4 days. After this incubation period the leaf lesion areas were assessed for disease. Yaupon and Southern Magnolia had showed reaction to *P. ramorum*. Yaupon was determined to have an average lesion area percentage of 28.05 for the inoculated plants compared to the control containing 0.13%. Magnolia was found to have an average lesion area since the percentage for the inoculated plants was 32.06 compared to the control containing 0.56%. The research will continue to analyze additional Gulf Coast forest plant species for reaction to *P. ramorum.*

O-RR-G-16

Arsenic Availability and Iron Redox Status in Soil. J. Pyles*, B. Hua, and J. Yang, Cooperative Research Programs and the Department of Agriculture & Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Arsenic (As) contamination in soil is of health and environmental concerns due to its threat to humans and the ecosystem. The human and environmental risks are directly related to As solubility and speciation in soil. The goal of this research is to study the As solubility and its interaction with key soil minerals such as iron oxides and iron phosphates. Soil and water samples were collected from plots with or without the addition of monosodium methyl arsenic (MSMA) under flooded or saturated water conditions during the rice growing season and analyzed for As using inductive coupled plasma-optical emission spectrometer (ICP-OES, Varian Vista-PRO). Water analyses indicated that there was little As present in water during the growing season. However, total As concentrations were higher in MSMA-treated and water-saturated soil, as compared with those in control and flooded soils. Arsenic solubility was positively correlated with iron (R^2=0.6327) and phosphorus (R^2=0.6655) present in the soil. There was also an inter-correlation between soil Fe and P (R^2=0.6413). Data suggested that the formation of iron plaques and/or non-occluded iron phosphates may play a critical role in controlling As solubility and uptake by rice plants.

O-RR-G-17

Oyster Gardening: Where in Delaware's Inland Bays to Focus Shoreline Oyster (*Crassostrea virginica*) Rehabilitation Efforts? B. A. Reckenbeil*, and G. Ozbay, Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901.

Along the eastern continental United States of America, oyster gardening has become a popular aquacultural practice for homeowners with waterfront property. Delaware's citizen volunteer program started nearly a decade ago. During the summer of 2010, oysters growing in Taylor Floats were measured at five different locations around the Delaware Inland Bays, which had riprap nearby. Individual oysters are grown in the gardening program for approximately two years until they are planted in different riprap locations around the bay. Two sites were located in the northern Rehoboth Bay, one site in South Bethany, and two sites in Fenwick Island. Each float, containing approximately 125 oysters, is located in either a dead end canal system, or on properties open to the larger bays. No mortality was observed at the Fenwick Island location, which was located on the open bay, Lighthouse Cove. This location also experienced the most oyster growth. Tidal current at this location was visibly greatest. It is also to be noted that this location resulted in the natural recruitment of five spat over the summer. Next spring, oysters will be planted in the riprap surrounding the banks at lighthouse cove. Water quality parameters and habitat value of oyster stocks in riprap have also been monitored to investigate the relationship between oyster stocks and the ecological services these oysters may provide. This two-part study will yield results that show within which environments around the Inland Bays future restoration efforts should be focused.

O-RR-G-18

Biological Control of the Grape Root Borer with Entomopathogenic Nematodes. R. Said*[1], R. Hix[1], and V. Colova[2], [1]Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, and [2]Center for Viticulture, Florida A&M University, Tallahassee, FL 32307.

The entomopathogenic parasitic insect nematode of the family Heterorhabditidae was evaluated for predatory potential to reduce grape root borer infestation in the field as well as in the laboratory and greenhouse. Field studies evaluated the effectiveness and mobility of entomopathogenic nematodes *H. bacteriophora* and *H. megidis.* These studies were conducted in vineyards at the Florida A & M Center for Viticulture in 2008, 2009 and 2010. Vineyards known to have infestations of GRB were chosen. The two studies consisted of four treatments replicated four times in a completely random design for 2008 and 2009. Each treatment replicate (plot) consisted of five grape vines. All treatments utilized the nematode *H. bacteriophora* or *H. megidis* applied at a rate equivalent to four billion per acre. Treatments varied by species and number of applications. These treatments were compared with chlorpyrifos (Lorsban) and an untreated control in a randomized complete block design. Each treatment replicate consisted of three *Vitis aestivalis* 'Cynthiana' grape vines and trellis with eight *Vitis rotundifolia* grape vines of either 'Fry' or 'Carlos.' Treatments varied by species and number of applications plus an untreated control. Populations of flying male GRB were monitored throughout the study using pheromone bucket traps. The numbers of males trapped via pheromone traps does not indicate level of root larval infestation, but the flight activity in that area.

O-RR-G-19

Characterization of Vegetative Composition and Diversity of the Ephemeral Ponds in the Munson Sandhills, Apalachicola National Forest. S. Sapp*[1], K. Milla[1], S. K. Pancholy[1], and J. Tobe[2], [1]Center for Water and Air Quality, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]Ecological Consultants, Inc., Tallahassee, FL 32303.

The Apalachicola National Forest houses a variety of natural ecosystems, which are unique to geographical location and are considered to be one of the "biodiversity hotspots" of the U.S. One significant feature of this region are the various ephemeral ponds, also termed seasonal ponds, which serve as breeding sites for a host of amphibians, microcrustaceans and aquatic insects, and additionally support a rich and diverse collection of plant life. In this study, the plant species composition and diversity of six ephemeral ponds, all ranging in degree of disturbance, was characterized. The emphasis of the monitoring was to record the species, percent cover, number of individuals, and percent bare ground of the vascular plant population. In general, the ephemeral ponds are shaped like shallow bowls, the deepest portions hold water the longest and the edges are in a near constant state of flux, drying and wetting. This influenced the plant composition and because of reproductive, physiological and ecological adaptations, those plants adapted to specific conditions created by the pond hydrology, etc., often grew in associations that visually created a distinct zonation of plants assemblages. Five of the six ponds displayed this pattern of zonation with approximately 4 to 5 zones per pond, based upon the dominant plant species growing in each zone. The surrounding landscape of sandhill and xeric hammock had major influence on the vegetation of the landward portions of the pond margins.

O-RR-G-20

Natural Succession: Examining Vegetative Composition and Structure Progression on Restored Agricultural Land. M. A. Schutte*, Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901.

Knowledge of natural succession in vegetative composition and ecological structure on reclaimed land is essential to assess ecosystem health and to guide management practices of restoration efforts. An experimental site was established at Blackbird Creek Estuarine Research Reserve in New Castle County, Delaware to monitor vegetation structure dynamics after restoring cropland to intentional forest. It was observed that natural vegetation of a few herbaceous species dominated by two grasses, *Panicum dichotomiflorum* and *Setaria viridis*, rapidly colonized the land parcel in the first year. In the second year, the vegetative composition expanded to vines, shrubs, and tree sapling species. Mulberry (*Morus alba*), sweet gum (*Liquidambar styraciflua*), black cherry (*Prunus serotina*), and white ash (*Fraxinus americana*) were among the emergent tree species. It is expected that the natural processes will continuously work on the restored ecosystem and eventually transform the land into a forest with major tree species similar to the surrounding woods. However, a time span of more than 30 years may be required. To facilitate forest establishment, artificial tree planting and other management efforts such as weed control and fertilization become necessary.

O-RR-G-21

Assessing the Effects of Land Use on Microbial Diversity and Phylogeny Across a Mixed Culture Agroecosystem. R. Shange*[1], R. O. Ankumah[2], L. Githinji[2], and R. Zabawa[3], [1]Tuskegee University Integrative Biosciences; [2]Department of Agricultural and Environmental Sciences; and [3]George Washington Carver Agricultural Experiment Station, Tuskegee University, Tuskegee, AL 36088.

Land-use diversification has been a strategy of small farmers in the southeast US to maximize and conserve resources. These different management approaches have been shown to have significant impacts on soil conditions and microbial communities alike. Nonetheless, there have not been many studies to assess the subsequent impacts on composition and structure of microbial communities in relation to soil physical and chemical properties. Replicate soil samples were collected from a demonstration farm in which three land-use types were used (grazed pine forest, cultivated crops, and livestock-grazed pasture lands) on a single soil type in Perry County, Alabama. Bacterial-tag encoded FLX amplicon pyrosequencing was used to generate genomic libraries targeting the 16S rRNA gene. Double dendrograms and PCoA plots were generated, showing distinction among the land use types through clustering. Specific phyla (notably Actinobacteria, Acidobacteria, and Proteobacteria) showed significant shifts across the land-use strata. Selected soil properties (SOM, soil texture, pH, and enzyme activity) also differed significantly across land-use types, while showing variation consistent with changes in microbial community composition and structure. Together these results suggest that pyrosequencing along with traditional analysis of physical and chemical soil properties may be able to provide insight into the evolution of microbial communities across a given landscape.

O-RR-G-22

The Effects of Co-Digestion on Performance and Methanogen Population Structure in a Pilot Plant Thermophilic Anaerobic Digester. D. Sharma*[1], T. Espinosa-Solares[2], and D. H. Huber[1], [1]Department of Biology and Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112; and [2]Agroindustrial Engineering Department, Universidad Autonoma Chapingo, Mexico 40160.

Anaerobic digesters are used to recover bioenergy from highly concentrated organic wastes. Additionally digesters can be used to study how environmental variability affects microbial community structure and function. Little is known about how the microbial community in digesters limits the performance flexibility of the system. The goals of this study were to evaluate how digesters stabilized on poultry litter feed (P) performed when the feed composition was changed with the addition of stillage waste (S), and relating this to methanogen population dynamics. Methanogen populations were evaluated with 16S rDNA clone libraries of both replicate treatment digesters and a control, and standard chemical analyses were performed to evaluate digester performance. Treatment digesters were fed with 100% P; 20% S: 80% P; 40% S: 60% P; 60% S: 40 % P and 80% S: 20 % P, whereas a control digester received only 100% P. Stable performance was observed with 40% and 60% stillage as shown by a high level of methane in the biogas, COD removal and lowering of volatile acids. However, 80% treatment showed a decrease in the performance of the treatment digesters. Methanogen population dynamics were found to be related to the performance. Population fluctuations were observed in methanogens during the accumulation and consumption of volatile fatty acids. *Methanothermobacter* was the most abundant methanogen in the control digester as well as the treatment digester at 100% poultry litter. However, the abundance of *Methanothermobacter* decreased while another hydrogenotrophic group *Methanoculleus* increased during the 40% stillage treatment. In addition, the abundance of *Methanosarcina*, which is an aceticlastic methanogen, increased during the 80% stillage treatment that could be due to the increased concentration of volatile acids.

O-RR-G-23

Fast Growing *Paulownia elongata* Tree as a Potential Lignocellulosic Bioenergy Crop for the Southern U.S. N. K. Yadav*, and N. Joshee, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

The current national policy on the "Partnership for Sustainable Communities Initiative" hinges extensively upon the development of a renewable fuels industry. To meet this goal, we need to develop specific feedstock packages for each phytogeographical zone. Research on a fast growing tree (*Paulownia elongata*) to enrich the feedstock bank for the southern U.S. is being conducted to assist this goal. Current field and lab research on *P. elongata* at FVSU is showing promising results for its use as the potential bioenergy crop. There has been a great surge in the demand for *Paulownia* plants for establishing bioenergy plantations. In-depth studies conducted to identify the most suitable medium, plant growth regulator(s), and explant (leaf, node and internode segments, and shoot tip) combination to achieve maximum multiplication rates is reported. High shoot bud induction incidences and enhanced multiplication rates for various explants to assist micropropagation have been achieved to make it a viable tissue culture commercial crop. Efforts have been initiated to develop a thin layer culture (TLC) system supported by liquid culture to further enhance the production and cut down the cost. This efficient regeneration system has provided a basis for *Agrobacterium* mediated gene transfer to introduce genes of interest for its improvement. Currently, field performance of *Paulownia* trees at two spacing densities (12ft x 12ft and 8ft x 8ft) is being carried out to evaluate its potential as lumber and biomass feedstock crop. *Paulownia* leaves are being tested for their suitability as a high crude protein containing fodder crop for livestock.

Scientists (30)

O-RR-S-1

Sustainable Urban Forestry Practice by Utilization of Urban Tree-Based Wood Waste as Mulch. K. Abdollahi*, Z. H. Ning, and T. Legiandenyi, Urban Forestry Program, Southern University Ag Center, Baton Rouge, LA 70813.

Proper urban forest management practices, such as utilization of urban tree wood waste as mulch, may assist the recovery of resilience and adaptive capacity of coastal urban forest ecosystems that have been degraded, damaged, or destroyed. The impact of five mulch types (from urban tree-based wood-waste) on net canopy CO_2 uptake and carbon sequestration of native oak tree saplings and their associated soil CO_2 fluxes were assessed using a portable photosynthesis system and an automated soil CO_2 flux system in a completely randomized block design experiment. The results indicated statistically significant differences in carbon sequestration and net CO_2 uptake of native oak saplings in response to mulch types. Two urban tree–based mulch types (mixed hardwoods and mixed

oaks) significantly increased soil CO_2 flux and tree sapling canopy net CO_2 uptake during the growing season. Soil CO_2 flux fluctuated significantly during the growing season under different mulch types. The largest increase in soil CO_2 flux occurred during the month of May under the mixed hardwood mulch. Soil net respiration under mulch and no mulch was highly correlated (R^2 = 0.91, R^2=0 .99) with time. Weekly soil CO_2 flux rate was significantly higher for mixed hardwood mulch. Analysis of variance showed that application of mulch significantly increases both photosynthetic and respiration rates of mulched saplings and associated soils. Low soil CO_2 flux rate for the no-mulch treatment is probably due to low soil organic matter substrate and low soil surface moisture content.

O-RR-S-2

Water and Sediment Quality Assessment of Development Lakes - A Case Study. A. Atalay*, E. Sismour, and B. Whitehead, Virginia State University, Agricultural Research Station, Petersburg, VA 23806.

Iron Bridge Lake is located in Chester, Virginia; it is a 21-acre impoundment with a storage capacity of 2.4 million gallons of water. Its watershed is approximately 476 acres of primarily of single-family homes, an apartment complex and scattered businesses. The outflow from the lake empties into Proctors Creek that feeds into the James River, a major tributary of the Chesapeake Bay Watershed. Concerns regarding frequent algal bloom during warm weather prompted management to conduct a water quality assessment. Consequently, water and sediment samples were collected in February 2006, December 2007, and April 2010. Results indicated that lake depths ranged from 2 feet in cove heads to 10 feet near the dam. Shallow areas were high in turbidity and filled with algae, but light penetration was about 66%. The water in deeper areas was clear and full of *Hydrilla*; light penetration was also about 66%. Dissolved oxygen levels were consistently high throughout the lake irrespective of sampling time. The lake was not eutrophic since N and P concentrations were relatively low, but varied greatly with sampling site. Initial assessment of the lake classifies it as oligo- to mesotrophic with slight acidity observed in the winter months. The presence of resident waterfowl did not impact the lake with nutrient enrichment. High levels of Al and Fe in sediment samples reflected the nature of parent material in the Piedmont/Coastal Plain physiographic region. Protection of environmentally sensitive regions, such as the Chesapeake Bay from development impoundments in the watershed is critical.

O-RR-S-3

Potential of Kentucky Freeway Rights of Way to Displace Fossil Fuel Consumption through Production of Prairie Switchgrass, *Panicum virgatum*. M. K. Bomford*, T. D. Sluss, S. Hansford, and K. Bates, Kentucky State University, Frankfort, KY 40601.

The grassland area of freeway rights of way in Kentucky was estimated using Geographic Information System software to determine potential to produce prairie switchgrass, *Panicum vigatum*, for bioenergy feedstock. Kentucky's combined interstate and parkway systems include 2,260 km of freeway and 9,151 ha of grassland. The currently mowed sections of their rights of way could produce 137 Gg switchgrass y^{-1}, sufficient to make 45 million L of cellulosic ethanol y^{-1}, or generate 137 GW h y^{-1} by combustion at an electric plant. Switchgrass grown on freeway rights of way could make sufficient ethanol to offset 1.1% of fuel used by vehicles on Kentucky freeways, or sufficient electricity to offset 1.8% of fuel used on Kentucky freeways if the electricity is used to drive electric vehicles. Our estimates of fossil fuel reduction available from freeway-grown switchgrass are uncertain due to necessary extrapolation from small-scale research trials, and are negligible relative to projected changes in fuel use associated with changing travel patterns and improved vehicle efficiency.

O-RR-S-4

The Groundwater Radionuclides in the Edisto River Basin, South Carolina. Z. Chang*, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

An investigation on the groundwater radioactivity in the Edisto River Basin, South Carolina has been conducted. A variety of radio analytical and chemical technologies were employed in the measurement of natural and artificial radionuclides in the samples collected from the basin. The basic chemical and geological properties of the samples were obtained together with the radionuclide concentrations. The radioisotope concentrations will be studied with respect to the geological settings. The dose exposure of the local citizens to groundwater nuclear radiation will be calculated based on the analytical results, as well. In addition, the mechanism of radon gas emanating from sands into water was studied taking the advantage of the difference in the half-lives of the radon isotopes. This study will obtain the detailed information about the background level of the natural radiation in the Edisto River Basin, which is surrounded by a number of nuclear facilities. The data will be used as an important reference in case there is a nuclear leakage in the future. Furthermore, the estimation of the dose exposure to the natural nuclear radiation is also important to the health and well being of the local residents. The kinetic study of the

radon gas emanation from the sands will help elucidate the long-lingering problem as to why the radon level in groundwater is often much higher than the estimate from the supporting source in the local solid phase.

O-RR-S-5

Development and Testing of Novel Metal Catalysts for the Remediation of Agricultural Pollutants in Water. C. J. Clark, II[1], E. E. Kalu[2], and A. T. Cooper*[3], [1]Civil and Environmental Engineering; [2]Chemical Engineering; and [3]Biological and Agricultural Systems Engineering, Florida A&M University, Tallahassee, FL 32307.

Agricultural use of chemicals ranges from use of fertilizers to pesticides, herbicides and veterinary pharmaceuticals. Recent advances in analytical methods have led to improved detection and reporting of low-level concentrations of previously unidentified contaminants in water and soil. It may be years before we know to any scientific certainty the true impact of low-level exposure of many of these contaminants. However, there is mounting evidence that indicates detrimental effects from at least some of these components. Changes in the endocrine systems of reptiles, increasing antibiotic resistance of microorganisms, and increased asthmatic rates amount are some indicators of the negative impacts of the presence of these chemicals in water and air. Zero-valent iron has been effective for reductive destruction of a broad variety of contaminants in water. The photocatalyst TiO2 has been effectively used for oxidative treatment of organic pollutants in water. However, both methods have some drawbacks that limit their effectiveness. Recent advances suggest the possibility of extending the photocatalytic range of TiO2 into the visible spectrum through incorporation of other elements into the matrix and creating a selective catalyst by similar means. In our lab we have increased the surface area of TiO2 by incorporating it into a binary silica aerogel and improved the performance of zero-valent iron through development of bimetallic catalyst. In this research, we explore the feasibility of a combination of these catalysts to improve both oxidative and reductive capabilities for the destruction of agriculturally derived non-point source pollutants such as pesticides and veterinary antibiotics.

O-RR-S-6

1890 Institutions National Facilitation Project for Water Resources: An Overview of Deliverables. S. O. Dennis*, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

There is a strong interest for water resources education, extension and research at 1890 Land-Grant Universities (LGUs). Scientists working in the area of water resources within the 1890 LGUs established a network of education, extension and research personnel. The goal was to engage 1890 LGUs research and extension scientists in the USDA-CSREES National Water Program as well as enhance water resource deliverables at these institutions. In FY 2005, the 1890 National Facilitation Project was funded. Prior to this funding, only three of the eighteen 1890 Land-Grant Universities participated in the National and Regional Water Quality Programs. Currently, twelve institutions are active in both the national and regional water quality programs. Ten scientists (research and extension) are successfully engaged in regional (region 3, 4 & 6) programming coordination efforts. There was also a 50% increase in the number of 1890 institution attendees to the National Water Conference. Scientists and students presentations at this conference had also increased as a result of the facilitation project. The project provided "seed money" of up to $10,000 as mini-grants for one year to scientists who competed for it. Twenty-five mini-grants were awarded during the life of the project. Eleven of the eighteen 1890 LGUs were awarded mini-grants to enhance water resources deliverables that addressed water issues. Three universities were able to leverage the funding received from the facilitation project, to gain extramural funding of approximately one million dollars from USDA 1890 Capacity Building Grant award. Other deliverables from the institutions funded will be discussed.

O-RR-S-7

Approaches and Challenges in Quantifying the Effectiveness of Agricultural Best Management Practices. M. W. Gitau*, Biological and Agricultural Systems Engineering, Center for Water and Air Quality, Florida A&M University, Tallahassee, FL 32307.

There is a continuing concern regarding impairment of surface waters as a result of pollutants emanating from agricultural land uses. A number of best management practices (BMPs) are being or have been applied to agricultural land use in an attempt to reduce pollutant losses to surface waters. Yet answers to the critical question of how effective these practices are remains largely elusive. Field studies have typically been used in assessing BMP effectiveness. These studies require a great deal of investment in time, money, and space, which may limit the extent to which BMPs can be explored. In recent times, there has been a steady shift towards modeling and model-based approaches as primary methods of quantifying watershed-wide BMP effectiveness. Models offer the ability to study multiple BMP scenarios and to analyze impacts of various management decisions on watershed response.

Depending on study objectives, however, associated analyses can be very computationally intensive. Regardless of the methods used, results from previous studies have varied widely with differences in reported effectiveness being as large as 70%-85% for particular BMPs. Often, site specificity of BMP effects has been a focus with differences in effectiveness being attributed to factors such as slope, soils, geographic location, nature of BMP implementation, and presence of hydrologically sensitive areas. This presentation explores the different approaches, tools, and techniques for quantifying BMP effectiveness and highlights successes, current challenges, and potential solutions.

O-RR-S-8

Use of Biochar from Chicken Manure as Soil Amendment in Weathered Soils. A. Hass*[1,2], J. M. Gonzalez[2], I. M. Lima[3], H. W. Godwin[2], and J. J. Halvorson[2], [1]Agricultural and Environmental Research Station, West Virginia State University, Institute, WV 25112-1000; [2]USDA-ARS, Appalachian Farming Systems Research Center, Beaver, WV 25813; and [3]USDA-ARS-SRRC, Commodity Utilization Research Group, New Orleans, LA 70124.

The low pH and fertility of many Appalachian soils renders them unproductive. Biochar, byproduct of pyrolysis conversion of biomass to energy, may act as liming agent and contribute to restoration of soil fertility. We evaluate the use of biochar from slow pyrolysis of chicken manure as soil amendments to a representative Appalachian soil. Biochar was produced at two temperatures (350 Cº and 700 Cº), with or without steam-flow activation. Gilpin soil amended with each of the four different biochars, each at four rates (0.5, 1.0, 2.0, and 4.0 % by weight), and a non-amended control were incubated for eight weeks at two-week wet/dry cycle intervals. At the end of the incubation, the soil columns were leached with deionized water and leachate was analyzed for ionic and elemental composition. The soil was analyzed for chemical, physical, and biological attributes. Application of biochar resulted in a rate dependent increase in soil pH, water-holding capacity, and leaching of dissolve organic matter. Of the material tested, the 350 Cº non-activated biochar exhibit the lowest effect on soil pH, likely because its low calcium carbonate equivalent content. Biochar application increased availability of micronutrients such as Cu, and Zn, while decreasing that of Cd and Pb. The results of this study suggest that biochar use as soil amendment at proper application rates can have positive impact on soil fertility of weathered soils.

O-RR-S-9

Dissipation of Clomazone Residues in Soil and Runoff Water. R. R. Hill*, E. T. Turley, and G. F. Antonious, Land Grant Program, Department of Plant and Soil Science, Kentucky State University, Frankfort, KY 40601.

Clomazone is widely used in agriculture as a pre-emergent herbicide. A field study was conducted on 18 pots at KSU Research Farm to study off-site mobility of clomazone residues. The soil in six plots was amended with yard waste compost mixed with sewage sludge (YW+SS) at 15 tons per acre, six plots were mixed with sewage sludge (SS) at 15 tons per acre, and six unamended (no-mulch, NM) plots were used for comparison purposes. The soil was sprayed with the herbicide clomazone (Command 3ME) at the rate of 1.5 pints per acre. Soil samples were collected one hour to 90 days after Command spraying. Runoff and infiltration water were collected following natural rainfall events. The main objectives of this investigation were to: 1) study the impact of soil amendments on the amount of runoff and infiltration water down the land slope and 2) study the impact of soil amendments on off-site movement of clomazone. Surface runoff water volume from NM soil and SS amended soil (712 and 570 L acre^{-1}, respectively) was significantly greater than runoff volume from soil amended with SS+YW mix (259 L acre^{-1}). Intitial deposits of clomazone varied from 1.3 µg g^{-1} dry native soil to 3.2 and 11.8 µg g^{-1} dry soil in SS and YW+SS amended soil, respectively. Decline of clomazone residues revealed half-life ($T_{1/2}$) values of 3.3, 2.0, and 8.1 days in YW+SS, SS, and NM treatments, respectively. YW+SS mix reduced surface runoff water volume and clomazone residues in runoff.

O-RR-S-10

Arsenic Accumulation in Rice and Iron Transformation in Soil. B. Hua* and J. Yang, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101.

Elevated arsenic (As) content in rice grains has been reported in the south central region of United States, which could increase human exposure to this carcinogen. To attenuate As uptake by rice plant and improve quality and safety of rice products, field experiments were conducted to investigate As accumulation in rice grains as affected by rice cultivars and water management practices in monosodium methanearsonate (MSMA)-treated soil. Results indicated that As concentration in rice grains was dependent on cultivar, soil As level, and water management practices. Extractable As in the soil was positively correlated with DCB (a solution of sodium dithionite-sodium citrate-sodium bicarbonate)-extractable Fe and P, suggesting a strong association of As with ferric hydroxide and/or iron phosphate. Soil flooding that induces reductive iron transformation would increase As availability to rice uptake due to the reductive dissolution of iron hydroxide in soil, leading to As accumulation in

rice grains. This study demonstrates that the selection of less As-responsive rice cultivars and saturated water management in paddy field could be effective means to reduce As accumulation in rice grains.

O-RR-S-11

Differentially Expressed Proteins in MCF-10A Human Cells Induced by Endocrine Disruptor Atrazine. P. Huang*[1], J. Yang[1], and Q. Song[2], [1]Cooperative Research Programs, Lincoln University, Jefferson City, MO 65102; and [2]Division of Plant Sciences, University of Missouri, Columbia, MO 65211.

Atrazine is one of the most common pesticide contaminants present in ground and surface water, which is a significant threat to human health. Atrazine has been reported to interfere with androgen- and estrogen-mediated processes and perturb normal physiological functions through alterations of protein level of individual cells. In this study, non-tumorigenic human breast epithelial MCF-10A cells were exposed to environmentally relevant concentrations of atrazine (100 ppb), and a negative control (solvent) for 12 hours. Then 2-D gel-based comparative proteome and phosphoproteome were performed to determine differentially expressed proteins between control and atrazine-treated cells. Ten proteins and twelve phosphoproteins had showed a significant change due to the treatment, among which eight proteins and six phosphoproteins were identified by MALDI-TOF spectrometry. All affected proteins were identified to belong to various cellular compartments (nucleus, cytosol, mitochondrion), and varied in function, including regulating oxidative stress such as peroxiredoxin-1, stress response and apoptosis such as heat shock protein 27 (HSP27), heat shock protein 70 (HSP70), and glyceraldehydes-3-phosphate dehydrogenase (GAPDH), tumor suppression such as Profilin-1, and tumor progression such as Trasgelin-2. This study highlights the susceptibility of human cells to atrazine and other compounds with endocrine disrupting properties.

O-RR-S-12

Variation of Nitrogen and Phosphorus in Gans Creek Impacted by CAFO and Residential Wastewater Treatment Plant (WWTP) Discharges. A. Ikem*[1], S. Tesfaye[1], J. Garth[1], and B. Broz[2], [1]Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101; and [2]Department of Agricultural Engineering, University of Missouri, Columbia, MO 65211.

This study investigated seasonal changes in total nitrogen and total phosphorus levels of Gans Creek impacted by residential and agricultural wastewater. These two water quality determinands were measured in CAFO lagoon wastewater, WWTP effluent, upstream, midstream and downstream samples collected from May 2009 – March 2010. The highest observed ammonia-N values (mg/l) in the WWTP, lagoon, and Gans Creek samples were 26.5, 0.95 and 0.69 respectively. Nitrogen phosphorus ratios for Gans Creek suggested nitrogen limitation (N: P < 15) to primary producers for most of the monthly data except for February and April data (N:P = 22 and 29, respectively) that suggested phosphorus limitation. Hierarchical clustering and principal component analysis showed three major clusters depicting three pollution levels (combined effluents of WWTP and lagoon, lagoon wastewater and Gans Creek) in the study area. The efficiency of implemented best management practices (BMPs) in N, P reduction is being evaluated.

O-RR-S-13

NSF REU Site-Research Experiences for Undergraduates in Molecular Genetics and Genomics at Delaware State University. V. Kalavacharla*[1], K. Melmaiee[1], L. Davis[1], Z. Liu[1], T. Mennella[1], G. Ozbay[1], P-Q. Mennella[1], C. Sabanayagam[1], S. Taylor[1], L. Everett[2], and B. Wiggins[3], [1]Delaware State University, Dover, DE 19901; [2]Wesley College, Dover, DE; and [3]Delaware Technical & Community College, Georgetown, DE**.**

Delaware State University (DSU) was awarded a four-year grant in 2010 from the National Science Foundation for a nine-week summer Research Experiences for Undergraduates (REU) program in the area of molecular genetics and genomics. This new grant extended the original grant from 2007 to 2010. This program is a partnership between DSU (host institution), Delaware Technical & Community College and Wesley College which draws from a wealth of faculty mentors in the biological sciences, including research and teaching faculty in plant biology and genetics, molecular genetics, neuroscience and aquaculture. Students apply in the spring and come to DSU in the first week of June. Students initially work together in a two-week methods workshop to become familiarized with tools and techniques in molecular biology and genomics. Students meet with research mentors to understand specific research projects and develop research proposals. While continuing to conduct research in the mentor's laboratory, students present research progress to their REU peers and mentors. Also included in the REU experience are seminars given by government, academic and industry scientists, visits to biotechnology organizations and interaction with other scientists. Additionally, at approximately two-week intervals, the REU students attend four ethics seminars on various ethical issues in natural science research. The student research projects conclude with the Undergraduate Research Symposium where students from all summer research programs

participate in a combined event. The FY2007, FY2008, FY2009 and FY2010 have trained a total of 40 students from diverse backgrounds. The DSU REU website is at (http://cars.desu.edu/reu/index.htm).

O-RR-S-14

Microalgae as Bio-Fertilizer. D. Dumbach[1], G. Kandasamy*[1], T. Viswanathan[1], K. Lee[1], and P. Nam[2], [1]Bioenergy Research Laboratory, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101; and [2]Department of Chemistry, Missouri University of Science and Technology, Rolla, MO 65401.

Excessive use of synthetic fertilizers leads to soil degradation over time and runoff contamination of water systems. Current practices using organic fertilizers such as worm castings are more environmentally friendly, but also more expensive than synthetic fertilizers. Bio-fertilizers composed of a consortium of live formulates of microorganisms are a possible solution which will promote long-term soil health and the quality of crop products, as well as mitigating the environmental hazards associated with synthetic fertilizer. When applied to soil, plant seeds, or roots, bio-fertilizers stimulate an increase in the availability of necessary macronutrients via their biological activity, providing optimal growing conditions for crops. In this study, we present an alternative to mass spreading of synthetic fertilizers by using a bio-fertilizer slurry, comprised of microalgae and natural micro-flora that are grown using flue gas from a fossil fuel-fired electrical power plant. From the nutrient compositional analysis of corn plants grown with this microalgae-based bio-fertilizer, total plant nitrogen increased to 3.5-4.6% when as low as 10g bio-fertilizer/ plant was applied. This result was equivalent to those grown with commercial fertilizers.

O-RR-S-15

Variation of Stream Water Quality for the Past Decade in the Lower Missouri River. F. Liu*, and J. Yang, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101.

Runoff from agricultural watersheds remains a critical concern of stream water quality in the Midwest. Using US Geological Survey's data collected for the past decade, variation of stream water quality over watershed scales and time was examined for the Lower Missouri River. Mean dissolved oxygen (DO) values were 10.7-9.2 mg L^{-1} from upstream at Yankton, SD, and Omaha, IA, to downstream at Hermann, MO and also at Louisville of Platte River, a major tributary converged right after Omaha. Mean atrazine concentrations were 0.04 and 0.49 µg L^{-1} at Yankton and Omaha, respectively, and significantly increased to 1.08 µg L^{-1} at Hermann. The increased atrazine at Hermann was primarily contributed from Platte River and all agricultural watersheds between Omaha and Hermann. The mean atrazine concentration was 1.66 µg L^{-1} at Platte River and 1.30 µg L^{-1} for all agricultural watersheds combined between Omaha and Hermann, calculated based on the mass balance of flow and atrazine concentrations. There were no temporal trends from 1996 to 2009 for DO, nitrate and atrazine at all of the above locations. These results suggest the need to better understand the controls of agrochemicals in stream water at small agricultural watersheds and to search for effective means of watershed management to mitigate the exports of agrochemicals by streams.

O-RR-S-16

Applications of Genomics/Bioinformatics Sciences and Technology for BioEnergy. C. Louime[1]*, O. Onokpise[1], M. Abazinge[2], L. Almeida[3], and H. Fasanya[4], [1]Florida A&M University, College of Engineering Sciences, Technology and Agriculture, The FAMU BioEnergy Group, Tallahassee, FL, 32307; [2]Florida A&M University, Environmental Sciences Institute, The FAMU BioEnergy Group, Tallahassee, FL 32307; [3]Universidade Federal de Viçosa, Campus Universitario, Departamento de Solos, Vicosa, MG, Brasil 36571; and [4]Florida A&M University, College of Arts and Sciences, Biology Department, Tallahassee, FL 32307.

According to "*Technology Review*", Microbial Technology has been selected as one of the ten most important emerging technologies. Microbial technology applied to biofuels is the most likely technology to change the world on the largest scale possible, when compared to other existing technologies. Based on current literature, there are two known distinct catalytic mechanisms used by microorganisms to attack crystalline cellulose, namely the so-called inverting or retaining mechanism. While most anaerobic microorganisms produce a multienzyme complex called cellulosome, most aerobes release individual cellulases. Many of these cellulases contain a cellulose binding domain (CBD), which facilitates attachment of the enzyme to its substrate. C*ytophaga hutchinsonii*, on the other hand, appears to use a third mechanism. Many of *C. hutchinsonii* endocellulases encode neither CBDs nor dockerin domain, a key component of cellulosomes. This raises therefore the question as to what mechanism *C. hutchinsonii* uses to degrade its insoluble substrates and whether an optimum enzyme specific activity can be achieved with *C. hutchinsonii*. Here we propose to use a combination of functional genomics and comparative genomes analysis to elucidate the mechanism underlying cellulose hydrolysis by the gliding bacteria *C. hutchinsonii*. The goal of the proposed project is to annotate and characterize the genome of several *C. hutchinsonii*

strains in order to predict the inherent metabolism of this novel biocatalyst for the purpose of optimizing conversion of biomass to biofuel and bioproducts.

O-RR-S-17

Factors Influencing Seasonal Pond Habitats in the Apalachicola National Forest. K. Milla*[1], S. Kish[2], O. S. Mbuya[1], A. Jain[1], A. Rasmussen[1], M. Pescador[1], S. Sapp[1], K. Livingston[1], and S. Pancholy[1], [1]Center for Water Quality, Florida A&M University, Tallahassee, FL 32307; and [2]Department of Earth Ocean and Atmospheric Science, Florida State University, Tallahassee, FL 32306.

Seasonal ponds in the Munson Sand Hills region of the Apalachicola National Forest provide various ecosystem services, including habitat for a diverse variety of plant, animal and insect species. Many of these species are adapted to and dependent upon the seasonal filling and drying of the ponds. A number of factors influence the quality of seasonal pond habitats, including pond hydroperiods, water quality, vegetation communities, climatic conditions and the impacts of human disturbances. One goal of this project is to develop a reference model against which the quality of seasonal pond habitats can be compared. For this project, ponds were selected for detailed study representing a variety of biophysical conditions and degrees of impact. Data collection is currently in progress for soil physical and chemical properties, vegetation communities, rainfall and temperature, pond water levels, aquatic insect communities and landscape properties and geologic settings. For this presentation progress will be reported on the compilation, analysis and interpretation of these data for developing a reference condition model and indices for evaluating quality of seasonal pond habitats.

O-RR-S-18

Internet Enabled Sharing, Distribution and Management of Environmental Spatial Data. F. L. Namwamba*, and E. Mulembo, Urban Forestry Program, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

This thesis research explored the use of Internet Mapping Server technology incorporated with the World Wide Web (WWW) to enable the sharing, distribution and management of environmental spatial data. In this research, maps were collated from different sources that contain data pertinent to urban forestry, environmental mitigation, and urban recreation. All of the maps collated together will assist in addressing pertinent environmental problems. The data-warehouse should be readily available to the users over the Internet. The study used areas in the vicinity of Scotlandville and around Southern University as a sample study of land cover/land use to generate a spatial data warehouse for different land use and land cover. Data was acquired, formatted, and converted digitally to GIS formats as a major component of this thesis research. Integrated data acquisition and formatting methodology was developed. The methodology was applied to natural resources on the coastal zone of Cameron Parish beaches where the different environmental factors that affect the quality of the beaches in the parish were analyzed. Through this study, we have a comprehensive understanding of the concept concerning Internet Mapping Server, the different techniques of acquiring data for research, and finally develop a system that will enable the different users to access the maps and spatial data over the Internet. The data acquired will assist scientists in developing different environmental application maps and enable users to query data and develop their own maps using the data warehouse created by the administrator.

O-RR-S-19

Quantify Urban Tree Growth and Physiological Response to Periodic Flooding. Z. H. Ning*, K. Abdollahi, and A. Negatu, Urban Forestry Program, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Five states in the Gulf Coast of Mexico region are subjected to periodic short-term and long-term flooding. The impacts of flooding on economically and environmentally important urban forests have not been adequately studied. Understanding the responses of the urban tree species subjected to flooding is crucial for management of the natural resources in general and urban forests in particular. In urban area, it is very common for much of the topsoil, surface soil, and subsoil to have been stripped away during construction. This study quantified the effects of periodic flooding and soil removal on growth and physiology of two commonly used urban trees, Cherrybark Oaks (*Quercus falcata var. pagodaefolia*) and Water Oak (*Quercus nigra*). A split-split plot design was used in the experiment with flooding treatment as the main plot and soil removal treatments as the subplots. Results indicated that flooding has significantly reduced the growth rate and physiological capacity of Cherrybark Oak and Water Oak. However, the impact of soil removal on physiology and growth of both species varied significantly.

O-RR-S-20

Sweetpotato as a Potential Feedstock for Biofuel Production. K. Nyiawung*, D. Mortley, A. Issah, C. Bonsi, M. Egnin, B. Min, W. Hill, and B. Vaughan, Department of Agriculture and Environmental Science, Tuskegee University, Tuskegee, AL 36088.

Production of fuel from biomass has gained particular interest as an alternative to fossil fuels with emphasis on renewable sources. Use of corn as the primary feedstock for bio-ethanol production in the US has led to concerns related to the large quantity of arable land required for production and the impact on grain supply for food. One approach to address some of these concerns is to explore the use of alternative sources of biomass feedstock. Experiments were conducted to evaluate white and orange fleshed sweetpotato [*Ipomoea batatas* (*L*.) Lam] cultivars as feedstock for bioethanol production, based on dry matter (DM), extractable starch, amylose-amylopectin ratio and ethanol yields and to determine the relationship among these parameters. Storage roots were harvested 120 days after planting in triplicates. For ethanol (EtOH), samples were prepared using a 0.12 solid/ liquid ratio, hydrolyzed at 66°C for 90 min and fermented with *Saccharomyces cerevisiae* anaerobically at 30°C for 36 h at 200 rpm in an orbital shaker incubator followed by HPLC analysis. DM ranged from 19.6 to 35.9% and extractable starch from 10.9 to 25.3%, for Beauregard and W308, respectively. Amylose/amylopectin ranged from 19.5 to 30.8%, with ratios of 0.24 and 0.46, for BM 8342119 and TU0002, respectively. EtOH production ranged from 32.4 g L^{-1} for Beauregard to 66.0 g L^{-1} for WS14905. Significant correlations existed between DM and starch, DM and EtOH, and starch and EtOH. Therefore, DM and starch content could be used to select promising cultivars for EtOH production.

O-RR-S-21

Economic and Environmental Impact of Agricultural Land-Use Change. O. A. Ojumu*, D. Hite, and D. Fields, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

This paper estimates the environmental and economic impacts of land-use change in three stage bio-economic modeling. Using soil and climate data of Kelly Creek watershed in Dale County, Alabama, the biophysical modeling of changing the traditional crops in the watershed to produce bio-energy crops is done. Replacing the traditional crops with switch-grass, corn, soybeans, and cotton, the yields, profits, nutrients in sediments, and run-offs are examined. Same bio-physical modeling is done under different ENSO phases to determine the best crops given these different weather occurrences. Given that the farmer will not be willing to adopt the new crop even when they are more environmentally friendlier that the traditional crop, the third stage of the modeling assumes a social planner position. By using an optimization model, the social planner maximizes the possible profits, while constraining the pollution level to the minimal levels produced by each of the crops. The land in the watershed is then allocated to the crops that will maximize the farmer's profit with minimum level of nonpoint source pollution to the ground water and water bodies in the region; thereby increasing the water quality for domestic and recreational uses. It is hoped that the increase in the demand for bio-energy will result in a demand pull price increase in the prices of bio-energy crops. The model in this essay will be applicable, not only in Alabama, but the whole southern seaboard region, with similar weather and soil compositions.

O-RR-S-22

Monitoring Infestation and Impact of Live Oak Midge Gall. Y. Qi*, V. A. Ferchaud, and Y. Li, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Live oak (*Quercus virginiana* Mill.) midge gall infestation is a new problem in Louisiana. The infestation is caused by *Arnoldiola atra* Gagne, a tiny "gall midge" insect about 2 mm long with a single pair of wings. This pest was first discovered in Texas and described by R. J. Gagne and E. G. Riley in 1999 as a new species to America and its signature gall considered a new introduction to the US. By 2009, this tiny pest with its signature gall has erupted in Louisiana and caused massive infestation in live oak trees throughout Baton Rouge and surrounding areas. We have been monitoring the infestation since February 2009. Field survey, sample collection, and laboratory studies have been conducted to understand the gall development, the gall midge life cycle, and assessment of its ecological impact on live oak trees. A survey at Southern University Baton Rouge campus indicates more than 80% of the live oak trees have been infested by this gall. The gall midge population attacks the live oak buds and aborts them by making massive budlike rosette galls throughout the canopy. The massive galls are woody at base and compete for water and nutrients and add weight to the trees, causing canopy die-back and decline in tree vigor in severely infested trees. The on-going monitoring of the gall infestation will gain a better understanding of the gall formation, biology and behavior of this pest, which will help to predict long-term impacts and form control strategies in the future.

O-RR-S-23

Performance of Five Sweet Sorghum, *Sorghum bicolor* (L.) Moench, Varieties in South-Central Virginia. L. K. Rutto*, S. Ren, and L. E. Coral, Agriculture Research Station, Virginia State University, Petersburg, VA 23806.

Sweet sorghum (*Sorghum bicolor*) holds potential as a source of fermentable sugars for the bioethanol industry. Five varieties of sweet sorghum (Dale; Della; Keller, M81E; Sugar Drip) were tested over two seasons at Randolph Farm of Virginia State University. Seed was machine drilled in plots randomly distributed within blocks uniformly fertilized as per recommendations for sorghum. At maturity (seed dough stage), two rows per plot were harvested and biomass (leaf; cane; seed) yield determined. Volume of juice in cane sub-samples and sucrose ($Brix^{o}$) content was also determined. Sugar Drip matured earlier than all other varieties with grain reaching dough stage in about 100 days, while M81E did not reach maturity before the first killing frost. There was no significant difference in cane yield in season 1, but Dale produced significantly more grain. Season 2 was drier than season 1 and there was marked difference in the performance of different varieties. Differences were also observed in resistance to the corn stalk borer, and seed damage by birds. Sugar content ranged from 13% to 18% for both seasons.

O-RR-S-24

Trends, Emerging Issues, Challenges and Opportunities in Soil Microbial Ecology. Z. N. Senwo*[1], and R. Ankumah[2], [1]School of Agricultural & Environmental Sciences, Alabama A&M University, Normal, AL 35762; and [2]Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

While there is critical need to diversify the workforce in food, agriculture, natural resource and environmental sciences, our 1890 institutions continue to experience declining enrollments in these fields. The declining enrollment threatens viability and sustainability of academic and research programs, the mission to serve society and particularly the underserved communities. A significant challenge to soil science is the need for interdisciplinary research that involves classical soil science sub-disciplines (soil chemistry, soil physics, soil biology, soil mineralogy, and pedology). Heterotrophic microorganisms generate the trophic base for detritus food webs, drive global carbon and nutrient transformations, and mediate plant production and atmospheric composition. Extracellular enzymes deconstruct plant and microbial cell walls, depolymerize macromolecules, and release soluble substrates for microbial assimilation. Expression of these activities is controlled by environmental signals linked to substrate availability and population density at the microbial scale while at large scales, activities track biogeochemical trends linked to climate and other variables. Over the last decade, large-scale DNA sequencing has markedly impacted modern biology and enabled us answer questions previously not experimentally approachable. The presentations will explore applications of next generation sequencing technologies. Participants will be introduced to several revolutionary sequencing platforms, including sample preparation procedures, general data handling through pipelines, and in-depth data analysis. A diverse range of biological questions will be explored including de novo DNA sequencing of bacterial genomes, and the use of these technologies in studying small RNAs, among others.

O-RR-S-25

Yield of Vegetables Grown in Sewage Sludge Amended Soil. E. T. Turley*, R. R. Hill, and G. F. Antonious, Department of Plant and Soil Science, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Sustainable agricultural systems are resource conserving. The sharply escalating production costs associated with the increasing costs of energy and fertilizers to U.S. farmers and problems of soil deterioration and erosion associated with intensive farming system have generated considerable interest in less expensive and more environmentally compatible production alternatives. Recycling wastes such as sewage sludge (SS) is a useful alternative to synthetic fertilizers and in providing high quality organic amendments for soil improvement. A field study was conducted at Kentucky State University (KSU) Research Farm. Eighteen plots of 22 × 3.7 m each were separated using metal borders and the soil in six plots was mixed with SS, six plots were mixed with yard waste (YW) compost, and six unamended (no-mulch; NM) plots were used for comparison purposes. During a subsequent 6-year study, plots were planted with potato (year 1), green pepper (year 2), broccoli (year 3), squash (year 4), tomato (year 5), and eggplant (year 6). The objective of this investigation was to assess the impact of soil amendments on yield and quality of vegetables gown in SS amended soil. Average total potato yield from SS and YW treatments were not significantly different. YW treatments produced greatest pepper yield. Eggplant marketable yield obtained from sewage sludge + yard waste (SS + YW) mix was superior compared to SS alone or NM treatments.

O-RR-S-26

Microalgae for Bio-Fixation of Flue Gas Carbon Dioxide and Sustainable Biomass Production. T. Viswanathan*[1], K. Lee[1], N. Dudenhoeffer[2], and P. Nam[2], [1]Bioenergy Research Laboratory, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101; and [2]Department of Chemistry, Missouri University of Science and Technology, Rolla, MO 65401.

The alarming increase in the atmospheric CO_2 levels is a serious threat to worldwide sustainability. Current CO_2 removal technologies like physicochemical absorbents and deep-ocean/underground injection are expensive and inefficient. On the other hand, microalgae have high photosynthetic efficiency that can fix CO_2 from flue gas directly without any upstream CO_2 separation, and concomitantly produce biomass for biofuel applications. Fossil-fuel fired electrical power plants are responsible for more than one-third of the US emissions, and for about 7% of the world's CO_2 emissions. While the concept of utilizing the power plant flue gas for microalgae cultivation has been proven at bench-scale level, reports on potentials and challenges at a pilot scale level of operation are limited. In this study we present the feasibility of CO_2 mitigation from a coal-fired power plant using microalgae grown in open-vertical pond systems. It was found that the native consortium of *Scenedesmus*, *Chlorella*, *Eudorina* and *Ankistrodesmus* can tolerate flue gas concentrations ranging from 1-4% CO_2 and sustain dry algal biomass productivity as high as 19 g/m^2/day. The species population change with respect to the monthly local environmental variation was observed. From the compositional and toxicological analyses of the harvested biomass, it can be concluded that the selected consortium of microalgae biomass can be sustainably produced at pilot scale level using the flue gas directly from the coal-fired power plant.

O-RR-S-27

Sustainable Irrigation in Madison and Limestone Counties, Northern Alabama Region. M. Wagaw*, G. Kebede, T. Coleman, T. Gabre, and W. Tadesse, Alabama A&M University, Normal, AL 35810.

Farming in Alabama is heavily dependent on a timely and evenly distributed rainfall throughout the major crop growing season. A supplemental water availability to bridge the frequently recurring "short" dry spells could critically enhance the productivity of this sector. In this study a holistic and adaptive approach is presented to facilitate the capturing of wet season surplus water for dry season usage across the state as an "on-demand-on-farm water harvesting enabler". Water harvesting is a complex technical process that can be at times environmentally sensitive. Hence such an investigation would demand an input from various natural and social science disciplines. The scope of this investigation is to explore the potentials and challenges in statewide introduction of the praxis of cool-season run-off impoundment for dry season irrigation purposes. Dry season irrigation across the state is predicated on a set of natural and environmental situations. For this study, historic flow recordings, multi-temporal/scale satellite imageries, meteorological data, reports, and thematic maps from water resource agencies were available. The ESRI GIS, ERDAS Imagine, and MIKE SHE modeling tools were used. As a preliminary finding, various approaches such as surface impoundments, more integrated use of underground localized micro-aquifer systems, tectonic lineaments, fractures, and other regional and sub-regional geological and geo-morphological features as inexpensive mechanisms of water retention are discussed. The potential unintended environmental side-effects of such small but frequent undertakings were also addressed. As a prelude to site-specific water access and use, this study provides a thorough understanding of the surface water bearing and hydrogeologic conditions based on the prevailing structural and geo-morphologic features. This investigation will assess broader irrigation potentials based on the precipitation trend, geology, and hydrogeology with a special emphasis on northern and central region of Alabama.

O-RR-S-28

Collaborative Partnerships with China in Agricultural Research and Education. Y. Wang*, Z. Senwo, X. Chen, and R. Taylor, School of Agricultural & Environmental Sciences, Alabama A&M University, Normal, AL 35762.

The project "Strengthening Minority Global Perspectives: Collaborative Partnerships with China in Agricultural Research and Education" was funded by the USDA - National Institute of Food and Agriculture - International Science and Education Program in 2009. The program is designed for Alabama A&M University (AAMU) to develop an international program with China in agricultural and environmental sciences. The overall goal is to provide opportunities for faculty and students through cultural, educational, and research interactions with Chinese students and faculty at Nanjing Forestry University (NFU) and other institutions and to strengthen AAMU's capacities to develop globally competent faculty and students. The specific objectives are to: (1) provide opportunities to develop students' global awareness, perspectives and experiential learning to enhance their competitiveness; and (2) enhance scientific research and teaching capabilities of AAMU faculty via exposures to international resources and technologies. The program is envisioned to assist in attracting students and enhance

recruitment in agricultural and environmental majors. Research conducted jointly will establish critical links for solutions to agricultural and environmental problems facing both countries. We will report on our first trip by faculty and student participants that included six faculty, one graduate research associate, and two undergraduate students to China between June 18 and July 14, 2010.

O-RR-S-29

Atrazine Removal from Aqueous Phase by Activated Carbon and Ordered Mesoporous Carbon Materials. J. Yang*, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65102.

Atrazine [2-chloro-4-(N-ethylamino)-6-(N-isopropylamino)-1, 3, 5-s-triazine] is a widely used herbicide to control broadleaf and grassy weeds for crop production. Residual atrazine in surface or ground water is of health and environmental concerns. This study investigated the potential of activated carbon (AC) and ordered mesoporous carbon (OMC) to remove atrazine from water through batch adsorptive experiments. Both carbon materials were initially functionalized with amine function groups, and surface properties characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform IR spectroscopy (FTIR), potentiometry, and N2-adsorption/desorption (BET). Atrazine concentration was determined by high performance liquid chromatography (HPLC) with a UV–Vis detector. Results indicated that the atrazine in water could be effectively removed by both AC and OMC at a capacity of 58.23 and 47.53 mg/g, respectively, through adsorptive processes. The adsorption reached maxima within 6-12 hrs, and the adsorption equilibrium isotherms were well fitted into the Freundlich model.

O-RR-S-30

***Faecalibacterium*-Based Fecal Source Tracking.** G. Zheng*[1], C. Duan[2], and A. C. Carson[3], [1]Cooperative Research Programs, Lincoln University, Jefferson City, Missouri 65102; [2]Department of Environmental Engineering, Chongqing University, Chongqing, the People's Republic of China; and [3]Department of Veterinary Pathobiology, University of Missouri, Columbia, MO 65211.

The main concern regarding microbiological quality of water is the presence of waterborne pathogens associated with human and animal feces. It is impossible to monitor all possible pathogens on a routine basis since each of these microorganisms requires a specific test method. Therefore, the fecal indicators were introduced to predict the presence of pathogens. Currently, *Escherichia coli* and enterococci are the fecal indicators used by the U.S. Environmental Protection Agency for determining fecal contamination of fresh and marine waters, respectively. However, the presence of these two indicators provides no information on the source of fecal pollution, which is needed in order to remediate or eliminate the source of contamination. To overcome the limitation, alternative fecal indicators and detection methods have been developed and used over decades, but not without limitations. The genus *Faecalibacterium* was recently found by this author to have the promising characteristics of a fecal indicator. By using the approaches of bioinformatics and molecular biology, the human feces- and poultry feces-specific genetic markers have been identified within 16S rDNA molecules of subspecies of *Faecalibacterium.* Based on these newly identified signature DNA sequences, human- and poultry-specific polymerase chain reaction (PCR) assays have been developed for use in tracking fecal pollution in water.

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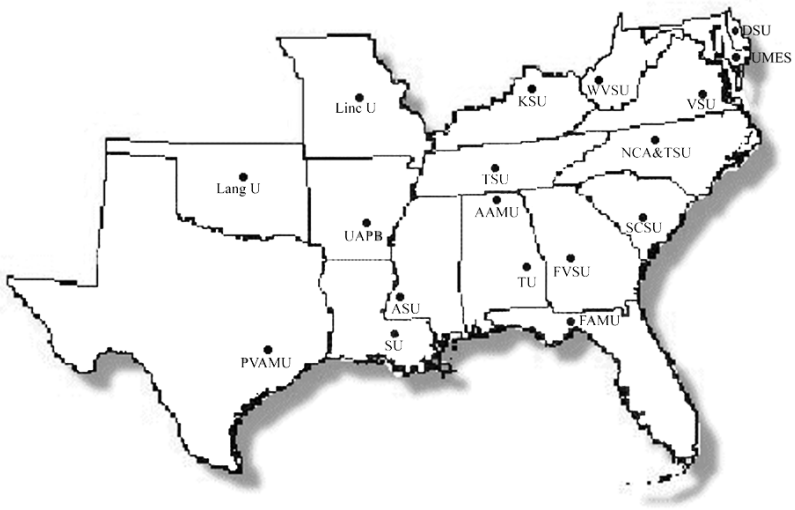

Abstracts of Renewable Resources, Bioenergy, and Environmental Stewardship Posters

Undergraduate Students (21)

P-RR-U-1

Carbon Nanotubes-Methyl Methacrylate Composites: Preparations and Characterizations. G. Beharie*[1], F. Akindoju[1], P. Traisawatwong[1], M. Stewart[1], C. Kelly-Brown[1], E. Carson[1], A. Oki[2], G. Regisford[3], and Z. Luo[4], [1]Cooperative Agricultural Research Center, [2]Department of Chemistry, [3]Department of Biology, Prairie View A&M University, Prairie View, TX 77446; and [4]Microscopy and Imaging Center, Texas A&M University, College Station, TX 77841.

Properties, such as nanometer size, high aspect ratios, and more importantly excellent mechanical, electrical and conducting properties, make carbon nanotubes (CNTs) highly suitable in electronics, optics, tissue engineering and other fields in material science. Due to rapid advances in synthesis methods, high quality, long and aligned CNT ropes are available. However, to align CNTs in nanocomposites is more challenging as many preparation methods produce CNTs, which are randomly oriented, and thus, diminishes the potential applications for CNTs. The objective of this study was to chemically modify CNT to afford well aligned CNT structures. It was hypothesized that the addition of bulky groups such as methyl methacrylate would greatly assist in the alignment of the CNTs. Carbon nanotubes reacted with HNO_3/H_2SO_4, then with $SOCl_2$ to afford the acetyl chloride derived CNT. This derivative was further reacted with p-phenylene diamine/chitosan before the final reaction with K_2SO_4 and methyl methacrylate. Fourier Transform Infrared Spectroscopy (FTIR) indicated the incorporation of both phenylene diamine and methyl methacrylate. Thermogravimetric Analysis (TGA) showed that the addition of functional groups onto the CNTs diminished its thermal stability. Scanning Electron Microscopy (SEM) showed the presence of CNTs while Transmission Electron Microscopy (TEM) showed that the CNTs were greatly coated when phenylene diamine and poly(methyl methacrylate) was added to its surface. TEM further showed that the CNTs which may have been coated, were either multi-walled or still bundled. Conclusively, CNTs appeared unaligned using this approach.

P-RR-U-2

Remediation of Emerging Contaminants in Water. M. Covin*[1], C. J. Clark II[2], E. E. Kalu[3], S. Hollingsworth[4], and A. T. Cooper[4], [1]Center for Water and Air Quality; [2]Civil and Environmental Engineering; [3]Chemical Engineering; [4]Biological and Agricultural Systems Engineering, Florida A&M University, Tallahassee, FL 32307.

Advances in analytical methods have led to improved detection and reporting of low level concentrations of previously unidentified contaminants in water and soil. It may be years before the true impact of low-level exposure of many of these emerging contaminants is known to any scientific certainty. However, there is mounting evidence that indicates detrimental effects from at least some of these components. For instance, changes in the endocrine systems of reptiles, increasing antibiotic resistance of microorganisms, and increased asthmatic rates amount are some indicators of the negative impacts of the presence of these chemicals in water and air. The photocatalyst titanium dioxide (TiO_2) has been effectively used for oxidative treatment of low levels of organic pollutants in water. In our lab the use of various forms of TiO_2 for the treatment of a variety of emerging contaminants is being evaluated.

P-RR-U-3

Determining Optimal Design of Rain Gardens to Maximize their Ecological and Environmental Benefits. J. Eisele*, and A. B. Lorenzo, Landscape Design and Management Program, College of Engineering Sciences, Technology, and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The Environmental Protection Agency (EPA) has cited stormwater runoff as the number one water quality issue in Florida. Due to the potential negative impacts of stormwater runoff to the environment, and human health and well-being, studies are increasingly needed in determining the possibility for alternative mitigation systems. One prospect is the rain garden to act as a natural filter for stormwater runoff. Rain gardens rely on plant communities with a mix of groundcover, grasses, herbaceous shrubs, and trees arranged in natural configuration to stabilize the ponding area, increase infiltration, and promote uptake of pollutants. A survey of residential rain gardens in Tallahassee, Florida built through grants from Think About Personal Pollution (TAPP) was conducted to gain knowledge on the commonly used plants and other garden variables including locations and physical dimensions. Survey results show a large majority of the rain gardens were located in front yards, areas ranged from 72 to 1,500 ft^2, and mostly bean shaped. Although 50 different plant species were recorded, only five were found in at least 10% of the rain gardens surveyed.

P-RR-U-4

Utilization of Cellulosic Wastes by *Cytophaga hutchinsonii*. H. Fasanya*[1], O. Onokpise[2], M. Abazinge[3], L. Almeida[4], and C. Louime[2], [1]College of Arts and Sciences, Biology Department; [2]College of Engineering Sciences, Technology and Agriculture, The FAMU BioEnergy Group; Environmental Sciences Institute, The FAMU BioEnergy Group, Florida A&M University, Tallahassee, FL 32307; and [4]Universidade Federal de Viçosa, Campus Universitario, Departamento de Solos, Vicosa, MG, Brasil 36571.

Cytophaga hutchinsonii is an abundant aerobic cellulolytic soil bacterium. An analysis of the recently published genome sequence showed a complete glycolysis pathway. Preliminary data from our research group however, revealed that *Cytophaga* does not utilize glucose as an energy source. Based on these findings, we hypothesized that *Cytophaga* may use an alternate pathway to attack its insoluble substrates. In the study presented here, a combination of genomics applications were used to gain insights into the molecular mechanism of cellulose hydrolysis by this organism. RNA-Seq data generated from growing *Cytophaga* on different carbon sources highlighted the unusual nature of this microorganism. Completely different sets of RNA were identified in the various sugars tested. These findings may facilitate increased usage of biomass resources by helping in the design of new and superior enzymes. More significantly, these investigations may help develop procedures aiming at increasing microbial utilization of cellulosic wastes. This will in turn address the present and immerging issue of national energy security and help protect and enhance the nation's natural resource base and environment.

P-RR-U-5

Chitosan: Potential Use in the Growth of Radishes. T. Fisher*, P. Traisawatwong, M. Stewart, C. Kelly-Brown, R. W. Griffin, and L. E. Carson, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Several studies have shown that high intakes of plants contributed to reduction in risks of chronic diseases, like cancer. Chitosan, a biodegradable product, has been reported to promote plant growth. For example, radishes *(Raphanus sativus)* are known to help prevent the body from developing cancer, specifically colon, breast and prostate, due to the high amount of antioxidants that they contain. In this study, radishes were grown in the presence of chitosans in order to evaluate chitosan's ability to enhance the growth of radishes. It is hypothesized that radishes grown in the presence of degraded chitosan would have a greater germination rate, larger leaves, larger bulb size and greater root length. Ten radishes were grown in each of the following treatments: 1) Metro Mix 200 series growing medium as controlled conditions, 2) Metro Mix 200 series growing medium in the presence of pure chitosan (CH), and 3) Metro Mix 200 series growing medium in the presence of degraded chitosan with a molecular weight of 18,0000 (CH18K). Plants were watered every three days while leaf measurements were taken once a week. Statistical analysis of the data indicated that there were no differences in germination rate or root length among the different treatment groups. Chitosan treated (CH18K and CH) plants tended to be taller than the control treated plants. The size of the radish leaves was significantly larger for CH18K- and CH-treated plants. These data indicate that the presence of both chitosan and degraded chitosan in soil enhanced the growth of radish plants.

P-RR-U-6

Utilizing Feed Overload Disturbances to Enhance Stability in a Thermophilic Anaerobic Digester. R. Goodall*[1], and A. M. Smith[2], [1]Department of Chemistry, and [2]Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112.

Anaerobic digestion (AD) technologies take advantage of naturally occurring microbial metabolic processes to treat industrial and agricultural wastes. While AD has been in use for over a century, the technology continues to be plagued with issues of instability. Greater stability of these systems would allow for more widespread use of AD technologies. External disturbance continues to be an issue with maintaining stability in digesters. This study utilizes controlled external disturbances to the benefit of AD. Controlled disturbances in the form of substrate overloading are used to cultivate more flexible and diverse microbial populations with the goal of increasing overall process efficacy. The effects of these disturbances on digester operational stability and resilience as well as microbial structure are evaluated using next generation sequencing technologies. This study tests the hypothesis: Microbial communities subjected to intermittent substrate overload disturbances will develop populations with greater phylogenetic diversity and metabolic stability compared with non-disturbed communities. Digesters are useful model systems for testing ecological hypotheses. This project furthers the goals of the USDA by supporting NIFA priority area "sustainable energy" as well as contributing to the field of microbial ecology by testing a relevant hypothesis.

P-RR-U-7

Synthesis of Water Dispersible Carbon Nanotubes as Silica Hybrids. K. Hibbert*[1], M. Stewart[1], C. Kelly-Brown[1], L. Carson[1], G. Regisford[2], and A. Oki[3], [1]Cooperative Agriculture Research Center; [2]Department of Biology; and [3]Department of Chemistry, Prairie View A&M University, Prairie View, TX 77446.

Hybrid materials composed of carbon nanotubes (CNTs) and silica nanoparticles are a class of synthetic materials whereby properties of CNTs are combined with properties of silica constituents and lead to materials with interesting functionalities that do not exist in the individual components. Many synthetic routes are aimed at the synthesis of dispersible CNT derivatives especially water-based CNT sols for biomedical applications, whereby the sidewalls of CNTs were decorated to afford hydrophilic surfaces. However, silica functionalized CNTs lack water dispersibility. Therefore, it is hypothesized that the fabrication of water dispersible CNT-silica hybrid can be produced through the surface engineering of the silica moiety and thus can introduce a new class of hydrophilic CNTs based on nanoparticles modifiers. In this study, acylated CNTs are reacted with chitosan (CS) that is biodegradable polymer, then triethoxyvinylsilane (TEVS) to afford dendritic type CNTs. These were further reacted with tetraethoxysilane (TEOS) to afford a sol-gel network system that could be used in a polymeric bone scaffolding systems. Significant differences were seen in Fourier Transform Infrared Spectroscopy (FTIR) with CS based derivatives. Thermogravimetric Analysis (TGA) showed a substantial decrease in the 10% weight loss temperature as the reaction proceeded toward final product. Scanning Electron Microscopy (SEM) for CNT-CS-TEVS grafts showed the presence of CNT, while Transmission Electron Microscopy (TEM) indicated a substantial amount of coating for CNT-CS-TEVS-TEOS hybrid materials. It is concluded that the presence of many amine groups on CS may have contributed to the substantial coating presence on the CNT-CS based hybrid materials.

P-RR-U-8

Uptake of Titanium Dioxide Nanoparticles in *Salix nigra*. S. Hollingsworth*, O. S. Mbuya, C. J. Louime, and A. T. Cooper, College of Engineering Sciences and Technology, Florida A&M University, Tallahassee, FL 32307

Nanoparticles are used in a number of everyday products such as cosmetics, fabrics and computers as well as pharmaceuticals and packaging. With the use of nanoparticles increasing, there have been concerns about how the nanoparticles will directly affect various plants and indirectly affect wildlife and humans. A nanoparticle can be defined as a particle that is between 0 and 100 nanometers in diameter with variations in size, surface area, shape, and surface charge specific to that nanoparticle. These variations can affect the uptake of the nanoparticle in specific plants as well as within individual parts of plants. They can also affect processes within the plant such as root growth, transpiration and water use. The experiment being conducted will measure the uptake of the titanium dioxide nanoparticle in willow tree cuttings. The primary research goal is to understand the mechanisms of uptake. Titanium dioxide, TiO_2, was selected for investigation due to its ubiquitous nature. It can serve as a model for semiconductor oxide nanoparticles. The willow tree was chosen because of its ability to grow and adapt to a new environment relatively quickly.

P-RR-U-9

The Measurement of Radon Gas in Soil, Water, and Air by RAD7. D. Hyatt*, L. Francis, and Z. Chang, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

Radon is a naturally occurring radioactive gas that exists in soil, water, and air. More than 50% of the background radiation accepted by an average American is from the radiation of radon. Radon is a carcinogen because the radioactivity of it and its decay daughters is hazardous to the lung cells. Radon is listed as the second leading cause of lung cancer, right after tobacco smoking. US Environmental Protection Agency (EPA) sets the Maximum Contamination Level (MCL) of radon at 4 pCi/L in the air. As high levels of radon are frequently found in in-door air in various geological regions, it is important to detect radon gas to be sure that it is not over the MCL level. This study employed a detection technique, RAD7, to measure radon isotopes (Rn-222 and Rn-220). The radon activity in the air and city water on the campus of South Carolina State University (SCSU) and Orangeburg Town was measured. Several soil samples in local areas were also collected and detected. An interesting pattern was found from the radon level in the air on SCSU campus. It was also found that the radon radioactivity in the city water in Orangeburg Town was ~100 pCi/L, which suggests that the source of radon in tap water is from water pipelines. Several city water samples with significantly high radon level were observed, and the reason was discussed.

P-RR-U-10

Influence of Landuse on Phosphodiesterase Activity and Soil Chemical Properties. S. Jones*, R. Shange, and R. O. Ankumah, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL

36088.

Soil quality in relation to land use has been a widely studied area of soil science. Because there is no definitive measure of soil quality, researchers utilize integrative measures of soil biological, biochemical, chemical, and physical status to make determinations of soil quality. In this study, pH, soil organic carbon (SOC), and phosphodiesterase (PD) enzyme activity was measured across one agricultural landscape that utilized three distinct types of management: pine plantation, grazed pasture, and cultivated vegetable crops. Results show that the distinctive land use types result in significant differences in all of the soil characteristics measured. Soil PD enzymes correlated with soil organic carbon, and shows that PD enzyme activity may be a good determinant in the biochemical status of agricultural soils.

P-RR-U-11

Plant Regeneration and Efficient *Agrobacterium tumefaciens*-Mediated Transformation in Alfalfa. K. Lawrence*, and S. Dhir, Center for Biotechnology, Department of Plant Science, Fort Valley State University, Fort Valley, GA 31030.

Medicago sativa L. is a flowering legume of the pea family Fabacea. For centuries, alfalfa has served as forage for cattle and as medicine to heal digestive tract disorders and arthritis. The goal of this study was to transform alfalfa leaf explants using *Agrobacterium tumefaciens*. It was projected that by doing so, eventually an entire transformed alfalfa plant could regenerate via somatic embryogenesis. For this purpose, some important parameters like sensitivity of explants to Kanamycin, age of explants, types of explants, co-cultivation time, acetosyringone and optical density (O.D.) of *Agrobacterium* culture medium were studied. *Agrobacterium* strain containing neomycin phosphotransferase (NPTII) gene as a selectable marker and β-glucuronidase (GUS) as a reporter gene was used for transformation. Results were tabulated on the basis of the percentage of GUS expression. Kanamycin at a concentration of 50-150mg/l was used to select transformed cells. Transient and stable GUS expressions were studied in transformed explants and regenerated calli respectively. Using the 0.2 OD level as a reference, we were able to standardize the system for the acetosyringone elution gradients. Acetosyringone concentrations were employed on alfalfa leaf explants. Highest transient GUS (70%) expression was observed at pH 5.8 after 3 days of co-culturing in 2-days-old explants. Optical density of 0.2 was considered optimal to obtain the highest transformation rate (70-75%). We found that acetosyringone at 200mM (for GUS expression) and 150mM (for GFP expression) yielded the highest transformation. We are using the developed protocol to transform alfalfa explants with several maker genes using *Agrobacterium tumefaciens*.

P-RR-U-12

Influence of Fermentation Times on Ethanol (EtOH) Production from Eleven Sweetpotato Cultivars. J. Madison*, K. Nyiawung, D. G. Mortley, C. K. Bonsi, and B. T. Vaughan, Department of Agricultural and Environmental Science, Tuskegee University, Tuskegee, AL 36088.

Experiments were conducted to evaluate the influence of fermentation time on bioethanol production from eleven white and orange fleshed sweetpotato cultivars. Samples of storage roots from W308, TU 0002, WS 149 05, BM 8342119, TU090W009, DMOI 158 096, DMOI 158 204, TIB4 008, TIB4 085, UK and Beauregard, were prepared using a 0.13 solid/liquid ratio. Samples were hydrolyzed at 66°C for 90 min and fermented with *Saccharomyces cerevisiae* anaerobically at 30°C for either 20 h or 40 h at 200 rpm in an orbital shaker incubator. Following fermentation, samples were centrifuged and then subjected to HPLC analysis to determine ethanol (EtOH) content at the different fermentation times. EtOH content ranged from 34.3 g L^{-1} for Beauregard to 64.6.0 g L^{-1} for UK at 20 h and from 34 g L^{-1} for Beauregard to 71.0 g L^{-1} for TIB4 085, after 40 h of fermentation, respectively. The magnitude of increase in ethanol production with an additional 20 h of fermentation ranged from 0 g L^{-1} to 9.0 g L^{-1} for TIB4 085. The highest percentage increases in EtOH production after 40 h were 11, 15 and 16.5% for TU0904009, TIB4-085 and WS14905, respectively. These results suggest that the benefits of extending fermentation time to 40 h maybe cultivar dependent. However, based on the magnitude of increase in fermentation time from 20 h to 40 h there are very few benefits to extend fermentation beyond 20 h.

P-RR-U-13

Isolation of Microalgae Strains and Screening for Use in Wastewater Biorefinery. M. Covin, E. Muhammad*, C. J. Louime, and A. T. Cooper, [1]Sustainable Systems Engineering Research Laboratory, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Algae are a large and diverse group of eukaryotic photosynthetic organisms. They use photosynthesis to transform carbon dioxide and sunlight into energy so efficiently that they can double their weight several times a day, producing oil and hydrocarbon biomass in the process. The biomass can be harvested for the direct production

of renewable fuel molecules, as a precursor to the production of bioproducts, or used in another waste to energy process such as anaerobic digestion. The oil can be extracted and burned directly in diesel engines, further refined into biodiesel or used as precursor molecules for next generation biofuels. The growth of algae requires a nutrient source similar to that found in wastewater. In this research algal samples from diverse sites were collected at multiple times of the year, isolated and characterized. The strains, along with other commercially available strains, such as *Chlorella vulgaris*, were screened for lipid and growth characteristics in a variety of wastewaters.

P-RR-U-14

Citrus Waste Characterization. C. M. Neal*, S. J.Hollingsworth, J. Arias, and A. T. Cooper, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

More than 90% of Florida's citrus crop is used for processing. Fifty percent of this weight is considered unusable and thrown away, contributing greatly to industrial waste after processing. This waste, referred to as orange bagasse, holds an enzyme called pectinase, often used to alleviate problems encountered during juice processing. Peroxidase activity has also been identified in a variety of citrus tissues and determined to be a factor in respiration, lignifications, degradation and treatment of industrial waste-waters. In this research we seek to isolate and identify activity from enzymes of interest. Proximate composition has been applied in order to distinguish the components of orange bagasse. Some properties of enzymatic constituents have been explored giving approximate result. Herein we report on the development of methods specific to the analysis of Florida's citrus waste for determination of elemental composition with an eye toward sustainability by potential waste reuse.

P-RR-U-15

Evaluation of the Effects of Plastic Mulches on the Growth and Yield of Tomato. J. Sawtelle*, A. James, and R. W. Griffin, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Vegetable production on raised beds with plastic mulch has become the method of choice in many parts of the country for high-value crops. Crops such as muskmelons, tomatoes, and peppers, have shown significant increases in earliness, yield, and fruit quality when grown on plastic mulch. Some of the advantages that black, clear, and white (or white-on-black) plastic mulch provides include earlier harvest, reduction in evaporation, weeds, fertilizer leaching, soil compaction, and increases in yield. However, there are disadvantages to mulching including greater initial cost of materials. The objective of this experiment was to evaluate the effects of three plastic colored mulches and a control (bare ground) on the growth and yield of an heirloom tomato Brandywine Pink (*Solanum lycopersicum*). The experimental design was a randomized complete block design consisting of three blocks and four treatments – red, black, olive mulches and control. Seedlings were transplanted into mulched beds 6 m by 1.2 m in rows at spacing of 0.8 m. Each plot contained 7 plants. Fruits were harvested 2.5 months after transplanting and continued for a period of a month. In 2009, results showed that fruit weights were not significantly different for treatments and were significantly different for block x treatment. In 2010, fruit weights were significantly different for treatments. Field observations indicated that fruits obtained from red and black mulches were very large and plants grew vigorously. Plants grown under olive mulch and control did not perform optimally and therefore, yields were low.

P-RR-U-16

Influences of Synthetic Peptide *D4E1* on Phosphomonoesterase Activity. M. Scott*, R. O. Ankumah, and L. J. Odom, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

Cotton Seedling Disease is a fungal complex that results in millions of dollars of revenue loss per year ($10 million in Alabama alone). There are no known cultivars that show resistance to Cotton Seedling Disease. Previous research has shown that a synthetic antimicrobial peptide *D4E1*, which has been shown in vitro and in-plants to have broad-spectrum antimicrobial action against many fungal orders. *D4E1* has been transformed into cotton seeds to examine the efficacy of this peptide on the control of Cotton Seedling Disease. With the introduction of synthetic antimicrobial peptides as a means of conferring disease resistance, it is important that the potential impact on non-target organisms such as beneficial insects, soil bacteria, and fungi, which play a fundamental role in crop residue degradation and in biogeochemical cycles. The objective of this study is to evaluate the effect of *D4E1* on phosphomonoesterase enzyme activity. Three 150 x 150 ft test plots, over two field seasons, were arranged in a completely randomized design and were assigned either one of three lines of cotton seed transformed with *D4E1* (designated 357, 358, and 373), a control line containing a GUS marker gene, or a non-transgenic control consisting of the parent variety. Soil samples were subjected to phosphodiesterase enzyme assays. There was no difference shown between the phosphomonoesterase activity between the control and the treatments containing the synthetic peptide *D4E1*.

P-RR-U-17

Photovoltaic Cell and Nanotechnology. M. Dweik, J. Spillers*, and L. White, Cooperative Research Programs and the Department of Life and Physical Sciences, Lincoln University, Jefferson City, MO 65101.

Photovoltaic is the direct conversion of light into electricity at the atomic level. Some materials exhibit a property known as the photoelectric effect that causes them to absorb photons of light and release electrons. When these free electrons are captured, electric current is generated, which can be used as electricity. Efficiency of photovoltaic cell has been a major problem in solar energy. There are many factors that affect solar cell output. Some of the main factors are wavelength of the light hitting the cell and band gap of cell materials. Utilizing organic materials can control the above problems. In assembling the cell, NANOCS ITO coated glass covered with paste is used as substrate. The paste is made out of Triton, Acetic Acid, Iodide, and nanocrystalline TiO_2. Fruit juices such as raspberry and orange were used in the assembly of the solar cell. An output of $0.4V/in^2$ was measured. The output can be improved by modifying the process, which will result in higher output.

P-RR-U-18

Spatial Variability of Soil Metal Ions in Close Proximity to a Coal Fired Power Generation Unit in Central Texas. C. Stewart*, and R. W. Griffin, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Four soil samples were collected from a 6-acre pasture in East Central Texas, which were characterized in order to determine the metal ion concentration of soils in close proximity to a coal fired electric generation unit. Of particular interest were the metallic soil ions, including iron, manganese, zinc and copper. The hypothesis of the study was that similar amounts of soil ions were present in upland and low lying, seasonally wet areas. Therefore, no additional accumulation of the ions would occur in low lying areas due to mass action, diffusion or solubilization/precipitation associated with seasonal fluctuations of wetness conditions between wet and dry cycles in the temperate climate. Iron and manganese oxides are metallic minerals that can produce specific ionic species during wet dry conditions that can lead to alternating anaerobic-aerobic conditions. The objective of the study was to determine the spatial variability of metallic ions in the soil using standardized laboratory methods as a part of soil testing for production of agronomic and forage crops. In this study four selected sites were sampled in the upland and low lying, seasonally wet soil areas; samples were mixed to represent an average for the selected topographic positions; and a soil test analysis was conducted for each sample. Materials used in the study included: sharpshooter, soil probe, measuring tape, sampling bags, and digital camera. The soil samples indicated that the metallic ions were spatially variable depending on the soil collection site; however the statistical analyses were not significant for all samples.

P-RR-U-19

The Measurement of Terrestrial Radioisotopes in Soil Samples. M. Terry*, A. Thomas, and Z. Chang, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

Naturally-occurring radioisotopes of uranium, thorium, and radium widely exist in soil, rocks, and sands in nature. The concentrations of these radioisotopes define the background radioactivity and affect the human health in the local region. Especially, radon gas, the primary source of the background radiation, is one of the decay products of these isotopes. Therefore, it is of great interest to study the emanation mechanism of radon gas from solid particulates into groundwater solution. A gamma-ray survey and analysis of sand samples collected from Red Bank, Lexington, SC were conducted in this study. The radioactive samples were found along the surface of the flow track of rain water in the highly eroded fields such as sand quarry and sports field. The sand samples were dried and separated according to the particulate size. An HPGe spectrometer was used for quantification of gamma emitting radionuclides in the sand samples. All samples contained radionuclides from the uranium and thorium series, as well as K-40. The measured radionuclide concentrations were compared with the data from previous studies. The samples collected in this study will be further used in the study on the emanation mechanism of radon gas evolving from soil into groundwater.

P-RR-U-20

The Effects of Iron on *Pistia stratiotes* (Water Lettuce) and *Eichhlornia crassipe* (Water Hyacinth) on Growth and Development. T. C. Tillman Jr.*, and A. E. Clardy, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

We will observe the effect of three different rates of Iron (Fe), 5ppm, 10ppm and 20 ppm in 15 liters of water. We have three replications per treatment and one control, which will contain no treatment. One (*Pistia*

stratiotes), water lettuce and one (*Eichhlornia crassipe*), water hyacinth per 15 liter container was grown for a two week period, both water lettuce and water hyacinth were allowed to grow in the predetermined iron treatment levels. Initial weights of the plants were recorded and water samples were taken. Plants will be harvested, 14 days after initial treatment and will be placed in paper bags and oven dried, final weights (fresh and dry) will be recorded at the end of the experiment. After plant material is removed from the oven, plant samples will be digested and prepared for analysis through the ICP (Inductively Coupled Plasma) Spectrophotometer. Plant material and water samples will be analyzed for Fe content.

P-RR-U-21

Novel BIO-MEMS for Detecting *E. coli* O157:H7 in Real-Time. M. Dweik, L. White*, K. Wilson, and A. Molitoris, Nanotechnology Research Laboratory, Cooperative Research Programs, and the Department of Life and Physical Sciences, Lincoln University, Jefferson City, MO 65101.

Escherichia coli O157:H7 is a toxic type of bacteria and is responsible for an estimated 73,000 cases of infection and 61 deaths that occur in the United States each year. *E. coli* O157:H7 can be found in fruit, vegetables, unpasteurized milk, juice, un-chlorinated water and on most cattle farms and can live in the intestines of healthy cattle. *E. coli* O157:H7 can have significant impact on businesses such as the food processing and packing industry. Bacteria testing requires extensive analysis which has to meet certain and challenging criteria. Sensitivity and response time for the analysis are imperative factors related to the usefulness of microbiological testing. In this project, a novel 3-dimensional (3-D) interdigitated microelectrode array (IDE) based impedance biosensor was developed. It is capable of rapid detection and selective for accurate identification of *E. coli* O157:H7 in fruit and vegetables. The uniqueness of this design is the use of 3-D IDE increases the surface area compared to a single (2-D) IDE sensor and decrease the amount of fluid used in the experiment. The increased surface area will enhance the sensitivity and speed of impedance detection. This bio-detection instrument for *E. coli* provided detection range (10^4-10^7 CFU/mL) in food samples (ex., tomatoes samples), reduce the detection time to 6 minutes, and improve the sensitivity of the biosensor by a factor of 10^2 CFU/ml.

Graduate Students (22)

P-RR-G-1

Lead Stabilization by Phosphate-Based Amendments of Shooting Range Soil. M. Bakari*, B. Hua, and J. Yang**,** Cooperative Research Programs and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65102.

Elevated lead (Pb) in soil is identified to be a threat to human health and to the ecosystem. Cleanup of Pb-contaminated shooting range soil is often difficult due to the high Pb levels and large lead solids present (usually over 10,000 mg kg^{-1}). Four phosphorous-containing amendments were applied in a St. Louis, MO shooting range soil to stabilize soil Pb and reduce the risks associated with soil Pb through the immobilization transformation. Leaching tests using the EPA toxicity characteristic leaching procedure (TLCP, pH = 2.88) showed that the amendments using KH_2PO_4 or $(NH_4)_3PO_4$-containing fertilizer could rapidly immobilize soil Pb and reduce Pb leachability by over 99% within a two-week period, while the treatment by phosphoric acid (80%) or insoluble $CaHPO_4$ was less effective. The X-ray diffraction (XRD) analyses of the pre- and post-treated soils indicated that lead carbonate, a highly bioavailable species present in the untreated soil, was converted to a relatively insoluble lead species by the phosphate treatments. The analyses of scanning electron microscopy in conjunction of energy-dispersive spectroscopy (SEM/EDS) analyses showed that phosphorus in treated soils was closely associated with lead, suggesting that the formation of chemical and biologically-stable pyromorphites [e.g. $Pb_5(PO_4)_3Cl$] could account for the Pb risk reduction in the context of leachability and bioavailability.

P-RR-G-2

Effects of Select Surfactants on Soil Microbial Activity. M. L. Banks*[1], F. Eivazi[1], R. Kremer[2], P. Motavalli[3], and K. Nelson[3], [1]Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101; [2]USDA-ARS, University of Missouri-Columbia, MO 65211; and [3]Department of Soil, Environmental, and Atmospheric Sciences, University of Missouri-Columbia, MO 65211.

Surfactants facilitate and accentuate the emulsifying, dispersing, spreading, and wetting properties of liquids. Surfactants are used in industries to reduce the surface tension of liquid and to solubilize compounds. In the

agricultural industry, surfactants are used to formulate herbicides and insecticides to enhance adhesion to plant surfaces. Soils are one of the direct recipients of surfactants and little is known about the behavior and fate of these chemicals in soil ecosystems. On entering the soil, various chemical, physical and biological reactions might take place depending on the conditions of the soil, potentially affecting microbial life. The objective of this study was to determine the effects of surfactants on microbial population in the soil. In our study we used three surfactants, Activator, Agridex, and Thrust; and three herbicides, Gly-4, Atrazine, and Basagran. Treatments added were surfactant only, herbicide only and surfactant with herbicide combination. A greenhouse experiment was conducted using two different types of soils: silt clay and silty clay loam. Each pot (4000 g) was fertilized according to soil test recommendations. Pots were arranged in a randomized complete block design. Field corn was used as the test crop and allowed to grow for seven weeks. Soil samples were analyzed using Polymerase Chain Reaction (PCR) and Denaturing Gradient Gel Electrophoresis (DGGE) technique to determine changes in community structure with respect to different treatments. Microorganisms are sensitive to perturbations, we hypothesize that treatments will alter soil microbial populations and, therefore, affecting nutrient uptake and recycling.

P-RR-G-3

Dust Accumulation on Sandy Soils of the Texas Gulf Coast Prairie. A. R. Bryant*, and R. W. Griffin, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

This research project focused on dust accumulation as a source of iron for production of redox features in sandy soils on the Texas Gulf Coast Prairie. Specific objectives included: 1) quantification of redox features in the upper 50 cm of selected sites; 2) determination of iron versus manganese related redox features; and 3) determination of soil matrix and percent of soil redox features. Materials that were used in the study were: 1) shovels; 2) Munsell soil color book; 3) sharpshooters; 4) soil probe; 5) spatulas; 6) soil knives; 7) soil description data sheets; 8) heavy duty trash bags; and 9) microscopic hand lens. An area within each treatment site was cored and the soils were described for matrix color and redox features (number, size, color, and type). Sites were described in order based on treatment specifications. The color (7.5YR) was the dominant background for the Encased (E) treatments, which also was composed of the native soil. In the Encased and Replaced (ER) treatments, which were composed of the white mortar sand, the color (10YR) was the dominant background color. The Replaced (R) treatments dominant background color was also (10YR). This third phase of the research project was focused on accumulation of red iron bearing dust particles that were easily identified against the white mortar sand background.

P-RR-G-4

Soil pH, Ferrous and Ferric Iron, Manganese, and Redox Potential Measurements in Simulated Wetland Depressional Ecosystems. J. Crain, III*, and R. W. Griffin, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Soil water measurements were conducted in simulated wetland depressional ecosystems to identify ionic species that are transitional during wetting and drying cycles within seasonal wetland systems. The hypothesis of the study was that the amounts of soil iron and manganese were similar regardless of the soil-organic matter substrate. The objective of the study was to quantitatively measure the soil pH, ferrous iron and redox potential (Eh) while qualitatively measuring the ferric iron and manganese within the soil-water ecosystem. Materials used in the study included: soil pH probe, soil redox probe, alpha- alpha- dipyridyl, hydrogen peroxide at 3 and 30% concentrations, and Munsell soil color charts. The ecosystems indicated that the iron and manganese ions were variable depending on the soil-organic matter substrate and the pH and redox potential values varied with the length of time in which the water was ponded.

P-RR-G-5

Reducing the Impact of Invasive Species on Urban Forest by Utilizing Geospatial Science to Monitor the Spread and Development of Native and Non-Native Species. J. Danzy*, and A. Johnson, Urban Forestry Program, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813

Exotic species are defined as species that are introduced from other countries and not native to the place where found. As non-native species encroach upon an area there are many negative side effects, including the loss of native vegetation. Our study area is Compton Park, which is located in a residential area in western Alexandria, LA. The park serves as one of the crown jewels of the City's park system, however in recent years this area is being threatened by an increase of exotic species. The objectives of this project were to: 1) develop an inventory of the park to identify and monitor the spread of exotic tree species currently in Compton Park, 2) develop a health monitoring system by creating a present, five, and ten-year model of the park, and 3) develop an environmentally sound approach to promoting a healthy ecosystem. Results showed that native trees species all had similar diameters

and heights with relatively high crown densities and low dieback. Geospatial analysis indicated that Compton Park has already begun to experience the encroachment of exotic species, however most of these invasive species are in the early stages of development. Using the tree inventory and geospatial analysis we were able to predict the possible proliferation of invasive species in the park. Exotic species in the park should be controlled before they reach reproduction stages. Education of the public to the causes and the effects of exotic species is key to maintaining recreational areas in their natural state.

P-RR-G-6

Impact of Climatic Variability on Water Quality under a Forest-Dominated Watershed. D. Davis*, and M. R. Silitonga, Mississippi River Research Center, Alcorn State University, Lorman, MS 39096

The increase in populations and modifications in land-use practices have caused changes in climatic variability that may alter the environment and water quality particularly. The land-use within the Homochitto Watershed (Hydrologic Unit Code or HUC 08060205) is predominantly forest covering an area of about 4.45 sq km. This watershed encircles a recreational lake, Lake Okhissa. Water quality parameters may be easily affected by climate parameters (such as precipitation and temperatures) and the types of land-use. With the increase in temperature and changes in rainfall patterns, the quality of the water may be altered. Higher temperature will increase the temperature in water that will lead to acceleration of biological processes and raise the probability of extreme water quality conditions, such as significant drop of dissolved oxygen levels and algal bloom. The purpose of this study was to evaluate the potential water quality impacts due to changes in climatic variability such as temperature, amount of precipitation and the temporal variability and seasonal distribution associated with the physical, chemical, and biological parameters. Water samples were collected from 24 locations. Water samples were tested for turbidity, pH, electrical conductivity, and dissolved oxygen. Water samples from two additional sites were also tested for total coliform and *E. coli*. Land-use and soil types were used to perform a Principal Component Analysis (PCA) as variables in a multivariate Gaussian distribution. These observations were needed to understand and monitor the physical landscape changes and its influence on water quality that may directly and indirectly impact human health and the surrounding environment.

P-RR-G-7

Evaluation of Chlorophyll Meter Use in Sweet Sorghum Crop Yield and Leaf Nitrogen Estimation. A. Devudigari*, R. Ravella, M. R. Reddy, and M. R. Miller, Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

In order to meet the growing demand for energy globally, it is essential to find alternate and renewable sources of energy. Sweet Sorghum (SS) (*Sorghum bicolor* (L.) Moench Saccharatum Group) biomass is evaluated for conversion to ethanol. SS requires less Nitrogen (N) and water as compared to corn and has potential to produce more biomass and ethanol per acre. The objective of this study is to evaluate the possibility of estimating yield with relative chlorophyll content if there is a positive correlation between the yield and relative leaf chlorophyll content and/or leaf N content at different growth stages. The SS was planted in early summer on Mecklenburg sandy loam soil in Guilford County, NC. The experiment was conducted using a split plot design with main plot factor variety (Dale and M81-E) and subplot factor fertilizer rates (0, 100% RDF, 50% RDF+ Bio-Fertilizer and 100% RDF+ Bio-Fertilizer) and four replications. The relative chlorophyll content readings were taken three times (6, 10, and 13 weeks after planting) during growing season with field scout CM-1000 Chlorophyll meter and the leaf samples were collected respectively for N analysis. The crop was harvested in October 2010 and biomass yield showed significant ($p=0.0175$) differences between the variety M81-E (38.42 tons/ha) and Dale (27.57 tons/ha). However, the results showed no correlation between the relative chlorophyll content and the biomass yield. Since this is just one season data, it is difficult to conclude, we have to check the correlation for 2011 season to get a better indication.

P-RR-G-8

Soil and Water Analyses from an East Central Texas Drainage Way Impacted by Runoff Water. E. Dilworth*, and R. W. Griffin, Cooperative Agricultural Center, Prairie View A&M University, Prairie View, TX 77446.

This study focused on analyzing soil and water samples along a drainage way that was likely impacted by runoff water. The study hypothesized that similar amounts of soil and water ions were present across the monitored site. The study methodology included: 1) five selected sites were sampled along the drainage way; 2) on site measurement of pH, Eh, and ferrous iron; and 3) lab characterization of pH, Mn, N, P, and Na. Important study results included: 1) natural soil pH in area ranged from 5.5 to 6.0, so alkaline inputs increased pH to levels higher than natural soil pH and 2) lowest soil and water pH values were observed at Site 5, lowest point on the landscape.

The study determined that, based on natural background soil and water conditions, the drainage way had indeed been impacted by runoff water that was released as part of a designed operation.

P-RR-G-9

Identification of Swine Feces-Specific *Faecalibacterium* Phylogentic Types. M. Farley*, and G. Zheng, Cooperative Research Programs, and Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

This study is to identify swine-specific *Faecalibacterium* phylogentic types, based on their 16S rDNA sequences, for use in tracking swine fecal pollution in water. The genus *Faecalibacterium* was found to be among the dominant bacteria in the microbial flora of swine intestine tract. Based on the reported *Faecalibacterium* 16S rDNA sequences, conserve sequences were identified and used to design a polymerase chain reaction (PCR) primer set targeting at the genus *Faecalibacterium*. A swine fecal *Faecalibacterium* 16S rDNA library was constructed with the resulting primer set and fecal DNA extracted from the swine feces. Result of the phylogentic analysis of the library in comparison with reported *Faecalibacterium* 16S rDNA suggests that several phylogentic types of *Faecalibacterium* may be specific to swine and useful in tracking swine fecal pollution in water.

P-RR-G-10

Spatial Variability of Rainfall Patterns within an Agricultural Landscape in East Central Texas. K. Ferguson*, and R. W. Griffin, Cooperative Agricultural Research Center**,** Prairie View A&M University, Prairie View, TX 77446.

This study examined seasonal and geographic variability of rainfall patterns within an agricultural landscape. Research methodology included: 1) seven rain gauges placed in relation to rainfall patterns with one mile distance between gauges; 2) volume of water was recorded following a rainfall event; and 3) rainfall spatial variability was analyzed statistically. Preliminary results included: 1) Precipitation during winter period was dominated by showers with a lower standard deviation, because events tended to be more evenly distributed across rain gauges and 2) Thunderstorms dominated summer period with a significantly higher standard deviation, signifying a rainfall pattern with more variability during period. Preliminary conclusions indicated: 1) Differences in wind and rainfall trajectories had a profound effect during different seasons of year and 2) Precipitation during winter was usually low intensity and longer duration, denoted by showers, whereas thunderstorms were usually associated with summer periods and high intensity, but for a shorter period. The seasonal data provided here will be useful in plans related to planting time and agrichemical management.

P-RR-G-11

Quantify Ground Water Recharge Using Water Balance over No-Tillage Farming. H. Han*, and T. Tsegaye, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

The quantification of water fluxes such as evapotranspiration (ET), infiltration and groundwater recharge in different land covers is critical to understand the water balance. ET is regulated by soil moisture within the root zone. Soil moisture is a critical control on water and energy fluxes, particularly in agricultural land covers. The main focus of this study is to understand the crop water budget and its changes during a growing season. The study was conducted at the Winfred Thomas Agricultural Research Station (34°53’34.00” N, 86°34’07.75” W) located at Hazel Green, AL. A micrometeorological station was installed at the center of the field (18 ha field, 400X400m) and included eddy covariance system, and open path gas analyzer were used to make long-term continuous measurements during two complete soybean and winter wheat growth cycle. The partitioning of precipitation between plant transpiration and recharge is estimated using ET and soil moisture data.

P-RR-G-12

Arylamidase and Beta-Glucosidase Activities in the Presence of Biochar Samples Derived from Different Feedstocks. M. R. Bayan, and N. O. Hoilett*, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Use of biochar as a soil amendment has received a great deal of attention in the past several years. Work has been done to understand the impact of biochar on soil properties and plant growth. We have investigated the effect of biochar samples obtained from different feedstocks on two soil enzymes. Arylamidase catalyzes the hydrolysis of an N-terminal amino acid from peptides, amides or arylamides. Beta-Glucosidase is involved in the hydrolysis of cellobiose, generating products that are important energy sources for microorganisms in soils. Five biochar samples generated from switch grass, oak, pine, cedar, and an oak/hickory mixed stand were incubated with soil obtained from the top 15 cm of grassland Alfisol (at the rate of 10% at room temperature). The pine, switch

grass, and oak/hickory biochar samples significantly reduced the activity of arylamidase and Beta-glucosidase. The oak and cedar biochar, on the other hand, enhanced the activity of these enzymes. When biochar samples were washed with de-ionized water prior to incubation with the soil samples, the Beta-glucosidase activity increased for the pine, switch grass and the oak/hickory biochar samples but activities still remained significantly below the level of the control samples. Washing treatment decreased the activity of arylamidase for these samples. Washing the cedar and oak biochar samples prior to incubation with soil samples, on the other hand, reduced arylamidase and Beta-glucosidase activities. The results of the study suggest that the feedstock and pyrolysis processes that were used in biochar production might influence its impact on soil enzymes.

P-RR-G-13

Trace Elements in Runoff after Subsurface-Applied Poultry Litter on Coastal Plain Soils. L. C. Kibet*[1], A. L. Allen[1], F. Hashem[1], C. Church[2], P. J. Kleinman[2], L. S. Saporito[2], G. W. Feyereisen[3], and T. R. Way[4], [1]Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853; [2]USDA-ARS, Pasture Systems and Watershed Management Research Unit, University Park, PA 16802; [3]USDA-ARS, Soil & Water Management Research Unit, St. Paul, MN 55108; and [4]USDA-ARS, National Soil Dynamics Laboratory, Auburn, AL 36832.

The production of approximately 570 million chickens annually on the Delmarva Peninsula is a primary source of poultry litter used to fertilize farmland to support crop production. The application of poultry litter to crop land over long periods of time may cause a build-up of trace elements such as arsenic (As), selenium (Se), and zinc (Zn) in soils, which may contaminate water resources at relatively low levels. Additionally, the widespread adoption of no-till farming on the Delmarva Peninsula, and the practice of surface application of poultry litter have led to elevated trace element transport in run-off and ground water. Three poultry litter application treatments, broadcast, subsurface incorporation, and broadcast/disked, were compared to a control (no litter). Immediately after litter application, lysimeters (61 x 61 x 61cm) were extracted from each treatment area, and subjected to two rainfall simulations (1 hr, 6.06 cm/hr) 15 and 42 days after litter application. Runoff samples were analyzed for As, Se, mercury (Hg), and Zn. Subsurface application with a new USDA developed instrument (*Subsurfer*) and broadcast application followed by disking lowered amounts of As and Zn in surface runoff twofold as compared to broadcast application in the first rainfall simulation, but these results were not significant in the second rainfall simulation. No differences in levels were observed among treatments for Hg and Se in runoff in either rainfall event. These results suggest that the application of poultry litter by subsurface incorporation or broadcasting followed by disking would help lower trace elements, As and Zn, in surface runoff.

P-RR-G-14

Enhancing Rhizodegradation for Remediating Undesirable Concentrations of Pyrethroid Insecticides in Soil. X. Le*[1], M. Blacksmith[1], D. Hui[2], and E. K. Dzantor[1], [1]Department of Agricultural Sciences, and [2]Department of Biological Sciences, Tennessee State University, Nashville TN 37209.

Rhizodegradation is a process by which plant-supplied substrates stimulate soil microbial communities in plant root zones (rhizospheres) to cause removal of undesirable levels of contaminants in soil. Dissipation of the synthetic pyrethroid insecticide, bifenthrin, was examined in two soil types under rhizosphere influences of alfalfa (*Medicago sativa*), switchgrass (*Panicum virgatum*) and big bluestem (*Andropogon gerardii*) to understand components and processes that are involved in removal of unwanted levels of the insecticide from soil. The two soils examined were Armour silt loam collected at Tennessee State University agricultural experimental station in Nashville, TN, and Sullivan sandy loam collected from Tennessee Technological University experimental station in Cookeville, TN. After 10 weeks in soils, significantly more bifenthrin was recovered from both unplanted soil types than recoveries in planted soils. Different levels of bifenthrin were recovered in planted Armour soil but the levels were not significantly different. Recoveries of bifenthrin in planted Sullivan soil were different but in contrast to observation in Armour soil, differences in bifenthrin recoveries from planted Sullivan soil were statistically significant. We are using traditional microbial enumeration methods (Plate Dilution Frequency Assay) and Biolog® carbon substrate utilization profiling to relate bifenthrin dissipation to microbial communities so rhizodegradation may be developed further for routine clean up soils that have been negatively impacted by bifenthrin and potentially other synthetic pyrethroids.

P-RR-G-15

Effect of Transgenic Cotton Plants Transformed with Antimicrobial Synthetic Peptide *D4E1* on Cotton Seedling Disease, Soil Microbial Diversity, and Enzymatic Activity. L. J. Odom*[1], R. Ankumah[2], C. Bonsi[2], M. Egnin[2], J. Jaynes[2], D. Mortley[2], K. Rajasekaran[3], and J. Carey[3], [1]Integrated Biosciences Program, and [2]Department

of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088; and [3]USDA/ARS Food and Feed Safety Research, New Orleans, LA 70124.

Cotton seedling disease (CSD) causes the largest yield losses of any cotton disease in the U.S. In Alabama alone, CSD is responsible for an average of $10 million per year in revenue. In Alabama, the pathogens primarily responsible for CSD are *Rhizoctonia solani* and *Pythium* spp. Its economic importance, coupled with the fact that cotton has no known disease resistant cultivars to CSD, make it an ideal candidate for genetic modification to confer disease resistance. *D4E1* is a synthetic antimicrobial peptide which, when transformed into cotton, *in vitro* and *in planta*, confers broad spectrum antimicrobial and antifungal properties against many fungal classes, including *Basiodomycetes* and *Oomycetes.* The effectiveness of *D4E1* against these pathogens and its effect on soil biological processes has yet to be tested *in situ*. The efficacy of D4E1 in the field and its effects on soil enzyme and microbial diversity was tested over two consecutive growing seasons on test plots using a completely randomized design. Treatments were: a control with GUS reporter gene, a non-transgenic parent variety, or one of 3 isogenic lines of cotton seed transformed with *D4E1* (designated 357, 358, and 373). Evidence of disease symptoms was evaluated by assigning severity of disease symptoms a numerical score. Microbial diversity was measure by whole DNA extraction of sampled soil followed by pyrosequencing. Overall results show that introduction of *D4E1* resulted in a decrease in disease symptoms when compared to the control. Enzymatic activity and microbial diversity did show temporally associated changes that were not treatment related.

P-RR-G-16

Micrometeorological Measurements of Carbon Dioxide Balance and Anthropogenic Air Pollutants in Huntsville. Y. A. Omidiran*, T. Tsegaye, and H. H. Han, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762

Human activities such as mobility and industries affect the atmosphere on scales that range from local to global. Mobility demand in the city met principally by road transportation mode supplemented by rail, aviation and marine transport services, keeps increasing in reflection of the economic growth and the attendant population increase; thereby contributing to the anthropogenic air pollution sources. The typical city setting of study is Huntsville which is presently included in the list of non-attainment area for criteria pollutants especially ozone by EPA in compliance with National Ambient Air Quality Standards (NAAQS). This study aims at assessing the Green House Gas emissions related to urban vehicular traffic and industries in the municipality of Huntsville; to quantify the share of responsibility of GHG emissions related to urban transport and industries; to quantify the GHG sources and sinks at the local level following the NAAQS and Intergovernmental panel (IPCC) guidelines; and, the evaluation of the economic growth, air quality and noise impacts of regional jet service at commercial airport serving small cities. Previous results showed that ozone concentration by 2008 stands at 0.078 ppm, slightly higher than the level of the NAAQS (0.075 ppm); the PM_{10} measurement was below the maximum standard of 150 ug/m^3; CO was well below standard and measured SO_2 concentration of 0.13 ppm is an order of magnitude slightly below the NAAQS of 0.14 ppm. The study on human contamination of the atmosphere has the end purpose of characterizing the resulting problems and informing the development and implementation of solutions to the problems.

P-RR-G-17

Benthic Diatoms as Water Quality Indicators in the Blackbird Creek Watershed, Delaware: Molecular Approach Investigating Benthic Diatom Assemblages and Abundance. A. Pappas*[1], G. Ozbay[1], A. Staehr[2], and K. J. Coyne, [1]Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901; [2]Midland Lutheran College, Fremont, NE 68025; and [3]College of Earth, Ocean, and Environment, University of Delaware, Lewes, DE 19958.

Benthic diatoms have been used as water quality indicators in freshwater systems throughout the world. They are found in almost every aquatic habitat and due to their high growth rates and rapid response to changes in water chemistry, diatoms are ideal biological indicators. Although the value of diatom indices for water quality assessment of freshwater ecosystems has long been recognized, the utility of benthic diatoms as environmental indicators within estuarine systems has limited information. In Delaware's estuaries, there has been only one study of benthic diatoms as paleoecological indicators of climate change. This investigation revealed that nutrient input resulted in an increase in diatom abundance and a decrease in diversity. The goal of this study is to evaluate the use of molecular methods in using benthic diatoms as water quality indicators of the Blackbird Creek Watershed, Delaware in relation to land use. Most project efforts involve collecting baseline data before the effects of land use permanently impact the estuary. Currently, the most common methods of analyzing diatom communities involve microscopy by individuals with much experience identifying diatoms. By developing molecular methods to identify

diatom species and determine community composition, more accurate information can be gathered by a wider range of individuals. The knowledge gained in this study will be used to identify ecological problems such as eutrophication in Blackbird Creek, to obtain a better understanding of the diatom communities, determine the effects of land use on water quality, and provide strong information to aid the improvement of land management practices.

P-RR-G-18

Nutrient Content and Trace Elements in Biochar Samples from Different Feedstocks. M. R. Bayan, and J. R. Pyles*, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

A biomass to bio-energy system involving biochar is capable of sequestering the atmospheric carbon dioxide, an ever-increasing greenhouse gas. Biochar has been reported to enhance aspects of soil chemical, physical and biological attributes leading to better plant growth. In a study of five biochar samples generated from different feedstocks (switch grass, oak, pine, cedar, and an oak/hickory mixed stand) we found that samples contained varying amounts of water soluble macro nutrients. The switch grass biochar released the highest amount of phosphorus per kilogram of biochar. The switch grass biochar also showed more potassium concentration than other biochar samples. The amount of the water-soluble trace elements varied significantly among the biochar samples. The switch grass biochar contained more Rb while the pine biochar contained more Mn and Sr. The amount of As and Pb in the oak/hickory and the oak biochar samples were minute and such trace elements as Be, Cd, Co, and Cr were not detected in any of the biochar samples. The results indicated that biochar samples differ significantly in their initial release of nutrients and in their content of trace elements. They clearly reflect the feedstock they were produced from, the conditions of the pyrolysis processes that generated them and ultimately the soil and environmental conditions of feedstock production.

P-RR-G-19

Chenopodium (*Chenopodium ambrosioides*) Extracts for the Suppression of Cogongrass (*Imperata cylindrica* L). L. D. Reid*, and O. Onokpise, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307

Cogongrass is one of the most invasive species in Florida and other Gulf Coast States and poses a major problem on forested lands, natural habitats, rights-of-way interstate highways. The present study was undertaken to evaluate the performance of cogongrass when grown in extracts of Chenopodium. Genets and ramets of cogongrass were transplanted into magenta vessels containing 10% solution of root and shoot extracts of Chenopodium. Magenta vessels were then placed in a growth chamber maintained at 28^{o}C, at a 16/8 hour photoperiod and a relative humidity of 55 % for growth performance of cogongrass. The genets and ramets of cogongrass were evaluated for shoot and root growth, as well as rhizome extension at seven days interval after transplanting. Results showed that the extract of Chenopodium reduced shoot growth and rhizome extension of cogongrass. The Chenopodium leaf and root extracts were the most effective in reducing the performance of cogongrass. Root: shoot ratios of cogongrass also decreased by 50-70%. Thus, Chenopodium extracts may contain some allelochemicals that could impact the invasiveness of cogongrass.

P-RR-G-20

Effect of Soil Type, Well Depth and Climate on Nitrate Contamination of Private Wells in Geneva County, Alabama. E. Smith*, L. Githinji, and R. O. Ankumah, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

Groundwater is a major source of water for drinking and domestic use in many parts of the world. In Alabama, about 20% of the population uses private wells for their potable water supply. More than 50% of the state relies completely or partially on groundwater. The quality of ground water can be comprised by contamination from various sources including agricultural chemicals use, and failing septic systems. Factors which have been found to mitigate nitrate, pesticide and coliform contamination include depth from surface, climatic variations, permeability and chemical makeup of the sediments through which groundwater moves and agricultural practices. For example, positive correlations have been found between well depth and nitrate concentration and cropping practices and precipitation have also been found to affect nitrate concentration in groundwater. The objective of this study was to assess private wells in Geneva County, Alabama on how some of these factors (well depth, septic system, precipitation, and soil types) and agricultural practices influence extent of nitrate contaminations. Wells which were sampled, about 15 years ago were resampled and the concentration of the parameters measured were compared to that of the 1995 study to determine whether changes in climatic factors and cropping practices have influenced nitrate the concentration. In comparing nitrate levels of private wells in Geneva Country from 1995 to the present,

there was generally a decrease in nitrate concentration in most wells sampled.

P-RR-G-21

Emergence of *Agrilus planipennis* from Trees Treated with *Beauveria.* D. Williams*, J. Vandenberg, and E. Buckner, University of Arkansas at Pine Bluff, Agriculture Department, Pine Bluff, AR 71601.

Emerald ash borer (EAB), *Agrilus planipennis* (Coleoptera: Buprestidae), is a destructive exotic pest of North American ash (*Fraxinus* spp.) EAB larvae tunnel under the bark of ash trees and form serpentine galleries that disrupt the conducting system of the host tree. To date, there is no evidence of resistance to EAB among native North American ash. Our objective is to prove or disprove that fungal treated ash bark will adversely affect EAB prior to or upon emergence of known infestation. Forty infested Ash trees were identified to host a paired treatment study. Treatment one consisted of fungal spores in a carrier mixture, treatment two consisted of carrier oil (control.) Spore concentration was $2x10^{13}$ spores per liter. Assignment of treated verse control comparisons was randomized. Emergence was monitored over a ten-day period. Samples were collected every other day and mortality rates were monitored. Due to the ongoing investigation no final conclusions were drawn, however, observations were recorded. Observation1. Beetles from fungal treated ash have shown signs of contracting *Beauveria bassiana*, 2. More samples were collected from trees that had maximum sunlight exposure and 3. 63% of beetles that emerged from trees sprayed with the control and 37% from treated. This suggests that the fungal treatment may have some adverse affects on the emergence of the EAB.

P-RR-G-22

Thin Film Composite Membrane Used for Desalination and Water Softening. J. Yin*[1], J. Yang[1], and B. L. Deng[2], [1]Cooperative Research Programs and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101; and [2]Department of Civil & Environmental Engineering, University of Missouri, Columbia, MO 65211

Membrane technology has been an attractive solution to the worldwide water shortage problem. In this study, a thin film composite (TFC) membrane was made through interfacial polymerization (IP) of m-phenylenediamine (MPD) and trimesoyl chloride (TMC). Initially, a porous polysulfone support layer was fabricated through a phase inversion process, and then an interfacial polymerization process was used to generate a polyamide thin film on the surface of the fabricated polysulfone substrate. A 2,000 mg/L NaCl solution and high Ca/Mg tap water were used as feed solutions to test the performance of the fabricated TFC membrane. In addition, several commercial nanofiltration (NF) and reverse osmosis (RO) membranes (NF90, TFC-S, TFC-HR) were also tested to compare the performance with our TFC membrane. Results demonstrated that the TFC membrane can reject over 91% of sodium chloride from the feeding salt solution and also can efficiently remove hardness in high hardness tap water. Furthermore, it also maintains as high a water flux as the commercial membranes during the filtration process.

Scientist (22)

P-RR-S-1

Assessment of Water Quality with Pollutants from Two Creeks of the Collins River Sub-Watershed Dominated by Nursery Crop. A. Akuley-Amenyenu*[1], D. Eskandarnia, and S. O. Dennis, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

The protection of surface water (rivers, creeks, stream and lakes) from agricultural pollutants continues to pose a major challenge to growers and researchers. The US-EPA identified eutrophication as the most widespread water quality impairment in the United States. In recent years, limited research has been done on the impact of nursery crop production systems on surface water quality. Agricultural production contributes to non-point source pollution, by way of plowing, liming and fertilization of nursery fields, thus, many states are concerned about the impact that can result in the runoff of tons of soil and essential crop nutrients on rivers, creeks, stream and lakes. The objective of this study was to assess the water quality in Hills Creek and Mountain Creek of the Collins River watershed as a result of possible pollutants from large concentration of nursery crops. This watershed is located in Middle Tennessee and also drains eight counties in the region. Hills Creek and Mountain Creek are tributaries of Collins River. The river is also known for its good population of muskellunge and fishing. Phosphorus and nitrogen are essential nutrients for crop production and they are also the primary factors that enhance eutrophication. Results during base flow indicated that Mountain Creek had better water quality characteristics than Hills Creek. However, both creeks had relatively low concentrations of the nutrients monitored with the exception of calcium and

magnesium. It is important that we know our creeks and that we provide an improved nutrient management strategy of individual nursery fields.

P-RR-S-2

Establishing an 1890s Land Grant Universities Water Center. A. Atalay*[1], T. Tsegaye[2], S. Pancholy[3], O. Mbuya[3], C. Gardner[3], M. Silitonga[4], S. Dennis[5], J. Yang[6], L. Githinji[5], F. Hasham[7], and E. Raymond[8], [1]Virginia State University, [2]Alabama A&M University, [3]Florida A&M University, [4]Alcorn State University, [5]Tennesse State University, [6]Lincoln University, [7]University of Maryland Eastern Shore, and [8]University of Arkansas Pine Bluff.

An effective virtual Water Center is critically needed to transmit research, education, and extension activities of the 1890 Land Grant Universities (LGU). These institutions need to have a comprehensive water management plan and database that can be accessed both at regional and local levels. Currently such information may only be available in scattered and scant format in very few institutions that have developed water programs. Such a virtual center will house databases that are archival and useful for various applications. Research, extension and academic programs can benefit a great deal from such a resource. The purpose of establishing a centralized 1890 Land Grant Water Center is to bridge the gap among institutions by sharing education and outreach methods, tools and technologies, and other needed information on water and related environmental issues, thus enabling research, academic, and extension programs to become more visible, accessible, and effective. The objectives are to: (1) enhance and/or initiate integrated water programs at each 1890 LGU through collaborative research, teaching, and outreach efforts; (2) investigate and document water and related issues within rural and underserved communities; and (3) develop geo-spatial databases on water related issues that can be used as decision-making tools; and (4) provide seed money to collaborating 1890 institutions to initiate water programs. The Center will serve as a first stop for inquiries concerning water issues in rural and underserved communities. A Center Director will coordinate all activities, and an advisory council of stakeholders will guide the center in developing its programs.

P-RR-S-3

Enrichment of Chromosome 17 Specific Molecular Markers of Pima Cotton Substituted in Upland Cotton Lines. A. Aziz*, and V. L. S. Kommireddy, Department of Agricultural Sciences, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

Cotton is an important fiber and oil crop and thus makes very important contributions to US agricultural security and sustainable agriculture. Two species are vital for American cotton industry, i.e., Upland cotton (*Gossypium hirsutum*) and Pima cotton (*G. barbadense*), which are prized for high yields and exceptional fiber fineness, respectively. For combining superior fiber quality and diverse adaptability, breeding lines of Upland cotton have been created by deleting some Upland genetic material and replacing it from Pima cotton. This research used cotton aneuploid (*G. hirsutum* x *G. barbadense*) plants to locate molecular markers to chromosomes17. The amplified fragment length polymorphism (AFLP) based markers' were used to comparatively analyze both cotton types and Upland cotton (TM-1) line CS-B17 that has chromosome 17 substituted from Pima cotton (double haploid line 3-79). IRD-800 and IRD-700 labeled AFLP markers were generated for dual-dye automated analyses. Further research is being carried out in our lab on AFLP analyses of recombinant inbred lines of CS-B17 for comprehensive association of the molecular markers to various regions on chromosome 17 of 3-79 cotton line that has been substituted in TM-1 cotton.

P-RR-S-4

Phosphorus Exchange Rates and Phosphorus Fractions of Wetland Sediments in the Upper St. Johns River Basin of Central Florida. G. C. Bugna*[1], Y. P. Hsieh[1], and M. M. Fisher[2], [1]College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]Water Resources Group, LLC, Olympia, WA 98507.

Phosphorus (P) enrichment in the lakes and wetlands of Florida has been a major environmental and ecological concern since the 1970s. We investigated phosphorus exchange rates between water column and sediments in intact cores taken from a variety of aquatic habitats in eastern central Florida, Blue Cypress Marsh Conservation Area (B), St. Johns Marsh Conservation Area (SJM), Sawgrass Lake (SG) and Moccasin Island Marsh Restoration Area (M), by laboratory incubation experiments. The major pool of P in the soils and sediments of these aquatic habitats was in the organic fraction, followed by Fe-bound, exchangeable and Ca-bound fractions. Higher P fluxes were observed during the first days of incubations due to initial disturbance of soil columns. The P fluxes became smaller with successive incubation periods. Positive (from sediment to water column; up to 1.3 $mg \cdot m^{-2} \cdot day^{-1}$) and negative (from water column to sediments; down to -6.8 $mg \cdot m^{-2} \cdot day^{-1}$) P fluxes were observed in the sediment column incubations of sites B and M, and sites SG and SJM, respectively. The fluxes did not correlate with the

internal P loading, P fractions, equilibrium phosphate concentrations, or pH. Lack of correlations in this study points to most likely the microbial mediated P exchange between the water column and sediments.

P-RR-S-5

Phosphorous Phytoremediation from Poultry Manured Soils by Diverse Plant Species. R. B. Dadson*, I. Javaid, F. M. Hashem, and J. Joshi, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Poultry manure application to cropland is a widely used practice on the Delmarva Peninsula. This results in an increase in soil phosphorus (P) contents and causes serious ecological problems. We evaluated five cowpea, four corn, four Sudangrass and eleven soybean genotypes for their potential to remove P from soils. Greenhouse and field experiments were conducted in two growing seasons in Princess Anne, MD, at two sites, which had a history of heavy poultry manure applications during the last 25 years. Harvesting of the cowpea and soybean was done at pod formation stages, while sampling of corn and Sudangrass was done when plants were in their early milk stages of development. Plant samples were oven dried at 70º C for three days, and the dry samples were ground and analyzed for P content. Results showed that cowpea genotypes Champion and White Acres extracted significantly higher amounts of P compared with the other cowpea genotypes. These two genotypes had a higher ability for P uptake from manured soils than other plant species. On the other hand, soybean genotype 091734 and SE 737513 extracted significantly higher amounts of phosphorous under field conditions, and the same general trend was also found in the greenhouse studies. Sudangrass extracted the maximum amounts of P compared with other genotypes of corn and sorghum. The approach of using plant genotypes, such as sorghum, Sudan grass, cowpea and soybean, for phytoremediation can play a significant role in improving nutrient management and environmental quality and thus, enhance agrosustainability.

P-RR-S-6

Potential Impacts of Advanced Biofuels on North Carolina Agriculture. G. C. Ejimakor*, P. B. Kyei, and O. Quaicoe, Department of Agribusiness and Applied Economics, North Carolina A&T State University, Greensboro, NC 27411.

The Energy Independence and Security Act of 2007 stipulates a renewable fuel standard of 36 billion gallons in 2022. From 2016, all increases in renewable fuels will have to be from advanced biofuels. North Carolina plans to reach a goal of 600 million gallons of liquid biofuels, grown and produced in the state, by 2017. Consequently, resources such as land, labor and capital will have to be allocated and reallocated between the production of traditional crops, energy crops and biomass for advanced biofuels. Furthermore, the prices of feedstock for advanced biofuels may have to change substantially in order to make them competitive with traditional crops grown in the state. This study estimates the breakeven price necessary to make advanced biofuel feedstock, such as switchgrass and others, competitive in North Carolina and analyzes the farm-level implications of producing biomass feedstock for advanced biofuels. Breakeven prices are estimated for non-traditional energy crops such as switchgrass and sweet potatoes that are, or could be, produced in North Carolina. Results for a programming model with estimated breakeven prices are compared with those with prevailing prices to approximate the reallocation of resources on a representative North Carolina farm. Some breakeven prices are found to be considerably higher than their current levels. Unless additional resources are used to produce feedstock for advanced biofuels, the anticipated reductions in the production of conventional crops could continue to lead to higher food prices at the state, regional and national levels.

P-RR-S-7

The Influence of Biochar on Physical and Hydraulic Properties of Soil. L. Githinji*, R. Ankumah, and R. Shange, Department of Agriculture and Environmental Science, Tuskegee University, Tuskegee, AL 36088.

Over the last five years there has been rising interest in use of biochar as a soil amendment, for improving soil quality as well as increasing soil carbon sequestration. However, there is inadequate information on how biochar alters the soil properties. In this study the physical and hydraulic properties of loamy sand amended with different levels (0, 25, 50, 75, and 100% v/v) of biochar were analyzed. The physical properties evaluated were particle density, bulk density, and porosity, while the hydraulic properties were infiltration, saturated hydraulic conductivity and volumetric water content. The wilt rating of Amelia tomato (*Solanum lycopersicum*) grown in various levels of biochar-amended soil were evaluated on a scale of 0 to 10, with 10 representing no wilting. The results showed that the bulk density decreased linearly as the percentage of biochar amendment was increased from 0 to 100%. Likewise, the particle density decreased with increased biochar amendment. However, porosity increased with increased biochar amendment. The mean volumetric water content for a period for 16 days increased, while the wilt rating decreased as the percentage of biochar amendment on soil was increased. These results reveal improvement of

soil physical and hydraulic properties following addition of biochar amendment.

P-RR-S-8

Countering Lepidopteran Resistance with Indigenous Bacterial Toxins and Soybean Genotypes. B. M. Green*, R. B. Dadson, F. M. Hashem, and T. R. Willingham, University of Maryland Eastern Shore, Princess Anne, MD 21853.

The increase in world population has greatly increased the need to keep insects from destroying food crops. Lepidopteran pests, such as *Helicoverpa zea,* Boddie (corn earworm), and *Epargyreus clarus* (silver spotted skipper), severely damage soybean fields in the Delmarva region and Mid-Atlantic States during extreme abiotic growing conditions. Synthetic insecticides are not safe for humans or environmentally friendly. The widely used bio-pesticide *Bacillus thuringiensis* (Bt) has developed a major problem with insect control due to the evolution in insect resistance. Therefore, a three-year field and laboratory study was conducted at the University of Maryland Eastern Shore Agricultural Experimental Station to address this problem. The objectives of this study were to: (i) isolate indigenous spore-forming bacteria expressing delta-endotoxins comparable to Bt; (ii) determine host plant interaction through soybean foliage defoliation; and (iii) assay the relative importance of genotype x insect interaction. Twelve isolates were obtained from *E. clarus* larvae and identified as potential insecticidal organisms. The bacterial isolates were grouped as *Bacillus cereus*, ***B. thuringiensis,*** and *B. mycoides.* Larvae treated with the effective isolates showed pupa delay or death after pupation. Petri dish assays were used to evaluate defoliation of 15 field-grown soybeans for resistance to silver spotted skipper larvae over 10-day exposures. The grain soybeans assay showed that 95Y60 was 65% defoliated with larvae weight gain of 0.90gm compared to the control, 94M30, with 10% defoliation and larvae weight gain of 0.60gm. Results showed that bacterial toxins x soybean genotype have the potential of decreasing insect resistance.

P-RR-S-9

Biological Control of an Invasive Aquatic Weed in the Wacissa Springs. R. Hix*[1], M. T. K. Kairo[1], and J. Cuda[2], [1]Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]Dept of Entomology and Nematology, University of Florida, Gainesville, FL 32611.

In 2000, aquatic plant researchers in Florida discovered the aquatic weed hydrilla (*Hydrilla verticillata* (L.f.) Royle) was developing resistance to fluridone, the only EPA registered herbicide approved for use in aquatic systems. This finding confirmed field observations of declining hydrilla control by public and private aquatic plant managers even though the same procedures from previously successful fluridone treatments were used. The fluridone resistance was unexpected because hydrilla reproduces asexually in Florida. At least six clones have been identified with a two- to seven-fold increased resistance to fluridone, and the resistance is stable over time, even in the absence of fluridone selection pressure. This herbicide resistance problem is cause for concern because the spread of resistant hydrilla is inevitable, and the higher fluridone concentrations required to control it will adversely affect on our country's hydrologic system, especially water supplies used for crop irrigation and organic or conventional aquaculture. Our objective is to develop and demonstrate an integrated reduced risk solution for hydrilla control by integrating selective insect herbivory and a disease with low concentrations of a new herbicide recently registered for aquatic use. We expect our research and demonstration project to show that these different low risk control tactics are compatible with each other, and that by integrating them, we can achieve safe and cost-effective control of both susceptible and resistant hydrilla.

P-RR-S-10

Evaluation of Water Quality for Selected Ephemeral Ponds in Apalachicola National Forest A. Jain*, K. Milla, O. S. Mbuya, K. Livingston, and S. K. Pancholy, Center for Water and Air Quality, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The Apalachicola National Forest covers more than a half million acres in Franklin, Leon, Liberty, and Wakulla counties in Florida. The ANF is considered to be one of the biodiversity hotspots in the United States. Ephemeral ponds are temporary ponds that go through annual wet and dry cycles and are distributed throughout the Apalachicola National Forest. The existence of these ponds are crucial for maintaining regional biological diversity because they serve as important habitats to a large diversity of plants, amphibians, reptiles, mammals, and birds. Six ephemeral ponds were selected in the Munson Sandhill region of the Apalachicola National Forest to study the water chemistry. Water samples were collected four times a year in each season using high density polyethylene amber bottles, filtered, and preserved with acids for laboratory analyses. Temperature, pH, electrical conductivity, and

dissolved oxygen (DO) were measured *in situ* at each sampling site. The water samples were analyzed for hardness, alkalinity, dissolved organic carbon (DOC), nitrate, ammonia, phosphate, total kjeldahl nitrogen (TKN), total phosphorus (TP), and metals. Water quality in these ephemeral ponds, characterized by acidic nature, low specific conductance, low nutrient concentrations, and high concentrations of dissolved organic carbon, seems to be controlled primarily by natural seasonal processes, such as evapotranspiration, rainfall, and biological activity.

P-RR-S-11

Use of the Tree Radar Unit (TRU) to Determine Root Growth Habit, Root Architecture, and Decline of Live Oak (*Quercus virginiana*) Trees on the Campus of Southern University. A. Johnson*, K. Barber, and C. Chappell, Urban Forestry Program, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Southern University and A&M College is located on Scott's Bluff overlooking the Mississippi River in the northern section of Baton Rouge, LA, encompassing 512 acres. One of the most dominant tree species on campus is the Live Oak (*Quercus virginiana*). However, increased mismanagement has resulted in the decline of many of these beautiful trees. The Felton G. Clark Activity Center parking lot, which was established in 1976, is the site of 110 Live Oak trees. The objectives of this study were to: (1) determine the effectiveness of TRU in analyzing root growth beneath pavement and asphalt, (2) determine if constricted root spacing, due to pavement, play a role in live oak tree decline at Southern University, and (3) determine if live oak roots are extending beneath the paved area. Concentric circles were drawn around the base of four randomly selected trees at one, two, and three feet from the base. Scans using the TRU were taken between each of the circles around the base of the tree. A straight-line scan was also taken along pavement. Results indicated that at depths between 0.0 to 16.0 inches, there was considerable root growth, however little root growth extended beyond this depth. Results also indicated that roots did extend under pavement to a depth of at least 12 inches. Results also showed that the TRU was very effective at analyzing root growth beneath pavement; however in several instances below ground obstructions distorted the data.

P-RR-S-12

Partial Correlation with Copula Modeling. Y. S. Jung[1]*, J. M. Kim[2], E. A. Sungur[2], and T. Choi[3], [1]Alcorn State University, Alcorn State, MS 39096; [2]Division of Science and Mathematics, University of Minnesota at Morris, Morris, MN 56267; and [3]Department of Statistics, Korea University, Seoul, 136-701, South Korea.

The current Pearson partial correlation approach is popular because of the simple computation advantage it confers. But the current approach has many drawbacks. It does not exist if the first or second moments do not exist. Possible values depend on the marginal distributions that are not invariant under non-linear strictly increasing transformations. This was our motivation to propose a new approach to partial correlation using copula, specifically a Gaussian copula. We propose a new partial correlation approach using Gaussian copula. Our empirical study found that the Gaussian copula partial correlation has the same value as that which is obtained by performing a Pearson's partial correlation. With the proposed method, based on canonical vine and d-vine, we captured direct interactions among eight histone genes. Partial correlation by Gaussian copula has an advantage in terms of simple computation procedures compared to recursive Pearson's partial correlation procedure while the values of partial correlations by Gaussian copula have the same values as those resulting for Pearson's partial correlation. In particular, when we have multivariate data such as that in a gene network, it is not easy to compute the partial correlation by Pearson's partial correlation. But the simple computation procedure built by our Gaussian copula partial correlation is useful in understanding and modeling dependent structures for random variables and possibly in measuring the partial correlation of genes.

P-RR-S-13

Comprehensive Value Chain Analysis to Utilize Sensor and Automation for Enhanced Production and Efficiency of Bioenergy from Selected Crops. S. Panigrahi[1], and A. K. Mahapatra*[2], [1]Department of Electrical and Computer Engineering Technology, Purdue University, West Lafayette, IN 47907; and [2]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

In recent years, several crops and agricultural materials have emerged with high potential for generating bioenergy (ethanol, electricity, etc.). To make it practical and viable, the process needs to be efficient and cost-effective. Advancements in sensors and automation technologies have potential to enhance process and production efficiency while enhancing cost-effectiveness. This study presents a comprehensive analysis of the value chain of two selected emerging bioenergy crops. One is sweet sorghum (*Sorghum bicolor*), a low input and high carbohydrate producer crop that can be cultivated on marginal lands, and another is watermelon (*Citrullus lanatus*), the quintessential summer fruit, and a promising new source for making biofuel ethanol. A systems-based approach

will be adopted to identify the critical points where appropriate forms of sensors/sensing systems along with relevant automation techniques can be used. The framework for implementation and associated cost-analysis will be discussed.

P-RR-S-14

Soil Physical Properties around Ephemeral Ponds in Apalachicola National Forest. K. Livingston, O. Mbuya*, and K. Milla, Center of Water and Air Quality, Florida A&M University, Tallahassee, FL 32307.

Many of the ephemeral ponds in the Apalachicola National Forest (ANF) have been disturbed by illegal recreational use of off-highway vehicles (OHV). Many irresponsible and uniformed OHV riders are attracted to the "mud bogging" opportunities provided by ephemeral ponds and leave designated trails to ride around ponds and through dry wetland depressions. The National Forest Service has recently closed most of the ANF to OHV traffic. To study the impact of OHV on soil physical characteristics around the ephemeral ponds, disturbed and undisturbed soil cores were taken from impacted and unimpacted sites. Soil bulk density, organic matter content, and particle size distribution were determined. Despite the destruction of vegetation around the ephemeral ponds, the bulk density of the soil remained unchanged, indicating that the OHV did not have significant (α=0.05) soil compaction. Soil organic matter (OM) within 0 - 30 cm of top around the ponds soil ranged from 0.1 – 2%, whereas up to 14% OM was recorded inside the ponds. There was no significant difference (α=0.5) in textural classes between impacted and non-impacted sites. On average the soil had 89%, 4%, and 7% sand, silt and clay, respectively. The OHV had a more severe negative impact on vegetation around the ponds than the soil physical properties.

P-RR-S-15

Soil Erosion and Associated Nutrient Movement on a Peanut Crop Field: A Mesh-Bag Study. D. Nemours*, and Y. P. Hsieh, Center for Water Quality, Florida A&M University, Tallahassee, FL 32307.

Cropland erosion is a major issue in agriculture due to its negative impact on soil productivity and water quality. Traditional research methods, such as the runoff plot or erosion pin either obstruct natural runoff paths or are not sensitive enough for short-term measurement. Recently a mesh-bag method has been developed for observing eroded soil redistribution in a field under unobstructed runoff conditions. The main objective of this study is to observe soil erosion and the associated nutrient movements in a field using the mesh-bag method. Mesh bag plots were laid out along a 200 m slope measuring 25-200 m^2 in sizes. Each plot contained an average of 30 mesh bags. The collected soil was oven-dried, weighed and processed for soil particle-size organic matter and nutrient analyses. The preliminary results showed that eroded soil redistributed on the slope ranging from 5 t/ha to 37 t/ha during the runoff events between June and August 2010. The heaviest soil redistribution was found at mid-slope and least at the bottom slope. The pattern of soil redistribution and its properties suggest that most eroded soil from the top slope was deposited at mid-slope and has yet to reach the bottom of the slope. We expect the field data of such kind will provide valuable information for the development, validation and calibration of practical soil erosion models.

P-RR-S-16

Sweetpotato Vine Growth Response to Prohexadione-Calcium. V. N. Njiti*, Q. Xia, L. Tyler, A. Tenner, L. Stewart, and M. Gao, Center for Biotechnology and Genomics, Alcorn State University, Alcorn State, MS 39096

The sweetpotato (*Ipomoea batatas* L.) produces excessive vines that may lower yield and increase harvest cost. Prohexadione-Ca (Pro-Ca) is a plant growth inhibitor that has been used to reduce vegetative growth in many horticulture crops without reducing yield. This study examined the effects of Pro-Ca dose rate, N, and cultivar on sweetpotato growth. An experiment was conducted to evaluate the effectiveness of five Pro-Ca rates (0, 70, 140, 210 and 280 g a.i. ha^{-1}) over two nitrogen levels (0 and 75 Kg ha^{-1}) in reducing vine growth in the cultivar O' Henry. The design was a split plot. Another experiment was conducted to determine the effectiveness of Pro-Ca applied at the dose rate of 140g a.i. ha^{-1} in reducing vine growth in the cultivars, O' Henry and SC1149 over N rates of 0, 75 and 150 Kg ha^{-1}. Data indicated that the 140 g a.i. ha^{-1} treatments achieved close to the same amount of growth reduction that was reported for other field crops. Data indicated that the ability of Pro-Ca to reduce vine growth in sweetpotato was depended on the dose, cultivar and the amount of nitrogen in the soil.

P-RR-S-17

Quantifying Soil Carbon in Ituri Forest, Democratic Republic of Congo. N. V. Nkongolo*, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101.

Carbon sequestered in vegetation and soil is very important in the removal of excess carbon in the atmosphere. However, while the quantification of vegetation C-stocks is a topic of interest, less data is available on

soil C, especially in the tropics. We evaluated soil carbon stocks (C) in the top 0-10 cm surface layer at Lenda1 - Forest Dynamic Plot in Ituri Forest, Democratic Republic of Congo. Soil samples were collected along a 20 m x 20 m grid in 10,000 m^2 plot. Samples were air-dried and brought to the United States (Harvard Forest) for analysis of soil total carbon and other nutrients. Soil carbon was calculated using both traditional and GIS based approaches. Results showed that the 0-10 soil surface layer sequesters between 2,000 to 4,000 tons C/ha. Further studies are needed for a full assessment of soil carbon in different horizons of this soil (20-30 cm).

P-RR-S-18

Selected Characteristics of Biochar from Different Feedstock and Pyrolysis Process. A. Hass[1], J. M. Gonzalez[2], I. M. Lima[3], A. A. Boateng[4], D. Patel*[1], J. F. Lamb[5], W. F. Anderson[6], and N. O. Nelson[7], [1]Agricultural and Environmental Research Station, West Virginia State University, Institute, WV 25112; [2]USDA-ARS, Appalachian Farming System Research Center, Beaver, WV 25813; [3]Commodity Utilization Research Group, USDA-ARS-SRRC, New Orleans, LA 70124; [4]Crop Conversion Science and Engineering Research Unit, USDA-ARS-ERRC, Wyndmoor, PA 19038**;** [5]USDA-ARS, Plant Science Research Unit, St. Paul, MN 55108**;** [6]USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793; and [7]Department of Agronomy, Kansas State University, Manhattan, KS 66506.

Pyrolysis process is one of the technologies used to convert biomass to energy. During the process up to 40% of the initial biomass is recovered as biochar, the coproduct of the process. Feedstock composition and chemistry is altered during the process, rendering its components (e.g. carbon, nutrients) less biodegradable and available. The biochar co-product can be used as a soil additive to overcome soil limitation, providing constructive use for the byproduct. The quality of the biochar as soil amendment and its environmental impact are likely to depend on feedstock source and processing conditions. We evaluated the characteristics of biochar from chicken litter and from plant residue processed under different conditions. Chicken litter was processed in slow pyrolysis at 350 and 700 ºC. Chicken litter from additional source, and alfalfa stem, bamboo, *Miscanthus*, and sorghum plant material were processed in fast pyrolysis at 450-500 ºC. Subsamples of all biochars were further steam-activated at 800 ºC. Biochars were analyzed for total elemental analysis, $CaCO_3$ equivalent (CCE), mineralogical composition, FTIR spectra, and for water, Mehlich-3, and Synthetic Precipitation Leaching Procedure (SPLP; EPA Method 1312) extractable elements. Biochar CCE increased with temperature, and with steam activation. Activation resulted in overall increase in macro- and micro- nutrients content, while decreasing their Mehlich-3 content. Element solubility was feedstock, process and element dependent. The results of the study suggest that feedstock and pyrolysis processes markedly affect biochar properties. Management practices needs to be further refined in order to assure agronomically beneficial and environmentally safe use of biochar in soil.

P-RR-S-19

Land, Labor, and Energy Efficiency of Alterative Biofuel Feedstock Crops at Three Farm Scales. M. K. Bomford, and A. F. Silvernail*, Community Research Service, Kentucky State University, Frankfort, KY 40601.

Sweet sorghum (*Sorghum bicolor* L.) and sweet potato (*Ipomoea batatas* L.) are promising crops for advanced biofuel production because they may be better suited than corn (*Zea mays* L.) to low input production on small farms in Kentucky. A four-year study was initiated on organic land in 2008 to measure land, labor and energy efficiency of these crops at three production scales: 1) BioIntensive (BI), relying entirely on hand tools; 2) Market Garden (MG), relying on no machinery larger than a walk-behind tractor; and 3) Small Farm (SF), relying on 4-wheeled tractors and smaller equipment. Land use efficiency was higher in SF than BI plots in 2008, but no farm scale effect was observed in 2009. Labor efficiency was highest in SF and lowest in BI plots in 2008 and 2009. BI plots were more energy efficient than SF plots in 2009 only. When scale effects were observed, MG plots were between SF and BI. Sweet sorghum gave the greatest return to land, labor and energy across production scales and years. Small-scale, low-input production of biofuel feedstock crops may be more energy efficient than large-scale production, but offers a poor return to labor. A small farmer's decision to dedicate a portion of yield to on-farm biofuel production is more likely to be motivated by concern about self-sufficiency, resource-cycling, or waste reduction than economics. Sweet sorghum shows greater potential than corn or sweet potato as a biofuel feedstock crop for small-scale, low-input production in Kentucky.

P-RR-S-20

Anaerobic Digester Metagenome Reveals Microbial Community Structure and Genetic Potential. A. M. Smith*[1], and D. H. Huber[1, 2], [1]Gus R. Douglass Land-Grant Institute, and [2]Department of Biology, West Virginia State University, Institute, WV 25112.

Anaerobic digestion is an effective method for reduction of organic waste related pollution while providing

a sustainable means of bioenergy production. Although anaerobic digestion technologies have been in development for over a century, much of the microbial diversity responsible remains unknown. Even less well known is the genetic potential of these engineered microbial communities. The goals of this study were to characterize the microbial community structure as well as the genetic potential of the microbial community involved in the thermophilic anaerobic digestion of poultry farm waste. These objectives were accomplished by total community genomic DNA pyrosequencing. Comparison of the 16S rDNA fragments retrieved from the metagenome to the RDP database indicates that the bacterial community is dominated by Firmicutes (40%), Proteobacteria (23%), and unclassified Bacteria (22%). Metabolic analysis by the MG-RAST server revealed an abundance of gene clusters of unknown function within the "Carbohydrates" metabolic subsystem. This subsystem is otherwise dominated by functional gene clusters involved in the metabolism of mono-, di-, and oligosaccharides. Among the most abundant of these is xylose utilization (26% of the monosaccharide subsystem), L-arabinose utilization (19% of the monosaccharide subsystem) and maltose and maltodextrin utilization (38% of the di- and oligosaccharide subsystem). Recruitment plot comparison of the digester metagenome to the whole genomes of known organisms revealed that *Clostridium thermocellum* ATCC 27405 and *C. phytofermentans* ISDg had the highest levels of mapped fragments (18% and 5% of classifiable fragments, respectively). Both *C. thermocellum* and *C. phytofermentans* are important organisms for biofuel production due to their cellulolytic capabilities. The abundance of fragments that map to these genomes indicates the presence of microbes with similar potential metabolic functions.

P-RR-S-21

Pest and Beneficial Insects Associated with Bionergy Crops in North Alabama. R. Ward*, and E. Cebert, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

Several crops are being evaluated for their potential as feedstock for biofuel production at Alabama A&M University's Winfred Thomas Agricultural Research Station. These include canola (*Brassica napus*), sweet sorghum (*Sorghum bicolor*), jatropha (*Jatropha curcas*), castor bean (*Ricinus communis*), sweet potato (*Ipomoea batatas*) and pearl millet (*Pennisetum glaucum*). Several pest and beneficial insect species have been observed to forage on these various plant species. This paper reports the temporal distribution of some major insect species associated with bioenergy crops under study.

P-RR-S-22

Quantification of TNT, RDX, HMX and Their Metabolites in Soils and Plant Tissues by Gas Chromatography-Mass Spectrometry and High Performance Liquid Chromatography-Mass Spectrometry. J. Yang*[1], C. H. Lin[2], N. Leigh[3], and R. Lerch[4], [1]Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101; [2]Center for Agroforestry, University of Missouri, Columbia, MO 65211; [3]Department of Chemistry, University of Missouri, Columbia, MO 65211; and [4]USDA-ARS Cropping Systems and Water Quality Research Unit, Columbia, MO 65211.

Military munitions explosives TNT (2,4.6-trinitrotoluene), RDX (1,3,5-hexahydro-1,3,5-trinitrotriazine) and HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine) have been widely used in the military operations. The contamination of soils and groundwater by such explosives and their degradates have raised public health concerns. Many of the explosives and their degradative products such as N-nitroso RDX and nitroamines have been reported as potent carcinogens. A sensitive, selective and fast multi-residue analytical method with simple sample preparation is required to study the fate of these compounds in the environment. Multi-residual analytical methods using direct solvent extraction followed by gas chromatography-IonTrap mass spectrometry (GC-MS) or high performance liquid chromatography- quadrupole mass spectrometry (HPLC-MS) were developed for quantifying these explosives and their eleven degradative products in soils and plant tissues. The developed methods offer sub-ppb detection limit with extraction efficiency greater than 90%, which have been successfully utilized to study the fate of these compounds in the rhizospheres environments.

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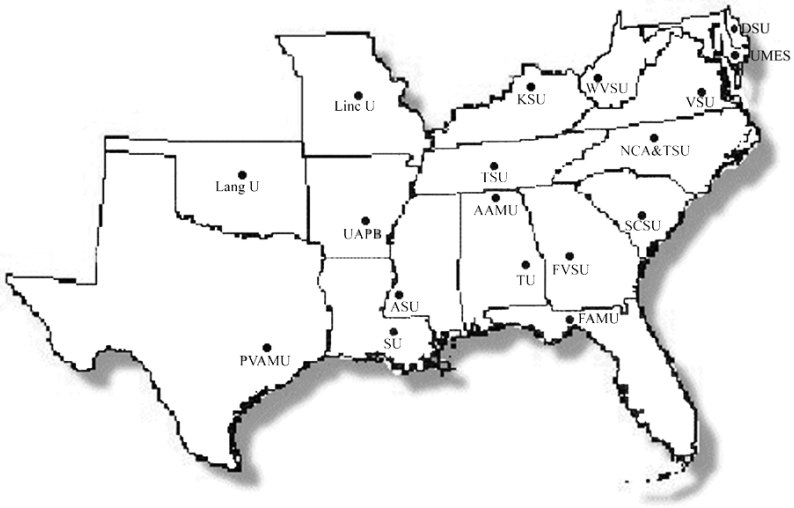

Abstracts of Sustainable Plant and Animal Production Systems Papers

Undergraduate Students (21)

O-SP-U-1

Performance and Gastrointestinal Parasite Control by Small Ruminants Grazing Forages Containing Condensed Tannins. E. A. Backes*, T. R. Higgins, H. A. Swartz, A. N. V. Stewart, B. C. Shanks, and J. D. Caldwell, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Gastrointestinal parasites, especially *Haemonchus contortus*, are a serious economic restriction affecting the sheep and goat industry in the United States. Traditionally, gastrointestinal parasites have been controlled through commercial anthelmintics. However, recent concerns about the development of anthelmintic resistance in parasite populations have been reported. One solution to this problem is to use natural anthelmintics such as those containing condensed tannins. Our objective was to determine performance and gastrointestinal parasite control by small ruminants grazing condensed tannin-containing forages (CTCF), including chicory (*Chichorium intybus*) and ragweed (*Ambrosia artemisiifolia*). Meat-type kids and crossbred lambs were grazed on pasture containing CTCF and mixed grasses, or tall fescue [*Lolium arundinaceum* (Schreb.) Darbysh]. Pastures were divided into two 0.4-ha paddocks per treatment with six lambs and nine kids each. Animals were weighed and samples [fecal egg counts (FEC), packed cell volume (PCV), and FAMACHA© scores] were collected at the beginning, middle, and end of a four-wk grazing period. Beginning, middle and end body weight, and beginning PCV were greater ($P < 0.05$) from lambs compared with kids. Beginning, middle, and end FAMACHA© scores, and beginning FEC were greater ($P < 0.05$) from kids compared with lambs. A treatment × species interaction ($P < 0.05$) was detected for average daily gain, total gain, middle and end PCV, and middle and end FEC. Fecal egg count change tended ($P = 0.10$) to be effected by treatment and species. Therefore, grazing condensed tannin-containing forages may impact animal performance and parasite control across species.

O-SP-U-2

Genetic Diversity in Kentucky Pawpaw Populations Using DNA Markers. Y. Banda*, J. D. Lowe, K. W. Pomper, L. Lu, and S. B. Crabtree, Land Grant Program, Kentucky State University, Atwood Research Facility, Frankfort, KY 40601-2355.

Pawpaw [*Asimina triloba* (L.) Dunal] is a native tree-fruit that is found in the forest understory of Kentucky. The fruit has a tropical-like flavor similar to a blend of banana-mango-pineapple and is emerging as a new fruit crop. Kentucky State University (KSU) in Frankfort, KY is the site for the USDA National Clonal Germplasm Repository for pawpaw species, containing over 2000 accessions from 17 different states. Repository research priorities include evaluation and collection of unique pawpaw selections, or genotypes, for preservation and use in breeding efforts. The objective of this study is to evaluate genetic diversity using the Simple Sequence Repeat (SSR) marker system with five pawpaw populations including one population at the Salato Wildlife Center in Frankfort, three populations at the KSU Environmental Education Center in Henry County, and a Kentucky population of trees grown from seed from trees in Fayette County. Leaves from 20 trees were sampled from each population and DNA extracted using the DNAMITE Plant Kit. Primers B3, B103, and B129 were labeled with FAM and used to amplify PCR-SSR products which were then separated with a 3130 Applied Biosystems capillary electrophoresis system. Genetic relationships were determined using the software program Power Marker. Primers B3, B103, and B129 generated multiple polymorphic alleles at each locus, which ranged from approximately 100 to 350 base pairs in size. SSR markers generated showed significant genetic variation among the pawpaw populations, indicating these unique populations should be sampled and incorporated into the KSU germplasm collection.

O-SP-U-3

Screening of Field and Heirloom Tomato Varieties for Pathogen Resistance Using CAPS Markers. D. W. Bright*, H. M. Cavender, J. M. Sisson, and B. E. Liedl, Gus R. Douglass Land-Grant Institute, Agricultural and Environmental Research Station, West Virginia State University, Institute, WV 25112.

Twenty-six selected heirloom and field tomato varieties were screened for fungal, bacterial, and viral pathogen resistance using CAPS markers for known function genes. CAPS markers, Pto, ANTL, C3, and TR2, for pathogen resistance were used in the screenings. The first objective of this project was to determine which, if any, of the twenty-six varieties have markers indicating resistance to these pathogens. The second objective of this project was to further expand the West Virginia State University database that is being used in the development of protected culture tomato cultivars with improved traits, such as ones with pathogenic resistance. Details on the CAPs markers were obtained from Sol Genomics Network (SGN) including primer sequences, restriction enzymes and the

expected restriction products. Each marker was amplified from DNA of the cultivars using PCR. The PCR products were digested with the appropriate restriction enzyme prior to electrophoresis. The size of the restriction products was determined on an agarose gel by comparison to a molecular size standard and compared to anticipated results from SGN. The band number and size of each band was entered into the WVSU marker database. One cultivar was found to have the allele for resistance at the C3 marker for Tomato Leaf Curl Virus. Two other cultivars were found to have the resistance allele at the TR2 marker for *Fusarium oxysporum.* Markers for these resistances can now be utilized in the breeding program to develop cultivars with these resistances, while preserving other desirable traits.

O-SP-U-4

Determinants of the Adoption of Integrated Pest Management Programs among Delaware and Maryland Minority Farmers. K. Brown*, and S. L. Tubene, Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Traditionally, minority farmers have not fully participated in state and federal agricultural programs for several reasons, including lack of information, lack of interest, program irrelevancy, and lack of resources. While most established farmers rely on integrated pest management (IPM) and related farm services delivered by Cooperative Extension Service to make informed decisions and improve the viability of their farms, minority farmers use their personal relations and networks to access agricultural information. Nevertheless, targeted federal programs such as Outreach for Socially Disadvantaged Farmers and Ranchers have provided needed technical assistance to minority farmers. This project seeks to identify potential factors affecting the use of IPM practices among minority farmers on Delaware's and Maryland's Eastern Shore. A survey of these minority farmers was conducted in collaboration with the University of Maryland Eastern Shore and Delaware State University extension offices. An econometric *Tobit* model was used to test the statistical significance of factors affecting the adoption of IPM practices. These factors are farmers' characteristics—including gender, age, and educational level—annual gross income, farm ownership, risk factors, and production practices.

O-SP-U-5

Effects of Feeding Regimen on Growth, Survival and Proximate Composition of Fingerling Northern Bluegill, *Lepomis macrochirus*, Reared in a Recirculating Aquaculture System. J. E. Callaway*, and J. E. Wetzel, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Developing bluegill, *Lepomis macrochirus*, as a food-fish is limited by growth rates and production cost. Automated feeders (i.e. belt feeder) could reduce labor investment taking advantage of the bluegill's natural feeding habits. Herein, we compare feeding regimens of twice daily, continuous 12-h and 24-h in respect to growth, survival, feed conversion, body composition and relate to feeding costs. Commercial hatchery produced bluegill were acclimated for 14 days to a recirculating aquaculture system with twelve 794-L tanks. Initial numbers of fish (weight = 6.8 g) were adjusted to 200/tank with 75 fish randomly selected from the population for length, weight and proximate composition. Randomly assigned feeding regimens were represented by four tanks per treatment. Twice daily treatment was applied by hand to apparent satiation and continuous feedings by belt feeders with either 12 or 24h timers. Regimens based on 7-day cycle with feeding withheld day one and the p.m. of day seven. Feed intakes were adjusted based on apparent feeding activity on days two through five. Total weights of fish/tank were determined at 28-d intervals throughout 128-d trial. Pellet sizes were adjusted to compensate for growth. At trial's end, fish were weighed in mass with samples of 50 fish per tank euthanized, measured for individual length, weight, weight on the round, visceral somatic index and liver somatic index. A sub-sample of 10 fish was analyzed for fillet proximate composition. Twenty-four hour automated feeders resulted in best production characteristics with significant differences from twice daily ($P < 0.05$).

O-SP-U-6

Effect of Rumen By-Pass Fat Supplementation on Milk Composition of Hair Sheep Ewes. A. P. Clary*[1], E. J. Chozu[1], S. Wildeus[1], and S. S. Zeng[2], [1]Agricultural Research Station, Virginia State University, Petersburg, VA 23806; and [2]E (Kika) de la Garza American Institute for Goat Research, Langston University, Langston, OK 73050.

Supplementation with rumen by-pass fat increases the energy density of diets without reducing forage intake, and is commonly used in dairy cows. In dairy ewes by-pass fat increased milk fat content while decreasing protein content, but there is no such information on its use in hair sheep ewes managed under an accelerated mating. In this experiment Barbados Blackbelly and St. Croix ewes (n = 84) were managed as one group during pregnancy, and lambed unassisted on pasture. As ewes lambed they were allocated, blocked by breed, to be supplemented at 1.5% body weight with cracked corn and soybean meal (16% CP) mixed either without or with rumen by-pass fat

(Megalac-R; 150 g/ewe/d). Within seven days after lambing ewes were transferred together with their lamb(s) to one of six experimental 0.4 ha pastures (three pasture replications each for the two treatment groups). Milk samples were collected from ewes at 7-8 weeks post partum by manually stripping teats after lambs had been separated for 2 h. Milk composition was determined by an infrared milk analyzer, and analyzed for the effect of diet, breed, and number of lambs nursing. Rumen by-pass fat supplementation had no effect on milk fat, but significantly reduced protein, lactose, solids-not-fat and total solids. There was no effect of breed on milk composition, but lactose was significantly higher in ewes nursing single compared to twin lambs. The increase in milk fat by rumen by-pass fat feeding in dairy sheep was not observed in the hair sheep here.

O-SP-U-7

Response of *Solanum retroflexum* Dun. to Organic and Inorganic Sources of N, P, and K. A. Faison*[1], and L. K. Rutto[2], [1]School of Agriculture and Human Ecology, and [2]Agriculture Research Station, Virginia State University, Petersburg, VA 23806.

Solanum retroflexum, commonly known as "Sunberry" or "Wonderberry", is one of a complex of nightshades cultivated for food and medicine in Africa and parts of Asia. It is a fast growing species with potential as a niche crop in the eastern US where there is growing demand from ethnic populations. Preliminary studies show that *S. retroflexum* is more responsive to organic as compared with inorganic sources of elements essential for plant growth. In a greenhouse pot experiment, *S. retroflexum* plants fertilized with pelleted poultry litter had higher leaf area and biomass than those treated with similar levels of mineral fertilizer. We will report results from a more detailed study to compare growth, chlorophyll, biomass, and nutritive values of *S. retroflexum* fertilized with either organic or inorganic fertilizer.

O-SP-U-8

Usage of Cellulase and Xylanase Alone or in Combination Improves Digestibility of Dietary Fiber. A. J. Goode*, and A. Woldehebriel, Department of Animal Sciences, North Carolina A&T State University, Greensboro, NC 27411

The purpose of this study is to examine the effects of cellulase and xylanase enzymes incorporated into a high fiber diet on improving the digestibility of fiber in pigs. Our hypothesis is that enzymes added to a high fiber diet will encourage digestability of fiber on account of an enzyme's natural ability to break down complex compounds such as fiber. A lab analysis was conducted to determine the optimum enzyme concentration required to yield effective results. The experimental diets consisted of a control (C), and an antibiotic-free high-fiber (HF) diet. The HF diet consists of oats and barley (2:1) as partial replacements to corn and as sources of fiber. Samples from both diets were sprayed with cellulase (Ce) alone, xylanase (Xy) alone, and Ce plus Xy (CX) in 1:10, 1:20 and 1:80 (v/v) dilutions in D-water. The fiber content before and after enzyme treatment of each sample was determined using an ANKOM fiber digester. The results show a significant reduction in fiber content after enzyme treatment. The untreated and enzyme-treated control diet yielded 8.22% and 6.22% fiber, respectively, resulting in a 24.33% improvement in fiber digestion. Likewise, the fiber content of the high-fiber diet was reduced from 16.31% to 11.66% with 28.51% improvement in fiber digestion. Each enzyme alone or in combination improved the digestibility of the fiber in the diet.

O-SP-U-9

HB-EGF Expression is Modulated by Progesterone and Estrogen in RL95-2 Cells. C. Johnson*[1], G. Regisford[1], J. Stone[2], C. Kelly-Brown[2], and L. Carson[2], [1]Department of Biology, and [2]Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Abnormal embryo implantation can lead to early pregnancy failure or pregnancy associated complications. Factors such as estrogen (E_2), progesterone (P_4) and Heparin Binding Epidermal Growth Factor (HB-EGF), have been implicated in regulating this all important event. Therefore, we examined the effect of pregnancy associated steroids, E_2 and P_4, on HB-EGF expression, since they are important regulators in the process of embryo implantation. We hypothesized that the expression of HB-EGF, under ovarian hormone regulation, will be upregulated in RL95-2 cells, a human uterine epithelial cell line. RL95-2 cells were cultured in charcoal-treated serum and then treated in triplicate with (1) $10^{-8}E_2$, (2) $10^{-6}P_4$, (3) $10^{-8}E_2$ and $10^{-6}P_4$ for a period of four days and (4) $10^{-6}E_2$ for two days followed by $10^{-8}P_4$ for a period of four days. Cells were then harvested, total protein extracted and the expression of HB-EGF in E_2-and P_4-treated RL95-2 cells was determined by Western blot analysis. The expression of HB-EGF was significantly upregulated in E_2-treated cells. HB-EGF expression was further increased in P_4-treated cells. However, there was no synergistic effect of E_2 and P_4 on HB-EGF expression, although HB-EGF expression increased significantly in cells that were primed with E_2 and then treated with P_4. Our data established

that HB-EGF expression is modulated by both E_2 and P_4 and these hormones may interact with HB-EGF to promote embryo implantation.

O-SP-U-10

Influences of Synthetic Peptide *D4E1* on Phosphodiesterase Activity. J. Keith*, L. J. Odom, and R. O. Ankumah, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

Cotton Seedling Disease is a fungal complex that results in millions of dollars of revenue loss per year. There are no known cultivars that show resistance to Cotton Seedling Disease. Previous research has shown that *D4E1,* a synthetic antimicrobial peptide, is able to control the disease *in vitro* and in-plants. *D4E1* transformed into cotton seeds have been shown to have promise in controlling cotton seedling disease, however, the potential impact on non-target organisms which play a fundamental role in crop residue degradation and soil in biogeochemical cycles have not been evaluated. The objective of this study is to evaluate the effect of *D4E1* on phosphodiesterase enzyme activity. Three 150 x 150 ft test plots, over two field seasons, were arranged in a completely randomized design and were assigned either one of three lines of cotton seed transformed with D4E1 (designated 357, 358, and 373), a control line containing a GUS marker gene, or a non-transgenic control consisting of the parent variety. Soil samples were collected from the treatment plots, composited and tested for phosphodiesterase enzyme activity. Phosphodiesterase activity was measured using the method described by Tabatabi and Bremner. No significant difference was observed in the phosphodiesterase activity between the control and the treatments containing the synthetic peptide *D4E1*.

O-SP-U-11

Antioxidants Content of Hot Pepper from the USDA National Collection. M. Johnson*[1], E. T. Turley[1], G. F. Antonious[1], T. S. Kochhar[2], and R. L. Jarret[3], [1]Land Grant Program, Department of Plant and Soil Science, and [2]Department of Biology, Kentucky State University, Frankfort, KY 40601; and [3]USDA/ARS Plant Genetic Resources Conservation Unit, Griffin, GA 30223.

The search for beneficial phytochemicals is growing worldwide. Phenols, ascorbic acid, capsaicin, and â-carotene are some of the several classes of naturally occurring compounds having antioxidants activity. Seeds of several accessions (genotypes) of hot pepper (*Capsicum chinense*) were collected from Belize, Brazil, Colombia, Ecuador, Mexico, Peru, Puerto Rico, and United States. Seeds were field grown in a silty-loam soil. Mature fruits of hot pepper were analyzed for capsaicin, ascorbic acid, â-carotene and phenol contents, which are important antioxidants of a number of benefits for human health. The main objective of this investigation was to select candidate accessions of hot pepper having high concentrations of these phytochemicals for use as parents in breeding for these antioxidant compounds. Fruits of C. *chinense* accessions PI-640900 (USA) contained the greatest concentration of capsaicin (1.52 mg g^{-1} fresh fruit) and dihydrocapsaicin (1.16 mg g^{-1} fresh fruit), while total major capsaicinoids (capsaicin and dihydrocapsaicin) in the fruits of PI-438648 (Mexico) averaged 2 mg g^{-1} fresh fruit. PI-152452 (Brazil) and PI-360726 (Ecuador) contained the greatest concentrations of ascorbic acid (1.2 and 1.1 mg g^{-1} fresh fruit, respectively), while PI-438648 (Mexico) contained the greatest concentration of total phenols content (349 µg g^{-1} fresh fruit). PI-355817 from Ecuador contained the greatest concentration of â-carotene among the other 63 accessions tested. These selected accessions were identified as potential candidates for use in hot pepper breeding programs and for mass production of fruits with value-added traits.

O-SP-U-12

Consumer Perception of Genetically Modified Food Products Risks: Survey Results from the 2010 Agricultural Exposition. D. Menefee*, M. Ibrahim, and J. Whitehead, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Food biotechnology has yielded a variety of products with nutritional, environmental and other economic benefits. Although such benefits are manifest, there is still some skepticism associated with Genetically Modified (GM) animals that are destined for human consumption. It is amazing that the debate still rages as more and more GM or food with GM ingredients are available in food stores. Through a survey instrument, this study explores consumer risk perception associated with GM foods, specifically introducing transgenic Salmon into the market. The first part of the survey elicited information on knowledge about transgenesis, whether or not consumers read labels when shopping, and their perception of risk. Additionally, respondents were asked questions pertaining to trust in scientists, federal government and biotechnology industry experts to do what is right from a societal perspective when it comes to animal biotechnology. In addition, the survey collected data on demographic variables such as age, gender, and level of education, race, as well as religious and political affiliations. The study used a

probit model to analyze the genetically modified foods risk perceptions. Preliminary results shows that only race appear to influence consumer risk perception. This study may be useful to policy-makers and the biotech industry in developing appropriate private and public strategies and policies relating to food biotechnology.

O-SP-U-13

Evaluation of a New High Protein Distillers Grains with Solubles for Inclusion in Diets for Channel Catfish, *Ictalurus punctatus*. L. Pires*, S. D. Coyle, L. A. Bright, and J. H. Tidwell, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Channel catfish (*Ictalurus punctatus*) remains the nation's largest aquaculture industry. However, high feed prices have negatively impacted profitability. Increased demand for corn for ethanol has increased grain prices. Ethanol companies have developed modified processes to enhance ethanol yield. These modified processes also increase the crude protein content of distiller's grains (DDGS). However, the lysine content is not increased in this product. This new protein product should be evaluated for its suitability in catfish diets. Twenty-five full-sibling channel catfish (7 g) were randomly stocked into twelve 260-liter polyethylene tanks. There were three replicate tanks per diet. The Control diet was similar to a commercial formulation. Experimental diets contained either 20% DDGS, 40% DDGS, or 40% DDGS with added lysine. Fish were fed to apparent satiation twice daily for nine weeks. Average harvest weights for fish fed the 40% DDGS diet without lysine supplementation (57.0 g) were significantly ($P<0.05$) smaller than the Control diet (77.7 g). Average harvest weights were significantly higher ($P<0.05$) for fish fed 20% DDGS (86.8 g) than for fish fed either 40% DDGS (57.0 g) or 40% DDGS+Lys (73.7 g). There were no significant differences ($P>0.05$) in feed conversion ratios or survivals between treatments which overall averaged 1.1 and 99%, respectively. These data indicate a 10% growth improvement by addition of 20% DDGS over the Control diet. Since added lysine restored performance to Control level, the 40% DDGS diet was likely limiting in lysine.

O-SP-U-14

Evaluation of Eight Cultivars and Two Plant Types on Growth and Yield of Southern Blueberries *(Vaccinium* spp.). S. Sangster*, B. R. Phills, G. Umar, G. Hawkins, and S. Leong, Center for Viticulture and Small Fruit Research, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32317.

Blueberries are one of the most nutritious fruits on the market. Blueberries are high in anthocyanins, and other antioxidant pigments and various photochemicals that may play a role in reducing risks of certain diseases to include certain cancers. Because of the highly desirable chemical properties of blueberries couple with their ability to be grown on small acreages, they are ideally suited for small farming. The purpose of this study is to evaluate varietal differences within and among two different blueberry species. In this study, we evaluated four varieties of highbush (Oneal, Sharp Blue, Pamlico, and Legacy); and four varieties of Rabbiteye (Climax, Bright Well, Power Blue, and Premier) for plant height, foliage density, number of shoots/plant, and average number of fruits plant. Data were taken prior to fruiting, during fruiting and after fruiting to determine the overall effect of fruiting on the growth and healthiness of the variety. Results of data showed that varieties differed greatly within and among plant types. In general, the Rabbiteye species performed best as a plant type in terms of growth factors and yielding potential. Brightwell was the best performer regardless of plant type. However, the Highbush species were earlier in all cases by at least two weeks. This is extremely important to the small farmer who is anxious to get his fruit to the market ahead of those farmers who are looking for higher yields and best quality. Further evaluations are needed to determine possible differences in organoleptic properties.

O-SP-U-15

The Size Relationship of 12-Day, Post-Exodus Larvae with 56-Day, Post-Exodus Fingerlings Regarding Growth, Total Length, Weight and Survival in Bluegill, *Lepomis macrochirus*. J. L. Schulte*, J. E. Wetzel, and J. Hayes, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Low survival and quality of early life-stage bluegill is an obstacle to viable production. Size and deformities may influence weaning efficiency. Herein, we investigate effects of apparent size at 12-d post-exodus and feeding regime quality through 12-d post-exodus on total length, weight and survival at 56-d post-exodus. Full sibling broods (trial 1=10, trial 2=6) were reared with hourly feedings of brine shrimp (BS) from 0800 to 1700 through 12-d post-exodus. Entire broods of trial 1 were reared through 12 d in a single tank/brood while trial 2 broods were split 4 day post-conception into two lots of 400 pro-larvae/brood with one lot fed two nocturnal feedings and the other was offered no nocturnal feedings. Trial 1 fry were sorted into small and large size classes of

>125 individuals per class. Trial 2 fry were randomly selected such that equal numbers represented each lot of a brood. Starting day 14 ending day 21, co-feedings of BS and formulated feed (FF) were applied, followed by FF only through 56-d post-exodus. BS during co-feeding was 0800 – 1700 for trial 1 and with 2 nocturnal feedings for trial 2. Day 56 post-exodus, fish were harvested, euthanized, measured for length/weight. Trial 1 portions of broods starting small at 12-d were found to be smaller at 56-d post-exodus in terms of length/weight ($p < 0.05$). Survival was different as a function of initial size with larger size class having higher survival at the end of trial ($p < 0.05$). Trial 2 is ongoing.

O-SP-U-16

Using Magnetically-Based Wireless Fencing for Containment of Goats in a Rotational-Grazing Situation. M. J. Singer*, B. C. Shanks, J. D. Caldwell, M. D. Schulte, and A. N. V. Stewart, Cooperative Research Programs, Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Goats (*Capra hircus*) can efficiently convert low-value feedstuffs into meat, milk, fiber, and are useful for biological management practices such as control of brush, weeds, and minimizing fire hazards through fuel load reduction. However, methods used to contain goats are costly and sometimes ineffective. Our objective was to contain goats in a rotational-grazing situation without traditional fencing by utilizing the Petsafe® Wireless Pet Containment System (PWS). The PWS was designed to contain pets to a given area by using electric shock collars. Six meat-type goats (25.2 ± 1.1 kg) were selected randomly, fitted with PWS collars, and placed in an approximately 120 m² paddock. Goats were monitored five times per d, starting at 0900 on September 28, 2010, and rotated through four equally sized paddocks over an 18-d period. Goats were trained with a structural fence for a total of five d during the first and second rotations. Goats tended ($P = 0.06$) to increase BW from the beginning to the end of the trial, spent more ($P < 0.05$) time grazing vs. not grazing, and were contained ($P < 0.05$) in the grazing area by the PWS. Therefore, the PWS may be an effective method to contain goats in a rotational-grazing situation, without negatively impacting grazing time.

O-SP-U-17

Bone Morphogenetic Protein 6 Expression and Function in Ovarian Granulosa Cells in Laying Hens. S. I. Smith*[1,2], and A. L. Johnson[1], [1]Summer Research Opportunity Program, Poultry Reproduction Laboratory, The Pennsylvania State University, State College, PA, 16802; and [2]North Carolina A&T State University, Greensboro, NC 27411.

Prior to follicular selection into the preovulatory hierarchy of laying hens, granulosa cells of the pre-hierarchal follicles are undifferentiated. The central hypothesis was Bone Morphogenetic Protein 6 (BMP6) causes inhibition of the follicle stimulating hormone receptor (FSHr). The main objectives of this study were to determine: if BMP6 is expressed in prehierarchal follicles granulosa and/or theca cells, the cell signaling pathway, and the effect of BMP6 on the FSHr. Prehierarchal follicles were collected from six 41-50 week old Leghorn Hens and cultured for three hours. The cells were treated with FSH, transforming growth factor beta (TGFβ) and/or BMP6, then cultured for an additional 24 hours. Cellular ribonucleic acid (RNA) were analyzed by quantitative polymerase chain reaction (qPCR) for FSHr, and an Enzyme-linked immunosorbent assay (ELISA); used to measure progesterone production. BMP 6 has been shown to be expressed in the prehierarchal and preovulatory follicles in the granulosa and theca cells. However, the expression of BMP6 was decreased between the prehierarchal and preovulatory follicles of the granulosa cells. The decrease in expression of BMP6 between these two follicles suggests that BMP6 does have some effect on the FSHr. Our research has also shown that BMP6 induced phosphorylation of SMAD 1/5/8 (a protein modulates the activity of TGFβ ligands), which is similar to the mammalian cell signaling pathway. Contrary to our original hypothesis, results from preliminary experiments suggest that BMP6, alone and combined with TGFβ and FSH, promotes FSHr receptor expression.

O-SP-U-18

Developing a Mass-Trapping System for Sustainable Management of Cucumber Beetles. T. G. Vehige*, J. C. Piñero, and S. Gu, Cooperative Research and Extension Programs and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Cucumber beetles (Coleoptera: Chrysomelidae) are the most important insect pests of cucurbits in most areas of the United States, including the central Midwest. Adult beetles transmit bacterial wilt and other diseases, and they also cause direct damage by feeding on roots, stems, leaves, and fruits. In Missouri, current control strategies of spotted [*Diabrotica undecimpunctata howardii* (Barber)] and striped [*Acalymma vittata* (Fabricius)] cucumber beetles include in-furrow applications of systemic insecticides at planting and foliar sprays later in the season, resulting in rising costs, environmental concerns, and the potential for developing insecticide resistance.

This study was aimed at investigating and integrating key visual and olfactory elements of beetle behavior to develop a mass trapping system that could be used in combination with other Integrated Pest Management (IPM) tactics for effective management of cucumber beetles by small, limited-resource farmers. The specific objectives were (1) to evaluate various commercially available lures for attractiveness to cucumber beetles, and (2) to compare the effectiveness of the most attractive lure(s) identified with various commercial and home-made trapping devices. Combined results from various field tests conducted at Lincoln University Carver Farm indicate that particular combinations of lures and traps are effective at trapping cucumber beetles and thus there is the potential of using mass trapping as part of an environmentally-friendly, sustainable IPM approach for cucumber beetle management.

O-SP-U-19

Effect of BA and Ferrous Sulfate/Chelate Solution on *in vitro* Propagation of Raspberry (*Rubus* spp.). R. Volcy***,** G. Umar, B. Beltinor, S. Sangster, G. Hawkins, and B. R. Phills, Small Fruit Lab, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

In vitro propagation of raspberries offers opportunities for increasing disease free plant material for successful multiplication. The pathogenic status of explants for *in vitro* culture is often unknown, but may play an important role in micro-propagation. Many raspberry cultivars are susceptible to several diseases in the field. A study was conducted to identify desirable plant tissue *viz*., clone apical or axillary bud and desirable concentration of Murashige and Skoog (MS) media to generate unproblematic and faster shoot initiation. Genotypic response for shoot initiation, shoot length and shoot multiplication was different among media formulations. Different concentrations of BA 1mg/mL (2, 4, 5, 6, 8 and 10 mL/L) for shoot induction and proliferation were studied with MS Basal Medium with Vitamins at 5.7 pH and 30 g/L of sugar and 2.5 grams of Gellan gum powder. Best shoot initiation occurred on MS medium with 8 ml/L BA from both apical and axillary buds. The micro cuttings were subcultures on the same MS media with 5mL/L for best shoot multiplication. Further, the plants showing discoloration (yellow spots) were corrected by adding 10mL/L of Ferrous Sulfate EDTA/ Chelate Solution to MS basal salts medium. The above experiment showed very positive results and healthy plants. Future research is in progress to identify different concentration of Indole-3-Acetic Acid (IAA) for root initiation and GA^3 for shoot elongation of raspberry *in vitro* cultures. Additional advancement in tissue culture techniques will give commercial growers of Southeast US the security of continued profits and quality raspberry products.

O-SP-U-20

Growth Comparison in Northern Bluegill, *Lepomis macrochirus macrochirus,* from Different Localities in a Commercial Recirculation System. T. S. Wieberg*, J. L. Schulte, J. E. Callaway, J. T. Edwards, and J. E. Wetzel, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Poor growth and feed conversion ratio are often problems of northern bluegill, *Lepomis macrochirus macrochirus*, aquaculture production. Stock source could be an important consideration. Herein, we compare bluegill stock sources over two sequential trials as wild-caught P1 adult and F1 juveniles. P1's were acquired from three locations (Mobile River drainage, AL; Bull Shoals Lake, MO; and Niobrara drainage, NE). Trial 1 fish were marked with passive implantable transponders, measured for length and weight before stocking into six 378-L raceways of a recirculating aquaculture system (RAS) such that each raceway had similar number of fish/source. Throughout the growth trial (duration 140-d), feeding occurred twice daily except Sunday when feed was withheld. Bluegill lengths and weights were determined at the end of the trial. Trial 2 P1's were in four breeding groups and conditioned for single matings in 794-L tanks. Four F1 broods / source were reared in isolation within the same tanks. Stocking densities were standardized with samples taken from each brood at exodus (day 1), day 14, day 21 and day 84. Randomly selected individuals (n = 10 / brood) were measured for length and weight. At the end of trial 2, fish were enumerated for estimate of survival and determination of feed conversion ratio. Trial 1 results indicate P1 northern bluegill collected from Bull Shoals Lake, MO exhibited the greatest increase in length and weight, therefore, this population, used as wild caught animals, is most suited for production in a RAS. Results concerning F1 performance will be presented.

O-SP-U-21

Effects of Source of Saturated Oils and Curing Time on pH, Hardness and Moisture of Goat Milk Soap. H. Williams*, R. Drake, R. Ragan, J. H. Lee, and B. Kouakou, Agricultural Research Station, Fort Valley State

University, Fort Valley, GA 31030.

Milk-based soaps made by cold process are getting more popular with small scale producers and consumers of natural products. Due to the ease of raising dairy goats and natural properties of goat milk, goat milk-based soaps could be a value-added product for dairy goat farmers. The main ingredients consist of vegetable oils, goat milk, sodium hydroxide (lye), and essential oils. The quality of the finished soap is mainly affected by the properties of the different vegetable oils. Three batches of goat milk soaps differing in the source/amount of saturated fats (palm oil, coconut oil or vegetable shortening) were manufactured at the Georgia Small Ruminant Research and Extension Center. The physical hardness, pH, and moisture content were determined over time (d1, d7, d14, d21). Results indicate that soap made from palm oil was harder and had higher pH than soaps made from shortening, followed by coconut oil, but the type of oil did not affect moisture content. Hardness was not consistent over time, but pH decreased from d1 to d14 and remained similar until d21, while moisture was higher at d1 compared to d7 and d14. These results suggest that goat milk-based soap is ready for use 14 d after production.

Graduate Students (26)

O-SP-G-1

Characterization of Effluents from Commercial Baitfish Holding Facilities. P. L. Adhikari*, N. Stone, A. Kelly, and H. Thomforde, Aquaculture/Fisheries Center**,** University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

The farm-gate value of U.S. baitfish production is approximately $40.3 million, and Arkansas is the leading producer of farm-raised baitfish. Baitfish farmers hold fish in vats for 2-4 days without feeding while fish are acclimatized to vat conditions and graded, before shipment to market. This study characterized the seasonal, daily, and hourly variation in the effluents from baitfish holding facilities. Daily (0500 to 1700 h) variation in the concentrations of various effluent parameters were measured on two farms at 3-h intervals on 4 days over a week period. Hourly effluent samples were also collected from one farm during the day within the same period. In addition, single grab samples of both source and effluent were collected from 10 commercial baitfish holding facilities. Total ammonia nitrogen, total nitrogen, total phosphorus, soluble reactive phosphorus, total suspended solids, biochemical oxygen demand, chemical oxygen demand, conductivity, temperature, pH, dissolved oxygen, alkalinity, hardness were measured and discharge was calculated. Effluent characteristics varied during the day and over the week, as fish were harvested, held and sent to market. Concentrations of all the water quality parameters were below the standards set by the Arkansas Pollution Control and Ecology Commission. Results from this study provide baseline information on nutrient concentrations and other water quality parameters in the effluents discharged from baitfish holding facilities.

O-SP-G-2

Genotypic and Physiological Evaluation of Gladiolus Varieties for Flower Production in Southeast Arkansas. L. L. Anderson*, and S. Islam, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

The plant genus *Gladiolus* is a member of the family Iridaceae. The flowers come in numerous colors such as white, pink, red, purple, yellow, orange, salmon, and even green. Several bi-color flowers can be recognized. Since cut-flower production is an important agribusiness, and *Gladiolus* flowers are always in high demand worldwide, we decided to evaluate available species for survival and performance in the Southeast Arkansas conditions. Five selected genotypes of Gladiolus bulbs were used in this study namely Red Flair, Ice Cap, Plum Tart, Pink Event, and Violet. The studies were conducted for two years such as from March 2009 to late July 2009 and then again from March 2010 to July 2010. The corms were germinated in four-inch bulb pot. Upon emergence of spike the corms were transplanted at the horticultural research farm of University of Arkansas at Pine Bluff. The experimental plots were set at 40 feet wide by 60 feet long. Bulbs were planted six inches deep, with a spacing of seven inches apart. The horticultural and physiological data were collected as needed and when found necessary. The experiments were conducted in Randomized Complete Block Design (for field study) and Complete Random Design (for flower vase life study) with three replications. The spikes were observed in the three different carbohydrate solutions such as sucrose, fructose, and glucose. The spikes were placed in 5, 10, and 15 mg concentrations of each solution, respectively, and observed at the time intervals of 10, 20, 40 and 60 minutes to evaluate the effect of carbohydrates on the flower vase life. These cultivars produced data suitable to develop profitable genotypes for the Southeast Arkansas region. Furthermore, the cut flower production can help local growers maximize profit and plan for market dates. Therefore, results of this study suggest that planting *Gladiolus*

species for floral production could be a profitable agribusiness in the Southeast Arkansas Delta.

O-SP-G-3

Furazolidone-Induced Cardiomyopathy in Broiler Chickens. T. Boatswain*, and S. Nahashon, Department of Agricultural Sciences, Tennessee State University, Nashville, TN 37209.

Dilated Cardiomyopathy (DCM) is a heart disease associated with rapid growth, high metabolic processes and mortality in poultry. Little is known of the causes of DCM in chickens (*Gallus domesticus*). Hence, the objective of this study was to develop a model for future studies of DCM in chickens. Broiler males (n=280) were individually weighed and randomly assigned to experimental diets containing 0, 200, 400, 500, 600 and 700 parts per million (ppm) furazolidone. The diets comprised 3,200 and 3,275 kcal ME/kg, and 20 and 23% CP at 0-3 and 4-8 weeks of age (WOA), respectively. The diets were replicated four times, and feed and water were provided at free choice. Mortality was recorded as it occurred and body weights (BW) and feed consumption (FC) were measured weekly. At 8 WOA, blood serum was obtained from 20% of birds from each treatment and analyzed for metabolic profiles. The birds were sacrificed and heart, liver, spleen, gall bladder and abdominal fat (AF) were excised and weighed. Feeding 200-700 ppm furazolidone did not change FC, BW gain, feed conversion ratios and organ weights of broilers. However, weight of AF was lower ($P<0.05$) and the hearts exhibited dilated left ventricular chambers in birds fed furazolidone at 500-700 ppm. Serum glutamic oxaloacetic transaminase was elevated while glucose and bilirubin levels were decreased in birds fed diets containing furazolidone. These changes in morphology of the heart and metabolic indices are associated with DCM; hence the condition was successfully induced in broilers by feeding 500-700 ppm furazolidone.

O-SP-G-4

Genetic Diversity and Geographic Differentiation in Pawpaw Populations from Six States as Revealed by DNA Markers. J. B. Botkins*, J. D. Lowe, K. W. Pomper, L. Lu, and S. B. Crabtree, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

The North American pawpaw [*Asimina triloba* (L.) Dunal] is a tree-fruit that is a native understory tree in the eastern portion of the United States that is in the early stages of commercial production. Kentucky State University (KSU) in Frankfort, Kentucky is the site for the USDA National Clonal Germplasm Repository for pawpaw species, containing over 2000 accessions from 17 different states. Research priorities for the repository include assessment of genetic diversity and collection of unique pawpaw genotypes. The objective of this study is to evaluate the genetic diversity in six pawpaw populations in the KSU-USDA repository orchard (IN-1, IN-2, KY, MD, NY, and WV). These populations will include 10 trees from Washington Co., IN (IN-1), 8 trees from Decatur Co., IN (IN-2), 23 trees from Tompkins Co., NY, 13 trees from Tyler Co., WV, 14 trees from Talbot Co., MD, and 21 trees from Fayette Co., KY. DNA was extracted using the DNAMITE Plant Kit from leaf samples collected from trees in each population. Primers B3, B103, B129, and G119 labeled with FAM were used to amplify SSR products, and products were separated with a 3130 Applied Biosystems capillary electrophoresis system. Genetic relationships among the pawpaw populations were examined using the software program Power Marker. The SSR markers generated showed significant genetic variation among the pawpaw populations and a number of unique genotypes in the populations should be sampled and incorporated into the KSU germplasm collection.

O-SP-G-5

Response of Corn and Mustard Greens to Nature's Fluid and Synthetic Fertilizers. C. Butler*, J. Danzy, Y. Ghebreiyessus, and A. Williams, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Although there are many organic fertilizers in the market, their effectiveness is not well documented for organic farmers to make informed cost and benefit decisions. One new organic fertilizer is the Nature's Fluid (0.0098% for N, 0.0044% for P, and 0.0099% for K). A greenhouse study was conducted to evaluate its effect on plant growth and to compare it with synthetic fertilizer. A randomized complete block design with five treatments and four replications was conducted. The treatments were: control (no fertilizer), 66, 132 and 264 ml of Natures fluid (NF) and 2 gm of NH_4NO_3 +8-24-24 fertilizers per pot. Corn and mustard were planted in one-gallon pots. Soil used was sandy loam and measurements were taken every week. Growth measurements taken included: plant height, chlorophyll and biomass contents. Perfect germination and healthy green plants were observed in the first week. After two weeks some insect damage was observed and NF and control treatments showed highly visible nutrient deficiency symptoms in both crops. Mean plant height and chlorophyll contents were highly significant between the organic and synthetic fertilizers. The mean plant height and chlorophyll measurements of the synthetic fertilizer were more than twice that of NF treatments. Plant height range was 34 to 85 cm and chlorophyll content was 6.5 to

33.5 Spad. Biomass data and root length measurements are in progress. More study is needed to evaluate NF fertilizer for conclusive results.

O-SP-G-6

Studies Related to Establishment of Pigeonpea as an Alternate Crop in Virginia. G. F. Chappell III*, and H. L. Bhardwaj, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

It is well established that requirements for establishment of a new and alternative crop include feasibility of production, existence of an economical system of production, and profitable marketing. Pigeonpea (*Cajanus cajan* L. Millsp), an important food crop on a worldwide basis, is being studied in the Southern United States for its potential. We conducted several studies to support establishment of pigeonpea in Virginia. A replicated field experiment, conducted with four cultivars, planted on three dates with three intra-row plant populations, indicated that pigeonpea harvested at approximately 80 DAP yielded 20909, 17065, and 10334 pounds of fresh forage per acre when planted May 21, June 11, and July 12, respectively during 2010. Intra-row plant population didn't affect forage yield whereas significant forage yield differences existed among four cultivars. Crude protein, ADF, NDF, TDN, fat, P, and Ca contents (Expressed as percent based on dry weight basis) in pigeonpea forage were 18.5, 35.7, 41.4, 62.0, 3.4, 0.2, and 0.8, respectively. We have demonstrated that green pigeonpea yields can be up to 6000 pounds per acre with shelling percent of approximately 50 percent. We are currently conducting nutritional quality analyses of green immature pigeonpea seeds. During 2010, a production field was planted for pick-your-own beans. This effort was quite successful indicating potential of marketing. Detailed results of these and other experiments, including those related to Biological N Fixation, will be presented and discussed.

O-SP-G-7

Efficacy of a Native Bee for Pollination of Eastern Orchards. M. A. Cutter*, and M. E. Kraemer, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

The blue orchard bee, *Osmia lignaria* Say, has been shown to be an excellent pollinator of tree fruits in western North America. A subspecies of this bee is widespread in eastern North America and is believed to be similarly effective in pollinating apples, cherries, and other fruits. However, previous attempts to use this bee for pollination in eastern orchards were not successful. This could be due to differences in behavior of the bee subspecies, or the more humid and forested eastern environment. The objective of this research was to evaluate the nesting behavior and pollen preferences of these bees in several commercial orchards, to better develop management techniques for this bee. Several hundred bees were released in artificial nest shelters at multiple locations within and near two apple orchards. Bee nesting activity was recorded weekly at each site from late March to early May. After nesting was completed, the nests were removed and pollen from individual nest cells was sampled. Pollen was cleaned of nectar compounds and prepared for analysis using a scanning electron microscope. A pollen stub was created for each nest cell and sputter coated with heavy metal. At least 300 pollen grains were randomly selected and identified to plant species on each stub. The results indicated the relative preference of these bees for pollen from both orchard and native plants. One native tree, the Eastern Redbud (*Cercis canadensis* L.) was shown to be of particular importance to bee establishment and orchard pollination.

O-SP-G-8

Separating Self-Incompatibility from Self-Compatibility in Cultivated Tomato, *Solanum lycopersicum*, and a Wild Species, *S. pennellii*. H. L. Dalton II*, H. M. Cavender, J. M. Sisson, and B. E. Liedl, Gus R. Douglass Land-Grant Institute, Agricultural and Environmental Research Station, West Virginia State University, Institute, WV 25112.

Wild relatives are a rich source of genetic variation; however, crossing barriers impede the transfer of desirable traits to cultivated plants. Self-incompatibility (SI), an intraspecific crossing barrier promoting outcrossing, is genetically controlled by the *S* gene. Plants without a functional SI system are termed self-compatible (SC) and are considered to have an inoperative *S* gene. Our study compared the *S* gene in SC lines (cultivated tomato and *S. pennellii* accessions) to SI lines (*S. pennellii* accessions). DNA was extracted from fourteen lines including SC tomato variety VFT Vender, SC *S. pennellii* accessions LA716 and LA2963 to compare to SI accessions of *S. pennellii*. PCR was performed using degenerate primers based on the *S* gene of *S. chacoense*. The PCR product consisted of several bands, which were ligated with a vector followed by chemical transformation of competent cells. White colonies were selected and plasmid DNA was extracted. Plasmid DNA from each transformant was digested with the BstXI, to check the size of the insert into the vector. Thirty-one clones with 400-600 bp inserts were identified for sequencing analysis. The SC *S. lycopersicum* varieties had several fragments, but a 600 bp

fragment amplified, which is 100 bases larger than the gene in *S. chacoense*. SI and SC *S. pennellii* accessions had inserts approximately 450 bp. This suggests there is more than one way to create SC in a species and tomato has the potential to answer questions regarding how SC arose and understand of how SC interacts with other reproductive barriers.

O-SP-G-9

Using Variable Rate Seeding to Maximize Corn Yield and Profit on a Field with Management Zones. X. Henry*[1], A. Nagchaudhuri[2], and M. Mitra[3], [1]Department of Agriculture, Food, and Resource Sciences; [2]Department of Engineering & Aviation Sciences; and [3]Department of Natural Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Precision agriculture (PA) allows farmers to make marked improvements in efficiency, profitability, and sustainability. Yield monitoring (a major component of PA) allows for unprecedented insight into spatial yield variations experienced within a field. In fact, normalizing several seasons of yield data helps one identify areas that can be individually managed depending on yield potential (management zones). So far, management zone (MZ) research has been limited to in-season chemical applications, although benefits are possible in other aspects of PA. In fact, its use in variable rate seeding (VRS) exhibits great potential. The traditional approach of uniform rate seeding (URS) in fields with uneven yield potential has led to reduced efficiency and adverse environmental effects. Three previously identified MZs within a field were seeded with corn at three population densities. The leaf area index height and relative greenness were monitored for seven weeks and analyzed by ANOVA to identify differences existing between treatments. Aerial images were also captured to provide normalized difference vegetative index information as another measure of crop vigor. Seed, fertilizer costs, and harvest price were used to calculate the subsequent efficiency of each treatment. The results of the trial indicated that VRS based on MZs provided marginally better returns for farmers than URS under similar conditions. However, better results may be anticipated with appropriate irrigation, since during the project period the area experienced subpar rainfall.

O-SP-G-10

Synergistic Effects of Organic Selenium and Zinc Single and Combined on Fertility and Hatchability. K. Hickerson*, M. Thornton, and V. G. Stanley, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

A study was conducted to examine the single and combined effects of organic Selenium (Se) and Zinc (Zn) on fertility and hatchability of exotic birds. Forty hens and four males were randomly separated into four treatment groups; Group 1, the Control fed diet with no supplements; Group 2, with 0.33 ppm of Zn; Group 3, with 0.33 ppm of Zn and Group 4 with the combined treatment of Se and Zn. The duration of the study was 11 days. Data were collected on egg production, % fertility, and hatchability, early and late embryonic mortality. Results show that there were no statistical differences among the groups. However, there were numerical differences, as the combined treatment of Se and Zn exceeded the other groups. Fertility and hatchability improved greatly with the combined treatment of Se and Zn. Eggs produced from the Zn-treated hens had the lowest late embryonic mortality. In conclusion, the positive interactions observed, indicated that there is great benefit from the combination of Se and Zn in improving fertility and hatchability.

O-SP-G-11

Developing Aquaculture Methods for *Fundulus heteroclitus*: Broodstock Management and Hatchery Techniques. C. R. Janiak*, and D. McIntosh, Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901.

Mummichogs, *Fundulus heteroclitis*, are one of the most utilized marine baitfish along the Atlantic Coast of the United States. The overlap in seasonal availability of mummichogs with the recreational fishing season is short, leaving a marine baitfish deficit for a large portion of the sport fishing season. Furthermore, the only means of providing mummichog as live bait is from wild harvest. As with any commercially harvested fish species, there lies the potential of population depletion due to fishing pressure. In light of both of these factors, we have evaluated the aquaculture potential of mummichogs and consider this species to be an ideal candidate for the Mid Atlantic. We are currently developing aquaculture methods for producing mummichogs to alleviate the environmental pressure of fishing on wild populations and to meet the demands of recreational anglers along the Atlantic coastline. The focus of these studies will concentrate on broodstock management and hatchery techniques.

O-SP-G-12

Effect of Sun and Shade Conditions on Distribution and Herbivory Activity of a Biological Control Agent of TSA, *Gratiana boliviana* (Coleoptera: Chrysomelidae). E. Kariuki*[1], R. L. Hix[1], S. Reitz[2], and S. Hight[2], [1]Center for Biological Control, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307; and [2]USDA-ARS, CMAVE, Tallahassee, FL 32308.

Tropical soda apple (TSA) *Solanum viarum* Dunal (Solanales: Solanaceae) is an invasive perennial weed species invading the rangeland and agricultural fields of Florida and other southeastern states. This weed invades low input agroecosystems, where conventional weed control programs such as use of herbicides and mowing are not economically feasible acting as a reservoir for crop pathogens and insect pests. TSA control efforts in Florida and other southeastern states have been directed towards use of a biological control agent, *Gratiana boliviana* Spaeth, a beetle that was first approved for release by USDA in 2003. This study was undertaken to evaluate how sun and shaded conditions affects the effectiveness of *G. boliviana* as a biological control agent of TSA. Field surveys were conducted at a *G. boliviana* release site in Madison County, FL. Sampling of TSA plants was done in 3 different dates in the fall of 2009. Beetle density for both larval and adult stages of *G. boliviana* on TSA plants in unshaded, partially shaded and shaded areas were evaluated, and densities were significantly higher on TSA in unshaded areas of the ranch than on the ones in shaded areas. Significantly more feeding damage was caused by the beetle on TSA across the three light intensity levels with significantly more damage on TSA in unshaded areas than on the ones in shaded areas. The results from this study suggest that this biological control agent provides better control on unshaded plants than on shaded plants.

O-SP-G-13

Antimicrobial Activities of Different Strains of Shiitake Mushroom (*Lentinula edodes*). H. Kaur*[1], L. M. Nyochembeng[1], S. R. Mentreddy[1], and P. Banerjee[2], [1]Department of Natural Resources and Environmental Sciences, and [2]Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762

In recent years, organic farming has become one of the fastest growing segments of agriculture in the United States. Plant disease management in such sustainable crop production systems is an important challenge for growers. Of the many tactics considered, biological control remains the requisite strategy to mitigate specific devastating pest problems in this system. This study was conducted to determine the antimicrobial potential of *Lentinula edodes* mycelial culture fluid. Fifteen shiitake strains were obtained from American Type Culture Collection (ATCC) and maintained in the laboratory on the YVMBSA media. Mycelia-derived culture fluid obtained by growing the strains in liquid culture media in 250 ml Erlenmeyer flasks under submerged conditions was harvested after 30 days of fermentation at 25˚C and 250 rpm. The culture fluid was passed through 0.45 µm syringe filters and tested *in vitro* on overnight cultures of *Xanthomonas campestris* pv *vesicatoria*, the cause of bacterial spot of pepper and tomato. High and low controls were 100 ppm streptomycin and bacteria alone respectively. *L. edodes* culture fluid from all fifteen strains successfully inhibited the growth of bacteria. Our results suggest that shiitake mycelia produce potent antimicrobial compound/compounds that can potentially be used as biopesticide to control bacterial diseases in plants. Further work will involve isolating and quantifying the active compounds involved.

O-SP-G-14

Cost Benefit Analysis of Alternative Crop Production for Rural Communities. R. Levochkin*, and M. R. Silitonga, Department of Agriculture, Mississippi River Research Center, Alcorn State University, MS 39096.

Sustainable crop production requires practices that incorporate finding a balance between social economics in maximizing profitability while minimizing adverse impact to the environment. Profitable production requires adequate nutrients in the soil. Insufficient nutrients will lower yields while excessive nutrients will lower profit margins and may adversely affect the environment through nutrients leaching into the soil subsurface. The purpose of the study is to determine the profitability of onion (*Vidali* sp.) as an alternative crop that minimizes pollution into the ground water. Data on current alternative crops for this study include cost of production, yield, and field experiments. Five different varieties of onions (*Vidalia* sp.) were planted on Natchez silt loam soil at Alcorn State University Experiment Station in Lorman, MS. The area consists of five rows of till and five rows of no-till plots. Soil samples were collected every four weeks during the growing season. The soil samples were collected from the field at depths 15, 30, and 45 cm, consecutively. These samples were tested for routine analysis and nitrate-nitrogen in the soil profile. Regression analysis will be used to evaluate the impacts of different practices on the harvested yield.

O-SP-G-15

Characterizing Insect Pest Problems and Farmer Decision Making in Crucifer Crops in Low-Input and Organic Farming Systems in North Florida. K. M. Lewis*, and M. T. K. Kairo, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Center for Biological Control, Tallahassee, FL 32307.

A good knowledge of pest problems and how farmer perceive and manage them is vital in order to develop effective integrated pest management (IPM) programs. The pest scenario is continuously changing as new invasive pests emerge, or changing crop practices lead to evolution of new ones. As part of the efforts to support development of IPM programs for small scale vegetable producers in North Florida, a study was conducted with a view to identify the major pest problems and constraints to their management. The study comprised of two interrelated components. First the occurrence and relative abundance of insect pests on two crucifer vegetables, collard greens and lettuce were quantified in several season-long crop monitoring studies on two low input, and two organic farms from summer 2008 to fall 2009. Sampling of the crop commenced from the initial seedling stage to harvesting at weekly intervals. The second component comprised of a questionnaire survey of small-scale farmers in North Florida and South Georgia. Data collected from season long studies showed that the key pests in these crucifer crops were whiteflies *(Bemisia argentifolii),* aphids (*Bervicoryne brassica),* and diamond back moth (*Plutella xylostella*). Data further suggested that most farmers within the study based most of their decision making with respect to production practices and pest management on data from Extension personnel, universities and co-op meetings.

O-SP-G-16

Activities of Copper Based Nanoparticles against Plant Pathogenic Fungus: *Bipolaris sorokiniana.* Y. Li*[1], Y. Qi[1], K. Lian[2], D. Collins[1], and Q. Wu[3], [1]Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813; [2]Center for Advanced Microstructure and Devices, Louisiana State University, Baton Rouge LA 70806; and [3]Louisiana State University Agricultural Center, Baton Rouge, LA 70803.

Antifungal activities of carbon-copper core-shell nanoparticles (CCCSNs), copper-gold nanoparticles (Cu-Au-Nps), copper-silver nanoparticles (Cu-Ag-Nps), cupric oxide (CuO), cuprous oxide (Cu_2O) and their mode of action against plant-pathogenic fungus, *Bipolaris sorokiniana,* were investigated in this study. The pure culture of the fungus was inoculated onto potato dextrose agar media in Petri-dishes treated with the CCCSNs, Cu-Au-Nps, Cu-Ag-Nps, CuO and Cu_2O at concentrations of 0 (control), 0.1, 1 and 5g/L, with three replications per treatment. Mycelial growth was imaged daily for 11 days and quantified using NIH Image (ImageJ 1.43u). *B. sorokiniana* growth was reduced by all the chemical treatments. The reduction varied with treatments and concentrations. Compared to the control at the end of 11 days, the CCCSNs treatment inhibited fungal growth by 81% at 0.1g/L, and 99% at 1g/L, and 100% at 5g/L. The Cu-Ag-Nps inhibited growth by 83% at 0.1g/L, 98% at 1g/L, and 100% at 5g/L. The Cu-Au-Nps inhibited growth by 76% at 0.1g/L, 84% at 1g/L, and 99% at 5g/L. In contrast, the Cu_2O treatment inhibited growth by 81% at 0.1g/L, 90% at 1g/L, and 99% at 5g/L, and the CuO treatment inhibited the growth by 74%, 83%, and 88% at 0.1g/L, 1g/L and 5g/L, respectively. The inhibitory effects on the fungal spore germination were studied using a compound microscope. This study suggests that the copper based nanoparticles are as effective as the bulk chemicals in controlling this pathogen, making them a potential new antifungal system. The CCCSNs and Cu-Ag-Nps are the most effective among the three nanoparticles.

O-SP-G-17

Cloning of a Soybean Sodium-Proton Antiporter and its Role in Abiotic Stress Tolerance. C. Lyle*, and S. Ren, Department of Biology, Virginia State University, Petersburg, VA 23806.

Salt stress is one of the major environmental factors that cause significant yield loss on agricultural crops. Identification of novel genes and understanding the mechanisms of how these genes regulate plant salt tolerance will help scientists to develop new strategies in engineering crops with salt tolerance. Soybean (*Glycine max* L.) is classified as a salt sensitive glycophyte. Previously, we mapped a dominant salt tolerant gene in soybean variety WF 7 to linage group N (now chromosome 3) and are flanked by SSR marker Satt 255 and SCAR marker JD33-432. Bioinformatic search identified a gene cluster that encoded three putative Na^+/H^+ antiporters near the mapped location. Here, we present the molecular cloning and characterization of one of these Na^+/H^+ antiporters (designated as *GmNHX3*), and its functional analysis in transgenic *Arabidopsis* lines carrying the *35S:GmNHX3* construct. *GmNHX3* is induced by salt treatment in soybean indicating its potential role in control of plant salt tolerance. Transgenic *Arabidopsis* lines over-expressing *GmNHX3* showed significant strong tolerance to salt stress at seedling stage. In addition, *Arabidopsis GmNHX3* over-expressed lines also improved drought tolerant ability. These results suggest a general role of *GmNHX3* in plant defending against abiotic stresses. Molecular mechanisms of how *GmNHX3* regulates plant abiotic stress tolerance are under investigation.

O-SP-G-18

Viability of SSCP Technique in Diversity Study of Resistance Gene Analogs (RGAs) in Peanut (*Arachis hypogeal* L.). I. Marong*, and G. He, Plant Genome Lab, Tuskegee University, Tuskegee, AL 36088.

Diseases cause substantial problems in crops, such as higher production cost, yield loss, and poor quality of produce. Plants acquire diseases from a wide range of pathogens including bacteria, fungi and viruses. Genetic variation of disease resistance genes within a certain crop is pre-requisite information for selection of parental genotypes in resistant breeding. In previous studies, 589 unique resistance gene analog (RGA) sequences have been identified from the NBS domain of disease resistance gene by the degenerate primer method in peanut. However, the sequence analysis showed that only single nucleotide polymorphisms (SNPs) were present in RGAs sequences from the different accessions. The single-strand conformation polymorphism (SSCP) technique facilitates rapid identification of genetic polymorphisms, including SNPs. SSCP is normally suited for PCR products between 100-300 base pairs. However, the sequences of peanut RGAs range from 400-500 base pairs. Therefore, the objective of this study was to optimize SSCP technique in various electrophoresis conditions including gel temperature, duration of electrophoresis, gel composition, and loading buffer content, to detect polymorphism of RGAs among the selected genotypes. Several peanut RGA primers were used to amplify RGAs from the selected peanut varieties. The amplified PCR products were subjected to the different electrophoresis conditions to determine the optimal SSCP protocol for peanut RGAs. The results showed that the combination of longer running time ranging from 8-12 hours, loading buffer (95% formamide, NaOH, 20mM EDTA, TBE), 10% glycerol and 12% of 29:1 acrylamide/Bis gel, and at room temperature was the best SSCP conditions for peanut RGAs.

O-SP-G-19

Evaluating the Interacting Effects of Progesterone, TNF Alpha and Cortisol on Early Loss of Transferred Embryo in Beef Cows. M. Mason[1]*, W. A. Bennett[2], E. J. Cuadra[1], J. Lopez[3], and J. Yoonsung[1], [1]Department of Agriculture, Alcorn State University, Alcorn State, MS 39096; [2]Department of Obstetrics and Gynecology, University of Mississippi Medical Center, University of Mississippi, Jackson, MS 39216; and [3]Universidad Nacional Agraria, Managua, Nicaragua.

Cows previously synchronized for estrus were assigned to two treatments to assess the effects of progesterone and its correlation with TNF alpha and cortisol on embryonic retention in cattle. On day 7 after estrus, cows in both groups received embryos, placed in the uterine horns of the ovulating side. In contrast with the control group (n = 28), animals in the CIDR-group (n = 30) had a CIDR inserted on that same day. Blood samples were taken immediately before insertion and removal of CIDR's and also on day seven after insertion. Progesterone was higher on days 7 and 14, TNF-α only on day 7 and no differences were observed in cortisol at any time in the pregnant cows compared to the non-pregnant. Treatment did not have any effect on concentrations of these; there was a trend toward higher progesterone in the control on day 7. Progesterone on day 0 was correlated to concentrations of this hormone on day 14 and to TNF-α on day 0 in the pregnant animals; in turn, TNF-α on day 0 was additionally correlated to this protein on day 7. As previously reported, high progesterone during the first 14 days after the transfer are critical to the survival of transferred embryos. It was also observed that the use of CIDR's for progesterone supplementation may suppresses luteal progesterone production. TNF-α concentration on day 7 after the transfer of embryos may be associated with the high levels of progesterone in the pregnant animals.

O-SP-G-20

Assessment of Goat Parasite Load and Control Management in Select Alabama Counties. S. Massey*, S. G. Solaiman, B. R. Min, N. Gurung, and A. W. Elliott, Tuskegee University, Tuskegee, AL 36088.

In order to integrate goats in Alabama grazing land system, more information is needed on pasture and animal management techniques. Fecal samples and management data were obtained from 13 Alabama farms in various Alabama counties including: Macon, Elmore, Lee, Chambers, Perry, Marengo, Dallas, Chilton, Shelby, Talladega, Lowndes, Butler, and Monroe. The overall stocking rates on each farm (2 goats per acre) were sufficient for less intensive management. Confinement of animals was minimal and all farms used an extensive grazing system. Anthelmintics were used in 92% of the farms and coccidiostats in only 30%. The most commonly used anthelmintic was Cydectin. 85.3 and 95.9% of the samples were positive for helminths and coccidian, respectively. Multiple helminth infections and mixed infections of *Eimeria* spp. were found in 79.7 and 97.2% of the sampled specimens. The most prevalent helminth spp. identified in goats was *Trichostongylus* spp. followed by *H. contortus* spp. *Strongyloides* spp., *Bunostomum* spp., *Moniezia* spp., *Oesophagostomum* spp., *Ostertagia* spp., and *Trichuris* spp. were also observed. Chilton, Dallas and Talladega counties showed the highest prevalence of infection with multiple helminth species. Adequate parasite control was a consistent problem on all farms and three *Eimeria* spp.

identified in this region of Alabama were severely pathogenic. Parasite resistance should increase the demand for new drug discoveries in the prevention and treatment of parasitic diseases. The farms were overall classified as moderate to poor in controlling internal parasites. Only 23% of farms had good parasite control management program.

O-SP-G-21

Comparative Botany of Roselle (*Hibiscus sabdariffa*) Accessions Grown in Louisiana. R. C. Nicholas*[1], Y. Qi[1], and K. L Chin[2], [1]Urban Forestry Program, Southern University and A&M College, Baton Rouge, LA 70813; and [2]Plant and Soil Science Department, Southern University and A&M College and Southern University Agricultural Research and Extension Center Baton Rouge, LA 70813.

Hibiscus sabdariffa goes by many common names worldwide, but in the United States of America, it is called Roselle. Roselle is an annual erect, herbaceous shrub. This plant in its entirety can be utilized for food and nutrition for human benefits. The objective of this study was to conduct a field trial in Louisiana to compare the botanical characteristics of 23 Roselle accessions collected worldwide including Cuba (2 accessions), Georgia (1), Ghana (2), India (1), Jamaica (1), Liberia (1), Malaysia (1), Nigeria (2), Poland (1), Senegal (1), South Africa (3), Sudan (3), Taiwan (1), Thailand (1), and Zambia (2). The goal is to help select accessions suitable for niche market production by small farmers and interested growers in the U.S. The field trial was conducted in 2009 growing season. The seed germination, field planting spacing, as well as cultural practices were studied. Field data collection included leaf dimensions, leaf area, leaf chlorophyll, leaf petiole, plant basal diameter, plant height and spread, flowering time, fruit production, and calyx harvest. The herbarium of the 23 Roselle accessions was completed. Each accession was described according to habit, leaves, petiole, flower/calyx, and other. All individual accessions studied proved to be similar in species, but exceptionally diverse in representation. This study gives a better understanding of characteristics of Roselle accessions that are optimal to local environment and desirable for Louisiana growers.

O-SP-G-22

Effect of Soil Organic Carbon Level on the Erodibility of a U.S. Piedmont Soil. J. S. Sedlock*[1], C. W. Raczkowski[1], G. B. Reddy[1], W. J. Busscher[2], P. J. Bauer[2], and A. J. Franzluebbers[3], [1]Department of Natural Resources, North Carolina A&T State University, Greensboro, NC 27411; [2]USDA-ARS, Florence SC 29501; and [3]USDA-ARS, Watkinsville, GA 30677.

Intensive soil cultivation and high soil erosion has impoverished levels of soil organic carbon (SOC) in the southeastern U.S. Piedmont region. Sound soil management practices that build SOC levels are needed to reduce soil erodibility and restore soil quality. We studied the relationship of SOM content and soil erodibility using a Piedmont soil that has been managed for seven years using key management practices, including winter cover cropping, the application of compost and the use of no tillage. The soil used, Enon sandy loam (fine, mixed, thermic, Ultic Hapludalf), was collected in June 2010 from the following treatments in a field study that began in 2003: (1) no tillage summer vegetable planting (NT0), (2) fall applied poultry hatchery compost + winter rye-clover cover crop + no tillage summer vegetable planting (NT2), (3) summer vegetable planting after disk tillage (DT0) and, (4) fall applied poultry hatchery compost + winter rye-clover cover crop + summer vegetable planting after disk tillage (DT2). A rainfall simulator was used to apply 75 mm hr^{-1} intensity rain for 1.5 h on a 1-m^2 soil pan adjusted to a 9% gradient. Soil erodibility decreased with increasing SOC. The highest carbon level and lowest erodibity was obtained with the NT2 soil. The lowest carbon level and highest erodibility was obtained with the DT0 soil.

O-SP-G-23

Enhancing Urban Sustainability through the Application of Permaculture Principles. K. Higgs[1], A. Telligman*[1], C. Young[1], A. Sparks[1], J. Patel[1], M. Hatcher[1], A. Wofford[1], M. Reyes[1], M. Glass[1], P. Howard[1], G. Gayle[1], C. Raczkowski[1], G. B. Reddy[1], L. Jackai[1], J. Idassi[2], O. Yeboah[3], R. Coomans[4], J. Smith[5], and J. Johnson[5], [1]Department of Natural Resources and Environmental Design; [2]Cooperative Extension; [3]International Trade Center; [4]Biology Department; and [5]Facilities, North Carolina A&T State University, Greensboro, NC, 27411.

With high percentages of impervious ground cover, contaminated storm water runoff, and increasing resource consumption, urban development contributes to the degradation of the local ecosystem and also reduces the capacity of that ecosystem to remediate itself. Permaculture, which can be loosely defined as a "design system for creating sustainable human environments," is based on common observable principles found in nature. In permaculture, practitioners learn from the working systems of nature to plan to fix the damaged landscapes of human agricultural and city systems. We hope to prove that in university and K-12 campuses inclusion of permaculture will be an environmentally, socially and economically better landscaping approach than just the

current traditional systems of manicured lawns and bricks or concrete. We will use these principles to increase the overall sustainability in three campuses as a model and hopeful precursor of more sustainable practices campus-wide. We have replaced Sockwell Hall, North Carolina A&T State University lawn to a permacultured vegetable and fruit (PVF) community garden wildlife friendly habitat, which contains a rainwater harvesting and a rain garden. We are comparing PVF, manicured lawn and brick systems' water consumption, urban runoff, temperature, public acceptance, soil quality, and biodiversity; fertilizer, pesticide and energy used; and labor cost. These systems are in close proximity to Sockwell Hall. In addition we are constructing a PVF community garden rainwater harvesting-irrigation system in an elementary and a middle school campus. This paper will report the results of our experiences with PVF gardens.

O-SP-G-24

Effect of Row Covers on High Tunnel Soil Temperature. M. J. Ward*, M. K. Bomford, and A. F. Silvernail, Community Research Service, Kentucky State University, Frankfort, KY 40601.

High tunnels are simple passive solar hoop houses used to extend the growing season in soil-based production systems. The daily temperature fluctuation inside high tunnels is often greater than outside. Daytime temperatures tend to be much warmer than ambient, while nighttime temperatures approach ambient. Translucent polyester (Reemay) row covers are sometimes used inside high tunnels to moderate temperature. During spring and winter we recorded soil temperatures hourly in covered and uncovered rows of spinach, *Spinacia oleracea*; kale, *Brassica oleracea* var. *acephela*; and beet, *Beta vulgaris*. All crops were transplanted and direct seeded in high tunnel beds. Row covers moderated temperature fluctuations inside the high tunnel but did not increase yield. Early morning soil temperatures were warmer under row covers than without row covers; and afternoon temperatures were cooler.

O-SP-G-25

Optimization of Follicle Growth and Maturation Prior to Ovulation and Artificial Insemination. D. R. Washington*, K. Baker, S. Horner, B. Johnson, C. Palmer, L. Nuti, and G. Newton, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Our goal was to conduct an integrated study that evaluates the relationships between estrous synchronization protocols, follicle growth and maturation and fertility in dairy goats. Ninety normally cycling female goats were subjected to ultrasound for ten days. On the 11th day goats were randomized across three treatments. One group received no additional treatments and ultrasound continued until one complete ovarian cycle was been monitored. Two estrous synchronization protocols were also evaluated. The CIDR-PG protocol is defined by the use of a controlled internal drug release (CIDR) vaginal insert, containing progesterone, inserted for seven days with Prostaglandin F2 alpha (PG) administered at CIDR removal. The Select Synch + CIDR protocol is defined by a CIDR inserted for seven days with GnRH administered at CIDR insertion and PG administered at CIDR removal. Follicle growth and ovarian characteristics in goats in the estrous synchronization groups were also monitored and all goats were artificially inseminated at detected estrus. Ovarian follicle populations varied across the estrous cycle and were influenced by the synchronization protocols. Results of the synchronization protocols suggest a higher success rate of confirmed pregnancy for CIDR-PG synchronization when compared to Select Synch + CIDR synchronization. Estrus synchronization protocols that maximize follicle growth and maturation will increase fertility in artificial insemination programs.

O-SP-G-26

Organic Food Availability: Emerging Trends and Challenges. A. M. Watson*, and A. L. Parks, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

The U.S. Market for organic foods has grown at a phenomenal rate over the past decade. This boom in organic foods consumption has created market opportunities for retailers in particular; however, it has created market challenges for producers and suppliers. The debate about what constitutes organic is a big concern. Questions such as are organic products healthier than traditional products? Are organic products available and accessible? Is there a stable market for producers to grow and sell organic products? These are just a few questions that have emerged. There have been a number of recent studies that support the argument that organic food is no better than food grown with the use of pesticides and chemicals. This creates further uncertainty among consumers when shopping organic products. In the produce isle, for example, a consumer has a conventionally grown product in one hand and in the other hand one that is labeled organically grown. Both products are firm, shinny and colorful. Both provide essential nutrients, both are fat free, sodium free, and cholesterol free. The conventional product costs less and is a proven family favorite. But the organic product has a label that says "USDA Organic." Does that mean

it is better? Safer? More nutritious? Several differences between organic and nonorganic foods exist. This study draws upon a combination of the most recent data available as well as a survey of local produce markets to address these issues.

Scientists (41)

O-SP-S-1

A Potential Alternative Income for Small Farmers: Shiitake Mushroom Production. L. Anderson*[1], P. Igbokwe[1], J. Jackson[1], and W. Millis[2], [1]Alcorn Experiment Station, Alcorn State University, Alcorn State, MS 39096-7500; and [2]Mississippi Natural Products Association, New Hebron, MS 39140.

Shiitake mushrooms, nicknamed "the elixir of life", have many benefits to human health. They can boost the human immune system, lower cholesterol levels, and inhibit tumor growth. Shiitake also contain more protein than corn, turnips, potatoes and carrots. The market for fresh shiitake is expanding in the United States. The United States is the largest consumer of mushrooms in the world. Therefore, this consumption presents an open market opportunity for small farmers to increase their on-farm income. Shiitake is an "environmentally friendly" option for recycling low-value forest by products, such as logs and sawdust. Shiitake are grown on logs or sawdust blocks. Growing shiitake on sawdust blocks is a relatively new production method. However, log production is compatible with landowner objectives, such as timber cutting. The objectives of this project are to (1) increase underserved farmers awareness about the potential of increasing on farm income with shiitake mushroom production, (2) evaluate growth room temperature differences by shelf and grow room position, and (3) evaluate the potential of sycamore, oak, hickory, sweetgum, and popular tree species for their potential in shiitake log production.

O-SP-S-2

Composition of Whole Seed Canola. H. L. Bhardwaj*, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

No information is available about the composition of whole canola (*Brassica napus* L.) seed produced in the mid-Atlantic region of the United States. Given that whole canola seed can have potential as food and feed, we quantified contents of oil, protein, macro-nutrients (N. P, K, Ca, Mg, and S), and micro-nutrients (B, Cu, Fe, Mn, and Zn) in canola seed produced at three Virginia locations (Orange, Petersburg, and Suffolk) over two (2001-02 and 2002-03) crop seasons. Both cultivars and growing locations affected composition of whole canola seed. The protein content of whole canola seed from four cultivars varied but averaged 26.7%. The four cultivars did not differ for their oil content that averaged 39.7%. The Virginia cultivar had the highest content of calcium and copper whereas KS8227 had the highest contents of nitrogen and sulfur. It was interesting to note that contents of iron and zinc, two micro-nutrients considered deficient in human diets on a worldwide basis, were not different among the four cultivars. However, mean contents of iron (3.81 $mg.kg^{-1}$ in canola seed) was greater than that in several foods. The mean content of zinc in canola seeds (41.9 $mg.kg^{-1}$) was also greater than that in several other foods. Greater details of this study will be presented and discussed. Utilization of whole seed composition for estimating nutrient needs of canola crop will also be presented and discussed.

O-SP-S-3

pH Stress in Newly Filled Golden Shiner, *Notemigonus crysoleucas*, Ponds in Arkansas. Y. Chen*, A. Kelly, N. Stone, S. Kumaran, and P. Perschbacher, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Golden shiner, *Notemigonus crysoleucas*, is one of the most important baitfish cultured in Arkansas. Golden shiner, especially its fry, is sensitive to pH stress in ponds. Fish farmers in Arkansas usually report fish 'disappearance' in golden shiner ponds. pH could be one possible cause for the 'disappearance'. Newly filled golden shiner ponds were monitored daily (morning and afternoon) in three water layers (5cm, 20cm, and 50cm) and two pond locations (edge and center) for pH, dissolved oxygen (DO), conductivity, and temperature, calcium and total hardness (only in the 50cm layer of pond center), and bicarbonate and total alkalinity (only in the 50cm layer of pond center) during the first five days of fish stocking. During the five-day monitoring period, no pH value was over 9.5 in the monitored ponds. pH increased to over 9.0 after the 3rd day. In general, the 50 cm layer had lower pH than those in the 5cm and 20cm; pond edge tends to have higher pH than those in the center; pH increased slightly in the afternoon. The current study found that high pH may have stressed golden shiner fry slightly during the first week of stocking.

O-SP-S-4

The Economic Benefits of TSA Biological Control. N. Divate*[1], and M. Thomas[2], [1]Office of International Agricultural Programs; and [2]Agribusiness Program, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Tropical Soda Apple (*Solanum viarum*) (TSA) is an invasive exotic plant from South America that has become a weedy pest, choking pastures and afflicting Florida's beef producers. In 2007, state-wide economic losses were documented to range from $6.5 million to $16 million annually. In 2008, efforts to control TSA resulted in the release of the green tortoise beetle (*Gratiana boliviana*) (GTB) across central and southern portions of the state. Also a native of South America, the GTB is particularly fond of TSA foliage with no alternative native hosts. Initial results indicate the beetle is spreading rapidly and significantly reducing TSA density in many areas of the state. To document the economic impact of this biological control effort on cattle production, the authors are conducting a follow up survey of Florida's cattle owners. The initial results suggest that average TSA control costs are lower and cattle producers have noticed a significant reduction in TSA infestations.

O-SP-S-5

Bacterial Soft Rot Disease: Identification of the Players Involved in *Pectobacterium*-Host Interactions. C. K. Dumenyo*, C. M. Kersey, P. A. Agyemang, and B. H. Hageman, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

Soft rot disease inflicts considerable damage to crops in storage and in the field resulting in substantial losses to farmers. The disease is caused by bacterial pathogens in the family Enterobacteriaceae in the genera *Pectobacterium* and *Dickeya* often referred to as soft rot erwinia. The bacteria infect over 80 cultivated plant species or their products by secreting multiple isozymes of extracellular cell wall-degrading enzymes including pectate lyase, polygalacturonase, cellulase and protease and the elicitor of hypersensitive response. Virulence and exoenzyme production in soft rot erwinia is induced by yet unidentified molecules from host extracts. We have used multiple experimental approaches including forward and reverse genetics tools including random transposon and site-specific mutagenesis of bacterial genetic elements and ectopic expression of cloned genes to shed more light on the key molecular players from both host and pathogen. Working in the hypothesis that yet unidentified host genes are involved in virulence, we have used promoter-probe transposon, mini-Tn5-lacZ1 to isolate *P. carotovorum* mutants in genes which 1) are up-regulated in host extract medium, 2) are down-regulated in host extract medium, 3) up-regulate virulence factor production, and 4) down-regulate virulence factor production. Analyses of these mutants have revealed that multiple players from the pathogen are involved in soft rot disease. A screen of more than ten hosts for induction of virulence gene expression revealed many hosts produced a chemical that induces the pathogen. Put together, our data indicate soft rot disease results from a complex interplay of genetic and chemical elements from both the host and the pathogen.

O-SP-S-6

Nutrient Solution Concentration, Management, and Propagation Substrate Affects the Yield of Swiss Chard in Hydroponic Culture. J. N. Egilla*, R. Ogutu, and I. Nyirakabibi, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101.

Hydroponic nutrient solution management techniques vary across the industry. Research on appropriate nutrient solution concentrations, interactions with various cultural practices and effect on crop yield in commercial hydroponic culture is limited. We examined the influence of nutrient solution concentration (NCONC), nutrient solution management (SMGMT) and propagation substrate (SBSTR) on the marketable leaf yield of Swiss chard (*Beta vulgaris* L. cv. Lucullus) in a commercial Nutrient Film Technique (NFT) hydroponic system. Seedlings were transferred into NFT culture at the second true leaf stage in a controlled environment greenhouse with a soluble fertilizer (15N-2.2P-12K) prepared at 150 and 200 mg nitrogen L^{-1} (C_1 and C_2, respectively). The treatments comprised of two SMGMT techniques (nutrient solution renewal [RNWL]) versus replenishment [RPLN], and two propagation substrates (oasis versus rockwool cubes). At 63 days after transfer (DAT) into NFT culture, mean per plant leaf count (LC), leaf fresh weight (LFW), leaf dry weight (LDW) and leaf area (LA) were determined. Leaf count, LFW, LDW and LA were significantly ($p<0.01$) higher at C_2 than C_1 with oasis cubes, but with rockwool, NCONC had no effect on yield ($p<0.05$). Across SMGMT and NCONC, LC, LFW, LDW and LA were higher in rockwool than oasis cube. However, LC was not affected by SBSTR, and NCONC x SBSTR interaction was non-significant ($p=0.05$). All yield parameters were significantly ($p=0.05$) increased by RNWL over RPLN. In this study, nutrient renewal with rockwool substrate provided better growing conditions for optimum yield of Swiss chard in NFT hydroponic culture.

O-SP-S-7

Timing of Primocane Mowing Influences Flowering and Ripening Time in Primocane Fruiting Blackberry Selections in Kentucky. K. L. Friley*, J. D. Sedlacek, K. W. Pomper, J. D. Lowe, S. B. Crabtree, and M. K. Bomford, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Primocane fruiting blackberries, such as 'Prime-Jim®' and 'Prime-Jan®', have the potential to produce a niche-market crop for Kentucky growers from late summer until frost. However, fruit size and quality of 'Prime-Jim®' and 'Prime-Jan®' are affected by the environment. Summer temperatures above 85°F can greatly reduce fruit set, size and quality of primocanes. Strategies to delay primocane growth, such as spring mowing of primocanes, could delay flowering and fruit harvest until fall when cooler temperatures could enhance fruit set and quality. Three meter plots either of 'Prime-Jim®' or 'Prime-Jan®' were initially mowed to ground level on March 30-31, 2010. Three replicate plots of each variety were then either mowed once on May 24 or mowed on May 24 and then again on July 6. Percent flowering canes and number of ripe fruit per plot were determined weekly. Mowing in May delayed flowering by approximately 3 weeks in both 'Prime-Jim®' and 'Prime-Jan®' plants. When primocanes were mowed in March in either variety, ripe fruit production peaked between 10-15 weeks after mowing. When primocanes were mowed in May in either variety, ripe fruit production peaked between 13-18 weeks after mowing. Mowing primocanes in July for either variety delayed growth and primocanes did not flower. Extremely hot summer and fall temperatures coupled with drought conditions starting in August and extending into the fall likely negatively impacted all treatments, especially plots that were mowed in May and July.

O-SP-S-8

Comparing Fresh Market Yield of Collard Greens (*Brassica oleracea* L.) from Traditional and Non-Traditional Cultivation Techniques. C. S. Gardner*, G. L. Queeley, and B. G. Brown, Cooperative Extension Service, College of Engineering Sciences, Technology and Agriculture (CESTA), Florida A&M University, Tallahassee, FL 32307.

Collards are unique to the southeastern United States where they play a key role in traditional southern culture. A two-season study was conducted at the Florida A&M research facility at Quincy, Florida, to identify cultivation techniques that could improve crop performance. Four non-traditional cultivation techniques were compared to traditional cultivation techniques. The non-traditional techniques included double row planting patterns, drip irrigation, black plastic mulch and three fertilizer regimes of 200, 225 and 250 lbs N/acre. The traditional techniques included single row planting patterns, bare soil and the recommended rate of 175 lb N/acre. The experimental design was a randomized complete block with 3 replications. Planting dates were April 30, and October 1, 2009 with corresponding harvest dates of June 30, and December 14, respectively. The variety used was top bunch, a F1 Georgia hybrid. Data on plant height, specific weight and number of bushel crates were analyzed using least squares dummy variable (LSDV) regression. The results indicated significantly taller plants ($p < 0.05$) for double row patterns, mulched beds and fertilizer rates at 225 and 250 lbs N/acre. Irrigated plants were not significantly taller, nor heavier than non-irrigated plants. However, plants that received 250 lbs N/acre had significantly higher specific weights than those that received the traditional 175 lbs N/acre rate. Significantly more bushel crates were obtained from mulched beds, double row patterns and the 250 lb N/acre fertilizer rate. The study concluded that collard yield can be increased by using the non-traditional cultivation techniques.

O-SP-S-9

Evaluation of the Growth, Carcass Traits and Parasitic Load of Kids Produced under Mixed Species Grazing System. S. Gebrelul*, L. Gray, R. Marshall, and Y. Ghebreiyessus, Southern University Agricultural Research and Center, Baton Rouge, LA 70813.

In order to evaluate the potential of producing Selection 1 goats from pasture raised kids, 50 kids born and weaned under a mixed-species system with cattle, were randomly assigned to four treatments in a slit-plot design. The main plots were confinement and semi-confinement. Kids under confinement system were further divided into two groups and fed rations, up to ¾ kg per hd/d, which contained 13% CP or 16% CP. Kids under semi-confinement were allowed to graze on Bermuda grass pasture during the day (for 8h) and supplemented with the same experimental rations during the night. At the initiation of the study, body weights (BW), body condition scores (BCS, 1=thin, 5-fat) and FAMACHA© (FS, 1-5 system) were taken. These measurements were repeated every 14 days for 8 weeks. At the end of the study, male kids were humanely harvested at the Southern University's Meat Technology Laboratory for carcass analyses. Data were analyzed using SAS's MIXED procedure. Kids under confinement were 2.5 kg heavier and 0.2 points lower in FS than kids under semi-confinement housing. Level of CP in the diet had no effect on BW, BCS or FS. Kids that originated from pastures that were comingled with cattle had higher BW and BCS, and lower FS. BW was positively correlated to BCS but negatively correlated to FS. BCS and

FS were negatively correlated. Carcass traits were not affected by treatments. Results showed that kids raised on pastures can be confined and fed for 8 weeks to achieve selection 1 status.

O-SP-S-10

Soil and Forage Quality Changes in Joint Cattle and Goat Grazing Practices. Y. T. Ghebreiyessus*, S. Gebrelul, V. Bachireddy, M. Berhane, and R. Payne, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Animals were grazed on Bermuda grass pastures during the summer and ryegrass during the winter. In a 2x3 factorial, 100 Spanish goats and 28 Brangus cows were randomly assigned to continuous or rotational grazing systems, and three grazing schemes (goats-alone, cattle-alone and goats mixed with cattle). A forage field of 31 ha of Bermuda grass was divided into six pastures, 8 ha each for mixed-species grazing, 2 ha each for goats-alone grazing and 5.5 ha each for cattle-alone grazing. The rotational pastures were further divided, into four paddocks and each paddock was grazed for 7 days and allowed to rest for 21 days. Significant differences in soil physical properties were found between seasons, grazing schemes and grazing system by grazing scheme interactions. Only with soil permeability (0.13 to 0.70 cm/s) that grazing system showed significant differences. Mean bulk density and penetrometer reading ranges were 1.36 - 1.49 Mg/m^3 and 3.9- 5.7 revolutions, respectively. Cattle alone compacted the soil the highest. Mixed grazing seems to help more in reducing soil compaction and increasing soil permeability. In mixed species grazing, hoof action of goats may have contributed in improving surface water storage, hence higher water content and permeability. Fresh forage yield ranged from 600 to 2,359 Kg/ha. Yield differences between years and among months were highly significant but there was no significant difference between grazing systems. Forage yield in goats alone was the highest. CP ranged from 8.9 to 11.8% and ADF and NDF 31.9% to 39.1% and 47.1 to 62.2%, respectively.

O-SP-S-11

Effect of Mixed-Species and Rotational Grazing Systems on Weights, Body Condition and FAMACHA Scores in Spanish Does. L. Gray*, S. Gebrelul, Y. Ghebreiyessus, and R. Marshall, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

A total of 1999 records on weights, body condition (BCS, 1=thin, 5=fat) and FAMACHA© (FS, 1=red, 5=white) scores were analyzed to evaluate the performances of Spanish does under mixed-grazing system. Between 2008 and 2010, in a 2x2 factorial arrangement, 50 Spanish does and 14 Brangus cows were randomly assigned to continuous (CON) or rotational grazing (ROT) systems, and two grazing schemes, goats alone (GTA) or mixed with cattle (MXD). A land area of approximately 20 ha was divided into four pastures. Rotational pastures were divided into four paddocks, and each was grazed for 7d and allowed to rest for 21d. Weights were analyzed using SAS's MIXED procedure while chi-square analysis was used for BCS and FS. MXD does weighed more (43.3 vs. 39.6 kg) than GTA does. Does in CON pastures were 2.0 kg heavier than does ROT pastures. About 11% of the GTA does had BCS of 2 or less as compared to only 7.8% for the MXD does. More than 44% of the MXD does had BCS of 2.5 or more as compared to only 36% of the GTA does. Proportion of does with low or high BCS was similar in ROT and CON pastures. About 48% of the MXD does had FS of 3 or less as compared to 43% of the GTA does. Does in CON or ROT pastures were similar in FS. The results suggest that goats could graze with cattle to efficiently utilize available forage resources.

O-SP-S-12

Amaranth (*Amaranthus cruentus*) Evaluation in Southwest Mississippi. P. E. Igbokwe*, L. Anderson, A. Burks, J. Jackson, C. Campbell, and R. Sanxton, Alcorn State University, Alcorn State, MS 39096.

The genus *Amaranthus* includes frost-sensitive vegetable and grain crop species, and belongs to the family Amaranthaceae. Field experiments were used to determine the impact of three within plant spacings on the growth potential and amaranth (*Amaranthus cruentus*) quality. The study was conducted at the Alcorn Experiment Station in Lorman, Mississippi. The soil type is Memphis silt loam soil with a soil pH of 7.0 and organic matter content of 1.03%. A randomized complete block (RCB) design with four replications was used during the two growing seasons. Variations in plant growth components, yield components and overall quality were generally significant.

O-SP-S-13

Differences in Sugar Metabolic Activities during Muscadine Grape (*Vitis rotundifolia*) Ripening. D. M. Kambiranda*, H. K. N. Vasanthaiah, and S. M. Basha, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

Muscadine grapes are widely used for making wine and eaten as fresh fruit. Muscadine wine is perceived to

be inferior compared to wines made from bunch grape. One of the reasons for poor quality of muscadine wines is believed to be their sugar content and composition. Sugars are transported to the berry from leaves in the form of sucrose where it is broken down to glucose and fructose by the enzymes invertase and sucrose synthase. Any limitations in these steps can alter sugar composition, and affect berry quality. To better understand sugar metabolism in muscadine berry, changes in sugar accumulation and enzyme activities were studied during berry development. HPLC analysis of sugars revealed that glucose and fructose were present in approximately 1:1 ratio prior to maturation. In addition, with increasing berry maturation and *veraison* sucrose accumulation increased. In ripened berry, sucrose accumulation ranged between 19-30%, and glucose and fructose between 30-35% and 31-36%, respectively. In Florida hybrid bunch and bunch grapes, glucose and fructose percentage ranged between 48-50% and 49-51%, respectively throughout berry maturation and ripening. Enzyme analysis revealed that muscadine grapes contained relatively low levels of invertase and sucrose synthase activities compared to bunch grapes. These studies suggested that high sucrose content, low enzyme activities, and lower amount of glucose and fructose in berry appear to be the reasons for inferior quality of muscadine grape juice. Studies are in progress to identify differences in molecular and cellular components among the *Vitis* species to enhance quality of muscadine grape products.

O-SP-S-14

Comparative Analysis of Leaf Proteins from Selected Grape (*Vitis* spp.) Species. R. Katam*, and S. M. Basha, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Grapes (*Vitis* spp.) are commercially grown worldwide for fresh fruit and wine. The *Vitis* species differ in their sugar content and composition, photosynthetic efficiency, and tolerance to abiotic and biotic stresses. In view of the unique genetic make-up of grape species, a proteomics study was conducted to increase our knowledge of *Vitis* leaf proteome to improve the enological characteristics of Florida grapes. Mature leaf samples from three *Vitis* species were collected and analyzed by two-dimensional gel electrophoresis (2-DE). It revealed > 255 proteins with pIs between 3.5 and 8.0 and molecular weight between 12000 to 100000 Daltons. Comparative analysis of leaf protein profiles showed that 54 polypeptides varied qualitatively and quantitatively among the three *Vitis* species. Of these, seven proteins were unique to muscadine and two to FL hybrids while 28 proteins were common to all the three species, two between FL hybrids and bunch, eight between muscadine and FL hybrids and seven between bunch and FL hybrids. The differentially expressed proteins were excised from gels, subjected to in-gel trypsin digestion and analyzed by MALDI/TOF mass spectrometry. Protein identity was determined using *Viridiplantae* database employing Matrix Science algorithm. Bioinformatics analysis of these proteins showed that they are involved in signal transduction, transport of metabolites, energy metabolism, protein trafficking, photosynthesis and defense. In addition, photosynthesis-related proteins were found to be more abundant in *V. vinifera* grape compared to other *Vitis* species studied. These differences appear to contribute to the unique physiological, enological and disease tolerance characteristics of these three *Vitis* species.

O-SP-S-15

Effect of Greenhouse Temperature on Tomato Yield and Size. M. E. Kraemer*, and F. D. Favi, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

Energy costs can greatly impact profits for greenhouse vegetables grown for the late winter and spring market. Tomatoes are the major cash crop in the mid-Atlantic region. Commercial growers from Holland, Canada, and the U.S. have given conflicting advice to small family run operations in Virginia and North Carolina, with respect to best day temperatures in the greenhouse. Thus, we evaluated tomato yield in a glass greenhouse under two temperature regimes, one cool and one warm. Each of two greenhouse sections had three rows of six plants each. Tomatoes (Var. Trust) were seeded in mid-July with harvest from October into December. During the two month period of fruit harvest, night temperatures were the same in both greenhouse sections (62°F) whereas day temperatures varied with solar activity but averaged about 4°F greater in the warm section. This experiment was repeated in the second year with the locations of the warm and cool greenhouse sections switched. The results indicated total fruit yield is not reduced at the lower temperature but that ripening may be delayed. Delayed ripening may be a useful tool to manage yields to market demand, but a delay in the first harvest of the season misses a period of high prices and great demand. A practical and economical model for greenhouse temperature regulation is provided.

O-SP-S-16

Parboiled Rice Hulls Can Replace Perlite in Hydroponic Substrates. B. E. Liedl*, and J. M. Sisson, Gus R. Douglass Institute, Agricultural and Environmental Research Station, West Virginia State University, Institute, WV

25112-1000.

Substrate in hydroponic production systems has traditionally used perlite, a non-renewable resource, as a major component. Perlite is used to provide aeration and drainage and has the benefits of being sterile, a neutral pH, lightweight and disease free. The main disadvantage of perlite is that it is non-renewable and does not decompose. Parboiled rice hulls (PBH), a renewable resource from rice production, are used in substrates in the ornamental and nursery industries. However, no research exists on PBH as a replacement for perlite in hydroponic production. Our question was if PBH could be used as a replacement for perlite in a hydroponic substrate. A vertical hydroponic system with two substrates consisting of approximately 85% perlite or PBH and 15% coir was used. The first experiment had two towers with eight pots each planted with parsley, basil, peppermint, nasturtiums and pansies for each substrate. Herbs were harvested weekly and flowers were harvested when petals were open. Fresh weight and flower/stem number of the plants in each pot were weighed and counted. A second experiment using a day-neutral strawberry was run from September to June. No statistical differences were found between the two substrates for fresh weight or flower/stem number for any crop. Fresh weight per tower was 4.8 kg of basil, 3 kg of peppermint, 2.7 kg of parsley and 1.9 kg of pansies and nasturtiums over the 3 months. Strawberry production was also comparable. Thus, PBH can be used as a renewable substrate component for hydroponic production.

O-SP-S-17

Generation and Analysis of Expressed Sequence Tags from *Phaseolus vulgaris* Using Massively Parallel Pyrosequencing. Z. Liu*[1], B. C. Meyers, J. Thimmapuram, K. Melmaiee, V. Kalavacharla, and W. M. Keck[2], [1]College of Agriculture & Related Sciences, Delaware State University, Dover, DE 19901; Department of Plant & Soil Sciences and Delaware Biotechnology Institute, University of Delaware, Newark, DE 19711; and [2]Center for Comparative and Functional Genomics, University of Illinois, Urbana-Champaign, IL 61801.

Common bean (*Phaseolus vulgaris* L.) is the second most important legume crop with significant nutritional importance and provides a major source of protein for millions of people in many developing countries throughout the world. It has a relatively small genome with estimates ranging from 450 to 650 million base pairs (Mbp) and is considered as a model diploid species for soybean. Global transcriptome analysis is important to better understand gene expression, genetic variation, and gene structure annotation. However, the sequences of common bean available are very limited, which greatly limits the common bean genome research. The emergence of next generation sequencing technology has intensely promoted plant genome research, particularly for non-model plant species. In this study, we used the 454 pyrosequencing method to obtain a total of 1,692,972 reads with an average length of 207 bp. These reads were assembled into 59,295 unigenes including 39,572 contigs and 19,723 singletons, in addition to 35,328 singletons less than 100 bp. Comparing the unigenes to common bean ESTs deposited in GenBank, 31,664 (53.40%) unigenes can be considered as new common bean transcripts. Functional annotation of the unigenes was carried out by Gene Ontology assignments from hits to Arabidopsis and was indicated to cover a broad range of GO categories. In addition, large numbers of SSRs were identified in the 454 unigenes in this study. These results provide a platform for the annotation of the on-going whole genome sequencing and help in the development of molecular markers such as SSRs and SNPs.

O-SP-S-18

Feeding Natural Zooplankton to Alligator Gar, *Atractosteus spatula*, Fingerlings in Tanks. S. E. Lochmann*, L. A. Will, C. L. Williams, M. L. Warner, A. J. Williams, B. Baker, and B. A. Timmons, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Growth and survival of alligator gar, *Atractosteus spatula*, larvae fed formulated feed and wild zooplankton, formulated feed and *Artemia* nauplii, or formulated feed, *Artemia* nauplii and wild zooplankton, from 5-21 dph were examined. Alligator gar fed formulated feed alone served as a control. Larvae were stocked into 75-L tanks at 2 larvae/L. There were two replicates of each treatment and two controls in each of four recirculation systems. Larvae offered live feed were fed at a rate of 5 prey·mL^{-1}·d^{-1} of wild zooplankton or *Artemia* nauplii. Larvae fed both types of live prey were fed at a rate of 10 prey·mL^{-1}·d^{-1}. All larvae were offered formulated feed at a rate of 10% of body weight/d. At 12 dph, there was a significant difference in growth (F = 7.50, df = 31, P < 0.001), with the formulated feed and *Artemia* nauplii treatment having faster growth than the control. At 21 dph, there were significant differences in growth among treatments (F = 3.57, df = 31 P = 0.026). The formulated feed and *Artemia* nauplii treatment had a significantly higher growth rate than the other two treatments and the control. However, the growth rate of *Artemia* and feed was only 0.16 mm/d faster than the control. There were no significant differences in survival among treatments and the control. When time and costs are considered, the feed only treatment appears to be the most appropriate treatment for raising alligator gar to 21 dph.

O-SP-S-19

The Mode of Host Resistance to Forage Diseases in Muscadine Grapes (*Muscadinia rotundifolia*). J. Lu*, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

It has been well known that the muscadine grapes are highly resistant to diseases commonly found in the bunch grapes, including the downy mildew (DM) disease caused by *Plasmopara viticola* (PV). However, the mechanism of resistance is not known in *Euvitis* grape species in general, and even less so in muscadine grape. This research is therefore designed to study the mode of resistance to foliage diseases in muscadine grapes, and to understand the mechanism of host resistance in morphological, tissue, cellular and molecular level. Evaluation for several foliage diseases was conducted among the musacdine cultivars, as well as intra- and inter-specific hybrids at Florida A&M University. Based on our observation, the fungal disease resistant level of these muscadine grapes are compatible or higher than the Native North American *Euvitis* species. In order to understand the mechanism of DM resistance among the muscadine grapes, microscopy study was used to analyze the host resistance in tissue and cellular level. In the mean time, to identify genes and pathways that are involved in resistance to the grape DM disease, a gene-expression based molecular analysis was also conducted. Real Time RT-PCR was used to further confirm the putative genes in responding to the PV infection.

O-SP-S-20

Utilizing Organic Mulches for Weed Control and Nutrient Management in Organic Cropping System. R. N. Mankolo*, L. M. Nyochembeng, and S. R. Mentreddy, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

Organic crop management uses traditional farming methods and modern farming techniques without synthetic chemical inputs for crop production. In most cases, the organic production system reduces nutrients in the soil, and causes a surge in population of insect pests, diseases and noxious weeds whose control may be a tough challenge for growers if not properly managed. Among the many organic practices, mulches (plastic or organic) are increasingly being used to control weeds in organic production of vegetable crops. The objective of this study was to determine the effects of different types of organic mulches on weed populations and soil nutrient availability in a transitional organic cropping system. Field experiments were conducted in 2009 and 2010 at Alabama A&M University's Winfred Thomas Agricultural Research Station (WTARS). Four organic mulches were applied for weed control in corn and tomato production system. Weed biomass and soil samples were collected during and at the end of the growing season, respectively. There were significant differences in weed biomass and soil nutrient levels among treatments. Weed suppression and soil nutrient status were greater in the spent mushroom compost (SMC) compared to the Sudan x sorghum hybrid (SS) and SS+SMC treatments. The reduced level of weed biomass was due to the effective covering of the soil surface by the applied mulches that prevented with weed germination and emergence. Our results suggest that organic mulch is a suitable alternative to plastic mulch for sustainable weed management.

O-SP-S-21

The Control of Gastrointestinal Infections of *Haemonchus contortus* in Goats Using Mixed Grazing Systems. R. Marshall*, S. Gebrelul, and L. Gray, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

The objective of this study was to evaluate effects of mixed species grazing on fecal egg counts (FEC in epg), FAMACHA© scores (FS) and packed cell volume (% PCV) in goats. In a 2x2 factorial, 50 Spanish does and 14 Brangus cows were randomly assigned to continuous or rotational grazing systems. Goats were allowed to graze alone or mixed with cattle. The rotational pastures were divided into four paddocks and each paddock was grazed for 7d and allowed to rest for 21d. Every 28d body weight (BW), body condition scores (BCS; 1=thin and 5=fat), FS (1=red and 5=white), blood and feces were collected. Fecal and blood samples were analyzed in the lab for FEC and %PCV. Data was statistically analyzed using SAS's MIXED, and correlation coefficients were determined among the measurements. Overall means for PCV, FEC, BCS and FS were 27.4%, 612 epg, 2.3 and 2.5, respectively. PCV was positively correlated to BW and BCS, and negatively to FS and FEC. As the PCV increased, BCS increased while FS and FEC decreased. BCS was negatively correlated to FS and FEC, while FS and FEC were positive. As FS increased, so did FEC. Goats grazing alone in rotational pastures had higher PCV percentages than those in continuous pastures. Mixed goats in rotational pastures had higher PCV and lower FS than those on continuous pastures. Overall, mixed grazing of pastures with cattle and goats reduced FEC in goats therefore decreasing FAMACHA scores that resulted in increased PCV and BCS values.

O-SP-S-22

***In vitro* Shoot Organogenesis and Cell Shoot Commitment in Peanut (*Arachis hypogaea* L.) Hair-Like Structure Explant.** K. Matand*, N. Wu, and S. Conley, Center for Biotechnology Research and Education, School of Agriculture and Applied Sciences, Langston University, Langston, OK 73050.

A hair-like emergence structure forms on the young peanut plant that fades as the plant grows. This structure is inherently distinct at specific peanut plant sites, including, the rachis joint of distal (Site 1), the proximal folioles (Site 2), at the attachment of the petiole to the stem (Site 3), and at the cotyledonary nod (Site 4). Because of its potential for *in vitro* cloning and plant formation genetic studies, this work focuses on cellular manipulation of emergences for plant organogenesis as an independent explant and related shoot cell commitment. The results showed that indeed emergence tissue could be used as a reliable peanut explant for adventitious plant formation. It also showed that peanut emergence cells commit for shoot formation as early as 30 minutes after treatment with a shoot-inducing chemical.

O-SP-S-23

Identification of Molecular Markers Associated with the Rust Resistance Locus *Ur-3* in Common Bean (*Phaseolus vulgaris*). K. Melmaiee*[1], A. Todd[1], P. McClean[2], R. Lee[2], and V. Kalavacharla[1,3], [1]College of Agriculture & Related Sciences, Delaware State University, Dover, DE 19901; [2]Department of Plant Sciences, North Dakota State University, Fargo, ND 58105; and [3]Center for Integrated Biological and Environmental Research (CIBER), Delaware State University, Dover, DE 19901.

Common Bean (*Phaseolus vulgaris*) is a major source of dietary protein and fiber in the United States and throughout the world. Bean rust caused by the fungal pathogen *Uromyces appendiculatus* affects yield in susceptible cultivars. The *Ur-3* locus of common bean provides resistance to 44 of the 89 rust races curated in the United States. The resistant bean genotype Sierra, a susceptible genotype Olathe, and three susceptible mutants derived from Sierra by fast neutron bombardment were utilized in this study. Common Bean Bacterial Artificial Chromosome (BAC) libraries were screened with the molecular marker SK14 that is linked to the *Ur-3* locus. Additional molecular markers showing polymorphism between the wild type resistant parent and susceptible mutants were derived using Amplified Fragment Length polymorphism (AFLP). These AFLP markers will be hybridized to BAC libraries in order to identify corresponding large-insert clones carrying these AFLP products. These markers will also be utilized for amplification in segregating populations derived from genotypes with and without *Ur-3* in order to determine the linkage between the selected markers and the *Ur-3* locus.

O-SP-S-24

Body Conformation, Testicular Morphormetry, Carcass Traits and Serum Insulin-Like Growth - I (IGF-I) Profiles in Pubertal Male Boer Goat (*Capra hircus*) Cross. C. Okere*, L. Keith, and O. Bolden-Tiller, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088

Recent reports suggest a regulatory role for circulating insulin-like growth factor-I (IGF-I) in growth, rate of lean tissue deposition and reproductive competence in meat animal species. The relationship between phenotypic, testicular, carcass traits and serum (IGF-I) levels were studied utilizing twenty-five pubertal male Boer crosses. The following body conformation and testicular traits were evaluated: chest girth, height at withers, body length, body condition scores, body weight, scrotal weight and scrotal circumference. Blood samples were collected at 3-week intervals for 12 weeks for serum IGF-I assay using the calibrated IMMULITE 1000 technique. Animals were slaughtered to evaluate carcass composition traits (adjusted backfat, backfat, body wall fat, chilled carcass weight, hot carcass weight, dressing percent, leg circumference, and rib eye area). Serum IGF-I levels showed significant and positive correlations with body length, body weight, chest girth, height at withers, and scrotal weight. There were low but negative correlations between IGF-I and testicular traits (scrotal weight and scrotal circumference) or carcass traits (adjusted backfat, backfat, body wall fat, chilled carcass weight, hot carcass weight, dressing percent, leg circumference and rib eye area). Although bucks with higher serum IGF-1 concentrations were heavier; the low and negative correlations observed between serum IGF-I and carcass or testicular traits indicates that IGF-I levels may not be a useful predictor of genetic merits for carcass or reproductive traits in the pubertal Boer male cross.

O-SP-S-25

Effects Of Diuron Drift on Hatchery Pond Plankton and Water Quality. P. W. Perschbacher*[1], and G. M. Ludwig[2], [1]Department Aquaculture/Fisheries School of Agriculture, Fisheries and Human Sciences, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601; and [2]H. K. Dupree Stuttgart National Aquaculture Research Center, USDA/ARS, Stuttgart, AR 72160.

The aerially-applied cotton herbicide, diuron, was tested for possible adverse effects on pond plankton and water quality in triplicate 550-L outdoor, pool mesocosms. Treatments were 30% of application rates or 0.42 kg/ha diuron active ingredient, representing highest cumulative drift concentrations to ponds less than 1.2 ha, and no herbicide (control). Diuron (without additives) was sprayed on the pool surface on March 18, and evaluations repeated at 1-15 d post-application. Ten water quality and plankton parameters were measured in morning samples. Diuron significantly affected oxygen production and pH after one day. As a result of lower pH, unionized ammonia levels were lower beginning d 2. Morning oxygen levels fell to critical levels of 3 ppm and below from d 2-3. Recovery to control levels in oxygen productivity and oxygen levels occurred on d 8 and 15, respectively, however pH and unionized ammonia levels remained significantly lower. Cladoceran and nauplii zooplankton were also reduced relative to control levels at d 1 and 8, respectively, by drift. However, on d 2-3 copepod numbers roughly doubled in diuron treatment pools compared to controls. All zooplankton recovered by d 15. Positive impacts noted from diuron high drift were reduced bluegreen and greater green algae from d 1 and reduced unionized ammonia from d 2. Chlorophyll a, a measure of algae biomass, was significantly higher in diuron treatment, which has been observed with another photosynthesis-inhibiting herbicide, propanil. Fry pond production should not be impacted from diuron drift. However, aeration would be recommended for several days after exposure to high levels of diuron drift. Major zooplankton food sources for fry, rotifer, copepod and nauplii (based on abundances), should not be greatly reduced. And, with the greater abundance green algae food sources, copepod numbers were rather stimulated.

O-SP-S-26

Evaluation of Raspberries (*Rubus* spp.) for Growth Performance under North Florida Conditions. B. R. Phills*[1], G. Umar[1], D. Kambiranda[2], H. K. N. Vasanthaiah[2], and S. M. Basha[2], [1]Small Fruit Laboratory, and [2]Plant Biotechnology Laboratory, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

Raspberry is a cool season crop intolerant to high temperatures of the South, especially Florida during the normal growing season. Hence, Florida needs raspberry cultivars that require low-chilling and tolerance to high heat for successful cultivation. The present study was designed to evaluate available raspberry genotypes to determine performance and suitability to north Florida. Selected raspberry genotypes were grown in field plots using a RBD. Plant development, flowering and fruit characteristics were determined during the plant growth. Leaf samples were collected before and after flowering and fruiting. Berry samples were collected where available and used for biochemical analysis to determine its quality. The results showed that plant size and development significantly varied among the genotypes as determined by their height, leaf area and biomass. Some of the cultivars failed to grow properly, set flower and fruit under the prevailing conditions while others died. Among the genotypes evaluated only Dorman Red, Heritage and Southland flowered and fruited. High throughput 2-Dimensional electrophoretic analysis of raspberry leaf revealed more than 100 proteins differentially expressed in high chill genotypes than low chill. Further, analysis of the berry samples revealed a Brix value of 11, which is similar to the ones grown in the Pacific West. HPLC analysis of sugars revealed that glucose and fructose were present in 1:1 ratio and appears to be the predominant sugars in the berry. Further, biochemical analyses and field evaluations would aid in identifying low-chill and high temperature genotypes useful for developing raspberry cultivars suitable for North Florida.

O-SP-S-27

The Kentucky State University Pawpaw Program: Finding the Next Great Pawpaw Cultivar. K. W. Pomper*, S. B. Crabtree, and J. D. Lowe, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

The North American pawpaw [*Asimina triloba* (L.) Dunal] is a tree-fruit that is in the early stages of commercial production. Pawpaw fruit have fresh market appeal for farmers' markets, community supported agriculture, and organic markets, as well as processing potential for frozen pulp production. New high yielding cultivars with excellent fruit quality would assist in the development of a pawpaw industry. Kentucky State University (KSU) serves as the National Clonal Germplasm Repository for pawpaw, and germplasm evaluation is an important research priority. The KSU selection K8-2 is a seedling from Maryland that has undergone evaluation at KSU over the last 10 years. This selection has been stably propagated via budding from the original K8-2 tree onto seedling rootstocks. Excellent yield and fruiting characteristics of mature K8-2 trees have resulted in the release of K8-2 in 2009 as KSU-Atwood™. Additionally, genotypes in the KSU repository orchards that produced high yields and excellent fruit quality have been identified and selected for clonal propagation (budding onto rootstock) experiments. The selections KSU-Atwood™ and Sunflower (controls), as well as Hi4-1, H3-120, G4-21, G4-25, G5-23, G6-120, G9-109, and G9-111 were budded successfully (75%) onto seedling rootstock; however, the

selection G4-21 had a poor budding success rate (40%). Most selections displayed excellent vigor; G4-21 and G4-25 displayed poor vigor. Most of the pawpaw advanced selections had similar budding success and vigor to controls and will be placed into field trials in 2011.

O-SP-S-28

Status of Integrated Pest Management in Black Belt Counties in Alabama and Effects on Food Safety. F. Quarcoo*[1], C. Bonsi[1], L. E. N. Jackai[2], and B. N. Dingha[2], [1]Department of Agricultural and Environmental Science, Tuskegee University, Tuskegee, AL 36088; and [2]Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

Adoption of integrated pest management (IPM) methods result in reduced use of pesticides and thus lower levels of pesticide residue in food products. This study sought to assess the level of IPM knowledge and practice by farmers in selected black belt counties in Alabama. A second objective was to assess pesticide residues in fruits and vegetables sold in farmer's markets in selected counties in Alabama. Questionnaires were used to capture data for the (IPM) situational analysis. Acreages cultivated and other pieces of information show that most of the farmers fall within the 'limited resource' category. Results clearly show that majority of farmers in black belt counties lack adequate information and practical skills in IPM. Majority of respondents indicated that they had heard of IPM but were not familiar with the concepts; some respondents said they had never heard of IPM. Results also reveal that IPM practices such as scouting (for pests) and use of action thresholds were not popular among farmers. Scheduled spray regimens are employed in the cultivation of fruits such as peaches. Pesticide residues in/on fruits and vegetables obtained from farmer's markets indicate the need for increased adoption of IPM practices.

O-SP-S-29

Managing a Piedmont Soil to Improve its Quality. C. W. Raczkowski*[1], G. B. Reddy[1], W. J. Busscher[2], P. J. Bauer[2], and A. J. Franzluebbers[3], [1]Department of Natural Resources, North Carolina A&T State University, Greensboro, NC 27411; [2]USDA-ARS, Florence SC 29501; and [3]USDA-ARS, Watkinsville, GA 30677.

Management systems that effectively increase soil organic matter are needed to restore southeast U.S. Piedmont soils into productive agronomic fields. A field study was conducted from 2003 through 2008 with the following objectives: (1) evaluate the effects of tillage, winter cover cropping and the application of compost on soil physical, chemical and biological properties; (2) assess soil quality in each experimental treatment using the soil property data collected; (3) identify a soil management plan highly effective at improving soil quality. The experimental design was a split-split plot with four replications. Main plot levels were disk tillage and no tillage, sub-plot levels were a winter cover crop and no cover crop grown, and sub-sub-plot levels were compost and no compost applied. Beginning in 2004, the sequence of summer crops planted was pumpkins, squash, sweet corn, pumpkins and squash. Soil physical, chemical and biological properties were used in the Soil Management Assessment Framework of USDA-NRCS to assess overall soil quality. Cover cropping increased soil water infiltration and soil water retention. The application of compost increased soil organic carbon and the soil cation exchange capacity. The largest improvement in soil quality was obtained in the treatment factorial combination no tillage/cover cropping/compost applied.

O-SP-S-30

Vegetable Agroforestry Systems in Southeast Asia. M. R. Reyes*[1], D. Catacutan[2], D. T. Ha[3], and A. Susila[4], [1]Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411; [2]World Agroforestry Centre, Nairobi, Kenya; [3]Nong Lam University, Ho Chi Min City, Vietnam; and [4]IPB-Bogor Agricultural University, Bogor, Indonesia.

Communities in many forest and vegetable-producing watersheds in Southeast Asia suffer from poverty, while forest, soil, and water resources are being degraded. The objective of this research is to develop economically viable and ecologically sound vegetable-agroforestry systems (VAF) and to quantify the potential economic and environmental benefits of these systems. VAF is the integration of vegetable crops with trees or trees with vegetable crops – under or beside them, simultaneously or in sequence. The technique has a strong potential to improve quality of life for small-scale farmers. In Vietnam, Indonesia, and the Philippines, researchers experimented with a variety of high-value medicinal plants and vegetables, including bell pepper, bok choy, cabbage, cauliflower, melons, and tomatoes; and with cash-crop trees such as cashew. The paper describes various techniques to enhance VAF, such as low-cost drip irrigation, reduced tillage, pest management, reintroduction of indigenous vegetables, and soil enrichment; and offering local workshops to introduce improved cultivation and production practices. Researchers also have conducted baseline household and market surveys that included demographics, household income and expenditures, vegetable market chains, and the role that gender plays in division of labor and farm decision-making.

This presentation summarizes the findings of this research and will launch the set of four books on Vegetable Agroforestry Systems in Southeast Asia. It will be shown that a new horizon in agroforestry research has been discovered, that is for several vegetables, yields are higher in agroforestry systems than in open field conditions.

O-SP-S-31

Analysis of Organic Foods of the Southeast. R. D. Robbins*, and K. Y. Jefferson-Moore, Department of Agribusiness, Applied Economics and Agriscience Education, North Carolina A&T State University, Greensboro, NC 27411.

Organic foods represent one of the fastest growing sectors of the American agriculture economy. Sales of organic foods have grown at a rate of 400% since 2000. Most of these sales are for fruits and vegetables with meat and dairy product sales second. The reason for the growth is the concern that many consumers have over the use of hormones, chemicals, and the desire for nutritious foods source for the family. Organic consumers believe that the absence of chemicals means less residue in the food supply and therefore is better for consumption. Consumers are willing to pay extra for organic foods. Farmers have responded by increasing production of organic foods. However, many in the organic industry believe that supply limitations have hindered the growth of the sector.

O-SP-S-32

Cost Analysis of Mobile Fish Nursery for Hybrid Striped Bass, *Morone chrysops x Morone saxatilis*, Fry. P. Sapkota*, C. R. Engle, and D. Heikes, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Although hybrid striped bass broodstock can now be spawned year-round, year-round supply of fingerlings has been limited due to low survival of fry stocked in ponds in late summer. Hybrid striped bass fry are small (3-5 mm long), require live food (primarily small rotifers), and are susceptible to predation by insects and cyclopoid copepods. A mobile fish nursery was developed at the University of Arkansas at Pine Bluff. The system cultures fry under protected conditions by filtering out large zooplankton and providing fry with the appropriate size of live rotifers until they are large enough to escape predators in ponds. The specific objective of this study was to estimate the investment and annual costs associated with such a mobile nursery system. Economic engineering techniques were used to estimate the investment cost, annual fixed cost and annual operating costs of the mobile fish nursery. The major operating costs required to run this system included costs for electricity, labor, repairs and maintenance. The total investment cost for the primary system was computed to be $29,812. Annual fixed costs were $5,887 and composed 93% of total annual cost and operating costs for one production cycle were 7% of total annual cost. Increasing the number of production cycles in a year from one to six resulted in a 24% decrease in annual fixed cost as a percent of total annual cost. The cost analysis will be extended to include larger scales and temperature controls. Sensitivity analyses will evaluate effects of varying unit costs of key inputs and effects of varying survival rates.

O-SP-S-33

Beneficial Insects in Sweet Corn Baited with Methyl Salicylate Based Lures. J. D. Sedlacek*[1], K. L. Friley[1], M. K. Bomford[1], R. S. Hayden[1], C. M. Wales[1], M. L. Grayson-Holt[1], and D. Slone[2], [1]Land Grant Program, Kentucky State University, Frankfort, KY 40601; and [2]University of Kentucky, Horticulture Department, Lexington, KY 40546.

Sweet corn, *Zea mays* 'Garrison®', was grown organically in replicated plots on Kentucky State University's Agricultural Research Farm and conventionally in replicated plots on the University of Kentucky's Horticultural Research Farm. Yellow sticky traps 15 cm x 15 cm were used to capture insects and examine efficacy of PredaLure® within plots. Lures were deployed in baited plots and stapled to tobacco sticks at crop canopy height. Lures were deployed in the center of each plot and one in the center of each quadrant of each plot. One sticky trap was deployed at the same location as each lure and stapled to the tobacco stick at ear height. Traps were changed weekly through anthesis. Sticky traps were placed individually in ziplock plastic bags, labeled, and transported to the laboratory for insect identification and enumeration. Pink lady beetle and big-eyed bug were the two most abundant predators caught representing 61% and 20%, respectively, of the total beneficial insects caught in the organic plots. There was a tendency toward higher numbers of Asian lady beetles in organic plots where PredaLure had been deployed. Pink lady beetle and Asian lady beetle were the most abundant predators in the conventional sweet corn plots accounting for 56% and 28% of the predatory insects caught in the conventional sweet corn plots. There were significantly greater numbers of pink lady beetle, Asian lady beetle, green lacewing and big-eyed bugs caught in conventional PredaLure baited plots. Results will be discussed within the context of weed presence.

O-SP-S-34

Analysis of Leaf Proteome to Identify Drought Responsive Proteins in Peanut (*Arachis hypogaea* L.). M. B. Sheikh*, and R. Katam, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Water stress (WS) is known to predispose peanut (*Arachis hypogaea*) to aflatoxin contamination. During WS, plants respond to adopt for survival through ion homeostasis and conformational changes in proteins. Some of these changes include oxidative stress leading to destruction of photosynthetic apparatus and other macromolecules within cells. To obtain insight into the effects of WS on molecular and cellular functions of peanut, changes in leaf protein composition was studied by 2-DE complemented with MALDI TOF Mass spectrometry. Peanut cultivars with diverse drought tolerance characteristics were subjected to WS and leaf samples analyzed. The results showed that four proteins viz. serine/threonine protein phosphate PP1, choline dehydrogenase, peroxidase 43 and SNF 1 related protein kinase regulatory subunit beta-2, which plays a role as chaperone and cryoprotectants were induced in drought-tolerant (DT) cultivars following WS. In addition, heat shock protein, ATPase alpha subunit, putative quinone oxidoreductase and putative triose phosphate isomerase were up-regulated in DT cultivars. Several proteins with molecular weight between 14 kDa and 70 kDa, and pI between pH 4.0 and 8.5 were down-regulated in drought-susceptible (DS) cultivars. These data showed that WS suppressed majority of leaf proteins in DS cultivars while their expression either increased or maintained in DT cultivars. Identification of drought-responsive proteins will be useful for determining their role in drought tolerance and as markers for screening peanut germplasm to identify DT cultivars. Protein-protein interaction analysis revealed the response network of DT and DS cultivars, and proteins positioned as hubs in system response networks in DT cultivar.

O-SP-S-35

Assessing Feed Intake, Growth Performance, Organ Growth, and Carcass Characteristics of Pure Boer and Kiko Male Kids. S. Solaiman*[1], B. R. Min[1], N. Gurung[1], E. Taha[1], C. M. Hill[1], and J. Behrends[2], [1]Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088; and [2]Department of Animal and Meat Sciences, Mississippi State University, MS 39762.

Twelve pure breed Boer and Kiko male kids (n = 6) were randomly selected to determine intake, growth performance, and carcass quality. Goat kids weaned at three months of age, with initial body weight (IBW) of 24.5 and 23.8 kg for Boer and Kiko, respectively. Goats were offered a concentrate mix at 3.2% of BW, and grass hay ad libitum. Performance was monitored for 88 days at which goats were slaughtered. Carcasses were evaluated and different organ weights were recorded. There was no difference in IBW for two breeds; however, final BW and average daily gain were higher for Boers. Although there was no difference in total dry matter intake, grain intake and gain efficiency were higher for Boers. Boer kids consumed less hay (12.9 vs. 21.3% DMI) and more grain (87.1 vs. 78.7% DMI) than Kiko kids, respectively. There were no differences in dressing percentage and carcass characteristics, except Boer kids had higher fat thickness over 12th rib, higher total percent fat, and lower total percent bone, with no difference in muscle content. All the body organs as a percent of empty BW were similar, except Boer kids tended to have heavier head. Boer kids consumed more grain and had higher ADG than Kiko kids, but gained more fat, and less bone.

O-SP-S-36

Production Comparsion of Intraspecific Hybrids of the Freshwater Prawn (*Macrobrachium rosenbergii*). J. H. Tidwell*, S. D. Coyle, and L. A. Bright, Division of Aquaculture, Kentucky State University, Frankfort, KY 40601.

Freshwater prawn (*Macrobrachium rosenbergii*) production in the US is based on a small number of founder stock and have received little input of genetic resources for over 20 generations. Based on a microsatellite analyses, two genetic strains of domestic prawns (Texas and Hawaii) and a wild strain with high levels of genetic diversity (Myanmar) were chosen for evaluation and crossed. Four test crosses were produced and compared with pure Texas strain. Fifteen 0.04 ha ponds were utilized and the five genetic groups were replicated in three ponds each. After 115 days all ponds were harvested. Prawns were counted, weighed and identified according to sexual morphotype. Survival was significantly higher ($P<0.05$) in the TxH cross than in the TxT, TxM or MxT groups. Specific growth rate (SGR) was significantly higher ($P<0.05$) in the MxT than in the TxM or TxH crosses. Other production parameters did not differ among the genetic groups. In terms of premium sizes, the MxT cross had significantly greater percentage of animals achieving weights of >50 g and > 70 g than the HxT or TxH crosses. The two Myanmar crosses also achieved greater unit production (kg/ha) of these size categories. Morphotype data indicate that the Myanmar crosses likely had delayed sexual maturation in both sexes. The Myanmar crosses appear

to possess positive production traits that might be exploited through further selection.

O-SP-S-37

Determining Selected Physio-Chemical Characteristics among Blackberry Genotypes in North Florida. G. Umar*, D. M. Kambiranda, H. K. N. Vasanthaiah, B. R. Phills, and S. M. Basha, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317

Blackberries are perennial plants of the genus *Rubus* and belong to the family Rosaceae. Blackberries are a rich source of polyphenols, which are compounds of interest because of their antioxidant activity. To provide North Florida small farmers with well-adapted blackberry cultivars having highest fruit quality and nutraceutical value, a study was conducted to evaluate blackberry genotypes to determine their performance and suitability in this region. Selected blackberry genotypes were grown in field plots using Complete Randomized Block Design. Morphological characteristics and fruit quality were determined for three consecutive years. Phenotypic data of six blackberry cultivars Roseborough, Apache, Shawnee, Kiowa, Chickasaw and Brazos were recorded regularly. Berry samples were collected frequently for biochemical analysis to determine their quality. Field data showed highest numbers of branches and fruits per plant in the cultivars Roseborough and Kiowa compared to the other cultivars. Maximum fresh weight of fruits per plant was recorded in the cultivar Kiowa and lowest in Brazos. pH of the berries varied between 3.6 and 3.8 among the genotypes. Soluble solids analysis of the fruits revealed highest Brix value in Apache (16.0) compared to the other six blackberry genotypes tested. HPLC analysis of total sugars revealed 1:1 ratio of glucose and fructose in all six genotypes. Results of this study showed that some blackberry genotypes performed better under North Florida conditions than others. Additional studies are in progress to determine variation in antioxidant activity to identify blackberry genotypes with highest nutraceutical value and performance in North Florida.

O-SP-S-38

Development of Molecular Markers Linked to Low Chill/Heat Tolerance in Raspberry (*Rubus idaeus* L.). H. K. N. Vasanthaiah[1]*, D. Kambiranda[1], S. M. Basha[1], G. Umar[2], and B. R. Phills[2], [1]Plant Biotechnology Laboratory, and [2]Small Fruit Laboratory, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

Red raspberries (*Rubus idaeus* L.) are a composite fruit and are a healthy addition to one's diet. This fruit is delicious and nutritious, packed with full of vitamins, antioxidants and fiber. The most promising benefit that red raspberries hold for consumers is their substantial quantity of ellagic acid, a phenolic compound that has become to be known as a potent anti-carcinogenic/anti-mutagenic compound. Raspberry cultivation in southern United States requires tolerance to high temperatures coupled with low chilling requirement (<500 hrs below 40°F) for setting fruit. Expanding the commercial growth range of raspberry production to the southern United States is undoubtedly one of the most challenging tasks that any plant breeder can face. With this in view, this study was conducted to develop molecular markers for aiding in the selection of low chill/heat tolerant raspberry cultivars that are adaptive to southern environment and for advancing our breeding program aimed at developing low-chill and heat-tolerant raspberry cultivars. DNA fingerprinting was carried out using various random and SSR primers. Cluster analysis of unique and shared amplification products using Euclidean linkage distances clearly separated low-chill and high-chill loving raspberry genotypes. In addition, amplification studies yielded several unique polymorphic DNA bands that differentiated low-chill/ heat-loving as well as erect and vine type raspberry genotypes. Additional studies are in progress to develop specific DNA/gene markers for marker assisted selection which would accelerate raspberry breeding program and aid in screening of raspberry cultivars suitable for southern United States. Supported by USDA/CBG.

O-SP-S-39

Experimental Study of Peanut Immature Pod and Leaf Expression Profile to Identify Pod-Specific Expressed Gene(s). N. Wu*, and K. Matand, Center for Biotechnology Research and Education, School of Agriculture and Applied Sciences, Langston University, Langston, OK 73050.

Peanut (*Arachis hypogaea* L.) is the second most important seed legume grown in the United States after soybean (*Glycine max*) and a major source of income, protein, and oil. Unlike other members of the legume family, the peanut's pods develop underground. Following pollination and fertilization, the flower stalk curves downward and pushes into the ground, for ovary development into the pod. Thus, understanding flowering and fruiting processes is essential to enhancing peanut productivity. The goal of this study was to probe for expressed genes that are unique to peanut pod formation through the subtraction technique. mRNAs of immature peanut pods were purified and subtracted from leaf mRNAs. A subtracted cDNA library was constructed to facilitate target clone

selection. The resulting target clones were further validated by PCR screening using standard peanut leaf and immature pod cDNA libraries as templates. Two unique genes expressed in immature peanut pods, but not in leaf tissue, were identified. The sequencing results showed that both genes matched peanut desiccation-related protein and the histone H2B gene, which are essential to peanut pod physiology. The results of this study could be used in future peanut functional genome and genetic engineering research.

O-SP-S-40

Evaluation for Crown Gall Disease Resistance among Different Grapevine Genotypes. X. Xu*[1], J. Lu[1], J. H. Roh[2], Z. Ren[1], and F. Bradley[1], [1]Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317; and [2]Visiting Scientist, National Horticultural Research Institute, RDA, Suwon 440-706, Korea.

Relative levels of crown gall disease resistance were screened in different grapevine genotypes by inoculating soft green and hard dormant cuttings with *Agrobacteria* strains C493 and C4612, which were gifted by H. K. Yun from National Horticultural Research Institute (South Korea). The inoculation was conducted in June and December, respectively. Five cuttings were used for each treatment with two types of controls: cuttings without inoculation and cuttings inoculated with sterilized distill water. Inoculated sites were wrapped with paraffin tapes and cuttings were maintained in pots on mist beds for soft green cuttings. The hard dormant cuttings were maintained in Magenta square boxes filled with water and changed every other day. Incident rate and gall weight were scored at inoculated sites and top sites of the cuttings two months after the inoculation. Interestingly, all muscadine soft cuttings including control showed about 0.1-0.2 g callus/gall growth in the inoculated sites for both C493 and C4612 *Agrobacterium* strains, but only inoculated soft cuttings of *V. vinifera* and Florida hybrid bunch grapes showed callus/gall growth ranged from about 0.2 to 0.3 g at inoculated sites, no callus/gall growth was noticed for the controls. Electronic scanning analysis of the growth tissue found the present of bacteria in inoculated cuttings but not in control for all cultivars. It appeared that muscadine grapes had a genius healing power (callus production) for wound at inoculate sites, while *V. vinifera* and Florida hybrids were vulnerable to *Agrobacterium* attack. In addition, *Agribacterium* strain C4612 was more virulent than C493.

O-SP-S-41

Improving Sustainability of Dairy Goat Operations through Research, Extension and International Collaboration. S. S. Zeng*, Department of Agriculture and Natural Resources, Langston University, Langston, OK 73050.

The dairy goat industry in the United States has taken off since the mid 1980s. As the goat research and extension leader in the U.S., as well as in the world, the American Institute for Goat Research has established many programs to make the U.S. goat industry more sustainable. The dairy food program is one of the flagship programs at Langston University. Research conducted by dairy scientists in milk quality, mastitis control, antibiotic residue testing, and factors affecting yield and quality of goat milk and cheese has generated a wealth of scientific information and advanced the technology for dairy goat products. Workshops and training sessions have been hosted and/or conducted around the U.S. by dairy goat extension specialists on utilizing goat milk for manufacture of cheeses, yogurts, ice cream, Cajeta, smoothie and even goat milk soap. These hands-on sessions have helped goat milk producers and processors add value to goat milk and enhance their household income. This presentation highlights information dissemination methodology, learner-centered teaching strategy, and education-focused training practices at Langston University for making a dairy goat operation more sustainable.

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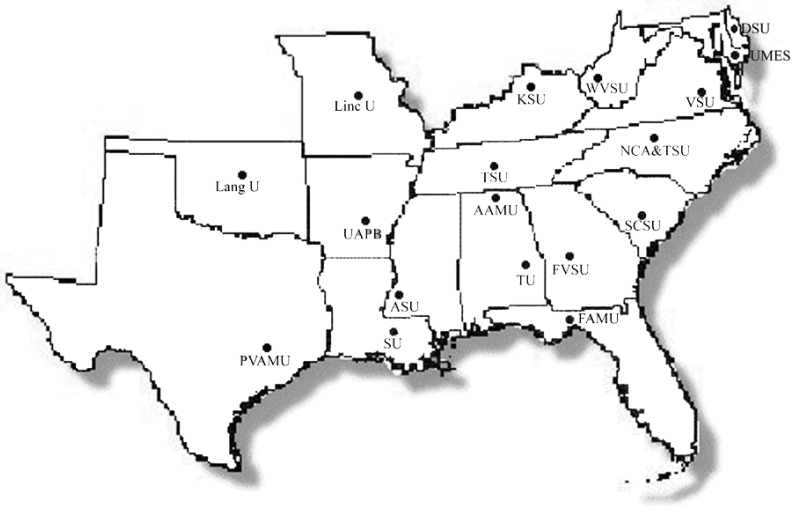

Abstracts of Sustainable Plant and Animal Production Systems Posters

Undergraduate Students (34)

P-SP-U-1

Promoting Seed Germination and Somatic Embryogenesis of Needle Palm with Plant Growth Regulators. L. Bowie*, and L. Lu, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Needle palm (*Rhapidophyllum hystrix*) is a small, bushy fan palm with single to multiple trunks and medium foliar texture. It is native to the coastal areas of southeastern United States and is an excellent ornamental plant. Needle palm has been reported as "rare", "threatened" or "endangered" species and is included in many states' special plant lists due to loss of habitats and difficult seed germination. The germination of seeds in natural conditions usually takes very a long time (from 6 months to 2 years), and the germination percentages are low (~10%). The promoting of seed germination and developing of *in vitro* regenerative protocols for needle palm has direct applications for mass propagation and conservation of this rare plant. Somatic embryogenesis, as a main technique for *in vitro* plantlet regeneration, has not been reported for needle palm. This project aims to: 1) Evaluate the germination rate of commercially available needle palm seeds, and use plant growth regulators (PGRs) to stimulate the germination; 2) Induce somatic embryogenesis from zygotic embryos and young leaf tissues of needle palm; and 3) Induce somatic embryogenesis from young leaf tissues or shoot meristem tissues of needle palm. Needle palms seeds have been purchased and tested for their germinating rates. At present, there is no seedling germination. Embryos dissected from the seeds have been placed in a series of media with PGRs to induce germination and somatic embryogenesis. They show some enlargement but no obvious callus formation at present. More results will be reported during the meeting.

P-SP-U-2

Relationships among Body Conformation, Testicular Traits and Semen Output in Electro-Ejaculated Pubertal Kiko Goat Bucks (*Capra hircus*). P. Bradley*[1], C. Okere[1], O. Bolden-Tiller[1], A. Paden[1], E. R. Bridges[2], and D. l. Ford[2], [1]Department of Agricultural and Environmental Sciences, and [2]School of Veterinary Medicine, Tuskegee University, Tuskegee, AL 36088.

The objective of this project was to determine the relationship between body conformation traits chest girth, height at withers, body length, body condition scores, body weight, scrotal circumference and semen output in three electro-ejaculated pubertal Kiko bucks. An electro-ejaculator (Pulsator IV Auto Adjust™ Lane MFG Inc. Denver, CO) was used once a week for semen harvest for five consecutive weeks. Upon collection, semen samples were evaluated for ejaculate volume, color, consistency, and mass activity. Semen output did not differ significantly throughout the five collection weeks. Also, semen volume did not differ among bucks. Chest girth and body condition scores were positively correlated with body weight. Scrotal circumference showed positive and moderate correlation with semen volume. However, there were low and negative correlations between body weight, body condition scores, height at withers, chest girth and semen volume, suggesting that semen output is fairly independent of most body conformation traits. The study has demonstrated that semen can be harvested in sufficient quantity from pubertal bucks via the electro-ejaculation method if the use of artificial vagina is inappropriate due to age or training. We recommend that this procedure be incorporated in a breeding soundness examination tool for selecting or culling potential breeding Kiko sires at an early age.

P-SP-U-3

Validation of 454 Sequence Derived Transcription Factors and Role in Rust Resistance in Common Bean (*Phaselous vulgaris* L.). A. Brown*[1], K. Melmaiee[2], A. Todd[2], and V. Kalavacharla[2,3], [1]Department of Biological Sciences, [2]College of Agriculture & Related Sciences, and [3]Center for Integrated Biological and Environmental Research (CIBER), Delaware State University, Dover, DE 19901.

Common bean is an important source of protein and dietary fiber around the world. Transcription factors or sequence specific DNA-binding factors regulate expression of specific genes based on biological needs. Our previous research identified 2,500 transcription factors bioinformatically from high throughput deep sequencing by the 454 Roche technology. In this study, we are focusing on the validation of three specific transcription factors which are homologous to b-zip, NAC and MADS transcription factors families. Furthermore, we are interested in identifying the expression of these transcription factors during infection with the bean rust fungus (*Uromyces appendiculatus*). In this research, we show that these 454 sequencing-derived transcription factors are real and we are now in the process of studying expression patterns with fungal infection in common bean using resistant Sierra and susceptible Olathe genotypes.

P-SP-U-4

Identifying Factors That Determine the Demand for Goat Meat in Florida. N. S. Brown*, G. L. Queeley, and A. McKenzie–Jakes, Scholar Research Program, College of Engineering, Science, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32301.

Goat production has become one of the fastest growing livestock industries in the U.S. However, despite the increase in demand, U.S. producers are still unable to match production with demand. The demand for goat meat in the United States comes mostly from ethnic groups that include Asians, Africans, Latin Americans and the Caribbean. The purpose of this study was to identify factors that affect the demand for goat meat in the state of Florida. A marketing survey using 173 participants was used to collect data relevant to the study. The study focused primarily on the association of certain qualitative parameters such as cultural and religious practices, breeding programs, marketing age, weight and sex classes of animals, income categories, and the ethnic backgrounds of current and potential consumers with goat meat consumption. These parameters were chosen since previous research has shown that they were linked to the demand for goat meat. A chi square analysis was done to test the null hypothesis of no association between these parameters and goat meat consumption. The results indicated no significant association ($p < 0.05$) between ethnicity and goat meat consumption so this hypothesis could not be rejected. The results also indicated that Black Americans are the least likely consumers of goat meat, while people of African, Caribbean, European and Hispanic ancestry were the most likely consumers. This information could be useful in identifying marketing opportunities for small and limited resource goat farmers in the state of Florida.

P-SP-U-5

Plant Regeneration and Genetic Transformation of *Stevia rebaudiana* Using Particle Bombardment. P. N. Bumpus*, and S. K. Dhir, Center for Biotechnology, Department of Plant Science, Fort Valley State University, Fort Valley, GA 31030.

Stevia rebaudiana is a perennial shrub that originated in the forests of Brazil and Paraguay. *Stevia* is known to be a no calorie sweetener and is 30 times sweeter than sugar. The objectives of this study were to introduce β-glucuronidase (GUS) or Green Fluorescent Protein (GFP) as a reporter gene in *Stevia* to evaluate transient and stable expression over time after microprojectile bombardment. Leaf segments and embryogenic calli were bombarded with 1.0 µM gold particle coated with a plasmid DNA vector containing a GUS or GFP reporter gene fused to 35S constitutive gene promoter at various levels of acceleration pressure (450-1800 psi). Bombardments with DNA produced tissue sectors expressing GFP that could be visually selected under the fluorescence microscope over multiple subcultures. An average of 10 to 12% leaf segments and young embryogenic callus tissue expressed transient GUS or GFP gene expression at 1100 psi with a 6 cm distance from stopping screen to target tissue using gold particles. Leaf and embryogenic tissues bombarded with a GUS or GFP gene were sub-cultured on embryo induction medium. Embryos at various developmental stages (globular, heart and torpedo shaped) expressing GUS or GFP genes were being recovered. The tissues were then placed on selection media with kanamycin at 100mg/l. Transgenic tissues at different developmental stages were selected, and PCR analysis of transgenic material will be presented. Furthermore, this method should allow the development of assays for the transient and homogeneous expression of promoters of various genes in *S. rebaudiana*.

P-SP-U-6

Effects of Grazing Forages Containing Condensed Tannins on Lamb Carcass Measurements. N. E. Cahill*, B. C. Shanks, J. D. Caldwell, H. A. Swartz, A. N. V. Stewart, and T. R. Higgins, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Using condensed tannin-containing forages (CTCF) as natural anthelmintics have gained popularity in small ruminant production in recent years; however, information pertaining to the effects of these forages on lamb carcass measurements is limited. Our objective was to determine the impact of grazing CTCF, including chicory (*Chichorium intybus*) and ragweed (*Ambrosia artemisiifolia*) on lamb carcass measurements. Beginning on July 19, 2010, a total of 25 crossbred lambs (43 ± 1.4 kg, average initial body weight) were allocated randomly to one of two grazing treatments: 1) CTCF and mixed grasses or 2) tall fescue [*Lolium arundinaceum* (Schreb.) Darbysh; E+]. Treatments consisted of two 0.4-ha paddocks each. At the end of a four-week grazing period, four lambs from each treatment were selected randomly for harvest. Approximately 10 d prior to harvest all lambs were comingled on E+ pastures, because forage availability was low in CTCF. Lambs were transported to the abattoir at the University of Missouri for harvest and carcass measurement collection. Final body weight, hot and cold carcass weight, dressing percentage, cooler shrinkage, and longissimus muscle area did not differ ($P \geq 0.21$) across treatments. Backfat thickness tended ($P = 0.10$) to be greater in carcasses of lambs from CTCF compared with E+ and more lamb carcasses tended ($P = 0.08$) to grade USDA Choice from CTCF compared with E+. Therefore, grazing condensed

tannin-containing forages over a four-week summer grazing period may alter backfat thickness and quality grade in lambs.

P-SP-U-7

The Growth and Mortality of Larval Sunfishes, *Lepomis* spp., Fed Diets of Various Aged Post-Harvest Brine Shrimp Nauplii, *Artemia* spp. N. F. Afu, J. E. Callaway*, and J. E. Wetzel, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Brine shrimp *Artemia* spp. nauplii (BS) are routinely used as a live food for early life-stage fishes. Resources required for hatching and holding BS are costly. Typically multiple batches/day with one to several feedings per batch is required. Feedings/batch may be limited by time post-harvest BS retains growth promoting qualities. Herein, we evaluate BS for post-harvest time on growth and survival of longear sunfish, *Lepomis megalotus*, redear *L. microlophus* and bluegill *L. macrochirus*. Three 14-d trials, one per species, were run. Each trial had six full-sibling broods harvested at exodus yielding four lots of 100 randomly selected individuals/brood. Lots were placed into separate 19-L buckets. Buckets (n =24), served as experimental units (EU). Four EU for a given brood were randomly assigned one of four treatments. Treatments differed by BS post-harvest age (0-h, 6-h, 12-h and 18-h). Fish were fed fixed volume of BS solution such that 0-h treatment was in excess. Six-hour intervals were between feedings at 0500, 1100, 1700, and 2300. Fourteen days post-exodus, fry were harvested, euthanized, enumerated and measured for total length (TL) and weight. Samples (n = 25) were taken when an EU contained > 25 fish. Within each species, means of TL, weight, percent survival and total weight of surviving fry were related to age post-harvest of BS fed and brood using two-way ANOVA. Results enable recommendations concerning maximum age post-harvest of quality BS and resources needed to meet daily feeding requirements for sunfishes.

P-SP-U-8

Evaluating Protected Culture Tomato Breeding Lines for Improved Lycopene, Beta Carotene and Soluble Solids. H. M. Cavender*, J. M. Sisson, and B. E. Liedl, Gus R. Douglass Institute, Agricultural and Environmental Research Station, West Virginia State University, Institute, WV 25112.

The contribution of antioxidants and soluble solids that tomatoes provide are critical for maintaining a healthy diet. To optimize potential benefits in new tomato varieties being developed at WVSU, we evaluated the use of molecular and morphological techniques to screen lines for increased levels of lycopene, beta carotene and soluble solids. Tomatoes were harvested from the WVSU greenhouse at the same level of maturity during the winter of 2010. Lycopene content on a hexane fraction was quantified spectrophotometrically using a method developed by FISH. Variation in lycopene levels in the cultivars and germplasm ranged from 25-50 mg/g. Advanced progeny from using 'High Carotene' had lycopene reading ranging from 17- 66 mg/g exhibiting transgressive segregation. Beta carotene was also estimated using the lycopene method with analogous results. Data from colorimeter was regressed with lycopene concentrations to generate the best r-squared value (62%) using the a/b ratio. Thus, the colorimeter measurements will be most useful identifying lines with potentially higher levels of lycopene and beta carotene but will not replace the spectrophotometric method for quantification. Soluble solids were measured using a refractometer and resulting in 3-5°Brix, which is not surprising as beefsteak tomatoes rarely exhibit a Brix reading higher than 5. Screening using molecular markers, *Brix 9-2-5*, *B* and *hp2*, exhibited no variation between the parents or within the breeding lines.

P-SP-U-9

Identification of Expressed Resistance Gene Analogs by Data Mining in 454-derived Transcriptomic Sequences of Common Bean (*Phaseolus vulgaris* L.). M. Crampton*[1], Z. Liu[2], A. Todd[2], and V. Kalvacharla[2,3], [1]Department of Biological Sciences, [2]College of Agriculture & Related Sciences, and [3]Center of Integrated Biological and Environmental Research, Delaware State University, Dover, DE 19901.

Common bean (*Phaseolus vulgaris* L.) is an indispensable component of the diet for many people worldwide. Common bean has health benefits due to its high fiber, protein content and low fat content. Because of the dependence on this legume, it is essential to reduce bean loss due to pathogens. Disease resistance genes (*R* genes) typically contain a few highly conserved domains such as nucleotide binding site (NBS), leucine rich repeats (LRR), protein kinase (PK), transmembrane domain (TM), and Toll/Interleukin receptor (TIR). Since the *P. vulgaris* genome is not yet fully sequenced, a total of 83,947 common bean expressed sequence tags (ESTs) and 1.69 million 454-derived transcriptomic reads were used to identify resistance gene analogs (RGAs) via data mining in this study. After clustering, this yielded a total of 354 unigenes that were considered as tentative resistance gene analogs (RGAs). These 354 unigenes were blasted against BAC-end sequences, 125 of which had a good hit. Based on these 125 hits, 101 primer pairs were designed and used to amplify in six genotypes, namely Sierra, Olathe,

G19833, Bat93, Pinto114, and Aurora. Sequence alignments revealed frequent occurrences of SNPs and small InDels. It turned out that 19 SNPs were related to enzyme sites which gave rise to RGA-tagged cleaved amplified polymorphic sequence (CAPS) markers and 11 indels led to RGA-tagged sequence-tagged-site (STS) markers. The findings from this study provide a good source to develop more RGA-tagged molecular markers and will benefit mapping of RGAs and discovery of more resistance genes from common bean.

P-SP-U-10

Verification of the Expression of *CHS* gene in *in vitro* Cell Lines of North American Native Grapes. G. M. Davis*, A. O. Ananga, S. Krastanova, S. Sutton, and V.M. Colova (Tsolova), CESTA, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

Muscadinia rotundifolia is known to have the highest antioxidant levels among fruits. It contains flavonoid compounds that are important part of the animal and human diet. Flavonoids form various distinct groups of natural products, which include anthocynin, proanthocyanidin and phlobaphene pigments. There are several pertinent genes involved in critical steps of the flavonoid biosynthesis and differential expression of transcripts associated with *Muscadinia* berry ripening. Some of these genes have been identified and expressed. The aim of this study was to confirm the expression of Chalcone Synthese (CHS3) gene in *in vitro* cell lines of *Muscadinia rotundifolia* (Noble) and *Vitis aestivalis* (Cynthiana) by RT-PCR technique. Total RNA was extracted from the cell lines, and reverse transcriptase enzyme was used to convert mRNA to cDNA. RT-PCR primers specific to CHS3 were used to screen the cDNA to confirm its expression in 'Noble' and 'Cynthiana' cell lines. Our study indicates that CHS3, which is associated with flavonoid biosynthesis in *vinifera* grape is differentially expressed in both 'Noble' and 'Cynthiana' cell lines. This confirms the previous studies by emphasizing that regulatory steps of the flavonoid pathway are conserved among *M. rotundifolia* and *V. aestivalis.*

P-SP-U-11

Effects of Auxins and Heat on Root Initiation in Various Succulent Plants. S. DeGraphenreed*, and A. E. Clardy, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

We will observe the effect of auxins and heat on root initiation, number and developments in tropical succulent plants *Opuntia arbuscula* (pencil cactus), *Schlumbergra truncate* (Thanksgiving cactus), and *Sansevieria* spp. Forty-five, inch-long, cuttings of each plant varieties were taken and allowed to dry for 24 hours. Because of sap, prior to planting, cuttings were dipped in the auxins treatment. After planting cuttings were placed on the heating mat (65 to 70 degrees) for a period of four weeks. Half of the auxins treated stems will be placed on the heating mat and the other stems will be placed on table in the greenhouse. Stems will be observed for four weeks and root length, numbers and development will be measured to determine if auxins treatments are were affected by heat treatment.

P-SP-U-12

Molecular Identification of Fungal Pathogens for Ectoparasitic Mite, *Varroa destructor*, of Honey Bee. C. Eddington*, and L. H. B. Kanga, Entomology Program, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

This study will be carried out to determine if mortality of *Varroa* mite is due to fungal infections. Thus, cadavers of V*arroa* mite will be collected from an Apiary located in Quincy, FL and brought to the laboratory in Tallahassee, FL. The infected cadavers will be surface-sterilized by immersing them in a sterilant disinfectant, Expor for three minutes and rinsed with 95% ethanol for two minutes. The cadavers will then be plated on Petri dishes containing Sabouraud maltose agar supplemented with 1% yeast extract and incubated at 27 ± 1°C, 85 % RH, and 13:11 (L:D) h photoperiod. The Petri dishes will be sealed with parafilm prior to incubation and dead mites will be observed daily for the presence of external fungal hyphae. Only mites that show fungal growth will be considered to have died of infection. The fungus will then be isolated and cultured on new Petri dishes for use in DNA fingerprinting techniques for identification.

P-SP-U-13

Utilization of Sow Productivity Index (SPI) to Optimize Reproductive Efficiency in a Sow (*Sus scrofa*) Herd. C. Ellis*, C. Okere, O. Bolden–Tiller, and W. McElhenney, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

Sow Productivity Index (SPI) provides a measure of sow productivity and represents a systematic tool for predicting total reproductive merit, so that breeders can rank sows from best to worst. SPI = 100 +6.5 (L) + W, where L = the adjusted number born alive record on the dam minus the average of the adjusted number born alive

records of her contemporary group, and W = the adjusted 21-day litter weight record on the dam minus the average of the adjusted 21-day litter weight records of her contemporary group. 100 represents index for sows in the herd that are average and 6.5 is a weighting factor. Data on dam and litter performance (no. pigs/litter born, and weaned, litter weight at birth and at weaning) were collated and analyzed to calculate SPI values for each of the 60 multiparous Large White sows maintained at a swine operation in Auburn, AL. Average herd SPI was calculated as 105.24. Only 32 sows ranked above this herd average SPI. To optimize reproductive performance we recommend that only sows with indexes greater than 105 should be retained in the breeding herd. If the need arises to select sows having indexes below 105, only those with indexes closest to 105 should be chosen. This SPI method should aid in selecting replacement gilts from the most productive sows in the herd and serve as a basis for culling the least productive females.

P-SP-U-14

Role of *Arabidopsis* Novel Jasmonic-Acid Responsive Mutants in Defending Bacterial Disease. T. Ferrell*[1], S. Ren[2], and C. Lyle[3], [1]Department of Agriculture and Human Ecology, [2]Agriculture Research Station, and [3]Department of Biology, Virginia State University, Petersburg, VA 23806.

Jasmonates (JAs) regulate a wide range of developmental processes in plants and play a central role in regulating plant defense against biotic stresses such as disease resistance and insect resistance. The expression of the *Arabidopsis VSP1* gene is induced by JA. A transgenic *Arabidopsis* line containing the P_{VSP1}*::Luciferase* (*LUC*) reporter gene was mutagenized using random T-DNA insertion tags. Genetic screening of these lines through LUC imaging identified 12 *Arabidopsis* mutants that showed either reduced or enhanced P_{VSP1}*::Luciferase* reporter gene expression following JA treatment. By inoculating *Pseudomonas syringae* DC 3000, the roles of these mutated genes in defending against bacterial disease were investigated. One of these mutants, designated *jasmonate-mediated disease resistance* (*jdr*) 1 was further molecularly characterized on its role in disease resistance. Mutant phenotype on disease resistance does not link to the inserted T-DNA. In an effort to clone the corresponding gene in *jdr1* mutant, an F_2 segregation population was generated between wild type ecotype Columbia and *jdr1* mutant. Phenotypic screening in response to DC 3000 inoculation were performed for this population and the results demonstrated that a single recessive gene in *jdr1* regulates its disease resistance. Primers for PCR-based markers that are distributed throughout the *Arabidopsis* genome were designed. Map-based cloning and functional analysis of *jdr1* gene are ongoing.

P-SP-U-15

Management Practice Awareness in Limited-Resources Associated Animal Production and Research Facilities. S. Grant*, A. Binkley, H. White-Reese, R. Green, J. Washington, L. Doore, J. Milan, D. Reed, and V. McWhinney, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

The management practices of an animal facility, whether of a production or research nature, is guided by research-based criteria set forth in the code of federal regulations, animal welfare and industry organizations based upon scientific evidence. One of the major goals of a facility is to raise animals in environments that support the animals' health and well-being. This purpose may sometime appear obscured in limited-resources owned or associated facilities. The project summarizes the observations of management practices in a limited-resource associated facility. One observation of importance to the health and wellness of animal is the belief, knowledge or involvement of workers and veterinarian. The work presented is pertinent to raise the level of awareness of the need for training, interest and innovation among limited resource associated animal production and research facilities.

P-SP-U-16

Stink Bug Species Associated with Organic Blackberry Production in Central Kentucky. M. L. Grayson-Holt*, J. D. Sedlacek, K. L. Friley, K. W. Pomper, J. D. Lowe, M. K. Bomford, C. M. Wales, and R. S. Hayden, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Stink bugs (Hemiptera: Pentatomidae) are pests of organic blackberries in Kentucky. Brown, one spotted, green, and other stink bug species cause damage by feeding on blackberry drupelets discoloring fruit and imparting foul odors. These insects and organic management tactics have not been studied in Kentucky blackberry crops. Strategies to delay primocane growth, such as spring mowing of primocanes, on primocane fruiting blackberry varieties could delay fruit set and avoid stink bug attack. Three meter plots either of 'Prime-Jim®' or 'Prime-Jan®' were mowed to ground level on March 30-31, 2010. Three replicate plots of each variety were then mowed once on May 24 or mowed on May 24 and then again on July 6. Stink bugs were sampled weekly by hand picking them from blackberry bushes and with 15 cm x 15 cm yellow sticky traps. Species caught were the brown stink bug, *Euschistus servus*; one spotted stink bug, *E. variolarius*; green stink bug, *Acrosternum hilare*; twice stabbed, *Cosmopepla*

lintneriana; rice, *Oebalus pugnax*; and the red shouldered stink bug, *Thyanta custator*. The brown stink bug was the most abundant species caught followed by the green stink bug and rice stink bug with 38%, 17% and 15% of the total number captured, respectively. One spotted and twice stabbed stink bugs each accounted for 14% of the total stink bugs caught while the red shouldered stink bug represented less than 3%. Approximately 70% of the fruit harvested from both cultivars showed some feeding damage on berry drupelets.

P-SP-U-17

Lady Beetle Composition and Abundance in Sweet Corn Bordered by Pasture or Buckwheat and Sunflower Plantings. R. S. Hayden*, J. D. Sedlacek, K. L. Friley, C. M. Wales, and M. L. Grayson-Holt, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Sweet corn, *Zea mays* 'Garrison®', was grown in 25 m x 12 m plots on Kentucky State University's Agricultural Research and Demonstration Farm. Each plot was bordered on its length by a 2 m wide border of one of three treatments. The three treatments were 1) unmowed pasture, 2) buckwheat (*Fagopyrum esculentum* and 3) dwarf sunflower (*Heliathus annuus* var. Big Smile). A randomized complete block design replicating each treatment five times was used and all plots were separated by 25 m. Yellow sticky traps 15 cm x 15 cm were used to capture lady beetles. Two traps were deployed at canopy height between the edges and equidistant from the ends of each border plot. Four traps were deployed in each sweet corn plot, one in the center of each plot quadrant. Traps were changed weekly through anthesis. Sticky traps were placed individually in ziplock plastic bags, labeled, and transported to the laboratory for insect identification and enumeration. Pink lady beetle, *Coleomegilla maculata*; Asian lady beetle, *Harmonia axyridis*; spotless lady beetle, *Cycloneda munda*; and seven-spotted lady beetle, *Coccinella septempunctata* were caught in this study. The pink lady beetle was the most abundant species in all three border types and the sweet corn plots with 79% and 94% of the lady beetles caught in the borders and sweet corn, respectively. Pink lady beetle numbers decreased in buckwheat from 14 August through 27 August, but increased markedly in sweet corn from 20 August to 27 August potentially indicating movement into the sweet corn.

P-SP-U-18

Utilizing Mushrooms to Enhance Health and Performance of Broiler Chickens in Pasture Production. V. Hines*[1], W. Willis[1], O. S. Isikhuemhen[2], S. Hurley[1], and F. Anike[2], [1]Department of Animal Sciences, and [2]Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

A 56 d experiment was conducted to assess the combined use of three exotic mushrooms (EM) in pasture poultry production. Ninety-six chicks were randomly assigned to the following treatment (trt) groups for 21 d in cages as follows: 1) No-(EM) + Inovococcivac, 2) No- (EM) + No Inovococcivac, 3) 10% (EM) + Inovococcivac and 4) 10% (EM) + No-Inovococcivac. Chicks were moved to pasture on d 21 and remained there until d 56. Body and bursa weights, oocyst count, fecal *Salmonella* population, intestinal lesions scores were determined. Average body weight at 21 d was improved in trt 4(0.746) over trt 2(0.677), trt 3(0.665) and trt 1(0.565kg). Average body weight at 56 d of age differed with trt 3(2.87), trt 2(2.82), trt 4(2.72) and trt 1(2.64kg)) for male broilers. Bursa wts and lesions scores did not differ. Chicks from trt 2 exhibited the highest oocyst count (14, 468) vs. trt 1(1,712), trt 3(1,800), trt 4(1,150). *Salmonella* populations in trt 4(4.2) had the lowest mean $\log_{10}$ count compared to trt 1(5.2), trt 2(5.2), and trt 3(4.7). The results from this study suggest that the mushroom has the ability to reduce oocysts, *Salmonella*, and improve body weight in pasture broiler chickens.

P-SP-U-19

Alternative and Traditional Marketing Strategies for Herbs. L. D. Hughes*, and A. E. Clardy, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

New and small resource producers are constantly seeking new and innovative crops to supplement their incomes and with the rise in consumers preparing their own meals and seeking health conscious alternative for seasoning and flavoring meals. Many people are using herbs as alternative method for preparation. Fresh herbs are an excellent alternative but have a short shelf life therefore, we explored various ways fresh herbs could reach consumers before the end of their shelf life and still provide the producer additional income. We explored alternative strategies herbs could be marketed and sold to the general public and compared these ways to traditional marketing strategies.

P-SP-U-20

Micropropagation of Ginger (*Zingiber officinale*) Rhizomes Using Bud Explants. L. Lee*, L. Marsh, and B. Green, Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess

Anne, MD 21853.

Ginger (*Zingiber officinale* Rosc) is an important spice and a medicinal crop that is grown for its rhizomes. Typically, these rhizomes develop to maturity over an extended growing period, but can potentially be mass produced in shorter seasons through disease-free, actively growing transplants derived from micropropagation. The objective of this study was to examine the relationship between the sizes of bud explants and microbial contamination. Three treatments of ginger bud explants, 1-2 mm, 3-4 mm, and 5-6 mm, with four replications each were cultured and contamination rates were documented. For each experiment, buds were randomly selected, and their length and width measured. They were surface sterilized using 1% alconox and 20% bleach and then triple rinsed with sterile distilled water. The bud explants were excised for each treatment and cultured on modified Murashige and Skoog medium supplemented with 0.5 mg/L IAA, 0.1 mg/L BAP, 8 g/L agar, and 30 g/L sucrose. They were grown in vitro under a 16/8 hour day/night photoperiod at 25^0C. There was no difference in contamination between the different sizes of bud explants. However, the results indicate that the initial length of the bud influences the level of contamination. This study suggests that the size of the ginger bud can be used as a factor when determining a selection of explants to regenerate plants.

P-SP-U-21

Effects of Various Media and Growth Regulator on Root Initiation in Interior Tropical Plants. L. Martin*, and A. E. Clardy, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

We will observe various mediums on root initiation in three tropical plant species, *Opuntia arbuscula* (pencil cactus), *Schlumbergra truncate* (Thanksgiving cactus), and *Peperomia* spp. Plants will be treated with plant hormone "dip and grow" and placed into four different types of growth medias (potting soil, bark, hydroponically and perlite) and control to determine the rate of growth, quality of roots and length of roots. Twenty cuttings per plant species will be taken and observed for a 21 to 28 day period. All cuttings will be grown in the greenhouse and weekly measurements will be taken and recorded to determine which growth media that affected root initiation and development.

P-SP-U-22

Impact of Feeding Peanut Skins on Carcass Characteristics of Meat Sheep. J. Matthews*[1], G. Abdelrahim[1], J. Khatiwada[2], and J. Vizcarra[1], [1]Alabama A&M University, Normal, AL 35762; and [2]North Carolina A&T State University, Greensboro, NC 27411.

The overall objective of the study was to gain a thorough understanding of the feeding value of Peanut skins (PS) for meat sheep. The specific objectives were to investigate the effects of varying levels of dietary PS inclusion on dry matter intake, growth, and carcass characteristics of meat sheep. Twelve Gulf Coast ewe lambs (27.8 ± 2.3 kg initial BW, and 7 to 8 mo of age) were used in a randomized complete-block design (4/trt replicated twice for a total of 8/trt). Diets (on a dry matter basis) were: control, 20% PS, and 40% PS. All diets contained 50% fescue/bermudagrass mix hay, and 50% of the respective concentrate mixes. The concentrate mixes containing PS were formulated to be isonitrogenous at 16% crude protein. The PS replaced corn and soybean meal in the concentrate mixes so that diets contained desired amounts of PS. Data were analyzed as a completely randomized design. No differences were observed in hot carcass wt ($P = 0.67$), cold carcass wt ($P = 0.36$), body wall fat ($P = 0.01$), 12th rib fat ($P = 0.04$), and kidney and pelvic fat ($P = 0.03$) between treatments. However, the rib eye area (REA) was greater in lambs fed 20% and 40% PS than the REA in lambs fed 0% PS ($P = 0.03$). Based upon the findings of this research, PS can replace a portion of corn and soybean meal commonly fed to lambs without any negative effect on carcass characteristics.

P-SP-U-23

Effects of Row Spacing and Plant Population Density on Fruit Yield of Chili Pepper (*Capsicum* spp.) Genotypes. C. Payton*[1], C. R. Reddy[1], M. S. Rao[2], P. Igbokwe[1], A. Johnson[1], F. Chukwuma[1], and F. Matta[3], [1]Alcorn State University; [2]Alabama A&M University; and [3]Mississippi State University.

Cultural practices for chili pepper in Mississippi area have begun to shift from conventional wide (0.73-m) to narrower row spacing for maximizing pepper yields. Field experiments were conducted using new pepper genotypes, ASU 88 and MLK 99, to determine row spacing and plant population density effects on fruit yield in order to develop production practices for these new genotypes in southwest Mississippi. Yield per hectare of ASU 88 and MLK 99 chili pepper increased by 52 and 44%, respectively, as row spacing was decreased from 0.73 to 0.27 m during 2008 and 2009. Yield of ASU 88 did not increase with increased plant populations, while yield of MLK 99 increased as the plant population increased to 198, 000 plants ha^{-1}. Row spacing and plant population interaction for yield was significant for both cultivars. In another experiment, three chili pepper genotypes (ASU-29, ASU-34,

ASU-37) were grown at 0.21, 0.40, and 0.77 m row spacings in 2007 and 2008. Significantly higher yields were obtained as row spacing was decreased. Yields of three genotypes were up to 53% higher when grown at 0.21 compared with 0.77 m row spacing. Yield rank of the genotypes tested changed within the three row spacings. Genotype X row spacing interaction may require the testing of breeding lines for potential production at specific between and within row spacings.

P-SP-U-24

Carcass Characteristics of Wether Lambs Fed Increasing Levels of Distillers Dried Grains. M. Peterson*[1], G. Abdelrahim[1], J. Khatiwada[2], and J. Vizcarra[1], [1]Alabama A&M University, Normal, AL 35762; and [2]North Carolina A&T State University, Greensboro, NC 27411.

The objectives of this study were to determine the influence of feeding dried distillers grains plus solubles (DDGS) on carcass characteristics in lambs. Twenty-four wether lambs (40.1 ± 2.2 kg initial BW, and 8 to 9 mo of age) were used in a randomized complete-block design (4/trt replicated twice for a total of 8/trt). Diets were: control, 10% DDGS, and 20% DDGS. All diets contained 50% fescue/ bermudagrass mix hay, and 50% of the respective concentrate mixes. The concentrate mixes containing DDGS were formulated to be isonitrogenous at 16% crude protein. The DDGS replaced corn and soybean meal in the concentrate mixes so that diets contained desired amounts of DDGS. Lambs were allowed 7-d adjustment period, followed by 7-d transition period to the DDGS diets. After 135-d feeding period final weight was determined, lambs were slaughtered, and carcass characteristics were collected after a 48-h chill. Both growth and carcass quality data were analyzed as a completely randomized design. Final body wt was not different between treatments ($P > 0.05$). Also, no differences were observed in hot carcass wt ($P = 0.79$), cold carcass wt ($P = 0.73$), body wall fat ($P = 1.0$), ribeye area ($P = 0.34$), 12th rib fat ($P = 0.88$), and kidney and pelvic fat ($P = 0.71$) between treatments. Based upon the findings of this research, DDGS can replace a portion of corn and soybean meal commonly fed to lambs without any negative effect on carcass characteristics.

P-SP-U-25

Comparison of Temperature, Relative Humidity, and Dew Point between Two Different Types of Huts. S. H. Oh[1], W. C. Choi[2], and S. Routh*[1], [1]Department of Animal Sciences, and [2]Department of Civil, Architectural and Environmental Engineering, North Carolina A&T State University, Greensboro, NC 27411.

Pigs are sensitive to high temperatures, which cause them stress. Providing adequate shade is one of important factors in outdoor management systems. Many different types of shade huts are available. The objective of this study is to compare temperature (centigrade), relative humidity (RH; %), and dew point (DP; centigrade) of an English-type hut and a commercial hut (Smidley®). Two HOBO temperature loggers were placed on the ceiling inside of each hut. Data were collected every 10 minutes for 20 days from June 2 to June 21 in 2010. Total number of data was 2,649 in each hut; however, only 883 data were at the exact same time points so that those two different temperatures could be compared. Average of temperature, RH, and DP inside the English-type hut was 29.09±9.89, 67.44±29.70, and 20.07±2.79, respectively. Average of temperature, RH, and DP inside the Smidley® hut was 24.41±4.14, 67.75±13.60, and 17.03±4.96, respectively. The temperatures were analyzed with Paired Comparison in a T-Test procedure in SAS. The temperature, RH, and DP in the English-type hut were significantly higher than in the Smidley® hut ($p<0.01$). As a result, we concluded that the English-type hut is hotter and more humid than the Smidley® hut. More huts will be needed for further studies in different seasons.

P-SP-U-26

Effects of Brine Shrimp Feeding Regimen on Growth in Bluegill, *Lepomis macrochirus.* J. L. Schulte*, and J. E. Wetzel Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Economical indoor rearing of larval bluegill, *Lepomis macrochirus*, benefits from rapid transition from live to formulated diets. Live brine shrimp (BS) applications are diurnal to excess but evidence suggests nocturnal feeding under natural conditions. We report findings of two trials involving variations in supplemental nocturnal feedings and diurnal frequencies to control excess. Pro-larval bluegill broods 4-d post-conception were sampled for groups of 100 each. Groups (trial 1 = 3/brood; trial 2 = 6/brood) were stocked into 40-gallon aquariums. BS feedings were from exodus to 14 d. Trial 1 was a one-factor design with three feeding treatments: no nocturnal feedings (0800-1700 hourly), one nocturnal feeding (0800-1700 hourly + 2200), and two nocturnal feedings (0400 + 0800–1700 hourly + 2200). Trial 2 was a two-factor design (nocturnal x diurnal frequency) with six feeding treatments 1) 0800-1600 at 1-h intervals + 2200, 2) 0800-1600 at 2-h intervals + 2200, 3) 0800-1600 at 4-h intervals + 2200, 4) 0400 + 0800-1600 at 1-h intervals + 2200, 5) 0400 + 0800-1600 at 2-h intervals + 2200, and 6) 0400 + 0800-1600 at

4-h intervals + 2200. Fourteen days post-exodus fry were harvested, euthanized, enumerated and measured for weight. Trial 1 indicated weight differences between no nocturnal and two nocturnal feedings with one nocturnal feeding intermediate (p=0.026). Survival (p=0.45) and production (p=0.14) did not differ. Recommendation based on trial 1 is that larvae should be feed at 2200 and 0400 in addition to daily feedings. Trial 2 results and recommendation will be presented.

P-SP-U-27

Effects of Sources and Levels of Dietary Fiber on Digestibility and Performances of Growing Pigs. S. Smith*, A. Woldeghebriel, and T. Barrios, Department of Animal Sciences, North Carolina A&T State University, Greensboro, NC 27411

Sixteen crossbred {(Yorkshire x Landrace, sow) x Berkshire boar} barrows weighing 16.4 $\pm$1.3 kg were used to determine the effects of multiple sources and levels of dietary fiber (DF) on feed intake, weight gain, apparent total tract digestibility (ATTD) of feed, and fecal consistency score of weaning pigs. Pigs were randomly assigned to 1 of 4 diets after metabolic crate assignments with an individual pig serving as the experimental unit. The diets were iso-nitrogenous (18% CP) and iso-caloric (3.415 Mcal DE/kg) supplemented with vitamins and minerals to meet nutrient requirements. Diets used include: control (C), and three antibiotics-free diets (D1, D2, and D3) containing equal amount of sugar beet pulps with different ratios of oats and barley. The pigs had free access to water, but feed allowance was limited to 10% of average body weight, fed twice a day (0830, 14.30). The study period consisted of 10d of adjustment plus 5d of total urine and feces collection. Average daily feed intake and body weight gain of pigs that were fed D2 and D3 were higher than either the C or the D1 fed pigs. Pigs that were fed diets containing higher proportions of oats were more efficient than any of the other groups. The lowest fecal consistency score was for control and D1 fed pigs followed by D2 and the highest score was for D3 fed pigs. This study demonstrates the potential benefits of feeding different sources and levels of DF on the overall performances of pigs on antibiotics-free diets.

P-SP-U-28

Parity Effects on Reproductive Efficiency in Purebred Large White Sows (*Sus scrofa*). J. Streeter*, C. Okere, O. Bolden-Tiller, and W. McElhenney, Department of Agriculture and Environmental Science, Tuskegee University, Tuskegee, AL 36088.

There is considerable evidence that the choice of breed and the structure of the breeding herd have large impacts on reproductive efficiency in a commercial swine enterprise. The aim of this study was to analyze performance records and monitor reproductive efficiency in multi-parity purebred Large White sows housed at a 60-sow farrow-finish operation in Auburn, AL. Sow and litter traits recorded and analyzed were number of pigs born alive/litter, number weaned, pigs weaned per sow per year and litter weight at weaning from parity 1 through 10. Results indicate that parity had highly significant effect on number of piglets weaned / sow/ year. Litter piglet weight at weaning increased from parity 1 to 8 and declined slightly in parities 9 through 10. Compared with multiparous sows (parity 3 and older), first and second-parity sows had fewer total born but no significant decrease in number born alive reflecting a higher survival rate of neonates from lower parity sows. Also, the number of piglets weaned per litter increased from parities 1 to 7, then remained steady at parity 8, but declined in parities 9 - 10. The beneficial effects of sow parity on overall herd reproductive competence appear to be primarily due to differences in productivity of primiparous and multiparous sows. These results suggest that maintaining a higher proportion of multiparous sows is the key to optimize reproductive efficiency in pig herds.

P-SP-U-29

Effect of Shipping Environment and Extender Composition on Motility of Liquid-Stored Ram Semen. S. D. Szabo*, E. J. Chozu, and S. Wildeus, Agricultural Research Station, Virginia State University, Petersburg, VA 23806.

Efforts are underway to develop simple vaginal AI techniques using liquid-stored chilled semen after short-term storage. Here we evaluated the effect of shipping environment and extender composition on motility of semen stored for 72 h. Semen was collected from 8 hair sheep rams and pooled with equal contributions from each ram. Pooled semen was divided into four subsamples, extended with either skim milk-only, skim milk + egg yolk (5% v/v), skim milk + glycerol (3% v/v), or skim milk + egg yolk + glycerol to 250 million sperm/ml, and packaged in 0.5 ml straws. Straws were placed in styrofoam boxes (5.5 L interior volume and 38 mm wall thickness) with three cooler packs rated at either -1°C or -23°C. Semen was evaluated for motility parameters with a computer assisted sperm analyzer after 0, 24, 48 and 72 h storage in the two storage environments (three straws per assessment). Cooling rate at straw level was similar between the two environments, however, the -23°C packs reached a lower

temperature than the -1°C packs (5 vs. 7°C) but returned to ambient temperature more quickly. Progressive motility of sperm was significantly higher and was retained longer in extenders containing egg yolk. The -1°C packs maintained progressive motility longer than the -23°C packs. Curvilinear and average pass velocity of spermatozoa was highest in the skim milk + egg yolk extender with -1°C packs. Results suggest that modifications of extender composition and shipping environment can be tools to improve storage of liquid semen.

P-SP-U-30

Orexigenic Effects of Anti-Ghrelin Antibodies in Broad-Breasted White Turkeys. A. Vizcarra*, H. Wright, L. Shackelford, G. Abdelrahim, D. Washington, and J. Vizcarra, Department of Food and Animal Sciences, Department of Biology, Alabama A&M University, Normal AL 35762.

Ghrelin, a 28-amino acid orexigenic hormone, is predominantly produced in the stomach and induces increased feed intake in all mammalian species studied to date. In contrast to mammals, studies in poultry found that ghrelin inhibits feed intake. To evaluate the effect of ghrelin in turkeys (*Meleagris gallopavo*), we performed passive immunization against ghrelin, using plasma from pigs that were previously immunized against ghrelin. One-day old broad-breasted white turkeys were reared using normal feeding and lighting management recommended by the industry. At 5 weeks of age, animals were stratified by feed consumption and randomly assigned to a 2 x 5 factorial arrangement of treatment. Four days before treatments were applied (day -4) animals were weighed and placed in individual cages with free access to feed and water. On day 0, turkeys were given intravenous (iv) injections (0.5, 1.0, 2.0 4.0 or 8.0 mL; n = 20) of pooled undiluted plasma, obtained from pigs actively immunized against ghrelin (passive immunization), or iv injections (0.5, 1.0, 2.0 4.0 or 8.0 mL; n =20) of undiluted normal pig plasma (control). Starting on day 0, feed and water intake was determined every 5 to 15 h by recording the weight of feed or water offered minus any unconsumed feed or water remaining. Water intake was not affected by treatment; however, feed intake was significantly increased in birds that were passively immunized against ghrelin. Our data suggests that in turkeys, the response to ghrelin is the opposite of that described in mammalian species.

P-SP-U-31

Plant Regeneration and *Agrobacterium*-Mediated Genetic Transformation in Valeria (*Valeriana officinalis* L.). A. L. Williams*, and S. K. Dhir, Center for Biotechnology, Department of Plant Science, Fort Valley State University, Fort Valley, GA 31030.

Valeria (*Valeriana officinalis* L.) is a perennial, flowering plant used as an herbal medicine. Tissue culture and genetic engineering have provided rapid methods to develop desirable varieties of cultivated plant species. Transient gene expression has a wide range of applications in molecular genetics. The goal of this work was to establish an optimal transient gene expression system using *Agrobacterium tumefaciens* into different explants from which the whole transgenic plants can be regenerated. Leaf explants from one-month-old in-vitro-grown plants were infected by *A. tumefaciens* carrying a binary vector that harbors a β-glucuronidase (GUS) and Neomycin Phosphotransferase (nptII) genes. The infected leaf explants were incubated for three days before they were subjected to GUS histochemical assay. The transformability was determined as the percentage of leaf explants expressing the GUS gene and as the intensity of gene expression (blue color). Several parameters, including different concentrations of acetosyringone during co-cultivation, the length of the pre-culture period of explants prior to infection, co-cultivation period, different bacterial density (OD), and duration of immersion periods were tested. The results, based on transient GUS gene expression of explants, suggested that one-month-old leaf explants inoculated for 60 minutes with 0.4 OD and 150 μm acetosyringone and co-cultivated for 3-4 days in MS medium with 2, 4-D showed 80-90% transformation efficiency. To our knowledge, this is the first report of Valeria susceptibility to *A. tumefaciens*-mediated genetic transformation. This procedure will allow us to introduce relevant genes in order to control synthesis of secondary metabolites through metabolic engineering.

P-SP-U-32

Clonal Propagation through Nodal Explants Culture of *Valeriana officinalis*, a Rare Medicinal Plant. J. Williams*, A. L. Williams, and S. K. Dhir, Center for Biotechnology, Department of Plant Science, Fort Valley State University, Fort Valley, GA 31030.

Valeriana officinalis is a perennial, flowering herbal plant native to Europe and parts of Asia. It is a medicinal plant used as a muscle relaxer for anxiety relief, as well as a sleep aid. Due to its variations, poor seed production and germination, and the cost and time required for traditional breeding, clonal propagation should be used in order to produce large scale homogeneous plants with high yields of Valerian. In propagating Valerian clonally, a simple one step method for the regeneration of plants/multiple shoots in via using nodes as explants and studying the effect of benzyl amino purine (BAP) and kinetin (KN) was developed. We supplemented the MS media

with various concentrations of cytokinins to study which concentration had the best effect on producing Valerian efficiently and effectively. The results from this protocol indicated that KN or BAP at 2.5 mg/L was the best concentration. Comparing KN 2.5 mg/L with IAA, IBA, or NAA, maximum number of shoots were observed with KN 2.5 mg/L + IAA 0.1 mg/L. Rooting was effectively achieved on MS supplemented with IAA at 1.0 mg/L. The subsequent hardening experiment showed that the commercial medium containing a mixture of decomposed coir waste, perlite and organic compost in the ratio of 1:1:1 by volume was most effective, with 80% of plantlets surviving. Regenerated plants were morphologically uniform, having normal leaf shape and growth.

P-SP-U-33

Comparing On-line Marketing Strategies to Traditional Marketing Strategies for Herbs. N. D. Williams*, and A. E. Clardy, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37209.

With the explosion of computers and the Worldwide Web, online services for information and sales opportunities are on the rise. Therefore, with this occurrence, it is time to determine if on-line marketing will be significantly beneficial for the herb growers as well as vegetable growers. Vegetable growers traditionally have sold their goods at farmers markets, roadside stands, and other venues. With the increase of the number of homes having compters and internet access, it is time to evaluate and compare the advantages and disadvantages of the selling of herbs through on-line applications compared to traditional marketing practices.

P-SP-U-34

Effect of Passive Immunization Against Ghrelin on Animal Behavior. H. Wright*, A. Vizcarra, L. Shackelford, G. Abdelrahim, and J. Vizcarra, Department of Food and Animal Sciences, Department of Biology, Alabama A&M University, Normal Al 35762.

One-day old broad-breasted white turkeys (*Meleagris gallopavo*) were reared as recommended by industry standards. At 5 weeks of age, animals were stratified by feed consumption and randomly assigned to a 2 x 2 factorial arrangement of treatment. Four days before treatments were applied (day -4) animals were weighed and placed in individual cages with free access to feed and water. On day 0, turkeys were given intravenous (iv) injections (4.0 or 8.0 mL; n = 9) of pooled plasma, obtained from pigs actively immunized against ghrelin (passive immunization), or iv injections (4.0 or 8.0 mL; n = 9) of normal pig plasma (control). On day 0, a laptop computer with a built-in color camera and appropriate software was used to record birds for nine consecutive hours, starting 4 h before treatments were applied. Video clips were saved and a human observed and annotated animal behavior manually. Feeding behavior was evaluated by obtaining the number of pecks from the cup feeder and the time devoted for feeding. Drinking behavior was evaluated by the apparent ingestion of water from the cup and the amount of time devoted for drinking. Body position (standing or sitting) was evaluated by the amount of time devoted to these behaviors. No differences in behavior were observed before treatments were applied. However, after treatments were applied, the number of pecks and the time devoted to feeding was significantly increased in treated birds. We concluded that passive immunization against ghrelin affects feeding behavior in turkeys.

Graduates (16)

P-SP-G-1

Pigeonpea: A Potential Vegetable, Grain and Forage Legume Crop in Alabama. R. Baggett*[1], S. R. Mentreddy[1], J. Herring[2], and U. Bishnoi[1], [1]Department of Natural Resources and Environmental Sciences, and [2]Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Pigeonpea (*Cajanus cajan*) is a drought tolerant, summer legume, used for human food and livestock feed in Asia. The fresh pods are consumed as vegetable or as a snack when boiled in salt water. The dry mature grains are split and used for human consumption in multiple ways. The foliage is often used as forage for animals. The seeds are nutritious with high digestible protein (68%), low in fat, sodium, and cholesterol. As a forage crop it can fill the late summer/fall gap when good quality forage is not available. A replicated field trial was conducted to determine genotype that is best suited as green fresh vegetable or dry matured grain, and optimum planting date and intra-row spacing using four genotypes. Planting dates May 28th and June 22nd comprised main plot treatments; genotypes GA1, GA2, W1 and W3 were sub-plots, and intra-row spacing of 5, 10, and 15 cm were sub-sub-plot treatments in a split-split plot design with four replications. The genotypes GA1, GA2, W1, and W3 reached full flowering within 89, 80, 92, and 86 Days after planting (DAP), respectively; and peak pod development within 110, 94, 113, and 104 DAP, respectively. Preliminary data showed that early flowering lines, GA2 and W1 may be better suited for dry mature grain production and later maturing lines could be better as fresh green vegetable in Alabama. Optimum

planting date and spacing based on final yield as a vegetable or matured dry grain and leaf and stem forage quality will be discussed.

P-SP-G-2

A Comparison of iPod Touch® and Paper-Based Field Data Collection Systems. J. C. Cambron*, and M. K. Bomford, Community Research Service, Kentucky State University, Frankfort, KY 40601.

Agricultural field data have traditionally been recorded in field notebooks or on paper datasheets. Paper-based data collection systems present challenges associated with bulk, consistency, legibility, organization, and data transfer to computer for analysis. The iPod Touch® ($229+) is a handheld computer that runs several software applications that allow direct entry of data in agricultural field settings. To assess the potential of the platform and available software, individuals were randomly assigned either a notebook and camera or a handheld device equipped with one of three applications: 1) Google Docs® (free); 2) Office2® ($5); or 3) HanDbase® ($10). Times required for setup, data collection, data recording, and data transfer to a desktop computer were recorded for a set of standardized field and laboratory. The data collection methods were compared in terms of speed, accuracy, and ease-of-use. The handheld computer did not speed data transfer to the desktop computer. Advantages of the handheld computer included its portability and breadth of functions. Google Docs was the only method requiring a wireless signal, which may be unavailable or intermittent in agricultural field settings. The iPod Touch was compatible with field data collection in an agricultural setting.

P-SP-G-3

Comparison of Physiochemical Properties of Goat Milk and Name Brand Soaps. R. Drake*, R. Ragan, J. H. Lee, and B. Kouakou, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Goat milk is known for its beneficial and therapeutic effects for people who have cow milk allergies. While it is not as popular as cow milk, the use of goat milk for manufacturing milk products is increasing. Artisanally, on the farm, or in commercial settings, successful products that are being manufactured include pasteurized milk, various cheeses, ice cream, yogurts, soaps and lotions. For this study, three brands of cleansing and moisturizing soap bars (Dial, Dove and Ivory) were purchased from a local retail store and their pH, moisture content and physical hardness were tested and compared to that of goat milk soap which was made at Fort Valley State University. The pH of the goat milk soap (10.50) was comparable to that of Ivory (10.64). Moisture contents differed among all varieties, with Ivory having the highest moisture (14%) followed by the goat milk soap (11.8%), Dial (7.7%) and Dove having the least (6.1%). The physical hardness ranked Dial as the hardest (1465 g), followed by Dove (1002 g), with the goat milk soap (484 g) and Ivory (335 g) being the softest.

P-SP-G-4

Combining High Tunnel and Agroforestry Technologies for Vegetable Production in Small Farms of North Carolina. A. Elobeid*[1], M. Reyes[1], and J. Idassi[2], [1]Department of Natural Resources and Environmental Design, and [2]Cooperative Extension, North Carolina A&T State University, Greensboro, NC 27411.

With the growing popularity of 'buying local' farm products, small farmers can compete with large commercial farm operations by establishing niche products. One such niche is fresh, highly perishable vegetables that are at their best when moved from the farm directly to the dining table. Recently, interest has been increasing in the use of high tunnels, which are unheated, plastic-covered structures that afford an intermediate level of environmental protection and control requiring low chemical inputs. Use of these tunnels has allowed growers to expand the growing season into late fall and early spring. While the effectiveness of high tunnels has been demonstrated, their use in combination with other strategies for "controlling" the growing environment has not received much attention. One set of strategies that might be used in combination with high tunnels is agroforestry applications. Agroforestry, the integration of working trees on farms, provides ecosystem services, by protecting natural resources, sequestering carbon, providing wildlife habitat and shade, ameliorating soil quality, and pumping back percolated nutrients. To explore the potential of this combination of growing environment strategies, this research seeks to answer the question, "Is it technically and economically feasible to combine high tunnel and agroforestry technologies?" The design of the experiment is a split-plot with three replications, with main-plot 'near trees and far from trees,' and split in to 'with high tunnel and with no high tunnel. The research is replicated on three North Carolina farms. High tunnel construction for each farm and results of fall 2010 season will be reported.

P-SP-G-5

Effect of Garlic and Papaya Seed on Fecal Egg Counts in Sheep and Goats. M. C. Gooden*[1], J. G. Schwarz[1], N. C. Whitley[2], and D. J. Jackson-O'Brien[3], [1]Department of Agriculture, Food and Resource Sciences, University of

Maryland Eastern Shore, Princess Anne, MD 21853; [2]North Carolina A&T State University, Cooperative Extension Program, Greensboro, NC 27420; and [3]Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901.

Gastrointestinal nematodes (worms) continue to be a major constraint to sheep and goat producers throughout the world. The use of chemical athelmintics (dewormers) has been the traditional method used to control these internal parasites. However, overuse and misuse of athelmintics have led to an increased resistance of gastrointestinal nematodes to chemical dewormers in many parts of the world, including the United States. Consequently, new methods to control or modulate internal parasites must be found. Experiments conducted in countries around the world have indicated some success in using garlic and papaya seeds for their anthelmintic properties. The objective of this study was to evaluate the efficacy of garlic juice and papaya seeds in reducing fecal egg counts (FEC) in sheep and goats. In Experiment 1, 18 Katahdin ewe lambs were placed in individual pens and administered either garlic juice or water daily for 21 days. In Experiment 2, 22 naturally infected Boer-Spanish crossbred yearling does were randomly assigned treatments of papaya seeds every two days for 21 days, or as the control. In Exp. 1, FEC increased over time for all animals but were not influenced by treatment. In Exp. 2, papaya seeds failed to significantly reduce FEC in goats. In this study, garlic juice and papaya seeds were not effective in reducing fecal egg counts in lambs and goats. More studies are needed to evaluate the use of natural plant dewormers in small ruminants.

P-SP-G-6

Synergistic Effects of Organic Selenium and Zinc Single and Combined on Fertility and Hatchability. K. Hickerson*, M. Thornton, and V. G. Stanley, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

A study was conducted to examine the single and combined effects of organic Selenium (Se) and Zinc (Zn) on fertility and hatchability of exotic birds. Forty hens and four males were randomly separated into four treatment groups: Group 1, the Control fed diet with no supplements; Group 2, with 0.33 ppm of Zn; Group 3, with 0.33 ppm of Zn and Group 4 with the combined treatment of Se and Zn. The duration of the study was 11 days. Data were collected on egg production, % fertility, and hatchability, early and late embryonic mortality. Results show that there were no statistical differences among the groups. However, there were numerical differences, as the combined treatment of Se and Zn exceeded the other groups. Fertility and hatchability improved greatly with the combined treatment of Se and Zn. Eggs produced from the Zn-treated hens had the lowest late embryonic mortality. In conclusion, the positive interactions observed, indicated that there is great benefit from the combination of Se and Zn in improving fertility and hatchability.

P-SP-G-7

***In vitro* Galax Seed Germination under Different Treatments.** R. C. Jackson*, G. Yang, and Z. Lu, Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

Galax (*Galax urceolata*) is an evergreen perennial and native from Virginia to Georgia. The glossy green leaves turn red in winter and are collected from the wild for use in floral decorations. Because of over harvesting, the existence of this species is becoming threatened. Normal propagation is by division of the underground rhizomes. However, growth is very slow, making this method generally uneconomical. Expediting the multiplication of Galax would increase its potential in becoming economically viable as a cash crop. We studied influences of culture medium pH and strength, seed stratification, and seed maturity as indicated by color on Galax seed germination *in vitro*. The best germination rate, 78%, occurred in dark colored seeds, which are the most mature, stored in the refrigerator. By comparison, the non-refrigerated seeds on pH 5.8 plain agar medium experienced a 0.6% germination rate. There was no apparent difference between pH treatments for the final germination count. The refrigerated dark seeds produced a 32% higher germination rate than light colored seeds. This suggests there is a potentially significant effect from seed maturity and refrigeration on the rate of germination. For all seeds tested, MS medium at half strength was the best for germination, although "no MS nutrients" produced an initial higher germination. A similar germination rate was obtained from the seeds cultured with full strength MS medium. Basic medium nutrients were required to sustain the tiny seedling survival and subsequent growth because the Galax seeds have very limited amount of endosperm.

P-SP-G-8

Identification of Key Proteins Associated with Fat Accretion in Broiler Chickens Using a Proteomics Approach. G. Kelley*, A. Stewart, X. Wang, F. Chen, and S. Nahashon, School of Agriculture and Consumer Science, Tennessee State University, Nashville, TN 37209.

Fat accretion in poultry directly influences the efficiency of feed utilization and consumer acceptability of poultry and poultry products. Losses estimated at $250-300 million are incurred by consumers and processors annually in pollution control, extraction and disposal of excess carcass fat. Understanding underlying mechanisms of excessive fat deposition in poultry will aid in improving carcass quality and minimize production cost. We hypothesized that chicken adiposity is highly influenced by factors beyond the genome. Therefore, the aim of this study was to employ a proteomics approach to identify proteins that may be associated with fat accretion in broiler chickens. One hundred and twenty 1-day-old broiler chickens were randomly assigned to floor pens and fed standard broiler diet for eight weeks. The diets comprised 3,200 Kcal ME/kg diet and 23% crude protein (CP) and 3,275 Kcal ME/kg diet and 20% CP. At eight WOA, experimental birds were sacrificed and adipose tissue from the abdominal and visceral areas was collected, weighed and frozen in liquid nitrogen prior to storage at -80^{o}C until used. Adipose proteome from the birds with the highest and lowest abdominal fat percentage (eight birds each) was assayed using two-dimensional differential gel electrophoresis (2D-DIGE) followed by in-gel digestion and Matrix Assisted Laser Desorption/ionization Time-of-Flight (MALDI-TOF) mass spectrometry. A total of 132 spots were found to be differentially expressed between the extreme birds ($P<0.05$). Several of the proteins are unique and some are involved in metabolic pathways that are associated with fat accretion including vimentin, apolipoprotein, and anexin.

P-SP-G-9

Effect of Cydectin® (Moxidectin) Oral Drench for Sheep for Controlling *Haemonchus contortus* Infections in Goats. R. Merriott*, H. Mukhtar, R. C. Noble, and M. Worku, Department of Animal Science, North Carolina A&T State University, Greensboro, NC 27411.

Cydectin Oral Sheep Drench is approved for use in sheep to control 13 types of adult and larval stages of internal parasites. The objectives of this study were to evaluate the efficacy of Cydectin® (moxidectin) oral sheep drench (Fort Dodge lab) as dewormer against *Haemonchus contortus* in six goats with fecal egg counts more than 500 eggs per gram of feces on the day of treatment. The goats were maintained at the NC A&T small ruminant research unit. Cydectin® was administered to the goats via oral drench at a dose of 0.02mg/kg. On days 0 days and 14 fecal samples were taken from the goats and fecal egg counts (FEC) were conducted using a modified version of the McMaster's method. The numbers of Coccidia and *Haemonchus* eggs/gram of feces were recorded. Cydectin® efficacy was calculated using the fecal egg count reduction test as recommended by the World Association for the Advancement of Veterinary Parasitology. When administered at the recommended dose, Cydectin® proved to have a 100% anthelmintic efficacy in five of the six animals tested. One animal exhibited only 47% efficacy. Further in this study treatment with Cydectin and decreased *Heamonchus* egg counts were associated with up to 100% reduction in the levels of coccidia eggs. Cydectin Oral sheep drench is effective for controlling *Haemonchus* in goats. Further, studies are needed to evaluate the effects for controlling coccidia in goats. Levels of infection, genetic variability in susceptibility of goats to parasites and other factors may also influence the efficacy of this dewormer.

P-SP-G-10

Estrus, Mating and Fertility Response in Meat Goats following Estrus Synchronization Protocols. K. K. Matthews*[1], D. J. Jackson-O'Brien[1], E. Crook[1], J. Eierman[1], and N. C. Whitley[2], [1]Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901; and [2] Cooperative Extension Service, North Carolina A&T State University, Greensboro, NC 27420.

Forty-six Boer–crossbred meat–type does and two bucks were used to examine the effectiveness and subsequent fertility of using a controlled internal drug releasing device (CIDR) containing progesterone in combination with the buck effect and pregnant mare serum gonadotropin (PMSG), when compared to no hormonal priming before buck introduction in synchronizing estrus during the non-breeding season. To facilitate use of the buck effect, males were removed from sight, sound and smell of females for three weeks prior to the beginning of the study. All goats were housed in dry lots and separated into two groups. On day –9, CIDRs (0.3 g progesterone) were inserted vaginally into females in the CIDR group. At CIDR removal (day 0), does received 300 IU of PMSG i.m. and all females were grouped for mating with two mature bucks wearing marking harnesses for 14 days. Females were checked four times daily for mating and number of does marked was recorded to determine time to first mating and percentage mated. Transabdominal ultrasound was conducted to determine pregnancy 76 days post-mating. Litter size and birth weights were recorded at kidding. More females in the CIDR-treated group were mated and do come into heat faster than those not treated. However, there were no differences in conception rates, kidding rates, kid birth weight or litter size between treatments. In summary, though the hormonal estrus synchronization protocol used was more effective in synchronizing estrus during late spring, subsequent fertility was similar to that

of non-treated animals.

P-SP-G-11

Effect of Supplemental Grower/Finisher Ration Protein Level on Performance of Crossbred Meat Goats Grazing Joy Chicory Pasture. S. Murray*, B. Barlow, and M. Lema, Department of Agricultural Science, Tennessee State University, Nashville, TN 37209.

Chicory (*Chicorum intybus*) is becoming popular as warm season forage for ruminant livestock. A study was conducted with weaned crossbred meat goats to elucidate how growing/finishing meat goats grazing Joy chicory pasture respond to supplementation with varying levels of dietary protein. Thirty weaned crossbred kids (26 $\pm$ 3 kg) were blocked by body weight and genotype and divided into three treatment groups. Each treatment group was replicated in two 0.4 ha Joy chicory and paddocks with five kids per paddock and supplemented with iso-caloric grower/finisher ration containing 11, 17 or 23% crude protein for 56 days. Grower/finisher ration intake (1.13, 1.31 and 1.31 kg/day) and cost (0.41, 0.51 and 0.51 dollars/day) for the 11, 17 or 23% supplemented groups, respectively, were not affected by protein content of the diet. Total live weight gain (7.7 kg) and average daily gain (145.0 kg) for the 17% protein level were significantly higher ($P < 0.05$) than for 11% (2.7 kg and 52.0 g, respectively) and 23% (6.0 kg and 113.0 g, respectively) protein levels. Feed cost per kg gain was significantly lower ($P < 0.05$) for the 17% protein level than for the 11 and 23% protein levels (3.5 versus 7.8 and 4.5 dollars/day, respectively). Boneless retail cut followed the same trend as weight gain. Increasing protein level in the diet from 17 to 23% did not result in significant improvement in weight gain or return over feed cost.

P-SP-G-12

Development of Gene-Based Markers for Diversity Study in Peanut Germplasm Using the Trap Marker Technique. M. Omoaholo*, and G. He, Plant Genome Lab, Tuskegee University, Tuskegee, AL 36088.

The advent of advanced genomics has generated thousands of expressed sequence tags (ESTs) using a large scale sequencing in each crop species. However, the level of polymorphism in EST sequences is low due to the conservation of their genes, thus designing primer pair to detect EST sequence variation is difficult to make a gene-based marker. Even EST-SSR primer pair still identifies lesser genetic variation than using genomic SSR primer pair. Target region amplification polymorphism (TRAP) is a fairly new PCR-based molecular marker technique, which uses one primer to anneal with the targeted EST sequence, another primer to bind either an intron or exon by either forward or reverse primer of sequence related amplified polymorphism (SRAP) marker. The objective of this study was to test the feasibility of TRAP markers in assessing genetic variation of peanut germplasm by using TRAP technique. The study will help to understand the relationship of peanut germplasm at the gene level. We have modified our protocol by using one EST-SSR primer instead of general EST primer to anneal with targeted EST sequence. About 48 pairs of EST-SSR and SRAP Primers were used to test for polymorphism on four selected parental genotypes (Tifrunner, GT-C20, H-22, and D-99). The results showed more variability among the selected DNA samples using TRAP primers than by using EST-SSR primers alone though the level of polymorphism was low.

P-SP-G-13

Evaluation of Grape (*Vitis* L.) Germplasm for Downy Mildew (*Plasmopara viticola*) Resistance. R. Pierre*, and J. Lu, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32317.

Downy mildew of grapes, caused by the fungal pathogen [*Plasmopara viticola* (Berk. & Curt.) Berl. & de Toni], is one of the most destructive diseases of grapevines worldwide. This disease could cause potential disastrous economic and environmental consequences. It is even more so in areas like Florida with warm and humid sub-tropical climate conditions. Developing new grape cultivars resisting towards *P. viticola* is a lofty goal of many grapevine breeding programs, including the grape breeding program at FAMU. The aim of the present study is to evaluate the available grape germplasm at the experimental vineyard of Florida A&M University, to select downy mildew resistant grapevines for future breeding. For this purpose, field and laboratory surveys were conducted during the growing season of 2010. The levels of resistance among the genotypes evaluated were compared with those of European (*Vitis vinifera*) and native muscadine (*Muscadinia rotundifolia*) cultivars. Variable resistance was observed under natural conditions in the vineyard. The field data were supported by artificial inoculation in the lab. Statistical analysis showed significant difference in the level of resistance among the Florida hybrid bunch grapes, the European and the muscadine grapes. Microscopic observation of selected genotypes will help characterize the interaction between the fungus and its host at a cellular level.

P-SP-G-14

Identification of Small RNAs in Common Bean (*Phaseolus vulgaris* L.) from 454 Transcriptome Sequencing. Y. Thurston*[1], Z. Liu[1], and V. Kalavacharla [1,2], [1]Department of Agriculture and Natural Resources, and [2]Center for Integrated Biological and Environmental Research, Delaware State University, Dover, DE 19001.

Common bean (*Phaseolus vulgaris* L.) is an edible bean initially cultivated more than 7000 years ago in Central and South America. Over time, common bean has proven to be a low cost source of protein that is nutritionally and economically important. Common bean is worth $600 million and is a major source of fiber to the U.S. Compared to most plant genomes, common bean is relatively small-600 mega base pairs (Mbp); making it a good model species for studying sequence organization and evolution of the legume family. MicroRNAs in plants are known to play a major role in development, nutrient homeostasis, abiotic stress and pathogen responses via interactions with specific target mRNAs. MicroRNAs are well conserved in eukaryotic organisms and are thought to be a vital and evolutionarily ancient component of genetic regulation. In this study, we analyzed our 454 sequences derived from transcriptome sequencing to identify candidate microRNAs. Our analyses show that three sequences carried signature hairpin stem loops. Using a combination of computational methods (mfold software, and mirBase database), evaluation against published microRNA criteria, and current experimental approaches, we are validating expression of these microRNAs.

P-SP-G-15

Use of Goats for Controlling Invasive Weeds in New Castle County, Delaware. J. C. Warren*[1], D. J. O'Brien[1], and R. Beaman[2], [1]Department of Agriculture and Natural Resources, Delaware State University, Dover, DE 19901; and [2]Delaware Department of Transportation, Dover, DE 19901.

Invasive weed species are becoming a problem throughout the state of DE and the rest of the U.S. Compared to burning, mowing, and chemical use, animal grazing is a more sustainable method of invasive weed control. It was the objective of this study to determine the effectiveness of goat browsing in controlling Autumn Olive (AO; *Elaeagnus umbellate),* Multiflora Rose (MR; *Rosa multiflora*), and Japanese Honeysuckle (JH; *Lonicera japonica).* Approximately 1.95 hectares of land was split into five fenced in paddocks with three treatment (TRT; 0.45 hectares each) and two control (CON; 0.30 hectares each) paddocks. Thirty-five crossbred meat type goats were used in the experiment. Goats grazed each TRT for two weeks, at the end of which they were moved to the next TRT. Sampling was done every two weeks for BW, and visual estimates, using the double DAFOR method, were made for AO, MR, and JH. Also, an estimate of percentage ground cover was measured at each sampling. Mean BW remained constant over the study period. AO was the dominant invasive species in all paddocks over the study period. At the end of the grazing period, visual estimates of JH decreased in the TRT paddocks compared to the CON, while MR was similar between TRTs. In addition, there were no differences between TRTs in groundcover percentage noted. In summary, goat browsing was effective in controlling JH following one grazing season, however it might require multiple grazing seasons to have an impact on AO and MR.

P-SP-G-16

Somatic Cell Counts and DNA Isolation for Gene Expression Studies in Dairy Cows. J. William*, H. Mukhtar, and M. Worku, Department of Animal Science, North Carolina A&T State University, Greensboro, NC 27411.

Increases in somatic cell counts in milk result from an influx of blood leukocytes into the mammary gland, in response to infection. Both high MSCC and anemia are associated with cases of subclinical mastitis in cows. Such changes may impact the concentration of DNA available for in vitro isolation of DNA. This study analyzed the relationship between MSCC and packed cell volume (PCV) and white blood cell (WBC) differential counts. Ten Holstein Friesian cows at the NCA&T Dairy Unit were used. Monthly records were used for MSCC. Blood was collected from the jugular vein. The PCV was used as a measure of anemia. The WBC differential count was conducted on Wrights stained blood smears. Blood collected on FTA cards was used for DNA extraction and evaluation by spectrophotometry. The Pearson Correlation test was conducted using SAS software. The results showed a negative correlation between PCV% and % lymphocytes ($r=-0.94070$, $p=0.0016$). A positive correlation was observed between MSCC and % lymphocytes ($r=0.76148$, $p<0.046$). A negative correlation was observed between MSCC and % neutrophils ($r=-0.08542$, $p<0.8555$), MSCC and % eosinophils ($r=0.44177$, $p<0.3210$) and PCV and MSCC($r=-0.553$, $p=0.197$). A positive correlation was observed between the DNA purity and MSCC ($r = 0.62565$, $p=0.1329$) while the correlation between MSCC and DNA concentration was weakly negative ($r=-0.20764$, $p=0.6551$). Average concentration and purity of isolated DNA were 22.41 ng/ul and 2.41, respectively. Migration of leukocytes out of the circulation may impact the concentrations and types of blood cells available for isolation of DNA.

Scientists (49)

P-SP-S-1

A Novel Gold Nanoparticle Based Biosensor for Accurate Detection of Luteinizing Hormone. Z. Afrasiabi*[1], R. Almodhafar[1], A. Zambre[2], R. Kannan[2], S. Prayaga[3], and A. Upendran[4], [1]Cooperative Research Programs and the Department of Life and Physical Sciences, Lincoln University, Jefferson City, MO 65101; [2]Department of Radiology, University of Missouri-Columbia, Columbia, MO 65212; [3]Antibody Research Corporation, St. Peters, MO 63304; and [4]Nanoparticle Biochem, Inc., Columbia, MO 65203.

An important determinant to the economics of livestock production success is the genetic quality of the animals. The most cost effective method for improving the genetic quality of animals is to artificially inseminate females using semen obtained from a genetically superior male. However, females are often inseminated at the wrong time due to inadequate estrus detection. Developing a device to determine the appropriate breeding time would be highly beneficial and could result in increased use of artificial insemination. We have developed a novel platform technology using gold nanoparticles to detect extremely low levels of luteinizing hormone in sheep and goats. Our detection of hormone involved conjugation of anti-luteinizing hormone to gold nanoparticles (antiLH-AuNP) as sensors, in which the color of the sensor changes to red from colorless. Our platform nanotechnology sensor results in detection of hormone in less than 10 minutes and detection limit ranging from picomoles to nanomoles. We have corroborated the detection limits of sensor using standard ELISA technique. The synthesis, physicochemical characteristics of antiLH-AuNPs and its use to detect luteinizing hormone, and ELISA results will be presented.

P-SP-S-2

Mitochondrial Function and Growth in Channel Catfish, *Ictalurus punctatus*: Strain and Diet Effects. M. F. Ashame*[1], J. C. Eya[1], C. F. Pomeroy[1], B. Manning[2], and B. Peterson[3], [1]Department of Biology and Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112; [2]Thad Cochran National Center for Warm Water Aquaculture, Mississippi State University, Stoneville, MS 38776; and [3]USDA-ARS Catfish Genetic Research Unit, Stoneville, MS 38776.

A 2 x 6 factorial experiment was conducted to evaluate the effects of diets (32/4 or 36/6 % protein/fat) and channel catfish strains (A, B, C, D, E, or F) on the performance, mitochondrial respiratory chain enzyme activities and gene expression levels in the liver, muscle and intestine. The analyses of mitochondrial respiratory chain enzyme activities and gene expression analyses were performed on strains C and D with the lowest and highest feed efficiency. Results indicate that feed consumption per fish and feed efficiency (FE) were significantly affected by the fish strain but not by diets. Feed intake was significantly different between strain C and the rest of the five strains. Strain D had the highest FE compared to strain C that had the least FE. Data regarding mitochondrial complex enzyme activities showed that the activities of the liver mitochondrial complexes (I, II, III, IV) were all significantly lower in low FE compared with those in high FE strain. A significant diet X strain interaction effect was only observed in the liver for complex I. The effect of strain on the expression of the five selected genes in liver, intestine and muscles showed a significant up-regulation of ND1 in the liver and its down-regulation in the intestine and muscle for high FE strain compared to low FE. Cytochrome B (CYTB) gene was significantly down-regulated in the intestine and muscles in high FE but was not significantly affected in the liver. Diet had no significant effect on the expression of genes in the liver and muscles of both strains.

P-SP-S-3

Total Polyphenols, Antioxidant Content, and Chemical Profiling in Leaves of Roselle (*Hibicsus sabdraiffa*) Accessions. K. L. Chin*[1], Y. Qi[1], J. Coppin[2], Q. Wu[2], J. Simon[2], and R. C. Nicholas[3], [1]Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813; [2]New Use Agriculture & Natural Plant Products Program, Department of Plant Biology and Pathology, SEBS, Rutgers University; and [3]Urban Forestry Program, Southern University and A&M College Baton Rouge, LA 70813.

A field trial was conducted during 2009 growing season in Baton Rouge, LA for 22 Roselle (*Hibicsus sabdraiffa*) accessions collected worldwide. The seed sources of the accessions included Cuba (2 accessions), Georgia (1), Ghana (2), India (1), Jamaica (1), Malaysia (1), Nigeria (2), Poland (1), Senegal (1), South Africa (3), Sudan (3), Taiwan (1), Thailand (1), and Zambia (2). Mature leaves from these accessions were collected in September and oven dried. The total polyphenols and antioxidant activities in leaves of the 22 accessions were quantified using UV-Vis spectrometric methods and their chemical profiles were analyzed using LC/UV/MS. The variation among the accessions was low in total phenol content (ranged between 1.2-1.8% by wt) as compared to the

total antioxidant content (ranged between 1.9-5.1% by wt). By analyzing the UV and MS data, and in comparison with the authenticated standards, a total of 10 polyphenols/flavonoids were identified including gallic acid, chlorogenic acid and the isomers, and quercetin, kaemferol and the glucosides and rutinosides in hibiscus leaf extract. The profiles of the 22 hibiscus leaf samples were also compared using the developed method and the results indicate that, except for the India and Thailand accessions, the profiles of all the other samples are very similar. The results will serve as baseline quality control information for future analysis of nutritional compounds and their values in selected Roselle accessions.

P-SP-S-4

The Effects of Mulches and Fertilizers on the Growth and Development of Various Herb Varieties. A. E. Clardy*, School of Agriculture and Consumer Sciences, Cooperative Extension Program, Tennessee State University, Nashville, TN 37209.

Alternative crop production and marketing strategies for new, small and/or limited resource producers and farmers to supplement their incomes need to be explored and developed. Growing herbs as an alternative crop in Tennessee could be a potential answer to the alternative or niche market for new and small growers. We will evaluate two different fertilizer types and four different mulching techniques to prevent excessive weeding and preventing the use of herbicides in the herb beds, therefore producing "herbicide free" plants. We will evaluate various herbs for their potential harvesting and marketing ability as an alternative crop.

P-SP-S-5

Pole Lima Beans: A Mid-Atlantic, Niche-Market Crop. J. Clendaniel*, and M. Wasylkowski, Cooperative Extension, Delaware State University, Dover DE 19901.

Pole Lima Beans have been a very popular crop in the Mid-Atlantic region for years. This type of lima bean is worth a considerably more than commercially grown bush lima beans. Although this crop is labor intensive, pole lima beans can be profitable to small farmers. Delaware State University Cooperative Extension's Small Farms Program has been demonstrating and running trials on this type of bean for the past several years. The demonstrations have revealed the best beans to plant and how far to space the beans while planting. The demonstrations were aimed at helping new and beginning farmers get into a niche money-making market. Trials were conducted to ascertain the effects of fertilizer and planting dates. All of the beans used in the demonstrations and trials have been a DSU Doctor Martin bean seed variety. X different types of fertilizer were applied to provide similar rates of N, P and K. Of the types tried, pelletized poultry manure showed the best results based upon overall yield. In the preliminary trial of planting dates we found that May 29th was the best time to plant the ten-day-old plants in the ground. In future demonstrations, we hope to continue increasing the yields of the beans as well as bring some profitability to the region. These trials will continue over the next planting season for more accurate results.

P-SP-S-6

Cytokine Gene Expression in Parasite Resistant Goats Pasture Exposed to *Haemonchus contortus.* M. M. Corley*, and A. A. Saeed, Virginia State University, Petersburg, VA 23806.

Interleukin 13 (IL-13) is a cytokine secreted by T-helper type 2 (Th2) immune cells. Gut expulsion of a variety of mammalian [human (*Homo sapien*), sheep (*Ovis aries*), mice (*Mus musculus*)] nematodes requires IL-13 secreted by Th2 cells. Interleukin 13 enhances gut contractions and glycoprotein hyper-secretion that create an environment hostile to the parasite leading to detachment of the nematode from the gut wall. Studies on the relationship between standard methods of *Haemonchus contortus* infection detection [FAMACHA (FAM) eye color charts, packed cell volume (PCV), fecal egg counts (FEC)] and the ability to predict parasite resistance through IL-13 and other cytokine responses need to be assessed in goats (*capra hircus).* This study evaluated expression of IL-13 in selected parasite resistant Spanish and Myotonic goats. Whole blood, and abomasal and intestinal tissues were harvested from goats exhibiting susceptibility and resistance to *Haemonchus contortus* through standard and DNA detection methods. Enzyme Linked Immunosorbent Assay (ELISA) and Reverse Transcriptase PCR (RT-PCR) were performed to determine IL-13 expression. Results showed that IL-13 was expressed 70% more in intestinal than abomasal tissues. Parasite resistant goats expressed more IL-13 than susceptible goats. There was a strong positive correlation between FEC, FAM and IL-13 expression and strong negative correlation between PCV and IL-13 expression. These data indicate that IL-13 expression can be used to possibly predict susceptibility or resistance to *Haemonchus contortus* infection in goats, allowing IL-13 based anthelmintic drug development and goat producers the ability to select parasite resistant animals.

P-SP-S-7

Leaf Morphology and Stomatal Density Varies by Pawpaw (*Asimina triloba*) Variety. S. B. Crabtree*, K. W. Pomper, K. Neblett, and S. Skaggs, Community Research Service, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

Pawpaw [*Asimina triloba* (L). Dunal] is a tree fruit indigenous to the eastern U.S. As the satellite site for the USDA National Clonal Germplasm Repository for *Asimina* species, goals of the Kentucky State University (KSU) pawpaw research program include description and classification of unique germplasm. Leaf morphology is observed to vary among pawpaw cultivars but has not been previously described quantitatively. Leaf stomatal density among pawpaw cultivars has also not been previously reported. Plants with fewer stomata on their leaf surfaces can be more drought-tolerant due to reduced transpiration. The objectives of this study were to examine leaf morphology and frequency of stomata in 10 pawpaw cultivars. Five leaves were collected from 10 different pawpaw cultivars ('Middletown', 'Mitchell', 'NC-1', 'Overleese', 'PA-Golden', 'Shenandoah', 'Sunflower', 'Taytwo', 'Wilson', and 'Wells') at the KSU research farm. Leaf stomata impressions were made using clear fingernail polish and mounted to a microscope slide using adhesive tape. Stomata were counted using a compound light microscope at 400x magnification. Stomatal density varied significantly by cultivar, with 'Sunflower' having the most stomata per mm^2; and 'Shenandoah', 'Mitchell', and 'Wells' the fewest stomata per mm^2. These cultivars could potentially be more drought-tolerant than others due to their low stomatal density. Leaf length, width, and area did not vary among the cultivars examined. Leaf thickness did vary significantly by cultivar, with leaves from 'Shenandoah' being thicker than those of the other nine cultivars examined.

P-SP-S-8

A Possible Association of Mitochondrial Function with Feed Efficiency in Rainbow Trout, *Oncorhynchus mykiss*: Diets and Full-Sib Family Effects. J. C. Eya*, M. F. Ashame, and C. F. Pomeroy, Department of Biology and Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112.

A 2 x 4 factorial experiment was conducted, to evaluate the effects of diets (40/10 or 45/19 % protein/fat) and rainbow trout full-sibling families (designated as 076, 254, 256 or 257) on the performance, mitochondrial respiratory chain enzyme activities, and mitochondrial gene expression in the liver, muscle and intestine. Results indicated that full-sibling type had significant main effects on weight gain, feed consumption, feed efficiency (FE) and specific growth rate. Diet composition had no significant main effect on weight gain, feed consumption, FE, specific growth rate, and condition factor, regardless of the full-sib family type. There was no significant interaction between full-siblings and diet composition for weight gain, feed consumption, FE, specific growth rate, and condition factor. Full-sibling with the least weight gain and FE had significantly low nutrient utilization efficiencies. There were variations in the mitochondrial complex enzyme activities and expression levels of some mitochondrially encoded genes in different tissues. Generally, full-sib family with high FE and better nutrient utilization had higher numerical values for respiratory chain enzyme activities, down-regulation of hepatic complex I ND1 gene and its up-regulation in the intestine and muscle compared to the low FE full-sib family. These data demonstrate that full-sib family 257 of rainbow trout appears to possess superior traits in growth performance compared with the full-sib family 256 and that diet has important impact on rainbow trout production and that a commercial diet containing 40% dietary protein and 10% dietary fat is as good as diet with higher protein and fat levels for enhanced growth performance, mitochondrial enzyme activities, and gene expression.

P-SP-S-9

The Red Palm Weevil, *Rhyncophorus ferrugineus*, in the Netherland Antilles: A New Threat to Florida and the Caribbean. K. K. M. Fiaboe*[1], M. T. K. Kairo[1], A. Roda[2], F. Franken[3]; T. G. Damian[3], M. F. Leito[4], and M. Joubert[4], [1]CBC/CESTA, Florida A&M University, Tallahassee, FL 32307; [2]USDA/APHIS/CPHST, Miami, FL 33158; [3]DLVV Oranjestad, Aruba; and [4]DLVV, Willemstad, Curacao.

The red palm weevil (RPW), *Rhynchophorus ferrugineus* (Olivier), is a serious pest native to South and Southeast Asia. It has been reported from 36 countries in Asia, Africa and Europe. The first report of the pest's presence in the Western Hemisphere was only made in 2009 when it was reported from the Netherland Antilles, specifically Curacao and Aruba. RPW attacks more than 21 host plants, but mainly threatens canary palm (*Phoenix canariensis*), date palm (*P. dactylifera*) and coconut (*Cocos nucifera*). The control of RPW requires an integrated approach involving monitoring and mass trapping (with traps containing aggregation pheromone, food bait, water and/or insecticide), insecticide application and cultural practices. Successful eradication has been reported only from Israel and most recently from the Canary Island. Here we report on ongoing efforts to develop and implement management programs in Curacao and Aruba. We also report on adaptive research activities aimed at developing and implementing an eradication program specific to these Islands. The implication of the findings on eradication of

the pest on isolated Islands is also discussed.

P-SP-S-10

Optimum Duration of Performance Testing Growing Boer Bucks for Growth Rate, Feed Intake, and Feed Efficiency. W. Hu, T. A. Gipson*, S. P. Hart, L. J. Dawson, A. L. Goetsch, and T. Sahlu, American Institute for Goat Research, Langston University, Langston, OK 73050.

This study was conducted to determine the minimum length of time required for accurate evaluation of Boer bucks for ADG, DMI, and feed efficiency as assessed by ADG:DMI and residual feed intake (RFI). Data were collected from 425 bucks in Langston University tests from 2000 to 2009. Bucks averaged 111±25 d of age and 27±8 kg BW at the beginning of the test, consumed a pelletized 50% concentrate diet ad libitum, and were weighed weekly. Weekly data of four performance traits were analyzed using the MIXED procedure of SAS with a repeated-measures model. The first-order ante dependence [ANTE(1)] structure type was selected as the appropriate covariance structure based on goodness-of-fit criteria. Residual variance relative to that at 84 d (%) was 338, 272, 223, 188, 153, 129, 119, and 108% for ADG, 167, 159, 149, 141, 130, 119, 112, and 106% for DMI, 427, 305, 223, 164, 135, 123, 112, and 105% for ADG:DMI, and 156, 138, 131, 118, 107, 103, 102, and 102% for residual feed intake at 28, 35, 42, 49, 56, 63, 70, and 77 d, respectively. Residual variance stabilized at 63, 63, and 57 d for ADG, ADG:DMI, and RFI, respectively. A break-point for DMI was not estimable, although the correlation between DMI at 63 and 84 d was 0.99 compared with r of 0.95, 0.96, and 0.97 for ADG, ADG:DMI, and RFI, respectively. In conclusion, the duration of Boer buck performance tests could be decreased from 84 to 63 d with little loss in accuracy.

P-SP-S-11

Effects of Small Ruminant Type and Level of Intake on Metabolism. A. Asmare[1], R. Puchala[1], K. Tesfai[1], G. D. Detweiler[1], L. J. Dawson[2], A. R. Askar[1], T. Sahlu[1], and A. L. Goetsch*[1], [1]American Institute for Goat Research, Langston University, Langston, OK 73050; and [2]College of Veterinary Medicine, Oklahoma State University, Stillwater, OK 74078.

Boer (BG), Spanish goat (SG) and Rambouillet sheep (RS) wethers, ≥ 2.5 yr of age, consumed grass hay ad libitum (AL) or in restricted amounts (RE). Initial BW was 50, 74, and 40 kg for BG, RS, and SG, respectively. BW change was lowest among animal types for RS (-0.18, -0.29, and -0.14 kg/d for BG, RS, and SG, respectively). NDF digestibility was similar among animal types. Total energy expenditure (EE) in kJ/kg $BW^{0.75}$ was greatest among animal types for BG (363, 335, and 335 kJ/kg $BW^{0.75}$ for BG, RS, and SG, respectively) and similar between levels of intake. EE in MJ/d by the portal-drained viscera (PDV; 1.43, 1.25, and 1.17 MJ/d) and liver (1.16, 1.14, and 1.08 MJ/d) was similar among animal types. Net fluxes of ammonia N across the PDV (3.1, 2.4, and 3.0 g/d) and liver (-4.1, -3.5, and -3.8 g/d for BG, RS, and SG, respectively) were similar among animal types. PDV net flux of urea N was greatest among animal types for RS (-4.0, -1.4, and -3.6 g/d for BG, RS, and SG, respectively). Net flux of urea N across the liver was similar among animal types (3.1, 3.3, and 5.2 g/d for BG, RS, and SG, respectively). In conclusion, with these limited nutritional planes, sheep were less able to reduce EE than goats, which may have involved differences in extra-splanchnic tissue metabolism, and N recycling appeared less extensive for sheep vs. goats, but to a magnitude less than to impact fiber digestion.

P-SP-S-12

Selection of Heirloom Tomato Varieties for Future Grafting Trials. S. Gu*, and T. Blank, Cooperative Research and Extension Programs, Lincoln University, Jefferson City, MO 65101.

Growing heirloom tomatoes would have been more profitable, if the heirlooms had the resistance to foliage and soil-borne diseases. While foliage diseases can be managed in both conventional and organic systems, soil-borne diseases remain a major obstacle in production. As an emerging technique in the United States, grafting heirloom tomatoes will reduce the loss from soil-borne diseases, thanks to the resistance from rootstocks. The objective of this trial was to select high quality and high yielding heirloom tomato varieties, which will be used for grafting trials next year. In 2010, 27 heirloom varieties were chosen, based on the test results of 60 varieties in 2009. The tomato plants were started with seeds in a greenhouse and transplanted in a research plot at Lincoln University George Washington Carver Farm. Standard raised beds covered with black plastic and buried trickle irrigation were used in the trial. Data collected included disease resistance, growth habit, yield, and fruit quality. The size of fruit, sensory quality and yield were used as the major selection criteria. Of the 27 varieties tested, Pineapple, Aunt Ruby's German Green, Royal Hillbilly, Coustralee, Cherokee Purple and eight others were selected for grafting trials to be conducted in both field and high tunnels next year.

P-SP-S-13

A Measure of Comparative Production Performance of Kiko and Boer-Crossbred Goats under Pine-Silvopastoral Conditions. N. K. Gurung*, A. W. Elliott, S. G. Solaiman, and B. R. Min, College of Agricultural, Environmental and Natural Sciences, Tuskegee University, Tuskegee, AL 36088.

In an effort to develop Peace Haven Farm, Greenville, Alabama into a goat-silvopasture demonstration and training site for Tuskegee University, 20 high percentage Kiko and Boer goats (10 each) were raised under pine-silvopasture feeding system from May through October. During the rest period, goats were browsed under woodland vegetation and fed hay to maintain regeneration of silvopasture system. In the fall, two purebred bucks, Boer and Kiko were used to breed females. Boer buck served high percentage Kiko does while the pure Kiko buck served the Boer does. Based on the preliminary data, the Kiko goats had lower kid mortality compared to Boer goats. The weaning percentage rate for Boers was 63.6% while Kiko goats weaned 75% of their kids. The number of kids weaned per doe bred was higher for Kiko goats (1.1) as compared to Boer goats (0.8). Likewise, twinning percentage was higher for Kiko compared to Boer goats. The packed cell volume (mm), Haemonchus and coccidia (egg/g of feces) were 13.0, 3767, and 723 for Boer while the corresponding values were 23.3, 180 and 550, respectively, for Kiko goats. Based on the preliminary data, Kiko goats were more suited to pine-silvopasture system in Alabama.

P-SP-S-14

The Effects of Mixed-Species Grazing Systems on the Performance of Brangus Calves. A. Harris*, S. Gebrelul, L. Gray, and R. Marshall, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Record weights of 257 calves born between 2008 and 2009 were analyzed to determine the effects of mixed-species grazing systems. Brangus cows were randomly assigned to continuous or rotational grazing systems and were allowed to graze alone or mixed with Spanish goats at a stocking rate of 0.2 AU/ha. The rotational pastures were divided into four paddocks where each paddock was grazed for 7d and allowed to rest for 21d. Animals were weighed every 28d from February until September of each year. Data were analyzed using SAS GLIMMIX procedure where animals were included in the model as random effects. Calves grazing alone were heavier (134.5 ± 3.1 vs. 125.2 ± 3.2 kg) than those grazing mixed with goats. Calves under continuous grazing weighed 10.2 kg more than those in rotation. Body weights ranged from 52.2 ± 6.6 kg in February to 207.4 ± 4.6 kg in September where the differences between months were significant. This is due to the natural growth rather than treatment effects. Calves grazing alone under continuous grazing were similar in weights to those in rotation, but were heavier than calves in mixed grazing under rotational grazing. Except for month and year effects, no differences in weights were observed due to grazing system or species mixed grazing in cows. These observations indicated that the calves required more time to adjust and perform when mixed with goats. More information is needed to evaluate mixed grazing systems under Louisianan conditions.

P-SP-S-15

Perceptions of Limited-Resource Producers towards Pasture-Raised Pork in Southwest Mississippi: A Survey. A. Joseph[1]*, M. O. Ezekwe[1], and C. Okere[2], [1]Alcorn State University; and [2]Tuskegee University.

Although pasture-raised is not yet widely known to everyone, evidence suggests strong growth in consumer demand and willingness to pay more for pork raised in a manner that is humane and environmentally friendly. Therefore, the objective of this study was to examine limited-resource producers' attitude towards pasture-based pork production. A random sample of limited-resource producers (N=200) from 18 southwest Mississippi counties was surveyed. Descriptive statistics were used to analyze data. One hundred and sixteen producers provided usable data for the study. Ninety- two percent of respondents were male and 8% were female. A majority (79%) of producers were aware of pasture production system. Eighty-three percent (83%) were willing to convert their existing facilities to a pasture-based swine management system. Over 85% were willing to adopt the Alcorn State Swine Center artificial-insemination-assisted reproductive technique in their sows. Eighty-nine percent (89%) of producers were also willing to adopt the Alcorn State Swine Center Feed Resource Management Program that combines the traditional grain-based diet with pasture and vegetable sources. These producers used various marketing methods to sell and purchase their hogs, such as from sale barns, packers, neighbors, regular purchases from sale barns, auctions, directly from other producers, and Alcorn State Swine Center. Results of this study indicate that pasture-raised production may provide a means of enhancing sustainability in swine management methodology in southwestern Mississippi. Extension educators will work with producers to answer any questions they may have on pasture production, marketing, and management practices.

P-SP-S-16

Extension Education and Research Needs of Livestock Farmers in Alabama. U. Karki*[1], N. Baharanyi[1], D. Moxey[2], A. Elliott[3], J. Moore[4], A. Jackson[5], and W. Baldwin[6], [1]Tuskegee University Cooperative Program, [2]Department of Agricultural, Environmental, and Natural Science, Tuskegee University, Tuskegee, AL 36088; [3]Dallas County Cooperative Extension Office, Selma, AL 36701; [4]Barbour County Cooperative Extension Office, Clayton, AL 36016; [5]Greene County Cooperative Extension Office, Eutaw, AL 35462; and [6]Macon County Cooperative Extension Office, Tuskegee, AL 36088.

Livestock production is one of the important enterprises adopted by Alabama farmers. However, many farmers are struggling to get benefit out of their farm. Extension education programs based on existing situation and research finding will be useful to help these farmers. Objectives of this research were 1) to assess existing situation, constraints, and training needs of livestock farmers in Alabama and 2) to recommend suitable extension education and research programs for improving existing farm situation. Research was conducted in nine Black Belt Counties of Alabama. A structured questionnaire was developed and distributed to 44 livestock farmers, who volunteered to participate in this study. Among the participants, 60% were beef cattle producers and 27% goat producers. Seventy-seven percent of the farmers were 30 to 70 years old, and 18% were more than 65 years of age. Eighty-two percent farmers were male. The purpose of livestock farming for 48% farmers was income, whereas hobby was the main purpose for 29% of the farmers. Eighty percent farmers had warm-season grass dominated with bahiagrass, and only 25% farmers had white clover. Majority of the farmers indicated that they were not keeping a good record of farm activities, animal performance, and financial information. Most of them were basically following traditional management practices. Research and extension education programs are needed to improve management practices and reduce cost of production. Also, training is needed on a good record keeping system so that they can monitor the benefits of livestock farming.

P-SP-S-17

Identification and Characterization of Grape Leaf Proteins with Relevance to Photosynthesis. R. Katam*[1], S. M. Basha[1], P. Suravajhala[2], and K. Sakata[3], [1]Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL USA 32308; [2]Department of Science, Systems and Models, Roskilde University, Universitetsvej 1, 4000 Roskilde, Denmark; and [3]Department of Life Science and Informatics, Maebashi Institute of Technology, 460-1, Kamisadori, Maebashi-city, Gunma 371-0816 Japan.

Bunch and Muscadine grapes are commercially grown worldwide for fresh fruit and wine. These species differ in their sugar content and composition, photosynthetic efficiency, and tolerance to abiotic and biotic stresses. Muscadine grapes (*Vitis rotundifolia*) are native to the southeastern United States and are widely cultivated for making wine and consumed as fresh fruit. However, muscadine berry accumulates less sugar compared to *V. vinifera*. In view of the unique physiology and genetic make-up of muscadine grape, a proteomics study was conducted to increase our knowledge of *Vitis* leaf proteome and to determine protein identity and function for enhancing photosynthetic efficiency of muscadine grape, and to improve enological and disease tolerance characteristics of other grape species. High throughput two-dimensional gel electrophoresis (2-DE) was conducted on muscadine grape leaf protein extract which revealed presence of >258 proteins. Identity of these proteins was determined by MALDI/TOFF analysis. Of these, 68 proteins were found to be related to photosynthesis. Protein interaction studies on these proteins revealed that CR88, a heat shock protein was found to have seven interactors. Developmental studies revealed that several photosynthesis-related proteins are differentially expressed during leaf development. Comparative analysis of leaf proteome showed that 17 of these polypeptides varied among muscadine, bunch and Florida hybrid bunch grape species. These data showed that photosynthesis-related proteins were more abundant in *V. vinifera* compared to other *Vitis* species studied. The differences in leaf protein content and composition found among these species appear to contribute to their unique physiological and photosynthetic characteristics.

P-SP-S-18

Clonal Propagation of Guava (*Psidium guajava* L.) on Nodal Explants of Mature Elite Cultivars. X. Liu*, and G. Yang, Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

Guava (*Psidium guajava* L.), sometimes called “the apple of the tropics,” is rich in vitamins, minerals, organic acids, pectins, and many high-grade antioxidants. Seventy-nine phytochemicals provide guava with many unique properties and actions. However, there are obstacles to propagation, including explant browning or blackening of culture medium due to leaching of phenolics, microbial contamination, and *in vitro* tissue recalcitrance. We have developed a micropropagation system using Murashige and Skoog (MS) medium with 6-

benzylaminopurine (BA), kinetin and naphthaleneacetic acid (NAA). Various disinfection methods and plant growth regulators were tested *in vitro*. The most effective method was soaking explants in a 15% bleach solution for 20 mins, then culturing them in MS medium with 250mg/L polyvinylpyrrolidone. This method maximized percentage of bud break (53.3%), while producing the minimum explant browning rate (18.3%). The best observed proliferation rate (71.2%) occurred on the MS medium supplemented with 4.44 μM BA, 4.65 μM kinetin and 0.54 μM NAA. It produced the highest mean number of shoots (2.2). Shoots were then rooted (65%) when dipped in 4.9 mM Indole-3-butyric acid solution for 1 min and rooted plantlets survived (100%) after acclimatization to the greenhouse. Our research demonstrated a potential solution to aforementioned obstacles and developed an in vitro clonal propagation protocol for guava that could lead to production of bioactive compounds.

P-SP-S-19

The Pawpaw Peduncle Borer (*Talponia plummeriana*): A Pest of the North American Pawpaw (*Asimina triloba*). J. D. Lowe*, K. W. Pomper, J. D. Sedlacek, K. L. Friley, and S. B. Crabtree, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

The North American pawpaw [*Asimina triloba* (L.) Dunal] is a tree-fruit in the early stages of commercial production and has had few pest problems. One pest, the pawpaw peduncle borer (*Talponia plummeriana*), is a moth in the Tortricidae family. Pawpaw peduncle borer adults are about 6 mm in length with gray speckled wings and a wide copper band at the end of the wings. Traditionally, it was thought that larvae only fed on pawpaw flower peduncles. The larvae bore into the flower and peduncle eventually killing the flower. Most years, the damage is light; however, in some years there can be significant loss of flowers reducing fruit set. In the orchards of the Kentucky State University Pawpaw Research Program, a small number (less than 5%) of unripe and ripe pawpaw fruit show evidence of feeding activity from an unknown fruit borer causing extensive internal injury to the fruit. Infested fruit were placed in containers and the adults allowed to emerge. The adults were tentatively identified as pawpaw peduncle borer. Growers in Ohio also believe they have observed pawpaw peduncle borer damaging young trees. The larvae bore into the main stem and down into the root system killing the tree. While pawpaw peduncle borer damage is usually light, it does have the potential to significantly reduce fruit yields by flower and fruit damage, and potentially killing young trees. This pawpaw pest may become a larger problem as the number of pawpaw plantings increases and control measures may need to be implemented.

P-SP-S-20

Expediting Production of Alexandrian Laurel through Micropropagation. Z. Lu*, and G. Yang, Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411.

Alexandrian laurel (*Danae racemosa* L.) is a broadleaf, dark evergreen shrub with arching branches that grow to three feet high and four feet wide. Although it is relatively hardy when reaching maturity, it has a long growth/maturation period that has limited its commercial use. Normal propagation is with seeds and by division. When grown from seeds, germination takes up to a year but successful germination is only about 20%. Moreover, it typically takes up to six years to produce a saleable one-gallon size plant. This research was undertaken to develop a protocol for efficient germination and rapid production. Several treatments were investigated including soaking seeds in such solutions (hot water, GA_3, H_2SO_4) germinating fruits and seeds and scarifying fruits. To further expedite the micropropagation of Alexandrian laurel, different cytokinins such as BA and TDZ were studied to increase *in vitro* shoot multiplication. Substantial success was achieved for seeds cultured *in vitro* with GA_3, with germination occurring in only 2-3 months at a rate of 80-100%. BA accelerated the growth of micropropagated shoots. TDZ significantly promoted shoot multiplication and proliferation, but shoots were short. The vigor and growth of micro-propagated plantlets were much higher than conventionally propagated plants, and had healthier looking and more abundant roots. At one year, the micropropagated plantlets were as big as three-year old conventionally propagated ones. Much progress has been made and further research with combinations of different plant growth regulators should move us closer to developing an efficient micropropagation system for Alexandrian laurel.

P-SP-S-21

Physical and Thermal Properties of Sericea Lespedeza Pellets. A. K. Mahapatra*, D. L. Harris, T. H. Terrill, B. Kouakou, and G. Kannan, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Feeding sericea lespedeza (SL; *Lespedeza cuneata*) pellets has been identified as a natural alternative for controlling gastrointestinal nematodes (GIN) in small ruminants. Design of machines and processes for sorting, handling, transportation, and storage requires information about the physical properties of feed pellets. Thermal properties of pellets are needed in the optimization of coolers for freshly made pellets and in appropriate

management of stored pellets in bins and silos. In the current study, bulk density, unit density, porosity, hardness, gross calorific value, thermal conductivity, thermal diffusivity, and specific heat of SL pellets were determined at various moisture contents. Most physical characteristics of the SL pellets were significantly affected by moisture contents from 7.26 to 15.55% wet mass basis. Pelleting increased the bulk density of the SL by three fold, thus reducing the amount of space required for transportation and storage. At higher moisture content, there was a decrease in pellet hardness. Gross calorific value decreased with increase in moisture content. The thermal conductivity and thermal diffusivity values of SL pellets were not significantly affected by changing moisture content. The results may provide guidelines for animal scientists and pellet manufacturers about the role of moisture content on SL pellet physical and thermal properties.

P-SP-S-22

Transitioning an Organic Site at UMES: The Process, Opportunities, and Challenges. L. E. Marsh*, F. M. Hashem, and C. P. Cotton, Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853.

The organic food industry continues to experience tremendous growth in this decade. Prompted by the consumer's heightened consciousness and perceptions about the quality and safety of these foods, the demand continues to rise at the regional and national levels in the USA. At the same time, guidelines at the state and national levels are established to facilitate the process and to be followed so that production sites can be certified as organic. At the University of Maryland Eastern Shore, we initiated the transition of a two-acre conventional university farm site and a high tunnel for certified organic production. These sites will serve as organic research, teaching, and demonstration locations that will provide information and encourage local farmers to transition to organic production. Our current management practices include use of organic hairy vetch and rye as cover crops for nitrogen fertilization, use of a buckwheat and cowpea mix for trap crop, selected use of mychorrhizae and poultry compost for nutrients, and use of approved certified organic seeds of tomatoes (*Lycopersicon esculentum*) and tomatillos (*Physalis philadelphica*) and tatsoi [*Brassica rapa* L. (Narinosa Group)] for research. Research at the sites includes studies to determine food safety of fresh produce grown on amended soils. Pest management, particularly of insects on heirloom tomatoes, has been a challenge and has included the use of approved OMRI chemicals. With the completion of two years of transition and state inspections regarding the management practices and adherence to necessary guidelines, we anticipate becoming a certified site after three years.

P-SP-S-23

The Effect of Synchronization Treatments on Estrus Response in Does During the Seasonal and Non-Seasonal Breeding Periods. A. McKenzie-Jakes*, G. Nurse, and G. Bryant, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Reproduction efficiency is one of the most important economic traits in terms of livestock production. Maintaining good reproductive functions in the herd is pivotal to the success of any livestock production system. Theoretically, a gestational period of five months should support more than one kidding interval per doe per year. However, the seasonal breeding behavior of goats in the U.S. has limited the producer's ability to increase herd productivity and to access markets that will bring the highest economic returns. In recent years, estrus synchronization has become a valuable reproductive tool for controlling and manipulating the breeding period in does. The objective of this study was to determine the efficacy of three different treatment regimens on inducing cyclic heat in seasonal and anestrous does. Eighty does were randomly assigned among three treatment groups and a control group. Cyclic heat was observed in all of the does in treatment groups B (CIDR + PGF2@) and C (CIDR + PG600). Heat was observed between 24.90 $\pm$ 4.23 hours and 25.25 $\pm$ 10.27 hours respectfully in trial 1. Furthermore, all of the does in the study had higher pregnancy, kidding and weaning weights in both trials compared to the control group and treatment group D (Buck Effect) The findings of this study indicated that CIDR in conjunction with Lutalyse or PG600 can induce estrus successfully during both breeding periods.

P-SP-S-24

Extending Information to Small Poultry Flock Owners through the Development of a Small Flock Education Series. B. McCrea*, Cooperative Extension, Delaware State University, Dover, DE 19901.

Beginning in October 2008 through August 2009, a series of extension workshops were held in Delaware for small poultry flock owners. The workshop series was titled the Small Flock Education Series (SFES). The SFES was held once in each of Delaware's three counties every other month. Delaware is the home of the densest population of broiler production in the United States, so it is important that small flock owners be educated and well-informed about good management practices. Prior to these workshops, no extension workshops or seminars on

small flock poultry management were available to this group of poultry owners.
The workshop series served a four-fold purpose: 1) Determining the best method of advertisement to reach this unorganized group of flock owners; 2) Determining the demographic of small flock owners; 3) Determine the current level of knowledge held by flock owners; and 4) Educating small flock owners about good management practices. Several different methods of advertisement were used initially to draw interest to the SFES. Fliers and brochures at local feed stores were the most effective at bringing in the 200 attendees. The demographic of most small flock owners was bi-modal: both young adults and a 50+ age group. Both groups mainly showed interest in laying hens. It was determined that the majority of small flock owners had a rudimentary level of knowledge about good management practices and almost no knowledge about biosecurity. The survey information gathered from the SFES was used to determine future extension program planning and efforts.

P-SP-S-25

Change in Behavior of Goat Producers after On-Line Training in Health Practices. R. C. Merkel*, and T. A. Gipson, American Institute for Goat Research, Langston University, Langston, OK 73050.

In 2006, Langston University unveiled an on-line training and certification program for meat goat producers (http://www2.luresext.edu/training/qa.html) consisting of 22 learning modules, including herd health, biosecurity and internal parasite control. In March 2010, an electronic survey was sent to 160 certified producers to assess impact of the training. Fifty-four surveys were completed for a response rate of 33.7%. Prior to certification, 52.8% of respondents used selective deworming criteria. Current deworming practices include: FAMACHA, 43; visual condition, 28; pasture rotation-based, 15; and calendar-based, 14, for practice and percentage of responses, respectively (χ^2=19.02, P<0.001). When deworming, 76% of respondents said that only animals requiring deworming received anthelmintic (χ^2=14.52, P<0.001). The dosage of dewormer given was most often calculated based upon table guidelines given in the certification course (54%), vs. 35% who relied on veterinarian instructions and 11% who self-determined dosage amounts (χ^2=18.22, P<0.001). Over 60% of respondents reported that prior to becoming certified they did not consult a veterinarian for use of drugs extra label. When asked how current withdrawal times for drugs not approved for goats are determined, 41% of responses reported using veterinarian instructions with an identical percentage using table guidelines from the certification course; with 19% of responses using information from the internet (χ^2=7.32, P<0.03). Results of the survey show changes in behavior of certified goat producers when compared with previous practices in anthelmintic usage. Changes in production practices noted imply that an on-line training course can be effective in promoting proper herd health practices for goat producers.

P-SP-S-26

Use of Geospatial Technologies to Understanding Invasion Processes to Mitigate the Invasion of Chilli Thrips (*Scirtothrips dorsalis*) in Florida. K. Milla*, M. T. K. Kairo, S. Reitz, and A. B. Lorenzo, Center for Biological Control, College of Engineering Sciences, Technology, and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The chilli thrips (*Scirtothrips dorsalis*) is a relatively new pest in Florida. Interest in chilli thrips continues to grow due to the ease of spread in field and ornamental crops, and its potential negative impacts on yield and economics. The highest reported detections in the Cooperative Agricultural Pest Survey (CAPS) coincided with a high density of nursery and garden centers as well as with large urban areas and high population density. Climate-based risk maps were generated using the NC-State University-APHIS Plant Pest Forecast (NAPPFAST) modeling system to predict the possible extent of this pest's distribution. NAPPFAST links climate and historical weather data with biological development models for a specified pest. Climate risk maps generated were based on the generic degree day and insect degree-day templates in NAPPFAST and developmental requirements of 9.7^0 C as the base developmental temperature and 281 accumulated degree days from oviposition to oviposition. Plant host data in the risk map were obtained from county acreage data published by the USDA National Agricultural Statistical Service (NASS). Results suggest the occurrences of transportation, urban development, production nurseries and garden centers are positively correlated with population distributions of chilli thrips, and show the highest risk occurring in southwest Florida, with lower risks occurring in north Florida than central Panhandle region. The study shows NAPPFAST's potential for regional risk analysis, and demonstrates that a well-chosen allocation of resources to preliminary studies such as this one could possibly have a larger ultimate payoff in prevention of later economic losses.

P-SP-S-27

Effects of Feeding Pine Bark on Gain Efficiency, Ammonia and Methane Production, and Parasite Load in Goats. B. R. Min*, and S. G. Solaiman**,** Department of Agricultural and Environmental Sciences, Tuskegee

University, Tuskegee, AL 36088.

We have conducted a series of in vivo and in vitro trials utilizing ground pine bark additive (0, 15 and 30% of total feed intake) with growing Kiko-cross goat kids. Goats were strategically dewormed with commonly used anthelmintic; however, most resistant worms survived under controlled environment. The most significant finding of this work was that average fecal egg counts (an indication of parasite load) was reduced by 52-56% with 15-30% pine bark inclusion. More significantly, these were resistant worms that could not be eliminated by anthelmintic drugs. Feeding pine bark at 15-30% of diet improved average daily gain and feed efficiency linearly. There was no difference in initial body weight (BW) of goats; however, final BW linearly increased with increasing pine bark additive in the diet. Feeding pine bark was associated with higher feed intake, improved feed efficiency and enhanced rumen fermentation (low acetate: propionate ratio and lower ammonia level). In vitro fecal incubation results indicated that feeding pine bark reduced total fecal gas and methane gas emission linearly. Similarly, feeding pine bark at low and high levels lowered total methane gas production by 45.6 and 82.3%, *in vivo*, respectively, when accounted for total fecal dry matter output. Therefore, tannins-containing pine bark as a feed additive has the potential to decrease internal parasites and fecal methane gas production, and improve animal performance and feed efficiency by altering ruminal fermentation.

P-SP-S-28

Evaluation of Pelletized Chicken Litter as a Nitrogen Fertilizer Source for Sweet Potato Production. S. Ntamatungiro*, and J. Davis, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Pelletized chicken litter (PCL) was evaluated as an alternative nitrogen (N) fertilizer source for sweet potato production by comparing two N sources (urea 46% N and PCL 3.7% total N) and two application methods (single and split). In single applications, urea and PCL were applied at 40 lbs N/acre and incorporated before planting. In split applications, 20 lbs N/acre of urea and PCL were applied two days before planting followed by 20 lbs N/acre of urea side-dressed two weeks after planting. Sweet potato vines of *Kubota* cultivar were planted every 12 inches within the row on raised beds 15 feet long and 10 feet wide that had received a blanket fertilizer application of 100 lbs P_2O_5/A and 160 lbs K_2O/A. Treatments were arranged in 2 (N sources) x 2 (application methods) factorial randomized design and compared to a control with no N applied. Compared to the control, PCL decreased fresh and dry vine weights, US1 and culls more than urea. Urea increased jumbo and canners by 439 and 311lbs/A, respectively, whereas, PCL increased jumbo by 6 lbs/A, and decreased culls by 12 lbs/A. Both single and split applications of urea and PCL resulted in decreased vine and storage root weights. Split application of PCL reduced vine dry weights and culls, but increased canners. Single application of PCL reduced fresh vine weights, US#1, jumbo, and canners, but increased culls. Single application of urea increased jumbos, and split application of urea increased fresh and dry vine weights and also marketable US1 yields.

P-SP-S-29

Enhancing Corn and Tomato Seedling Establishment and Disease Resistance Using Biocontrol Microorganisms. L. M. Nyochembeng*, and U. R. Bishnoi, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

There is a need to develop improved sustainable disease management tactics that are compatible with integrated pest management and organic vegetable production systems. Biological control strategy often involves use of microorganisms' plant extracts, composts and even cover crops. Chemical seed treatment is often applied to protect seedlings from pathogens, increase seedling establishment, growth and yield. Biological treatment (e.g. coating seeds with antagonistic microorganisms) is a desired alternative way to circumvent the limitations and environmental disadvantages of chemical seed treatment. The objectives of this study were to evaluate corn and tomato plants treated with bio-control agents for *Colletotrichum graminicola* and *Alternaria solani* disease reactions, respectively. Sweet corn var sweet luscious bicolor seeds were treated with *B. subtilis* and *P. indica* (Pi) using the coating agents Celgard (Cp), Disco Clear (Dc) and Talc (T), germinated and maintained in potted field soil in the greenhouse. The plants were inoculated at the tasseling stage with *C. graminicola* and evaluated for disease. Four tomato varieties also treated with *B. subtilis*, *P. indica* and shiitake spent substrate (Le) were inoculated with *A. solani* in the greenhouse and laboratory and their disease severity assessed. Coating agents had no deleterious effect on corn seed germination. Both *Le* and *Pi* reduced *A. solani* severity on tomato. There were differences between tomato cultivars in their response to the biofungicide treatments. Results show that the coating agents can be used to apply bioprotective agents to corn seeds. Incorporating *Lentinula edodes* spent substrate in potting mix helps suppress early blight in tomato.

P-SP-S-30

Relationships between Phenotypic, Testicular Traits and Serum Testosterone Profiles in Pubertal Male Boer Goat (*Capra hircus*) Cross. C. Okere*, L. Keith, and O. Bolden-Tiller, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

Many producers do not test libido or ejaculate qualities of bucks before using them for breeding, therefore, a procedure to relate body conformation and external testicular traits to serum testosterone profiles may provide a useful tool for breeding soundness examination in potential breeding bucks. The objective of this project was to determine the relationship between phenotypic, testicular traits and serum testosterone profiles in 25 pubertal male Boer goat crosses. Body conformation traits measured included: chest girth, height at withers, body length, body condition scores, body weight, scrotal weight and scrotal circumference. Blood samples were collected at 3-week intervals for 12 weeks. A calibrated IMMULITE 1000 system was used for the quantitative measurement of serum testosterone. Serum testosterone levels were lowly and positively correlated to body length, body weight, chest girth, height at withers and scrotal circumference. Scrotal circumference was moderately correlated to body length and scrotal weight, and highly correlated with body weight, chest girth, and height at withers, respectively. Based on the results of this study, we recommend that scrotal circumference measurements should be used in conjunction with serum testosterone levels and body conformation traits as breeding soundness examination tools for selecting or culling Boer goat sires at an early age.

P-SP-S-31

Effect of Organic Farming Systems in the Performance of Rabbiteye Blueberry (*Vaccinium ashei* Reade var. Tifblue) on a Heavy Soil. G. K. Panicker*[1], M. D. Shorter[1], J. L. Silva[2], F. B. Matta[3], and J. M. Spiers[4], [1]Department of Agriculture, Alcorn State University, Alcorn State, MS 39096; [2]Department of Food Science, Nutrition, and Health Promotion, [3]Department of Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762; and [4]USDA-ARS, Thad Cochran Southern Horticultural Lab, Poplarville, MS 39470.

Horticultural crops have not been studied as thoroughly as agronomic crops on sustainable production systems. Blueberries are shallow-rooted crops grown on soils characterized by good aeration and drainage and hence, cannot grow on heavy soils. Rabbiteye bluebery (*Vaccinium ashei Reade* var. Tifblue) was grown on Memphis Silt Loam soil (Typic Hapludalf, silty, mixed, thermic). Two organic manure treatments (worm castings and cow manure) were applied in basins around each plant. The control treatment received regular inorganic fertilizers. All treatments received organic materials equally. Biomass development was significantly higher in organic plants treated with worm castings. Total anthocyanins were higher in fruit treated with worm castings and no pathogens were found in the fruit. Concentrations of nitrate-N and P were higher in surface soils treated with organic manures, but there was no trend in N or P enrichment in lower layers. Blueberry can be grown successfully on heavy soils with forest waste and worm castings increases yield and fruit quality

P-SP-S-32

Effects of Traditional and Alternative Diets with 28 or 32% Protein on Performance of Golden Shiners, *Notemigonus crysoleucas*, in Pools. H. Phillips*, J. Faukner, R. Chen, and R. Lochmann, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

A feeding trial with golden shiners was conducted in outdoor pools to determine whether alternative diets (with corn gluten feed) could support growth, survival, and feed conversion of golden shiners as well as traditional diets (with some animal protein), but at a lower cost. Four diets were commercially extruded by ARKAT, Inc. Two diets contained 28% protein and two contained 32% protein. At each protein level one diet was "traditional" (with porcine meat, bone and blood meal) and one was "alternative" (no animal protein, and with corn gluten feed added). Within a protein level, the alternative diets were cheaper than the traditional diets. Two hundred fish (averaging 0.19±0.004 g initially; 0.4 lbs/1000) were stocked in each of four replicate 4.1 m^3 aerated pools filled with reservoir water. Fish were fed twice daily on weekdays and once daily on weekends at 6-8% body weight (8% initially). After 8 weeks, there were no statistical differences in weight gain, survival, total yield or feed conversion. Relative weight was higher in fish fed diets with animal protein (either 28 or 32% protein). Based on total yield alone, it appears that cheaper diets are effective for golden shiner production. However, cost-of-gain was lowest in fish fed the traditional 28% protein diet (0.39 cents/lb), and highest in fish fed the 28% alternative diet (0.50 cents/lb). Feed conversion of the cheaper (corn gluten) diet was less efficient than that of fish fed the traditional (animal protein) diet, but the effect was only apparent in the 28% protein formulas.

P-SP-S-33

Use of Grape Festival to Highlight and Promote Center Research and Extension Programs. B. R. Phills*, J. Ammons, S. Leong, G. Umar, and A. Harper, Center for Viticulture and Small Fruit Research, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32317.

Enhancing public awareness and understanding of research and extension/outreach programs and activities is critical to the promotion of the University's Land-grant mission. Over the years, we have found that the use of our annual FAMU Grape Harvest Festival is an excellent vehicle for this purpose. However, our experience as shown that public attraction to a festival is based more on the entertainment aspect than the educational programs. The purpose of this presentation is to highlight the efforts we undertook to grow a festival that attracted a broad based constituency of both university and community participants while exposing them to FAMU research and outreach programs. Our first goal was to increase the visibility of the festival to the general public. To achieve this goal, we appointed the University's First Lady as Festival Chair, and the City Mayor's wife as one of two co-chairs. We also engaged the University Offices of Public Relations, Development, and NROTC to help organize, promote and implement recreational and educational events of the festival. The time of the festival was changed from Friday to Saturday, to provide a greater opportunity for university and community participation. Entertainment and educational attractions included guided tours, petting zoos, horseback riding, live music, bouncers, hot air balloons, grape tasting and harvesting, grape stomping, and vineyard run/walk competitions, wine making and wine sampling, Ask-A-Doctor Q&A, and blood donor drive. In the end, all of these measures paid off significantly by attracting more than 1500 people for our 10^{th} anniversary celebration.

P-SP-S-34

Effects of Restricted Feed Intake on Energy Expenditure by Different Goat Breeds. A. Helal[1,2], R. Puchala*[1], G. D. Detweiler[1], T. A. Gipson[1], T. Sahlu[1], and A. L. Goetsch[1], [1]American Institute for Goat Research, Langston University, Langston, OK 73050; and [2]Desert Research Center, Animal and Poultry Nutrition Department, Egypt.

Boer (B), Spanish (S), and eight Angora goats (283, 316, and 330 d initial age, respectively) were used in a study with two 10-wk phases. Animals were fed a 50% concentrate diet for maintenance and moderate energy accretion (C) or approximately 50% of these amounts in phase 1 relative to initial BW, followed by the higher level of feeding in phase 2 (R). ME intake was 4.47, 2.20, 4.84, 2.43, 4.14, and 2.06 MJ/d in phase 1 and 4.74, 4.09, 5.46, 4.67, 4.57, and 4.01 MJ/d in phase 2 for A-C, A-R, B-C, B-R, S-C, and S-R, respectively. ADG was 43, -20, 16, -78, 8, and -48 g in phase 1 and 26, 44, 50, 65, 27, and 32 g in phase 2 for A-C, A-R, B-C, B-R, S-C, and S-R, respectively. Energy expenditure (EE) for maintenance was greater for C vs. R in both phases, greatest in phase 1 among breed x intake treatments for A-C, and greatest in phase 2 among breeds for A (481, 347, 430, 356, 424, and 338 kJ/kg $BW^{0.75}$ in phase 1, and 494, 479, 445, 397, 444, and 406 kJ/kg $BW^{0.75}$ in phase 2 for A-C, A-R, B-C, B-R, S-C, and S-R, respectively). In conclusion, nutrient restriction and realimentation elicited more rapid change in EE of greater magnitude with A vs. B and S. The pattern of decline in EE by B and S during restriction was similar, but the subsequent rise with realimentation was slower and smaller for B.

P-SP-S-35

An *Arabidopsis* JA Signaling Suppressor Regulates Glucose Sensitivity and Heat Tolerance. S. Ren*[1], and T. Ferrell[2], [1]Agriculture Research Station, and [2]Department of Agriculture and Human Ecology, Virginia State University, Petersburg, VA 23806.

Jasmonates (JAs) play critical roles in plant physiological and developmental processes and regulate plant biotic and abiotic stress tolerance. The expression of the *Arabidopsis VSP1* gene is induced by JA. A transgenic *Arabidopsis* line containing the P_{VSP1}*::Luciferase* (*LUC*) reporter gene was mutagenized using random T-DNA insertion tags. Genetic screening of these lines through LUC imaging identified 12 *Arabidopsis* mutants that showed either reduced or enhanced P_{VSP1}*::Luciferase* reporter gene expression following JA treatment. To understand the function of these mutants in plant abiotic stress tolerance, both sugar sensitivity and heat tolerance assays were performed. One of these mutants designated *JA signaling suppressor* (*jas*) 1 was further characterized on its role in sugar sensitivity and heat tolerance. *jas1* mutant is sensitive to glucose but not to the same concentration of sucrose. In addition, *jas1* mutant confers significant heat tolerance. Mutant phenotype on glucose sensitivity does not link to the inserted T-DNA. An F_2 segregation population was generated between wild type ecotype Columbia and *jas1* mutant. Phenotypic screening in response to 5% glucose was performed and the results demonstrated that a single recessive gene in *jas1* regulates its glucose sensitivity. Map-based cloning and functional analysis of *jas1* gene are ongoing.

P-SP-S-36

A Color Rich and Stable Grape Selection of Red Wine Grape for Florida. Z. Ren*, J. Lu, X. Xia, and F. Bradley, Florida A&M University, Tallahassee, FL 32317.

Adaptability, productivity, and wine quality with nice and stable color are the challenges for Florida wine grape industry, due to the hot and humid growing environment that lead to high disease pressures. In the efforts to improve wine industry in Florida, FAMU's grape breeding program selected a PD resistant breeding line FAC30-5-1. This selection has produced high quality red wine with excellent and stable color. The wine color intensity is outstanding and aroma is very good. This selection could be a milestone for the future development of red wine grapes for Florida wine industry.

P-SP-S-37

Conservation Agriculture for Food Security in Cambodia and the Philippines. M. R. Reyes*[1], O. Yeboah[2], S. Boulakia[3], V. Ella[4], and A. Mercado[5], [1]Department of Natural Resources and Environmental Design, [2]International Trade Center, North Carolina A&T State University, Greensboro, NC, 27411; [3]the Centre de Cooperation Internationale en Recherche Agronomique pour le Développement, Avenue Agropolis, 34398 Montpellier Cedex 5, France; [4]College of Engineering and Agro-industrial Technology, University of the Philippines, Los Baños, College, Laguna, Philippines; and [5]World Agroforestry Center, Claveria, Mindanao, Philippines.

Degraded landscapes are expanding annually in Cambodia and the Philippines, decreasing agricultural productivity, which in turn heightens food insecurity and exacerbates poverty. In both countries, rural poverty is increasing pressure on natural resources like forests, soil, and water. This project will show how conservation agriculture principles and practices of minimal soil disturbance, continuous mulching and diverse species rotations can be adapted for local conditions as the best practices to create sustainable, permanent cropping systems for annual crop production under wet tropical conditions. The objectives are: pinpoint gendered limitations, advantages, and adaptations that can promote adoption of conservation agriculture production systems (CAPS), and determine the effect of CAPS on labor burden of women; identify field- and farm-level CAPS that will minimize smallholder costs and risks while maximizing benefits and adoption; promote widespread CAPS adoption by exploring ways to ease CAPS production inputs access and CAPS market connections; and assess soil quality and measure crop yield and biomass from CAPS and plow-based systems. Researcher and farmer managed sites were established. In the farmer managed sites 50 farmers are testing various conservation agriculture production systems (CAPS). Baseline data for each objective were gathered for both countries; networks are being established with stakeholders who can implement CAPS adoption when CAPS technology is proven to be successful. Works in both countries were synchronized, to allow for sharing of findings and benefits between countries. Results of comparisons between CAPS and plow-based systems will be reported.

P-SP-S-38

Effects of Level of Feeding on Energy Utilization by Angora Goats. I. Tovar-Luna[1, 2], R. Puchala[1], T. Sahlu*[1], and A. L. Goetsch[1], [1]American Institute for Goat Research, Langston University, Langston, OK 73050; and [2]Universidad Autónoma Chapingo, Unidad Regional Universitaria de Zonas Aridas, México.

Fiber growth of 12 mature Angora does was measured in the first 4 wk of 6-wk periods, preceded by 2 wk of adaptation. A 60% concentrate diet was fed at levels to approximate 100, 125, and 150% of assumed metabolizable energy (ME) requirement for maintenance. Digestibility was not affected by treatment. Energy expenditure (EE) during fasting (261, 241, and 259 kJ/kg $BW^{0.75}$), efficiency of ME use for maintenance (71.6, 69.6, and 69.2%), and the maintenance requirement (365, 344, and 377 kJ/kg $BW^{0.75}$ for 100, 125, and 150%, respectively) were similar among treatments. Tissue (non-fiber) gain was lowest among treatments for 100% (-0.6, 23.7, and 29.8 g/d), although clean fiber growth only tended to increase with increasing level of feeding (5.60, 6.57, and 7.36 g/d for 100, 125, and 150%, respectively). Intake of ME was greater for 125 and 150 than for 100% (6.87, 8.22, and 8.41 MJ/d for 100, 125, and 150%, respectively). Total EE was greater for 150 vs. 100 and 125% (6.03, 6.31, and 6.77 MJ/d), and mobilized tissue energy was low but greater for 100 vs. 125 and 150% (0.16, 0.01, and 0.04 MJ/d for 100, 125, and 150%, respectively). Efficiency of ME use for fiber growth was similar among treatments (17.2, 16.3, and 17.7% for 100, 125, and 150%, respectively). In conclusion, partitioning of energy to fiber growth was not complete possibly because energy metabolism for tissue and fiber accretion reached a plateau eliciting increased feed refusal.

P-SP-S-39

Differential Response of Grape (*Vitis* spp.) Genotypes to *Xylella* infection. M. Sheikh*, M. Basha, R. Katam, and H. K. N. Vasanthaiah, College of Engineering Sciences, Technology and Agriculture, Florida A&M University,

Tallahassee, FL 32307.

Pierce's Disease (PD), caused by the bacterium, *Xylella fastidiosa* (Xf), is vectored by sap feeding insects. *Xylella* colonization results in xylem vessel clogging leading to wilting of grapevine. Nature of *Vitis* xylem metabolites and their role in *Xylella* infection is not understood. PD precludes bunch grape cultivation in southeastern United States. Native muscadine grapes and Florida hybrid bunch grapes are tolerant to PD. Selected grape genotypes were analyzed to determine differences in tissue protein composition for identifying proteins expressed/ suppressed in response to *Xf* infection. The results showed that xylem tissue contained >235 proteins with pI between pH 4 and 8.0 and MW between 12000 to 90000 Daltons. Significant differences were found in xylem tissue proteome among the three *Vitis* spp. studied. Muscadine and FL hybrid bunch xylem tissue contained larger number and amount of proteins compared to bunch grape. Comparative analysis of xylem tissue showed that more than 50 proteins are differentially expressed in response to Xf infection. Muscadine and Florida hybrid bunch grape genotypes contained several unique proteins that may be responsible for their PD tolerance. *Xylella* infestation found to significantly suppress expression of several proteins in xylem tissue of bunch grape that increases their susceptibility to *Xylella.* Further, analysis will provide details of the molecular events involved in the mechanisms of pathogenesis, and PD resistance and aid in identifying PD tolerance specific gene(s). Development of PD-tolerant bunch grapes will enable cultivation of popular grape varieties in SE USA which will increase grape and wine production, consumer acceptance and farmer's profits.

P-SP-S-40

Subsurface Transport of Leaching of Nutrients under a Conventionally-Tilled Corn Field Plot on a Natchez Silt Loam Soil. M. R. Silitonga*, Mississippi River Research Center, Alcorn State University, Alcorn State, MS 39096.

The relationships between plant varieties and nutrient uptake are needed for effective site-specific management, especially for small scale and limited resource farmers in under-served communities. This study evaluates the subsurface transport and leaching of nutrients under conventionally-tilled corn field on a Natchez silt loam. The purpose is to determine the effective nutrient management approaches in order to supply sufficient plant nutrients for optimum forage and crop production, thus to prevent excess applications that can adversely affect ground water quality. The objective of the study is to evaluate the leaching potential of nutrients under different varieties of corn plants, to determine and compare plant nutrient uptake, thus minimizes subsurface leaching into the ground water. Corn plants of different species were planted randomly on a replicated field plots on five rows at Alcorn State University Experiment Station. Composite soil samples were collected from a corn field of 400-m^2 areas with 15 cell grid consisting of 3 blocks and 5 rows of 6-m each. Soil cores were collected every four weeks, with three replicates from the transects that are spaced at 2m. Preliminary results indicated that plant nutrient uptake and leaching potential is different by corn varieties. The relationship between plant nutrient uptake and variety differences was analyzed to determine the correlations and interdependencies. Corn variety differences are expected to minimize nutrient leachate into the subsurface of the soil profile. In addition, climatic variability is factored in to evaluate nutrients attenuation and movement into the soil profile.

P-SP-S-41

Determining the Genetic Divergence of Recombinant Inbred Line (RIL) Segregates of Pearl Millet for Photosynthetic and Water Use Efficiency Traits. H. P. Singh*[1], B. P. Singh[1], W. F. Whitehead[1], and J. P. Wilson[2], [1]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; and [2]USDA-ARS, Crop Genetics and Breeding Research Unit, Tifton, GA 31793.

Pearl millet (*Pennisetum glaucum* L. R. Br.) is an important food crop in Africa and the Indian subcontinent. In the United States, pearl millet is mainly grown for summer annual forage. In an effort to exploit the grain market for poultry and wildlife as well as an expanding ethnic market, USDA-ARS released Tiftgrain 102 (TG 102), a hybrid of Tift 99A x Tift 454. In 2010, we planted TG102, Tift 99B (the maintainer inbred for Tift 99A), Tift 454 and 226 RILs derived from Tift 99B x Tift454 in single row plots with three replications using a randomized complete block design. Our objective was to observe segregation for different phenotypic and physiological traits in the RIL population that could be of use for future cultivar development. In this presentation, we report our finding for the photosynthesis, conductance and transpiration. Data were collected using fully expanded flag leaves during the active grain filling stage. The net photosynthesis rate varied between 4.5-23.8 µmol/m^2/s, while conductance, and transpiration rates ranged between 25.3-109.1 and 1.2-5.7 mmol/m^2/s, respectively. Of the RILs, 59% had higher net photosynthetic rates than TG 102, 93% had photosynthetic rates higher than Tift 99B, and 38% had higher rates than Tift 454. A strong and positive correlation existed among leaf stomatal conductance and transpiration rates to net photosynthetic rate. The study demonstrated the possibility of improving photosynthetic

traits in new cultivars, but also indicated that genotypes with higher photosynthetic rates would also utilize more soil moisture.

P-SP-S-42

Effect of Month, Medium, and Hormone Treatment on Rooting of Lavandin Cuttings. A. O. Tucker*, and S. K. Jacobsen, Department of Agriculture & Natural Resources, Delaware State University, Dover, DE 19901.

Almost all of the named cultivars of lavender (*Lavandula angustifolia*) and lavandin (*L.* × *intermedia*) are clones that must be vegetatively propagated. Propagation of gray-leaved suffrutescents from the Mediterranean, such as lavender and lavandin, easily rot under normal misting and other conventional techniques. In one experiment, we tested the effect of month of cuttings and two different media outside and in the greenhouse; in another, we tested four different commercial rooting hormone preparations and two different media in the greenhouse. Significantly more rooting occurred during maximum growth in the summer. When rooted outside, a medium with peat moss produced significantly more rooting, but in the greenhouse, a medium with peat moss produced significantly less rooting. No hormonal treatment showed any significant increase in rooting, and there was no interaction of hormone treatment and rooting medium. However, Turface, a porous clay frit, showed significant increase in not only rooting, but survival within five months.

P-SP-S-43

Identification of Genes Associated with Pierce's Disease Tolerance in Grape (*Vitis* spp.). H. K. N. Vasanthaiah*[1], D. Kambiranda[1], S. M. Basha[1], and P. K. Varadwaj[2], [1]Plant Biotechnology Laboratory, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317; and [2]Indian Institute of Information Technology, Jhalwa Campus, Allahabad, India 211012.

Pierce's Disease (PD) caused by xylem-limited bacteria *Xylella fastidiosa* (Xf) is a serious disease of bunch grape (*Vitis vinifera*). To understand the molecular basis of Pierce's disease tolerance, a study was conducted employing various molecular approaches to identify and characterize transcripts differentially expressed in xylem tissue upon challenging with Xf. Study revealed expression of several defense and signal transduction related genes exclusively in PD-tolerant cultivars. Amino acid sequences were deduced based on their full-length nucleotide sequence. Protein modeling revealed presence of signal peptides unique to PD-tolerant cultivars, which may possibly play an important role in their ability to resist *Xylella* infection. Amino acid sequence varied at position 234(L/R) for chalcone synthase sequence. Chitinase amino acid sequence varied at amino acids 204(G/S), 249(G/E), 260(V/L) and 347(T/S). PR10 gene showed changes at the amino acid number 14(V/I), 123(C/S), 127(V/I), and PR4 gene showed changes at the amino acid number 37 (E/A), 57 (Q/K), 119 (K/Q), 128(N/A), 129(Q/K), 133(I/T), 137(E/Q) and 140 (D/N). Further, sequence analysis to locate the gene on the chromosomal sequence using the NCBI Map Viewer tool revealed that chalcone synthase and PR 4 genes were located on chromosome 14, and chitinase and PR 10 on chromosome 5 of the *V. vinifera* PN40024. Real time PCR analysis showed early expression of these genes in PD-tolerant cultivars upon *Xylella* infection, which is crucial for their tolerance characteristic. Further studies on these genes will help better understand PD tolerance mechanism that would aid in enhancing the tolerance level of commercially important PD-susceptible cultivars.

P-SP-S-44

Effects of Garlic Supplementation on Performance of Grazing Goats. Z. Wang*, A. L. Goetsch, G. Detweiler, S. P. Hart, and T. Sahlu, American Institute for Goat Research, Langston University, Langston, OK 73050.

Forty lactating Boer does naturally infected with nematode parasites (initial mean FEC = 474; SE = 119) were used in the 84-d experiment to determine effects of garlic supplementation on performance of goats grazing pastures in the summer. Five does with their kids (1 to 4 mo of age) grazed eight 0.4-ha pastures. Treatments were control and garlic, with four pastures per treatment. Control does received 80 g/d of a mixture of 25% molasses and 75% ground corn during the first 6 wk and 500 g/d of concentrate (54% ground corn, 26% soybean meal, 13% molasses, and 7% minerals and vitamins) during the second 6 wk. Does on the garlic treatment received the same supplements plus 20 g/d of garlic powder. Forage DM mass was similar between treatments at the beginning, middle, and end of the experiment. The concentration of CP in hand-plucked forage samples was similar between treatments. Doe ADG was similar between treatments (-0.15 vs. -0.12 g/d, SE = 0.024 in phase 1 and -0.045 vs. -0.060 g/d, SE = 0.008 in phase 2 for control and garlic, respectively). Kid ADG was similar between treatments (41.6 vs. 45.7 g/d for control and garlic, respectively; SE = 4.75) during a 56-d period. At 42 d, doe FEC was less for garlic vs. control (2,837 and 6,105, respectively; SE = 927). These data suggest that garlic supplementation of lactating meat goats grazing pastures in the summer does not affect performance of goats despite impact on level of nematode parasitism.

P-SP-S-45

Evaluation of Weaning Time and Stocking Densities for Longear Sunfish, *Lepomis megalotis*, Reared in Low Cost Static System. J. L. Schulte, L. P. Hirsch, J. E. Wetzel*, and T. Adkerson, Cooperative Research Programs, and the Department of Agriculture and Environmental Sciences, Lincoln University, Jefferson City, MO 65101.

Indoor culture of early life stage sunfishes, *Lepomis* spp., can be with recirculating aquaculture systems. Low cost static systems may be a reliable alternative. Herein, age at weaning and stocking densities are varied to determine effects on longear sunfish, *Lepomis megalotis*, growth, survival and feed conversion ratio (FCR). Static culture tanks (SCT), working volume of 70 L, supplied with supplemental aeration and bio-filtration (airlift driven sponge-filter), were stocked with 12-d post-exodus fry from broods reared for at least the first 14 d using brine shrimp (BS) only. Trial 1 broods were stocked at rate of 100 fish / SCT (three SCT / brood) with each SCT within a brood assigned randomly weaning treatments starting 14-d, 21-d or 28-d. Trial 2 weaning began at 21-d with randomly assigned stocking densities of 50, 100, 150, and 200 fry / SCT for each brood. As trials progressed through co-feeding phase (7-d duration) through 56 days post-exodus, feed size was increased with volume increases proportional to stocking density. SCT were siphoned weekly followed by 50% water change. Prior to water changes NH_3, NO_2, NO_3, pH, hardness and alkalinity were measured weekly and dissolved oxygen and temperature was recorded daily. Trial 1 results of growth, survival and FCR indicate optimum weaning age of 21 d post exodus. Trial 2 results of growth, survival, FCR and water quality indicate a stocking density of 150 fry / SCT was the maximum the low cost static system of this trial could support. Cost of production will be reported.

P-SP-S-46

Impact of Gastrointestinal Parasite Management Training in North Carolina. N. C. Whitley*[1], M. Worku[2], R. C. Noble[2], J-M. Luginbuhl[3], and S. Schoenian[4], [1]Cooperative Extension Program, [2]Department of Animal Sciences, North Carolina A&T State University, Greensboro, NC 27411; [3]North Carolina State University, Raleigh, NC 27695; and [4]University of Maryland Extension, Keedysville, MD 21756.

Understanding and using integrated parasite management (IPM) strategies is vital for small ruminant producers to maintain profitability. In order to determine the impact of training North Carolina sheep and goat producers on this topic, surveys were provided to those previously attending IPM training (including FAMACHA© eye lid color scoring) from 2002 to 2008. A total of 57 surveys were returned, 64% from owners of 50 animals or less. Ninety-one percent of respondents felt that the training they received made a difference in their ability to control or monitor parasites in their flock. The majority of respondents (98%) reported fewer or the same amount of parasite problems on their farm after the training. When asked if using the FAMACHA© eyelid color chart to make worming decisions, most answered yes, and those using it scored their animals at least once a month. Most respondents (72%) dewormed their animals less often after training and saved money due to the training. Respondents reported saving money primarily through fewer drug treatments and fewer animal deaths. The most popular practices adopted after training included rotational grazing, genetic selection, increasing plant grazing height, peri-parturient female deworming, and weighing animals before treatment. Producers also switched to oral dosing of dewormers, reduced stocking rates, began using multispecies grazing and/or planted a tannin-containing forage. Overall, the results indicate that North Carolina producers responding to the survey changed their management practices and improved control of parasites on their sheep and goat farms after IPM training.

P-SP-S-47

Species and Breed Differences in Strongylid Parasite Egg Counts in Co-Grazed Hair Sheep and Goats. S. Wildeus*[1], and A. M. Zajac[2], [1]Agricultural Research Station, Virginia State University, Petersburg, VA 23806; and [2]VA-MD Regional College of Veterinary Medicine, Blacksburg, VA 24061.

Anecdotal information, as well as scientific literature, indicates differences between sheep and goats, and breeds within these species, in parasite resistance. This experiment evaluated strongylid parasite fecal egg counts and FAMACHA anemia scores in yearling male hair sheep and meat goats of two breed types (sheep: Katahdin and St. Croix; goats: Spanish and Myotonic) co-grazing naturally parasite infected pasture during summer (June and July). Animals (10/breed) were randomly selected for monitoring from six mixed-species groups of 12 animals grazing 0.4 ha pastures. Concentrate supplementation was provided at 1% of body weight. Fecal samples were collected and FAMACHA anemia scores determined from experimental animals in 14-day intervals for a period of eight weeks. Strongylid fecal egg counts were determined by modified McMaster technique. Data were analyzed for the effect of species and breed within species using repeated measures analysis. Mean strongylid egg counts were significantly higher in goats than in hair sheep (2238 vs. 550 eggs/g), and this was reflected in FAMACHA score (2.9 vs. 2.2; scale of 1-5). Within species, Spanish had significantly higher egg counts than Myotonic goats (2644 vs. 1795

eggs/g), but FAMCHA scores were not different. In the sheep, Katahdin had significantly higher counts than St. Croix (978 vs. 126 eggs/g) and also tended to have higher FAMACHA scores. These results support observational information at our location in regard to species differences in parasite tolerance, and confirm previous findings regarding the parasite tolerance of St. Croix sheep.

P-SP-S-48

Managing Seasonal Outbreak of Foot Rot and Foot Scald in Sheep Flocks. T. Wuliji*, and C. Clifford-Rathert, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65102.

Incidence of foot rot in sheep flocks during the hot, humid and rainy season in the Midwest region of the U.S. is on the increase. Foot rot is caused by the synergic activity and infection by bacteria: *Dichelobacter nodosus* and *Fusobacterium necrophorum* species. In field inspection of a small sheep flock (n=73) showed that 89% of the flock appeared to be suffering from mild to severe foot rot infection on either one, two, three or four feet. Feet were examined for lesions and assessed for the severity. Sick sheep were hoof trimmed and initially treated with KopperTox® and "Purple Wound Spray", and re-examined in two weeks. The foot rot lesion severity scale and number of feet treated at the two intervals were analyzed for Chi-square statistics. The results showed a significant increase in the lower lesion scale groups. Therefore, it seemed some improvement in alleviation of the symptoms in the lower scale but worsen for the higher scale groups. Number of feet treated significantly decreased for all groups but four feet infection. Four lame sheep had their foot lesions swabbed for bacteria culture. Culture results revealed positive test for *F. necrophorum* sp. and possibly *D. nodosus*. Animals with severe lameness were treated with antibiotic spray (3.9% Tetracycline) and most of them responded favorably. However, 20 sheep were culled as result of precaution and management requirement. This study demonstrated the potential foot rot infection, treatment and labor cost, and culling of valuable animals by the seasonal foot rot outbreaks.

P-SP-S-49

Enhanced Availability of Softwood Shoots for Propagation through Interaction of Season and Growth Regulators. G. Yang*[1], and P. E. Read[2], [1]Department of Natural Resources and Environmental Design, North Carolina A&T State University, Greensboro, NC 27411; and [2]Department of Horticulture, University of Nebraska, Lincoln, NE 68583.

One key factor for success in plant propagation is the availability of softwood shoots. Availability can be affected by shortening the period of the dormancy of plant buds. Different concentrations of plant growth regulators (PGRs) can be used to achieve this. But, it is important to be aware that the concentrations of PGRs that are required will vary as the dormant stage progresses, and depending on the season. Our research has demonstrated that by incorporating PGRs such as GA_3, BA and others in a forcing solution (FS) it is possible to significantly increase the production and, therefore, the availability of softwood shoots. We investigated the application of PGRs on the five-leaf aralia and found that in late fall and early winter, concentrations of GA_3 between 30-50 mg/l were needed to break bud dormancy and increase percentage of bud break. At 100 mg/l, GA_3 suppressed bud break and shoot elongation. We also found that concentration treatment differences were lower when stems were collected later in the season. BA and other cytokinins tested increased the percentage of bud break but delayed bud break. Our results demonstrate that PGRs in the FS exert an endogenous hormone action which produces expedited rooting and shoot proliferation. These findings can be used in the development of optimized growth protocols for propagation of recalcitrant woody plant species, and minimize the use of valuable greenhouse space for stock plants.

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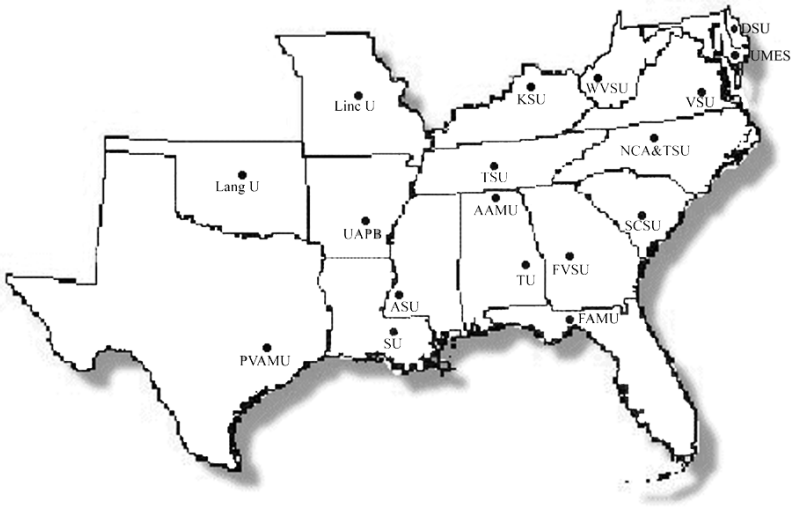

Abstracts of Family, Youth, Community, and Economic Development Papers

Undergraduate Students (12)

O-FY-U-1

Mayoral Leadership and the Distribution of Municipal Services in Small Towns in South Carolina. S. Burke*, and W. Legette, Department of Social Sciences, South Carolina State University, Orangeburg, SC 29117.

Small town mayors are generally viewed as having the responsibility to engage citizens in local public policy decisions and the delivery of municipal services. Municipal governments are responsible for infrastructures such as public road systems, water and sewer systems, fire departments, and street maintenance. Secondary services provided by municipal governments include the following: health care, housing, cultural and recreational, and elderly and youth facilities and services. Mayors have to work under various constraints as competing interests and demands are placed on their government. This study examines the role of mayors in the delivery municipal services and local policies in small towns in South Carolina. It investigates the relationship between city council officials' perception of mayoral leadership and their satisfaction with the delivery of municipal services. The study investigates the relationship between the mayor's perception of City Council support and conflict in the city, as well as explores the environmental and political determinants of mayoral leadership. The analysis employs five environmental variables regarding the municipality that include population, per capita income, class composition, educational attainment, and racial diversity. It employs five political variables: party competition, election method, form of government, voter participation, and racial diversity on the City Council.

O-FY-U-2

An Empirical Analysis of Factors Influencing Students' Nutritional Awareness, Food Label Use, and Perceptions of Health Status. L. A. Collins*, and P. E. McLean-Meyinsse, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Between 1991 and 2007 the percentage of overweight and/or obese Louisiana residents increased from 49 to 65%; the largest increase occurred within the 18-24-age group. A university campus usually has a large percentage of 18-24 year olds and is a fertile ground for sowing seeds for better food choices and healthier lifestyles. To accomplish this task, researchers must collect baseline information on students' levels of nutritional awareness, behaviors, and health status, among others. To that end, our study surveyed 441 university students and examined their awareness of health problems caused by excessive intake of cholesterol and insufficient intake of fiber and calcium; prevalence of reading food labels; and relationships among awareness, label use, and perceptions of overall health. The study's data were analyzed using a three-staged procedure in the *LIMDEP* software. The results suggest that older students have greater awareness of health problems caused by insufficient intake of fiber; freshmen and sophomores are less aware of the fiber-health link. For calcium intake, age and gender influenced awareness positively. Age is also the major determinant of awareness about cholesterol intake and diseases. Seniors and those living in households in excess of three persons are more likely to use labels. The probability of perceiving one's health as excellent is associated with a lower body weight, number of minutes exercised, and an awareness of the fiber-disease link. The likelihood of students' ranking their health as excellent falls with awareness about calcium, but is invariant to label use and awareness about cholesterol.

O-FY-U-3

Impact of Irrigation Practices on Water Quality of Two Community Gardens in Nashville, Tennessee. A. Frederick*, R. Stone, D. Long, F. C. Chen, and S. Godwin, Department of Family and Consumer Sciences, School of Agriculture and Consumer Sciences, Tennessee State University, Nashville, TN 37221.

Community gardens provide educational opportunities and alternative food sources to the neighboring households. However, many challenges face farmers who seek these opportunities. One of those is ensuring the safety of the food that they produce. The purpose of this study was to assess the effects of storage conditions on the microbiological quality of the water used to irrigate the crops. Samples of irrigation water from two independent gardens were collected from storage tanks. The same samples were stored in containers and placed in laboratory and greenhouse environments. Coliform/*E. coli* counts, pH, temperature and carbon dioxide of the water samples were monitored. Water temperatures in the greenhouse were on average 7.2°C higher than water in the storage tanks and 9.4°C higher in the laboratory. On average, water pH increase 1.1 and carbon dioxide decrease 1.2 mg/L over the experiment periods. The pH increase was significantly less (0.6) in the laboratory than other locations. The average initial coliform was 890 cfu/100 mL and the maximum days required to reach a safety standard of 100 cfu/100 ml were 8 days in storage tanks and in laboratory and 4 days in greenhouse. Decrease of *E. coli* followed similar trends. Higher temperature and direct sunlight influence the survival of harmful bacteria. Storage time is crucial in reducing

bacteria contaminations in irrigation water. Since educating community farmers of Good Agricultural Practices (GAP) will enhance safety of their products, a recommendation is made to store water at least a week in the tanks before use for irrigation.

O-FY-U-4

Analyzing Health Trends in Mississippi. M. L. Griffin*, M. N. Mojica, W. L. Whittaker, and V. Igbokwe, Agricultural Economics Program, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096.

There has been a growing recognition on the importance of health in promoting economic development. Several studies have supported the positive relationship between health and economic growth and vice versa. It is, therefore, imperative to understand health status and trends as it affects many aspects of the economy and the quality of life of people. Mississippi is one of the states that is considered relatively unhealthy with rising mortality rates and with the highest rate of obesity. The main objective of this study is to present the use of indices as an analytical tool to analyze the trends and changes in the health characteristics of a state. Health indices are constructed using variables measuring the capacity of a state to support the health of its population. Indices for various years are compared against a base period to provide a straightforward assessment of health trends. The study presents a methodology that can be useful in evaluating health measures as well as the changes and trends in health variables. Furthermore, the results can be used by policy-makers to evaluate health-related policies and to formulate strategies towards the improvement of health and healthcare practices.

O-FY-U-5

The Effectiveness of Using Community Action Research to Teach African American Boys. D. Hodges*, T. Knight, and M. E. Fields, Department of Teacher Education, South Carolina State University, Orangeburg, SC 29117.

In recent years, there has been a focus in closing the achievement gap between African American and Euro American children in South Carolina. Yet, the South Carolina's Education Oversight Committee reported in 2004 that the gap would only widen by the year 2014. African American boys test lower than any other group. This project has sought to use action research to connect African American boys with academic achievement and raise PASS test scores.

O-FY-U-6

Halal Market as a Niche for Goat Meat in Atlanta: A Logistic Approach. L. Hooks*, M. Ibrahim, and J. Whitehead, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

In Georgia, like the rest of the U.S., goat meat consumers are mostly immigrants from traditional goat meat consuming nations. The goat meat market is very informal and segmented into niche markets. One such niche market is the "halal" market. Halal means 'permissible', and it is a preferred method of slaughter among Muslims. The objective of the study was to survey Muslim goat meat consumers in the metropolitan Atlanta area to determine the consumption patterns of Muslims and whether they are willing to pay a premium for halal goat meat. Data were collected using a survey technique. The survey was conducted over a three-month period at different locations throughout the Atlanta area, and online. Only Muslims who eat goat meat were requested to participate in the survey. Preliminary results indicate that the majority of the respondents said they considered halal meat to be very important. The respondents also said they do not buy whole goats and they prefer goats less than thirty pounds. When asked whether they were willing to pay a premium above the market price, a majority of the respondents said yes. Thirty-six percent of the respondents had a college degree and had an income range from $25,000 to $34,000.

O-FY-U-7

Using NVivo to Analyze Data Collected from the Barriers to Parents' Participation in Education in Rural South Carolina: Orangeburg District 5 Elementary Schools. D. Jack-James*, and M. Garvey, Department of Social Sciences, South Carolina State University, Orangeburg, SC 29117.

The Barriers to Parents' Participation in Education project uses qualitative methods for data collection. Parents were interviewed in focus group sessions that were videotaped and transcribed. The NVivo software system was used for analysis of the data, and transcripts from the session were broken down into subcategories called nodes. The created nodes corresponded with questions designed as the instruments of evaluation for the project. NVivo coordinated responses to questions given at particular schools, grade levels, and geographic locations. The responses were also analyzed according to the demographics collected from the participants. This presentation specifically looked at how the NVivo process was used to compare and contrast participant responses.

O-FY-U-8

The Influence of Demographics on Goat Meat Consumption. A. Marzette*, J. E. Davis, J. Whitehead, M. Ibrahim, and E. Styles, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

The number of farms in the South producing goats and meat type goat production has experienced substantial growth in recent years. This growth has been encouraged by increases in immigrant populations with preferences for goat meat products. The increasing demand for goat meat was made evident in a national study funded by Winrock International in the 1980s, and more recent reports have documented a doubling of the number of meat goat sold in the United States. To document some of the factors influencing this market growth, Fort Valley State University conducted a survey at the 2010 Agricultural Exposition in Moultrie, Georgia, to determine if gender, race, and age have any influence on goat meat consumption, and also if consumers are willing to purchase goat meat over pork, chicken and beef. Preliminary results revealed that of those surveyed, 61% said they had tried goat meat before, but 81% said that they had never purchased goat meat. In terms of gender and ethnicity, majority of the respondents were male and white, respectively.

O-FY-U-9

Will Consumers Pay More for "Georgia-Grown" Tomatoes? Evidence from the Georgia National Fair. C. Myles*, M. Ibrahim, and J. Whitehead, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Interest in local foods has resulted in rapid growth in the use of "state grown" labels to promote the marketing of agricultural food products. Almost all the states in the United States had their Departments of Agriculture promote food grown within their states using labels such as "Georgia Grown" and "Jersey Pride." The growth is said to be due to increasing consumer demand for healthier and safer food products and community development. Studies have shown that consumers generally support state labels; for example, in Georgia, the label "Georgia-grown" is visible on a number of food products in grocery stores. The objective of the current study is to determine the characteristics that influence consumers' decision to purchase Georgia grown food products. The data for this study were secured through a survey conducted at the 2010 Georgia National Fair in Perry, Georgia. Randomly chosen prospective respondents were requested to complete the survey questionnaire by Fort Valley State staff and students**.** The collected data will be analyzed using qualitative econometric techniques such as logit and probit models. The descriptive statistics show that majority (82%) of the survey respondents were willing to pay at least 1-cent premium for Georgia grown tomatoes. The average for the respondents was 47.6 years and the average number of kids below 19 years was 1.7. In terms of gender, 72% of the respondents were female and 28% male. Results of the study are expected to show the factors that determine consumer willingness to pay for Georgia grown produce.

O-FY-U-10

A Study of the Increasing Trend in Medical Bankruptcy Filings in the United States since 2001. O. A. Omotosho*, and E. Beraho, Department of Accounting, Agribusiness and Economics, South Carolina State University, Orangeburg, SC 29117.

Medical bankruptcy is not a legal term; rather, it is a general term that refers to filing for bankruptcy due to medical related debt. This is a major problem in the U.S. that has been on a steady increase since 2001. Most people who file for bankruptcy due to medical debt owe less than $5000 in medical bills. The reason that they still choose to file for bankruptcy is that health insurance companies have become more aggressive in recent years about collecting their money. Many people become overwhelmed and are not clear about what their options may be. As a result, they file for medical bankruptcy instead of working out another payment plan. As recently as 1981, only 8% of families filing for bankruptcy did so in the aftermath of a serious medical problem. By contrast, a 2001 study in five states found that illness or medical bills contributed to about half of bankruptcies. A significant percentage of those listing medical debt as the reason for their bankruptcy are 65 and older, while other groups disproportionately bankrupted by medical debt include single women rearing children from low wages or who have been abandoned by their husbands who refuse to pay child support. Consequently, the number of uninsured, as well as underinsured Americans, has grown; health costs have increased; and Congress has tightened the bankruptcy laws.

O-FY-U-11

Will Consumers Pay a Premium for Locally Grown Tree Nuts? R. Phelps*, M. Ibrahim, and J. Whitehead, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

The market for "locally grown" foods is one of the fastest-growing agricultural segments of the U.S. economy. The growth is said to be due to increasing consumer demand for healthier and safer food products and

community development. In Georgia, the label "Locally Grown" is visible on a number of food products. The growth of farmers markets and roadside stands during the summer months may be an indication of the growth in locally produced food products. The purpose of this study is to determine the extent to which the label "Locally Grown" influences the food purchasing habits of Georgians. The primary objective of this study is to determine whether Georgia consumers will pay a premium for locally grown tree nut (pecans) and the factors that influence purchasing decisions. The data for this study were secured through a survey conducted in Middle Georgia. Randomly chosen prospective respondents were requested to complete the survey questionnaire by Fort Valley State staff and students at the 2010 Georgia National Fair in Perry, Georgia**.** The collected data will be analyzed using qualitative econometric techniques such as logit and probit models. Results of the study are expected to shed light on why a buyer would purchase or not purchase locally grown pecans.

O-FY-U-12

The Delivery of Municipal Services in Small Towns in South Carolina: The Views of Municipal Elected Officials. S. Taylor*, Department of Social Sciences, South Carolina State University, Orangeburg, SC 29117.

Municipal services are not necessarily distributed equally. Municipal governments are responsible for infrastructures such as public road systems, water and sewer systems, fire departments, and street maintenance. Secondary services provided by municipal governments include health care, housing, cultural and recreational and elderly and youth facilities, and services. Many citizens express dissatisfaction with the distribution of municipal services. Citizens express this dissatisfaction to their representatives on City Council. This study investigated the relationship between municipal elected officials' level of satisfaction with the delivery of municipal services and the complaints they hear from their constituents. Furthermore, it also investigates the relationship between the complaints these officials hear from their constituents and their perceptions regarding both the priority of municipal government and what should be the priority of municipal government. The study draws its analysis from a mail-out survey to mayors and city council officials in 106 small towns in South Carolina. The analysis employs five environmental variables regarding the municipality: population, per capita income, class composition, educational attainment, and racial diversity. Additionally, it employs five political variables: party competition, election method, form of government, voter participation, and racial diversity on the City Council.

Graduate Students (5)

O-FY-G-1

A Correlation Analysis between Education and Per Capita Income in Mississippi. I. Bruster *, M. N. Mojica, W. L. Whittaker, and T. Hargrave, Agricultural Economics Program, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096**.**

Economists have been concerned about identifying the factors affecting economic growth and development. Education is one of the significant factors identified to impact a region's economic productivity. In spite of the general agreement on the importance of education, the question still remains on the direct contribution of educational attainment in increasing an individual's earnings. While several studies have investigated the role of education in the economy, the primary objective of this paper is to investigate the association between education and per capita income in Mississippi. Like many other communities across the nation, the state is experiencing significant pressure on the rising costs of education. Using a dataset for Mississippi counties, indicators of educational attainment and per capita earnings are used to determine variable associations. Descriptive statistics and correlation analyses were used to analyze the data. The outcomes of the study are directly beneficial to policy makers in evaluating education policies, as well as in formulating strategies regarding the improvement of the educational system.

O-FY-G-2

Exploring Economic Growth Indicators of the Black Belt Counties, 1970 - 2000. A. Hill*, B. Gyawali, S. Banerjee, and J. Bukenya, Alabama A&M University, Department of Agribusiness, Normal, AL 35762

This paper examines income convergence at the county level in the 11-state southeastern United States. The primary objectives are to: (1) examine various income convergence indicators in these 11 states at 10-year intervals during the period 1970-2000, and (2) identify and compare predictors of income growth between Black Belt and other counties in the region. Spatially explicit ordinary least squares regression of logarithmic differences in average per capita income using 10-year-interval panel data indicates conditional income convergence across the region. However, the estimated rate of income convergence varies between Black Belt and non-Black Belt counties

and between urban and rural counties. This convergence varied across the region based on the initial and changed conditions of population density, employment structure, education, location of industries, and travel time to work.

O-FY-G-3

Assessment of Risks and Risk Reducing Strategies of Small Farm Operators in Tennessee. S. Pasirayi*, Department of Agriculture and Consumer Science, Tennessee State University, Nashville, TN 37209-1561.

Small farms represent an important segment of the agricultural sector and rural communities in the U.S. They account for 56% of the total U.S. value of agricultural land and buildings, but account for 91% of all U.S. farms and more than half of the land in farms. This trend holds true for the State of Tennessee where 93.2% of the farmers had small-scale operations in 2007. Nearly half of Tennessee's land area, or 11.8 million acres, is in farmland, there are more 91,000 farms in the state. Tennessee small farms generate more than $8 billion annually and provide more than 10,000 jobs, making them one of the major contributors to State GDP. Small farmers, however, face a number of problems that continue to challenge their viability. Their most pressing concerns involve changes in government policies/regulations (institutional risk), decreases in crop yields or livestock output (production risk), and uncertainty in commodity prices (price risk). Thus, there is need to effectively manage risks that threaten small-scale operators' viability. The survey results showed small farmers' perceptions of risk, sources of risk and risk management practices. Results also showed that despite a relatively diverse sample in terms of education, farm size, leverage ratio, and farm income, there was a considerable agreement on the relative importance of various sources of risk and alternative risk management practices among small-scale farmers.

O-FY-G-4

Does Increase in Entrepreneurship Lead to Employment and Economic Growth? Evidence from Alabama Data. D. N. Starks*, J. O. Bukenya, B. Gyawali, and S. Banerjee, Department of Agribusiness, Alabama A&M University, Normal, AL 35762.

In recent years, the relationship between business ownership (self-employment) and unemployment has received considerable attention from policy makers as one way to address persistent poverty, especially in minority and socially disadvantaged communities across the US. Particularly, the high unemployment rates coupled with limited economic growth in rural America have triggered policy makers into giving greater importance to entrepreneurship and self-employment as ways to foster economic progress and reduce unemployment. In this context, economic growth literature asserts that entrepreneurship and small firms play important role for two main reasons. Firstly, the use of new technologies has reduced the importance of scale economies in many sectors; and second, the increasing pace of innovation and the shortening of product and technology life cycles seem to favor new entrants and small firms, which have greater flexibility to deal with radical change than large corporations. Thus, this paper examines the relationship between entrepreneurship, as measured by the variation in business ownership rates, and unemployment in Alabama. County-level data for the 67 Alabama counties for the period 1969-2008 are drawn from the Bureau of Economic Analysis (BEA). The analysis considers two separate relationships between unemployment and entrepreneurship: a "refugee" effect by which unemployment "pushes" more people towards business ownership; and a "Schumpeter" effect by which increasing rates entrepreneurship (business ownership) leads to greater levels of employment and economic growth. The results suggest that Alabama has been a relative outlier in regard to the effects of entrepreneurship on unemployment when compared with other states in the southeast US.

O-FY-G-5

Recent Trends in Marketing of Aquaculture Products in the United States: Results from Store-Level Scanner Data Analysis. P. Surathkal*, A. Rabbani, M. M. Dey, and K. Singh, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Aquaculture producers and processors in the United States are keen to know the current trends in seafood consumption to suitably bring adjustment to their current business operations. This study describes the recent market trends of various products of four major species (catfish, crawfish, clam and shrimp) farmed in the U.S. The study analyzed monthly A.C. Nielsen store level scanner data on sales volume, value and prices from 52 major markets across the U.S. for the years 2005 through 2010. Trends in market share and prices across products in various cities/markets are analyzed using the descriptive statistics. Retail price and sales models are estimated to determine the impacts of product attributes, season, imports, promotions, and price of related products on prices and sales volume. The study has employed a two-stage recursive regression model with Prais-Winsten correction for autocorrelation using two-stage least squares estimation. Results reveal that New Orleans/Mobile market is the main catfish market in the U.S., contributing about 66% of catfish entrée products and 41% of breaded catfish products

during 2009-2010. Memphis is the top market for unbreaded catfish products. Overall, there is an increase in sales volume of shrimp products in 2010 compared to 2006; 58-60% of shrimp products sold under some sort of promotion. About 80% of shrimp products are sold in the unbreaded form. Results also indicate consumers' demand is highly responsive to price changes.

Scientists (20)

O-FY-S-1

A Study of Trends in Bankruptcy Filings in the District of South Carolina: A Following Enactment of the New Bankruptcy Law of 2005. E. Beraho*, Department of Accounting, Agribusiness and Economics, South Carolina State University, Orangeburg, SC 29117.

The word "bankruptcy" is believed to have originated from ancient Latin verbiage *bancus ruptus* describing a "broken bench". *Bancus* means a tradesman's counter, and ruptus means something broken or rotten. In the US, bankruptcy is provided in the Constitution and is meant to allow businesses and individuals who fall on economic hard times to file, or get rid of debt, and start over. The economic viability of businesses and individuals is important for the nation's economic health, as well. In the US, bankruptcy filings have been increasing since 1998, creating that filers are taking advantage of the bankruptcy option. In response to this steep rise, Congress has passed the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPACPA) which took effect on October 17, 2005. A month later, bankruptcy filings fell by 70% nationwide. The BAPACPA imposes guidelines which make filing for bankruptcy extremely difficult. Current studies show that filing statistics for South Carolina and the nation began a slow rise in 2006, but the rise has been much slower than during the pre-BAPACPA days. The new laws passed after millions of dollars were spent on lobbying Congress; the sudden reduction in filings after BAPACPA passage indicates that the law has benefited lenders and creditors to the detriment of debtors. On the contrary though, proponents of BAPACPA hold that the new law successfully curtails fraudulent flings and is why filings are very low.

O-FY-S-2

Students in Animal Sciences Attending 1890 Land Grant Institutions: Are They in the Count? O. Bolden-Tiller*, M. Rodgers, and A. Andrews, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

There is an increasing need to fill the shortage of scientists and professionals trained in food and agricultural sciences. Statistics on minority students in these areas, including Animal Sciences (AS), particularly African Americans - the majority of which attend 1890 Land-Grant Institutions (LGI), are not readily available. As universities, industry, and government move to diversify their workforce in the field of AS, many are unclear as where to find well trained underrepresented students to meet the diversity demand. A previous study conducted at Tuskegee University (TU) revealed that incoming undergraduate students in AS have similar backgrounds and preferences compared to those reported for other LGI (data only available for 1862 LGI). Therefore, the objective of the current study was to evaluate the student populations in the field of AS at the seventeen1890 LGI and TU. A representative at each institution was surveyed on the following topics for May 2010 (graduates) and Fall 2010 (enrollment): number of students enrolled; number of new students enrolled; number of graduates enrolled in graduate school, medical school, or veterinary school; and number of graduates employed. The survey results showed a large range of AS students at each of the institutions and that the educational and career paths of the graduates varied significantly between institutions. In conclusion, students majoring/concentrating in AS at 1890 LGI and TU represent a significant pool of individuals who can help decrease the diversity gap in the AS workforce for the 21st Century.

O-FY-S-3

The Effectiveness of Community Action Research and Professional Development Activities on the Classroom Roles and Partnerships of Rural Pre-Service and In-Service Teachers. M. E. Fields*, and S. Mickle, Department of Teacher Education, South Carolina State University, Orangeburg, SC 29117.

There is a serious shortage of certified and qualified teachers throughout South Carolina, but nowhere is it felt more keenly than in the I-95 Corridor schools. These districts lack the human and non-human resources they need to effectively connect students with academic achievement. A good school culture must be created to include a community of learners through partnership development. Community agencies, universities, teachers, administrators, and parents must create a framework that supports the development and academic learning of rural

students in low-achieving public schools. This project has sought to connect action research and professional development activities to help improve teachers' skills through learning communities thus positively impacting PASS test scores of the students they teach.

O-FY-S-4

Barriers to Parents' Participation in Their Children's Education in Rural South Carolina – Orangeburg, District 5 Elementary Schools. M. Garvey*, Department of Social Sciences, South Carolina State University, Orangeburg, SC 29117.

Considerable research in the theory and practice of education documents overwhelming agreement that parental involvement has a positive effect on children's education. Especially among students in public educational institutions, both urban and rural, the theory associated with parental involvement is strongly validated. Positive results stemming from parental involvement are evidenced, not only in children's academic performances but also in areas associated with attitudes and behaviors. The purpose of this presentation is to explore the rationale of, and justifications for a project that aims to identify barriers, psychological and physical, that may be standing in the way of parents' participation in their children's education. Parents of children at eight elementary schools in the District 5, elementary school system in Orangeburg, South Carolina are interviewed in focus group sessions based on the school the child attends and the child's grade level. Questions asked at the sessions are designed to gather data relevant to: educational resources, activities and techniques that parents use at home, and in the community; methods used by parents to communicate with teachers, principals and school administrators, and the kinds of responses they receive; their children's responses to their involvement; the purposes of education that they stress to their children; their hopes and aspirations for their children; and their interpretations of success in the educational arena. Preliminary findings of the data gathered from six of the eight elementary schools will also be discussed.

O-FY-S-5

Economic Development and Global Warming: An International Perspective. H. Gedikoglu*, W. Wollo, and E. Ajuzie, Cooperative Research Programs, Lincoln University, Jefferson City, MO 65101.

The general wisdom is that the developing countries, through increases in production and consumption, will contribute more to CO_2 emission levels and will negatively impact Global Warming. Hence, accomplishment of economic development can be seen as a source of Global Warming. The objective of this paper is to analyze the impact of economic development on CO_2 emission levels and test the convergence of CO_2 emission levels between developing and developed countries. A panel data set was generated using the World Bank's Development Databank. A regression analysis for the panel data was conducted in the form of: $y_{it} = \mathbf{X}_{it}\boldsymbol{\beta}_{it} + \varepsilon_{it}$ where y_{it} is the dependent variable, level of CO_2 emissions per capita, for observation *i* at time period *t*. $\boldsymbol{X}_{ki}$ is the vector that includes the independent variables, which includes socio-economic variables, $\boldsymbol{\beta}_{ki}$ is the vector that includes the coefficients to be estimated and ε_{it} is the error term. The results of the current study show that CO_2 emission levels increase with energy consumption per capita, but not with higher per capita income or higher per capita consumption. On the other hand, developing countries such as Bulgaria and Turkey are more likely to have an increase in CO_2 emissions per capita than the European Union average. A converge of CO_2 emissions per capita between developing countries and developed countries was also not found.

O-FY-S-6

Impact of Socioeconomic and Demographic Factors on Graduation Rates in Selected Mississippi School Districts. T. Hargrave*, W. Whittaker, I. Harper, M. Mojica, and V. Igbokwe, Agricultural Economics Program, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096.

This paper assesses selected factors that influence high school students' decision to graduate or to drop out of school prior to graduation. To accomplish the objectives, secondary data were collected and analyzed using various multivariate techniques. Overall, the results indicated that since 1990, high school graduation rates have decreased in the four school districts studied. In Jefferson County, unemployment and per capita income are found to be significant in determining a student's decision whether to finish or to drop out of school prior to graduation. Unemployment was a statistically significant factor in Warren County; however, the resultant sign did not correspond to the a-priori relationship. Although the incidence of poverty in Claiborne County is very high and has shown few signs of declining in recent years, the graduation rate in the school district has trended upward. This suggests that even as the poverty rate in the county remains high, graduation rate has not slipped below the historical trend. While the majority of the hypothesized variables were not significant for each county, the results help to

provide a framework by which to better understand the question of why students drop out of high school before they graduate.

O-FY-S-7

The Impact of Culturally Relevant Teaching on Rural African American Students' Achievement. G. Johnson*[1], and G. Boutte[2], [1]Department of Education, South Carolina State University, Orangeburg SC 29117; and [2]College of Education, University of South Carolina, Columbia, SC 29208.

This session presents first year data from a three-year study, which examined the perceptions of pre-service teachers at three universities (n=112) on culturally relevant teaching for African American students. Additionally, the study examined the efficacy of eight months of biweekly professional development sessions with teachers in a rural elementary school in the southeast. Data sources included pre-service teacher surveys, initial teacher survey, biweekly evaluations of sessions, and baseline data on student achievement. Virtually, all of the pre-service teachers (97%) from two HBCUs and one predominantly White institution reported having placements in schools with more than five African American students in their classes. Eighty-four percent of the pre-service teachers felt that they were effectively teaching African American students, though they felt more effective teaching females (86%) than males (69%). Yet, over one-third of the pre-service teachers did not use books about African Americans in their lessons. Most (60%) reported having seen positive imagery of African Americans in their classrooms, but only 45% used specific strategies for teaching African American students. Half (51%) said that they had engaged in the formal study of African American language and culture. Teachers (n=11) who received the professional development sessions were overwhelmingly positive regarding the learning of innovative information thus recommending the professional development sessions to other teachers. Cumulative responses on a five-point Likert scale (low to high) ranged from 4.3-4.6. Follow-up with teachers will determine how and if information from professional development will be used in classrooms, as well as with the impact on student achievement.

O-FY-S-8

Exploring Lending Patterns in Rural North Carolina. S. Lee*, V. L. Giddings, and R. Robinson, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

In the United States, high APR loans (HALs) are a factor in predatory lending and are concentrated in rural areas with chronic poverty and a high proportion of minorities. HALs are used for financing manufactured homes, a major component of rural housing markets. In rural areas, 48% of African-American borrowers received a HAL, compared to 17% of non-Hispanic whites. This study provides current rural lending patterns, focusing on North Carolina (NC) where (a) 85% of counties are designated as rural; (b) mortgage borrowers were 20% more likely than those in the nation to receive a subprime loan; and (c) NC was one of the top five states for new manufactured housing shipments. The 2009 Home Mortgage Disclosure Act Loan Application Register (HMDA LAR) data, provided by Federal Financial Institutions Examination Council, were analyzed (N = 617,668) using descriptive statistics, Pearson correlation, and Chi-square analyses. Results revealed that loan applicants with high-incomes in NC were likely to have high loan amounts. Almost 33% of all loans were borrowed by minorities, 68.8% were used for refinancing, and only 30% were government-guaranteed or insured. Rural residents, or those with low-incomes, received less than half of all loans. Compared to urban residents, rural residents were more likely to have lower incomes, to borrow for home improvement and to live in manufactured housing. Rural residents were more likely to be denied their application. Data analyses with secondary datasets, like HMDA, can assist housing researchers, educators, nonprofit organizations or policymakers in their future studies or policies.

O-FY-S-9

Municipal Officials and the Delivery of Municipal Services in South Carolina. W. Legette*, Department of Social Sciences, South Carolina State University, Orangeburg, SC 29117.

This study investigates the attitude and perceptions of municipal officials regarding the delivery of municipal services. Municipal governments are responsible for infrastructures such as public road systems, water and sewer systems, fire departments, and street maintenance. Secondary services provided by municipal governments include health care, housing, cultural and recreational and elderly and youth facilities and services. The study explores municipal officials' level of satisfaction with such services. Differences in attitudes among municipal officials toward public services can have important effects on municipal policies and the delivery of municipal services. The study examines the relationship between these officials' attitudes regarding municipal services and interests groups' demands, as well as conflict in the city and the responsiveness of municipal government to interests groups' demands for services. The study draws its analysis from a mail-out survey to mayors and city council officials in 106 small towns in South Carolina. The analysis employs five environmental variables regarding the

municipality: population, per capita income, class composition, educational attainment, and racial diversity. It employs five political variables: party competition, election method, form of government, voter participation, and racial diversity on the City Council.

O-FY-S-10

Cut Flower Production in West Virginia – the Good, the Bad and the Possibilities. B. E. Liedl*[1], and S. C. Byars[2], [1]Agricultural and Environmental Research Station, and [2]Extension Service, Gus R. Douglass Land-Grant Institute, West Virginia State University, Institute, WV 25112.

Flowers bought in West Virginia are brought in from other states and countries, thus commercial cut flower production is a venture that could increase the profitability and diversify a small family-owned farming operation utilizing as little as a ¼ of an acre to start a cut flower business. Several states have investigated the potential for small-scale cut flower production. To investigate the potential of cut flower production in southern WV, funds were obtained in 2008 to start a demonstration project organized by the Great Kanawha RC&D funded by the WV Department of Agriculture and WVSU based on a project run in Virginia. Our project involved six growers in five southern WV counties. Four of the six farms reported sales in their first year of operation with one reporting almost $1,000. In addition, some growers found cut flowers to be helpful in reducing insect pests when intercropped with their vegetables as floral crops can house beneficial predatory and parasitic insects. Growers also found some markets and florists were very excited about obtaining local cut flowers for products that were either high dollar value or shipped poorly. However, not all of the cut flowers used in the project did well for our growers either in production or as a product for sale. We are developing a list of flowers that can be produced by small farms in the region and more importantly working with our growers to survey their potential markets for their interest and willingness to purchase local cut flowers.

O-FY-S-11

Building Capacity in Family Consumer Sciences Education and Dietetics Programs: A Model for Recruitment, Retention, and Increased Graduation Rates at an 1890 HBCU. N. Lyon-Bennett*, and M. D. Cecil, Department of Human Ecology, University of Maryland Eastern Shore, Princess Anne, MD 21853.

The focus of this project is to enhance recruitment, retention, and graduation rates at the University of Maryland Eastern Shore by addressing the need to attract more students from underrepresented groups into two important specific disciplines: family consumer sciences teacher education and dietetics. Given the shortage of FCS teachers and dietitians from underrepresented ethnic/racial groups, the project is vitally important to the survival, perpetuation, and diversity of both disciplines. As a pre-college program, the emphasis of recruitment efforts is targeted specifically at senior-level high school students from underserved minority communities, who without exposure to post-secondary options might not otherwise choose college as a viable choice. The intent is to attract high school students who will be the first in their family to attend college and to focus on those students who may not traditionally choose an HBCU as a college choice. To increase the likelihood of participation by these students, monetary and educational incentives are provided. The goal of this project is to reform mainstream instructional practices and address future needs within the food and agricultural sciences system by pipelining potential college students into two low enrollment disciplines at an HBCU. This project has the potential to attract and retain students into professions that are underserved by minority populations. Secondly, this project has the potential to impact and advance the quality of human sciences and family and consumer sciences by strengthening institutional capacities to meet clearly delineated needs, including the recruitment, retention, and graduation of students from racial and ethnic minority communities.

O-FY-S-12

Does Easier Access to Nutritional Information Increase University Students' Nutritional Knowledge? P. E. McLean-Meyinsse*, J. V. Gager, and D. N. Cole, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

The Nutritional Labeling and Education Act of Congress passed in 1990 ushered in the implementation of Nutrition Facts labels in August 1994. The Act was based on the premise that if consumers had easier access to nutritional information, many would make healthier food choices; and in the long run, healthier food choices would lower diet-related diseases and healthcare costs. Sixteen years after the introduction of Nutrition Facts labels on processed food products, their role in lowering overweight and obesity rates in the United States has been minimal at best. In 2009 Louisiana ranked second nationally based on its adult obese rate. The state spends almost $3 billion annually in healthcare costs for treating diet-related diseases. Given the state's budgetary challenges, residents must improve their eating habits. Learning how to read food labeling information and then using this knowledge to make

healthier food choices are good first steps. Our study uses pretest and posttest scores to measure students' ability to correctly answer general and specific questions about the nutritional information on food labels. The posttest followed instructions on nutritional concepts and their relationships to the Nutrition Facts. From the results, average pretest and posttest scores were 51 and 53%, respectively; the difference between these scores was statistically insignificant. Differences between the two-test scores were statistically significant for questions measuring knowledge of Percent Daily Values for total fat, potassium, and trans fat, and for nutritional benefits from consuming a diet rich in fiber, fruits, vegetables, Vitamin A, Vitamin B, and Vitamin C.

O-FY-S-13

An Analysis of the Role of Human Capital in Economic Development in Mississippi. M. N. Mojica*, and W. L. Whittaker**,** Agricultural Economics Program, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096**.**

For many years, economists have been investigating the factors affecting the growth of an economy. Several studies have demonstrated that human capital is one of the vital factors of economic development providing evidence that education is a key driver of growth and has a major role in reducing poverty. While several factors such as repeated natural disasters and slow development of infrastructure have been associated with poor economic performance in Mississippi, scarcity of human capital is identified as one of the major constraints in achieving economic development. The general objective of the study is to determine the role of human capital in economic growth in the state. Results provide information on the impact of human capital on economic development in Mississippi. Specifically, the empirical analysis measured the importance of human capital and several other factors that are traditionally linked to economic growth. The results are useful to policy makers in evaluating the effectiveness of human capital development to promote economic growth. The outcome of this study will help in the development and improvement of education policies and the incentive system regarding human capital accumulation.

O-FY-S-14

Dynamic Linkages among Investment Outlays, Business Climate, Employment and Income Growth in South Carolina: An Empirical Analysis. M. Mustafa*, Department of Accounting, Agribusiness and Economics, South Carolina State University, Orangeburg, SC 29117.

This paper examines the dynamic linkages and causalities among investment outlays, education, business climate variables along with employment, and income growth in South Carolina. I applied multivariate co-integrations methodology and vector error-correction models to investigate the factors that are likely to contribute to the income and employment growth in South Carolina. Pooled-time series and cross-sectional data of 46 counties of South Carolina for the periods 1990 -2008 are used. To investigate the stationary properties of each data series, the modified DF (Dickey-Fuller) test, modified (Ng-Perron) test and the KPSS test are implemented. The co-integrating relationships between or among the variables are determined by using the VAR approach. The preliminary results indicated that capital investment and education have both short-term and long-term casual influence on employment and income. The results imply that a commitment to education and investment are important ingredients for successful employment and income growth.

O-FY-S-15

Use of Inkjet Printing Technology to Deliver Finishes for Functional Textiles. G. W. Namwamba*, and V. K. Naarani, Textile Technology Laboratories, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

The demand for high performance textile products has led to the development of functional textiles such as anti-bacterial fabrics, fluorescent fabrics with high-visibility properties, and a variety of nano-particle based compounds to impart specific properties to textiles. Inkjet printing is a non-impact printing technology that has become very important in the delivery of many of these functional finishes for textiles. New developments in print-head technology such as piezo-electric heads make it easier to use various printing liquids because no heat is involved in the printing process. The objective of this study was to use a textile inkjet printer to deliver functional finishes to textile fabrics during the printing process. A new technique was developed using inkjet printing technology to deliver fluorescent finishes and nano-particles for variety of functional textiles. Inks are prepared with appropriate physical and chemical properties that are required for inkjet printing. Ink's rheology was modified without disturbing its flow properties that are very necessary for problem-free printing through piezo-electric printheads. Fluorescent dyes and nano-particles are added to the ink. Customized color palettes for printing on fabric were developed to match printer configuration to ensure that the finishes were delivered in selected printheads.

Fabrics are pre-treated, printed with functional inks, and steamed to fix dyes onto the fabric. Colorfastness of the printed fabrics was determined. Results indicated that the fabrics were colorfast to laundering and crocking. The resulting fabrics have improved visibility properties as per American National Standard for High-Visibility Safety Apparel (ANSI/ISEA).

O-FY-S-16

Drinking Water Clinics and Outreach in Delaware Focused on Educating Rural Homeowners. G. Ozbay*[1], D. Marsh[1], A. Essel[1], S. Clemens[2], C. Cotton[3], and J. Austin[4], [1]College of Agriculture and Related Sciences, Delaware State University, Dover, DE 19901; [2]Master Well Owner Network, Mid-Atlantic Water Program, University of Maryland, College Park, MD 20742; [3]University of Maryland Eastern Shore, Department of Agriculture, Food, and Resource Sciences, Princess Anne, MD 21853; and [4]Sponsored Programs, Delaware State University, Dover, DE 19901.

Over 2 million homes throughout the Mid-Atlantic Region utilize a private water system as their primary drinking water supply. Wells constructed improperly are susceptible to contamination and homeowners with private water supplies are generally unaware of this risk. Unlike public or community water systems, all of the testing, maintenance, and treatment of a private system are the sole responsibility of the homeowner. In Delaware, a program was created to educate homeowners about how to properly protect and maintain their private drinking water supply and analyze the quality of their drinking water. In 2009, about 85 rural residents participated in an evening drinking water clinic conducted at Delaware State University, College of Agriculture and Related Sciences. Of these participants, 44 individuals received the opportunity to have their well water tested. All water samples were tested for total coliform bacteria, *E. coli*, nitrite, nitrate, pH, hardness, alkalinity, iron, and sulfate. The majority of water samples failed to meet at least one drinking water standard, indicating that an urgent need exists to reach out to our communities. Providing more frequent educational opportunities and free water testing will help to increase awareness and understanding of proper private water system management.

O-FY-S-17

Demand for Seafood in the United States: Econometric Analysis for Major Seafood Categories and Seafood Canned Products. K. Singh*, and M. M. Dey, Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

The food demand elasticities are of interest to policy-makers for designing effective price and income support policies as well as for various other public interventions. Using the Almost Ideal Demand System (AIDS) model, we have conducted demand analysis for major seafood categories and canned seafood products in the United States markets. Effects of own prices, prices of competition products, consumption expenditure and seasonality have been estimated. The models use A.C. Nielsen store-level weekly scanner data from the weeks ending on 06/23/2007 through the week ending on 06/12/2010. The category-level AIDS model estimates show that with an expenditure on seafood, the market share in total seafood of breaded products and unbreaded finfish would increase. Finfish breaded and other unbreaded, and other breaded and other unbreaded were found to be substitutes. The demand for breaded finfish was found to be highest from July to September and the lowest in January to March. The demand for other unbreaded products lowers in July to September period. The canned product model results show that with an increase in expenditure on canned products, the market share of total canned products of oyster will increase, and of sardines and shrimps will fall. All canned products were found highly responsive to changes in their own prices. Oysters were found to be a strong substitute for shrimp, and salmon. The demand for canned shrimp falls in July through September. The demand for canned sardines is the lowest during April to June and the highest in July to September.

O-FY-S-18

Strengthening the International Capacity of University of Maryland Eastern Shore Students Using International Service Learning. S. Tubene*, and L. Marsh, Department of Agriculture, Food and Resource Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Strengthening the capacity of 1890 institutions is much needed in the 21st Century. Since U.S. students have limited knowledge of foreign cultures, exposing them to international activities and learning experiences is critical to their career development in the food and agricultural sciences. The University of Maryland Eastern Shore's (UMES) International Service Learning Project aimed at training students in international multi-disciplinary programs to become competitive in the global economy and at enhancing teaching capacity for UMES faculty by exposing them to international opportunities in Belize. Nine UMES students were placed in Belizean institutions in July 2009 and January 2010 for three weeks. Interdisciplinary programs, instructional delivery systems, and student

experiential learning approaches were used to accomplish the project's objectives. A survey of nine participating students revealed that all nine students became better prepared for the global workforce; developed self-confidence; and acquired critical thinking, analytical, and problem-solving skills through solving real field problems and issues encountered in Belizean agencies. In addition, one student between two participating students who graduated in spring 2010 pursued graduate studies in an international agricultural development program. UMES faculty gained more international experience and developed and offered a new course entitled International Agricultural Development.

O-FY-S-19

An Analytical Model to Select the Fleet Size for Rural Agriculture Transit Systems. Y. C. Xie*[1], W. Wang[2], L. Quadrifoglio[2], and W. Lu[2], [1]Department of Civil and Mechanical Engineering Technology, South Carolina State University, Orangeburg, SC 29117; and [2]Department of Civil Engineering, Texas A&M University, College Station, TX 77843.

Transit is one of the vital service sectors for the U.S. economy, and it holds tremendous environmental significance. Efficient transit systems are essential for preserving and revitalizing both the nation's rural areas by providing mobility, reducing urban sprawl, and minimizing congestion such as greenhouse gas emissions and air pollution. The United State's Department of Agriculture (USDA) has also established a "Rural Passenger Transportation Technical Assistance Program" to assist rural areas in developing public transportation services. The prime objective of this research is to improve rural agricultural transit network design and system operations with a focus on the mobility allowance shuttle transit (MAST) system. The MAST system is a hybrid transit system in which vehicles are allowed to deviate from a fixed route to better serve rural areas with low-density transit demand. A mixed integer programming (MIP) formulation for the static scheduling problem of multi-vehicle MAST system is proposed in this study. Based on the MIP formulation, we analyzed the impacts of time headways between consecutive transit vehicles on the performance of a two-vehicle MAST system. An analytical framework was then developed to model the performance of both one-vehicle and two-vehicle MAST systems, which was used to identify the critical demand level at which an increase of the fleet size from one to two vehicles would be appropriate. Finally, a sensitivity analysis was conducted to determine the impact of a key modeling parameter on the critical demand.

O-FY-S-20

The Adoption of Orange Flesh Sweetpotatoes (OFS) by Ghanaian Small Farmers for Nutritional and Economic Well-Being. R. Zabawa*, E. Bonsi, P. Doamekpor, E. Kebede, D. Mortley, and C. Bonsi, George Washington Carver Agricultural Experiment Station, Tuskegee University, AL 36088.

Nutritional deficiencies (e.g., Iron and Vitamin A) take heavy health and economic tolls on rural peoples across the globe, especially among young children and women. This impact is particularly great in areas where women farmers account for a significant if not the majority of food crop (versus cash crops) production. The sweetptotato (*Ipomoea batatas*) has been found to provide a source for both iron (the leaves) and Vitamin A (in orange flesh varieties). In Ghana, West Africa, the sweetpotato lags behind other root crops such as cassava and yam in terms of production and food preference. This research explores ways in which orange flesh sweetpotatoes can be adopted by Ghanaian small farmers and introduced to the general public for increased health and economic benefits. Through the use of multidisciplinary teams that included plant science, extension, agricultural economics, nutrition and anthropology, it was found that adoption by farmers of a new variety of sweetpotato was not based on a single production—marketing decision but, rather contingent on a series of adoption decisions by a series of actors and based in a value-added chain of production—processing—new product development, each with technical, economic and commercial considerations.

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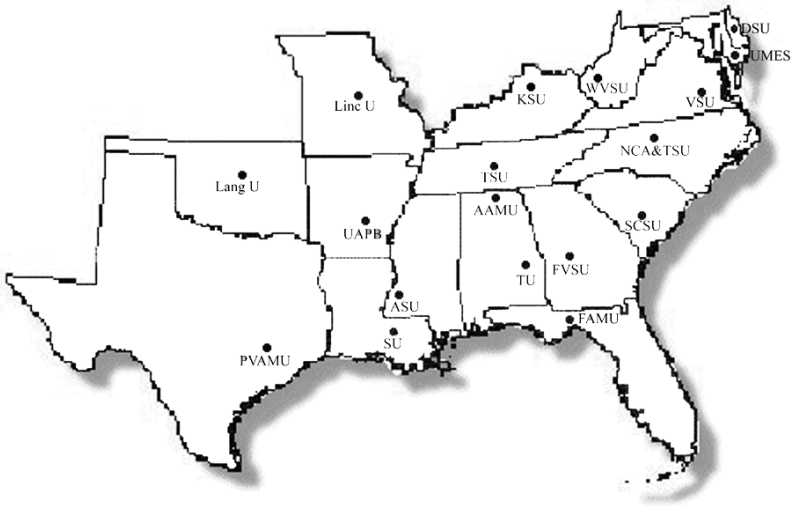

Abstracts of Family, Youth, Community, and Economic Development Posters

Undergraduate Students (3)

P-FY-U-1

The Persistence of Poverty in Forest County, Mississippi. R. Harris*, W. Whittaker, M. Mojica, T. Hargrave, and V. Igbokwe, Agricultural Economics Program, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096.

The US Census Bureau reported that poverty in America rose to 43.6 million in 2009, an increase of 3.8 million in the past year - the largest total since the first 1959 estimates. It shows one in seven Americans are impoverished. At the official 14.3%, it represents the highest poverty rate since 1994. Black and Hispanic Americans fared much worse at 25.8% and 25.3%, respectively. Poverty in Mississippi continues to be pressing and persistent and in many counties, have shown few signs of abatement. Counties in the lower Mississippi Delta region are some of the poorest in the country where majority is characterized by rural attributes. Further, it is assumed that areas in Mississippi that have a greater concentration of African-Americans tend to have higher rates of poverty while areas of a greater concentration of Caucasians have lower rates of poverty. This hypothesis has been tested in the research. The paper also identifies relevant factors that seem to consign Forrest County, MS into a persistent state of poverty. Using descriptive methods to analyze longitudinal data, results show extremely interesting poverty trends in Forrest County relative to Mississippi and the nation as a whole.

P-FY-U-2

Effect of Fabric Construction Method on Abrasion Resistance Properties of Textile Fabrics. B. Matthews*, K. Littleberry, A. Curry, T. Rubin, V. K. Naarani, and G. W. Namwamba, Division of Family and Consumer Sciences, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Abrasion resistance is one of the most important physical properties of fabrics and is defined as the ability of a textile material to withstand surface wear and rubbing. Abrasion resistance is an important indicator of fabric durability and appearance retention characteristics. Many factors such as fabric construction method, thread count, fabric thickness, and fiber content are important variables that determine surface and tensile properties of textile fabrics. The objective of this study was to determine the effect of fabric construction on abrasion resistance. Fabrics made with two different weaves were selected for the study. Fabric one was made with a simple ribbed weave and fabric two was made with a complex ribbed weave, and had a higher thread count. Three test specimens were obtained from each sample and were tested for abrasion resistance using the AATCC Accelerotor machine according to AATCC Test Method 93-1999. Test specimens were conditioned in the standard atmospheric conditions according to ASTM D 1776 procedure prior test. Abraded specimens were evaluated using two methods for abrasion resistance: weight loss and strength loss (breaking force by grab method according to ASTM D 5034). Tensile strength was measured in the warp and weft direction. Test results indicated that the fabric with complex rib weave and higher thickness exhibited less weight loss and higher tensile strength after abrasion. Based on these findings, fabrics with a tighter more complex weave tend to have higher abrasion resistance because there are less floating yarns on the surface.

P-FY-U-3

Effect of Fiber Content on Colorfastness of Textile Fabrics. C. Morton*, R. Martin, S. Johnson, V. K. Naarani, and G. W. Namwamba, Division of Family and Consumer Sciences, Southern University Agricultural Research and Extension Center, Baton Rouge, LA 70813.

Color is an important factor in determining consumer acceptance of a textile product because it is the most visible component. The ability of a fabric to retain the original color during routine use is called colorfastness. Colorfastness is therefore an important intrinsic indicator of quality for all textiles. Several variables such as coloration method, fiber content, even fabric construction methods can have a strong influence on colorfastness of a textile fabric. The objective of this study was to determine the effect of fiber content on colorfastness of textile fabrics. Colorfastness to laundering (washing) and crocking (rubbing) were studied for two fabrics made from different fiber content (100% polyester and 50/50 cotton/polyester blend). Test methods developed by AATCC were followed to determine the fastness ratings. Colorfastness to laundering was determined using AATCC 61 Tests 1A and 2A (machine and hand wash conditions, respectively). Colorfastness to crocking was determined using AATCC -8. Specimens were conditioned in standard atmospheric conditions using ASTM D 1776 procedure prior to color evaluation. Color change and the staining were evaluated using AATCC Gray Scales for Color Change and AATCC Gray Scale for Staining, respectively. Colorfastness to crocking was evaluated using the AATCC 9-Step Chromatic Transference Scale. It was observed that the 50/50 cotton/polyester blend fabric performed very poorly in laundering

tests. Crock fastness values of the 100% polyester were poorer than for the blended fabric. Interactions among colorant, coloration method, weave, and fiber content, have a strong bearing on the colorfastness of the test fabrics.

Graduate Stuedents (2)

P-FY-G-1

Performance in Animal Science Proficiency Test is Related to Student Class Standing, Farm or Non-Farm Background. D. Phillip*, C. Okere, O. Bolden-Tiller, W. Witola, N. Gurung, and W. McElhenney, Department of Agriculture and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

The conducted test evaluated competency of the Animal and Poultry Science students of Tuskegee University. The test consisted of 100 multiple-choice questions covering core animal science aspects. The scores were evaluated and interpreted according to class standing, demography and proficiency in Animal Science topics. Of 186 students sampled, 36.5, 19.8, 17.7 and 25.8 % were freshmen, sophomores, juniors and seniors respectively. Seniors earned a higher average test score than juniors, sophomores or freshmen indicating that the level of comprehension of Animal Science courses is related to class rank. Males responded correctly more frequently than females, but this statistic is difficult to interpret since a greater proportion of students enrolled in Animal and Poultry Sciences courses are females. Students from a farm background had the highest test scores, followed by urban and urban/rural farm students, respectively. The mean scores for all students was 50.2% suggesting that most students were ill equipped to fully comprehend basic concepts in animal science courses. Results from this study will be incorporated into new teaching methods and materials to address subject matter comprehension, gender and background disparities of participating students.

P-FY-G-2

Business Closure in Southwest Mississippi: Economic Impact on Selected Counties. M. Thomas*, W. Whittaker, M. Mojica, T. Hargrave, and V. Igbokwe, Agricultural Economics Program, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096

Rural Southwestern Mississippi counties such as Amite, Adams and Wilkinson are traditional areas that epitomize rural communities in Mississippi. These counties are characterized by persistent poverty where unemployment rate is high and average income is far below the national average. Historically this region depended on small-scale agriculture and was an attractive location for light manufacturing. Today, many of these advantages have been lost and firms that made up the bulk of the economic activities in the areas are disappearing in large numbers. Hence, per capita income falls and people migrate to more prosperous areas, leaving the region deeply depressed. Using descriptive as well as inferential methods to analyze data, results show interesting trends, especially with regard to business migration. Firms that were previously located in the area have migrated. Closure of these companies has seriously devastated the communities. It has in general, driven down land values, encouraged out-migration from the region and has created unbearable hardship for many residents and their families. To a large extent the region has seriously regressed in that it has exchanged relatively high wage manufacturing jobs for low wage retail and service jobs. The results of this study suggest that if manufacturing is again going to become an important force in these rural areas, it can only be high technology manufacturing. There is a need to improve the educational system, such that it can produce a workforce with excellent computational skills, plus an ability to respond to the rapid technological changes associated with those industries.

Scientists (9)

P-FY-S-1

Major Nutrition and Health Concerns among People Living in Rural Kentucky. C. Butler*, C. Wang, and L. Huang, Human Nutrition Program, Kentucky State University, Frankfort, KY 40601.

People living in rural areas may not have the same level of nutrition and health services available to urban populations. In addition, they may not be quite as concerned as people living in the urban areas. The objective of this project was to understand the major nutrition and health concerns of rural populations so service projects may be developed to meet their service needs. Visitors to the Kentucky State University's field day were recruited to answer a questionnaire about their current body weight and health status, and their major nutrition and health concerns. Among the 50 participants, over 60% were female, majority of them were over 40 years old, over 65% were either overweight or obese and 64% live in rural areas. Fifty percent of people living in rural areas think the nutrition information in public media is confusing, compared with 20% of people living in urban areas. Sixty percent of

people living in the rural areas grow their own vegetables. The top nutrition and health concerns for them are diabetes, obesity, alcoholism, cardiovascular disease, osteoporosis and cancer. These results emphasize the need for educational programs covering these topics for people living in rural Kentucky.

P-FY-S-2

University Collaboration with Secondary Education to Enhance Science Curricula. C. P. Cotton*[1], C. P. Harned[1], A. Shaw[1], and W. Waller[2], [1]School of Agricultural and Natural Sciences, University of Maryland Eastern Shore, Princess Anne, MD 21853; and [2]Wicomico County Public Schools, Salisbury, MD 21801.

A capacity building project entitled "Collaboration with Secondary Education to Enhance Agricultural Science Curricula" was funded in 2007. A team approach was used to incorporate agricultural concepts and applications into high school science curricula to broaden students' awareness of the extensive nature and diversity of the food and agricultural sciences. During summer 2009, the University of Maryland Eastern Shore (UMES) collaborated with two teachers from Parkside High School in Salisbury, MD, to develop instructional units on drinking water quality and the interactions of species and organisms within their environment. The units were pilot tested during the 2009-2010 academic school year. During summer 2010, the same two teachers worked closely with the curriculum specialist to revise sections of their 2009 units based on student engagement and performance in the pilot. The teachers also developed new instructional units by working closely with agriculture research faculty, content specialists, and the curriculum specialist to plan and develop new units. The biology teacher developed a unit on genetics and food safety, and the environmental science teacher developed a unit on the health of the Chesapeake Bay. By August 2010, each teacher had developed a three to four week instructional unit. The new units will be pilot tested during the 2010-2011 academic school year and revised summer 2011. A website will be developed to make the instructional units available to family and consumer science, agriculture, and science teachers. The units will also be packaged on DVDs for distribution to teachers at professional development workshops and conferences.

P-FY-S-3

Utilizing Orange-Flesh Sweetpotato to Enhance Nutritional and Economic Prospects of Women in Rural Communities in Ghana. P. Doamekpor*, E. Bonsi, R. Zabawa, D. Mortley, E. Kebede, and C. Bonsi, George Washington Carver Agricultural Experiment Station, Tuskegee University, Tuskegee, AL 36088.

Studies throughout the developing world in general and West Africa and Ghana in particular have found that vitamin deficiencies and other forms of malnutrition lead to poor health outcomes. In Ghana, vitamin A and iron deficiency cause early childhood malnutrition and possibly death especially in rural communities. In a continuing effort to address both malnutrition and low incomes, particularly among rural women and their families, researchers at Tuskegee University have focused on the orange-flesh sweetpotato (OFS) as part of the solution. The initial research collaboration between Ghanaians and Tuskegee researchers focused on the leaves of the sweetpotato as an excellent, year-round source of iron, to address iron deficiency anemia. Results from village level tests found that the leaves were highly acceptable in local stews, resulting in a significant increase in sweetpotato production and modification of traditional recipes to include sweetpotato leaves. To expand the utilization of the orange-flesh sweetpotato, additional products such as weaning foods, flour and chips were emphasized as valued-added products for making bread and baby foods. A series of workshops to improve traditional foods, nutrition and health of Ghanaian women and children provided opportunities for diversified income, economic and social progress to reduce poverty and nutritional deficiencies. Trainings held for food crop producers and processors provided an enabling environment for women to gain technical knowledge to assist them in addressing both income and nutrition problems.

P-FY-S-4

Implementation of Educational Opportunities Focused on Biotechnology and Related STEM Areas at Kentucky State University. L. Lu*[1], K. W. Pomper[1], and K. Kaul[2], [1]Land Grant Program, and [2]Biology Department, Kentucky State University, Frankfort, KY 40601.

Modern Biotechnology impacts multiple areas of natural sciences, like medicine, genetics, biochemistry, cell biology, and agriculture. Training in biotechnology techniques and related STEM areas is critical for students who wish to pursue careers in the life sciences and agriculture. In 2008, a USDA 1890 Institution Capacity Building Grant "Creation of Summer Educational Opportunities in Biotechnology to Recruit Students and Enhance STEM Areas at Kentucky State University" was funded with the objectives to 1) Create summer biotechnology workshops for K-12 students by providing "hands on" training in modern molecular techniques and scientific methods; 2) Implement summer biotechnology workshops for K12 teachers and non-traditional students; and 3) Create summer and fall BIO 410: Special Problems in Biology course at KSU in learning techniques of biotechnology through

undergraduate student research projects, and enhance the implementation of BIO 495 Biotechnology courses with new techniques. Totally ~200 participants have already participated in workshops and classes supported by this grant. The workshop participants acquired an understanding of modern biotechnology, most recent progress in high-technology Agriculture, possible careers in Agriculture and STEM areas, etc. through lectures. They also performed series of safe, easy-to-understand experiments concerning yeast fermentation, DNA finger printing, Genetic Modified Organisms, etc. The attendees enjoyed the process and expressed interests in related/advanced workshops. The undergraduate students of KSU have gained opportunities through courses/internship opportunities to learn and apply modern biotechnology techniques to various research projects.

P-FY-S-5

Assessing Hispanic Participation in the Free and Reduced-Price School Lunch Programs for Piedmont and Midlands Regions of South Carolina during the Period of 2000-2003. C. C. Mathis, Jr.*, and S. R. Choudhari, 1890 Research, South Carolina State University, Orangeburg, SC 29117.

In South Carolina, the Hispanic population is the fastest growing minority group, but only about 25% live below poverty level. Hence, the researchers proposed to assess participation of Hispanic students in the free and reduced-price school lunch programs from the 15 selected counties in Piedmont and Midlands regions of South Carolina for the period of 2000-2003, where the Hispanic population of each county was 1000 or more. From the secondary data source made available by the Office of Research and Statistics in South Carolina, necessary data sets and several scales were constructed by developing the software applications. Assessments done on the participations of Hispanic students in the free and reduced-price school lunch programs of each county of both regions are depicted in the graphs, which will also give comparison between the participations in the two programs for each county. Additionally, graphical presentation of the annual average number of participants in each program shows trend for each region and comparison of the two regions. This assessment may reflect economic conditions of the Hispanic families; furthermore, the assessment on Hispanic participations will be useful to the schools, as well as, the Department of Health and Environmental Control (DHEC) agency to support the nutritional needs of the poor Hispanic students.

P-FY-S-6

The Impact of Economic Hardship on Clothing Purchasing Behavior. J. Oh*, Department of Human Ecology, Delaware State University, Dover, DE 19901.

The National Bureau of Economic Research announced that the U.S. economy had entered a recession on December 1, 2007. According to the various media reports and trade publications, consumers showed changes in their purchasing behaviors, and consumers have less money to spend on clothing this year compared to 2008. These major changes sweeping the U.S. present a timely opportunity to study empirically the effects of economic hardship on consumers' cognitive and behavior patterns on clothing. Therefore, using Andreasen's Model of Life Change Effects as a theoretical framework, the purpose of this study was to develop and test a model that depicts the direct and indirect influence of a life event, the U.S. economic hardship, on financial stress, clothing lifestyles, and clothing purchasing behavior. A total of 359 usable questionnaires were included in the data analysis, and all respondents are independent clothing shoppers. The reliability of variables was tested using Cronbach's alpha and item-total correlation. Descriptive analysis was conducted to investigate characteristics of the samples, and chi-square and correlation tests were used to measure the association among the demographic variables. The results showed that when consumers perceived financial stress, they spent less money for clothing shopping and they were more concerned about utilitarian factors. Also, the life status change impacted clothing purchasing behavior and financial stress. Theoretical and managerial implications are discussed.

P-FY-S-7

Development and Evaluation of a Rapid Test to Assess Performance of PPE with Repellent Finish. A. Shaw*, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Use of Personal Protective Equipment (PPE) is required for the health and safety of pesticide operators. Performance specification for protective clothing was approved as an ASTM standard in 2009. According to the standard, manufacturers are required to provide detailed instructions on garment use and care, including when the item needs to be discarded. The usable life of a garment is dependent on its use and maintenance. Results of the wear studies indicate that in some cases garments with repellent finish that had performed well after 50 laundering cycles in the laboratory failed to perform as well when used by agricultural workers over time. Therefore, used garments from three wear studies were used to develop and evaluate a rapid field test that could be used to determine the performance of garments with repellent finish. This test would assist the farmers in determining when

the protection provided by the garment is no longer adequate and the item needs to be replaced. Sample swatches were cut from used garments and tested using tap water with and without a surfactant. The results of the rapid field test were compared with those of the penetration test conducted in accordance with ASTM 2130 to determine the suitability of the rapid test as a performance indicator. Based on the findings of the study, a simple instruction sheet was developed for training on the use and care of garments. The study results and the instruction sheet for training will be included as part of the presentation.

P-FY-S-8

Information Sources Used by Small Tennessee Farmers. F. Tegegne*, E. Ekanem, S. P. Singh, and L. Li, Department of Agricultural Sciences, Tennessee State University, Nashville, TN 37209.

Small farms make up about 91% of total United States agriculture and the figure is even higher for Tennessee. They own more than half of the land in farms. Over the years small farmers have been facing challenges, which are being exacerbated by changes in government policies, globalization and increasing concentration in agriculture. A key input in farmers' decision making is information. Possible sources of information include: Newspapers and magazines, Radio/TV, Internet, USDA agencies, Extension, other farmers and the private sector. Review of literature shows that technology transfer among farmers Worldwide is based on acquisition of information from other farmers. Use of a given source of information may also depend on past experience the user had with the different source(s). For instance, if small farmers perceive that some sources are only working with large farmers they may tend to avoid them. Similarly, if there is transaction cost involved in acquiring information small farmers may avoid such sources. Thus, information sources used by farmers may be affected by a number of factors including characteristics of the farmers and their operations. The USDA Small Farm Commission has called for making special effort to reach small farmers. It is also possible to consider using a mix of public-private information sources. The objective of this poster is to assess use of different sources of information. Preliminary analysis based on mail survey of small farmers in Tennessee shows that other farmers, extension and USDA agencies are the three top sources of information used by small farmers.

P-FY-S-9

Strengthening the Preparation of Underrepresented Minorities for Entrance into Family and Consumer Sciences Professions. A. P. Young*, and Q. Bentley, School of Agricultural and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

The goal of this project is to strengthen retention and the level of leadership development within the Family and Consumer Sciences department at Alabama A&M University. The field of Family and Consumer Sciences has seen an increase in the need for trained professionals to educate individuals regarding nutrition, to improve the financial literacy of the community as well as improve the level of FCS Education in the school system. To that end this project, funded by an USDA Capacity Grant, has been initiated. The intent of the project is to utilize a holistic approach to student recruiting, retention and support. The main components of the project include financial support for students, strengthening support for students within the department, and increased recruiting efforts. The project provides support to students via scholarships which include the following:freshmen, Peer Mentor stipends, internship scholarships, and student travel scholarships. A key component of the project is the development of the FCS Peer Mentor program. Peer Mentors have been selected from FCS majors to serve as a resource to incoming and first year students in the FCS department at AAMU. Peer Mentors are matched with freshmen and transfer students in an effort to ease their transition into college. Results indicate that the Peer Mentors increase the visibility of the majors within FCS in the community, and improve the quality of interaction with high school students when recruiting. To increase the level of interaction with potential students, social media has been activated, and the Peer Mentors actively submit material to be included within various social media platforms, including Facebook and Twitter.

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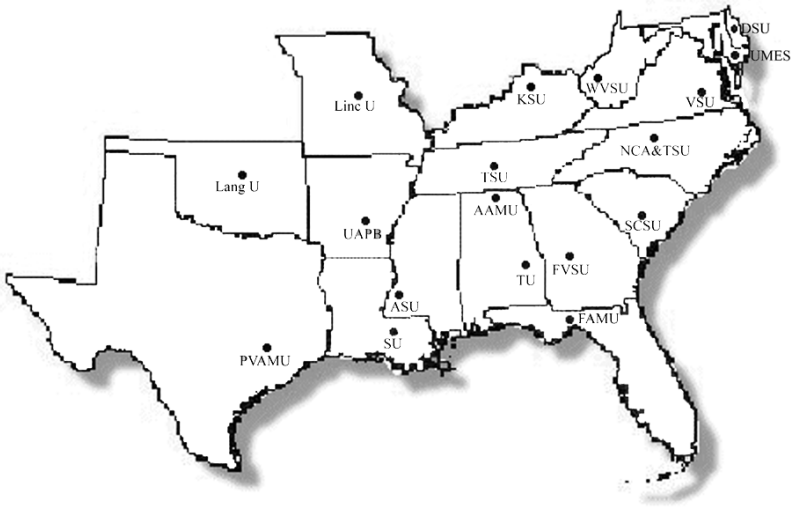

Abstracts of Human Health, Nutrition, and Obesity Prevention Papers

Papers

Undergraduate Students (7)

O-HH-U-1

Dietary Quality of Meals and Snacks Available to Students Residing on the Delaware State University Campus. C. Bethany*[1], C. Giesecke[1], and S. Besong[1], Human Ecology Department, Delaware State University, Dover, DE 19901.

Childhood obesity is a well-studied and much publicized problem of epidemic proportions in the U.S. In universities, the problem continues and compounds as students, away from home for the first time and confronted with a wide array of foods—usually in a buffet format and compounded by all the stresses and demands of college life—often gain more weight. The "Freshman Fifteen" is a phrase that has been used to describe this phenomenon for many years, but may become the Freshman Twenty or much more on a modern college campus. This research project asks the question, "Is it consistently possible to get healthful meals and snacks on campus?" First, we review the literature that examines the food intake of college students in the U.S.; next we apply the 2010 Dietary Guidelines to define healthful meals and snacks; then we examine the variety of foods being served at the various campus eating establishments and in vending machines. Finally, through student interviews, we tally the amount and types of foods students keep in their rooms, and the types and amounts of foods delivered to campus from area restaurants.

O-HH-U-2

Nutraceutical Value of Synchronized *in vitro* Cell Cultures of American Native Grapes. D. Branson*[1], S. Krastanova[1], and V. Colova (Tsolova)[1], Center for Viticulture and Small Fruit Research, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

Grape flavonoid nutraceuticals are produced and stored into the seeds and the skin of the developing berry. Green berry seeds are richer and during maturity large amounts of these compounds are shifted to the skin in most of the *Vitis* species. *Muscadinia* follows a different scenario and keeps the majority of the flavonoids into the seeds even during the berry maturity and this is one reason for the lack of longevity in muscadine wines and their modest vinification qualities. Molecular farming (using crop plants and plant cells as new efficient alternative for producing important industrial and pharmaceutical compounds) is immerging multibillion industry. There is no hypothetical limit to the amount of value that can be added to a crop. The use of *in vitro* cell culture techniques has become a fast and reproducible method to obtain compounds like bioflavonoids, often in much higher concentrations than found in the plants themselves. Cell suspension cultures can synthesize high levels of anthocyanins, proanthocyanidins, and other flavonoids; the products accumulated in plant cell cultures parallel those produced *in vivo* in the plant, and mixtures of co-occurring phytochemicals can be more easily harvested from the cultures. Red cell suspensions were initiated from muscadine, *aestivalis* grape varieties to be used as *in vitro* system for flavonoid profiling and gene microarray differential genomics analysis. Significant differences in flavonoid production between the various *in vitro* treatments from each genotype will be assessed and discussed in our work.

O-HH-U-3

An Effect of Three Months Refrigeration Storage on Free Fatty Acid Compositions of Low-Fat and Full-Fat Goat Milk Cheeses. A. Lee*, C. McGhee, J. Oglesby, and Y. W. Park, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Differences in free fatty acid (FFA) compositions between low-fat (LF) and full-fat (FF) goat milk cheeses were evaluated during three months refrigerated storage. The two types of cheeses were manufactured using bulk tank goat milk at Fort Valley State University, Fort Valley, GA. Fat was removed from the whole milk by a cream separator before manufacture of LF cheeses. FFAs of all cheeses were extracted in diisoprophyl ether using a polypropylene chromatography column (Bio-Rad Labs, Los Angeles, CA), and FFA concentration was quantified using a gas chromatograph (17A-GC, Shimadzu Co., Japan) equipped with a fused silica capillary column (DB-FFAP; 30 m x 0.25 mm i.d. x 0.25 μm, Agilent Technologies, Wilmington, DE). FFA contents (mg/g cheese) of initial FF and LF cheeses for C4:0, C6:0, C8:0, C10:0, C12:0, C14:0, C16:0, C18:0, C18:1, and C18:2 were: 0.020, 0.072; 0.070, 0.035; 0.061, 0.055; 0.181, 0.167; 0.073, 0.047; 0.174, 0.112; 0.579, 0.152; 0.308, 0.202; 0.521, 0.174; and 0.057, 0.026, respectively. The respective FFA to total fatty acids ratios for 0, 1 and 3 months aged FF and LF cheeses were 8.44, 12.4; 6.31, 16.91; 12.03, 14.19, respectively, indicating reduced-fat cheeses had significantly higher proportions of FFA than those in the FF cheeses. Total FFA of LF cheeses at 0, 1 and 3 months aging were 48.0, 96.8 and 36.4% of those in FF cheeses. The higher proportions of FFA in LF than FF cheeses may be attributable to increased lipase activities on fats released from fat globule membrane after cream separation.

O-HH-U-4

The Effect of Size of Sweet Potato Fries on Fat Uptake and Texture. N. Moody*[1], College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32307.

The sweet potato is a dicotyledonous plant that belongs to the family Convolvulaceae. Sweet potato tubers come in a variety of colors, ranging from purple or red to pale yellow or white. The variation of color depends upon the variety, soil type, climate and minerals. The sweet potato has many health benefits that have contributed to its recent popularity. Besides simple starches, sweet potatoes are rich in complex carbohydrates, dietary fiber, beta carotene, vitamin C, and vitamin B_6. Due to sweet potato nutritional value it is considered the most nutritional vegetable. This study was conducted to investigate the correlation between the size of sweet potato fries and the fat uptake and texture of the different size fries. Sweet potato fries were cut in the sizes of ½, ¼, and ¾ inch fries, blanched, frozen and fried to maximized crispy texture of the fries and then analyzed using texture analysis and crude fat analysis.

O-HH-U-5

Effects of *Hibiscus sabdariffa* Extracts and Compounds on Tumor and Vascular Smooth Muscle Cells. W. D. Rollyson*[1], C. R. Racine[1], M. E. Seidler[1], D. L. Moore[1], R. T. Harris[1], Q. Wu[2], J. E. Simon[2], K. L. Chin[3], and G. R. Hankins[1], [1]Department of Biology, West Virginia State University, Institute, WV 25112; [2]Department of Plant Biology & Pathology, Rutgers University, New Brunswick, NJ 08901; and [3]Southern Ag Center, Southern University, Baton Rouge, LA 70813.

Hibiscus extracts are used in traditional African and Chinese medicine. Previous studies have demonstrated medicinal properties of select *Hibiscus* extracts, however information is very limited about variations among *H. sabdariffa* accessions. Accessions of *H. sabdariffa* can be grouped by calyx color into green, pink, red, and dark red. Here we examine differences among accessions in anti-tumor properties and on vascular smooth muscle cell proliferation and migration. Cells were exposed to concentrations ranging from 0.0 to 4.0 mg/ml of Dark Red, Red, Pink, or Green extracts. The effects of selected isolated compounds from the extracts showing the greatest effects were also tested. Tumor cell proliferation was evaluated by Cell Titer Glo and tryphan blue exclusion assays. Where the tryphan blue exclusion assays demonstrated increased cell death, Annexin V staining was utilized to determine whether death was due to apoptosis. To determine effect on vascular cell migration and proliferation a scratch wound assay was utilized with A7r5 cells.

O-HH-U-6

Polyphenol Profiles of Different Parts of Grape Pomace and Impacts of Drying Methods. I. Smith*, B. Melton, D. Ellison, M. Ahmedna, and J. Yu, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Grape pomace (GP), a by-product of the wine industry, is rich in health promoting polyphenols. The health benefits of GP polyphenols have been great interest of functional food and nutraceuticals industry. GP typically consists of skins, seeds, stems and pulps, but the polyphenol composition of each part is rarely reported. In addition, grapes are seasonal agricultural products and are usually harvested and crushed in September and October in North Carolina. The pomace is perishable and has to be dried or stored at freezing temperature for use at later time. In this study, GP from cabernet sauvignon and muscadine nobel were dried by freeze drying and vacuum drying methods. Seeds, skins and stems were separated manually after drying, and the effects of drying methods on the total polyphenol (TP), total anthocyanins (TA) and total flavonoids (TF) were evaluated. Seeds and stems from both grape varieties were rich in TP and TF but low in TA. Muscadine skins had more TP and TA, but lower TF than cabernet skins. Compared to freeze drying, vacuum oven drying resulted in a significant loss of TP, TA and TF, particularly in the muscadine pomace. Among different groups of polyphenols, anthocyanin was affected most significantly by drying methods. The loss of TA due to vacuum drying ranged from 30 to 98%, depending on the part of GP. Therefore, in order to preserve bioactive components in the grape pomace caused by spoilage and heat damage, a mild drying method is required.

O-HH-U-7

Prevalence of Metabolic Syndrome (MetS) in Young African American Adults in a Typical Historically Black Colleges and Universities (HBCU) Setting. J. Walker*, A. M. Topè, and P. F. Rogers, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

There are ethnic disparities in the prevalence of obesity in the US population. African Americans (AA) continue to report higher rates for obesity than any other ethnic group. Overweight and obesity are linked to greater

risk for Metabolic Syndrome (MetS), a frank indicator of risk of chronic and cardiovascular diseases. It is a cluster of conditions that include a high body mass index (BMI), diabetes, hypertension and lipid imbalance. There are limited data on prevalence of MetS in young AA adults (18-24years). With an objective to screen the student population for the risk of MetS and to offer early intervention, SHAPE UP KSU, an integrated project involving freshmen students, which comprise more than 60% of young AA at KSU was launched. In the fall of 2010, freshmen students (n=110) have participated so far. Anthropometric evaluations included measurement of waist and hip circumference, BMI and total body fat composition, while the clinical evaluations included fasting lipid and glucose profile. Using thence definition of MetS, approximately 17% (n=17) of the participants were found to have MetS, which is significantly higher than the national average in that age group (12%). Those identified with MetS will be offered nutrition and life style related counseling and will be followed through by professional health care experts. These partnerships with local and national resources will work as a 'model' for many other institutions of higher education, especially for other Historically Black Colleges and Universities (HBCU).

Graduate Students (9)

O-HH-G-1

Spontaneously Hypertensive Rats' Response to Diets Containing Traditional and Novel Vegetable Greens on Gene Expression and Prevention of Lipid Peroxidation. S. Attoh*[1], R. Pace[1], and M. Egnin[2], [1]Department of Food and Nutritional Science; and [2]Department of Agriculture and Environmental Science, Tuskegee University, Tuskegee, AL 36088.

Hypertension (HBP) is a widely known cardiovascular disease seen in highest percentages among African Americans. HBP causes overall inflammation and free radical production associated with age related chronic diseases. Significant levels of antioxidants, which quench free radicals, are present in a variety of traditional (collard greens-CG) and novel vegetable greens (purslane-PL, and sweet potato leaves-SPL) ingested by African Americans. Their value relative to reducing free radical production in brain tissue is of interest. Fatty acid composition and apolipoproteins A and B (apoA and apoB) and highly-sensitive C reactive protein (hsCrp) of spontaneously hypertensive rat (SHR) brains consuming different antioxidants were investigated. SHRs were randomly assigned (N=44) to one of four diet groups (Control, C; 4% CG; 4% PL; 4%SPL) and fed for six weeks under controlled conditions. Rats were then euthanized; total fatty acids, RNA, and proteins were extracted from each brain. Results showed essential polyunsaturated fatty acids (PUFA); saturated fatty acids (Myristic, Nanoic, Arachidic, and Lignoceric acid); and monounsaturated fatty acids (Elaidic acid) expressed significant differences among the treatment groups. The control showed the highest significant difference in γ- and α-linolenic and arachidic acid when compared to treatment groups. Mean significant differences were determined by Duncan's multiple range test. The apolipoproteins and hsCRP are currently under investigation through ELISA, qRT-PCR, and Western analyses. Results from this study will be used to further educate the public about eating diets rich in antioxidants from traditional and novel green leafy vegetables to prevent hypertension, and other chronic diseases.

O-HH-G-2

Evaluating the Effectiveness of Swine Waste Treatment System on the UAPB Farm. W. Columbus*, and E. Buckner, Regulatory Science Center, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Although the use of constructed wetlands to treat various types of wastewater is slowly becoming a common practice throughout North America, little has been documented about their year round performance. On the University of Arkansas at Pine Bluff (UAPB) Demonstration and Research Farm, a Swine Waste Treatment System (SWTS) has been implemented for treatment of solid and liquid swine waste. The SWTS consist of three - 1,000 gallon septic tanks that will hold solid waste from a swine farrowing house and swine feed-out lots, and an anaerobic lagoon that has a storage volume of 2,637 cubic yards and a surface area of 0.29 acres, in which liquid waste and rain water flows. The system also consists of a three-cell constructed wetland, which is located to the south of the anaerobic lagoon. The dimensions of each cell are 24 x 150 feet. This project is a one-year study on the effectiveness of the SWTS in the removal of phosphorus, total nitrogen, nitrate, nitrite, and ammonia from the swine wastewater being recycled to the pasture of the UAPB farm. By monitoring the levels of afore mentioned organic nutrients in swine wastewater for one year, we are able to evaluate the effectiveness of the swine waste treatment system with the environmental conditions under which it is operating. Fluctuations in nutrient removal are then used as indicators of favorable and unfavorable conditions for the effectiveness of the SWTS.

O-HH-G-3

Fatty Acid Profile of 'Jewel' Sweetpotato Leaves Collected during Four Collection Periods Evaluated Using Two Procedures. M. Johnson*, and R. D. Pace, Integrative Biosciences PhD Program, Department of Food and Nutritional Sciences, Tuskegee University, Tuskegee, AL 36088.

Epidemiological evidence suggests that consumption of dark-green, leafy vegetables (DGLV) may decrease the risks associated with diseases such as cardiovascular disease (CVD). Sweetpotato (*Ipomoea batatas* L.) leaves, although a novel DGLV within the diets of Americans, exhibit many of the compounds with cardioprotective potential. The objective of this research was to determine the fatty acid profile of 'Jewel' sweetpotato leaves collected during four periods over the 150 day growing season, using either the chloroform-methanol or boron trifluoride procedure for the extraction and/or direct methylation of fatty acids prior to gas chromatography analysis. Percentages of individual fatty acids and the extent of saturation varied with collection period as well as extraction and/or direct methylation procedure employed. Younger leaves exhibited greater monounsaturated and polyunsaturated fatty acid percentages compared to older leaves; γ-linolenic (C18:3n6) and α-linolenic (C18:3n3) acids offered the greatest contribution to the total polyunsaturated fatty acid content. Percentages of linoleic (C18:2n6) and α-linolenic (C18:3n3), both essential fatty acids in human health and nutrition, decreased with increasing collection period. The saturated fatty acid content of the leaves was demonstrated to increase with age using both procedures. While the chloroform-methanol procedure yielded slightly less percentages of some fatty acids, the percentages of identified fatty acids were similar for both methods. Although the objectives of the research were met, additional research is required to confirm the current research findings as well as identify fatty acids that may be present in trace amounts, which have been demonstrated to reduce the risks associated with CVD.

O-HH-G-4

Effect of Peaches in Reducing Azoxymethane-Induced Aberrant Crypt Foci in Fisher 344 Male Rats. B. Kanda*, M. Verghese, L. Shackelford, P. Wambura, S. Appiah, R. Field, S. Ogutu, L. T. Walker, D. Asiamah, J. Hull, and A. Miller, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Peaches are nutritionally important because they are one of the most important fruits consumed worldwide. Objective was to investigate the effects of processed peaches (dried, frozen and juice) on Azoxymethane-induced Aberrant Crypt Foci (ACF) in Fisher 344 male rats and to determine their effect on selected enzyme activities. Fisher 344 male rats were divided into control (C) and 10 treatment groups and fed Freeze-dried (FD) and Conventional frozen (CF) (Steam blanched (SB) - (2 & 4%), boiling water blanched (BWB) (2 & 4%), and 2 and 4% peach juice (PJ) following 1-wk acclimatization period. Azoxymethane (AOM) injections were administered in saline subcutaneously at a dose of 16mg/kg body weight at 7 and 8 wk of age. At 17wks of age, rats were killed by CO_2 asphyxiation. Colon, liver and cecal samples were collected and stored at -80ºC until analyzed. Body weights and feed intakes were recorded weekly. Aberrant crypt foci (ACF), and selected detoxification (Glutahthione-S-transferase (GST) and antioxidative (Catalase-CAT) enzymes were determined using standard protocol. Rats fed 2 (100) and 4% (59) PJ had the lowest number of ACF compared to 2% FD (59-94) and 4% FD (68-85). Rats fed 2 and 4% CF peaches (SB) had lower ACF (62-71) compared to those fed CF-BWB peaches. GST (74-78) and CAT (0.128-0.144) activities (µmol/min/ml) were significantly higher in rats fed treatment diets, compared to those fed the control diet. Peaches (Steam blanched) and freeze dried had greater effects in reducing AOM-induced ACF compared to the other treatments.

O-HH-G-5

Resveratrol Attenuates Hypertrophy of Vascular Smooth Muscle Cells. R. P. Nagmal*[1], R. T. Harris[1], K. M. Rice[2], and E. R. Blough[2], [1]Department of Biology, West Virginia State University, Institute, WV 25112; and [2]Department of Biological Sciences, Marshall University, Huntington, WV 25755.

An inappropriate growth or hypertrophy of vascular smooth muscle cells (VSMC) leads to increased vascular stiffness and an increased risk of cardiovascular disease. Although not well understood, recent data suggests that resveratrol may have beneficial effects for the prevention of cardiovascular disease. Resveratrol is a polyphenolic compound found in high concentrations in grape skin and red wine and is known to have anti-oxidant and anti-carcinogenic properties. Here we investigate the potential of resveratrol to inhibit the growth of VSMC following fluprostenol (Fp) stimulation. Fp is a PGF2α analog that is thought to increase intracellular reactive oxygen species (ROS) which has been linked to VSMC hypertrophy via the activation of the mammalian target of rapamycin (mTOR), Akt, ribosomal protein S6 kinase (p70s6k) and extracellular regulated kinase 1/2 (ERK1/2). Our data indicate that resveratrol markedly attenuates VSMC hypertrophy that results from Fp stimulation. The results further suggest that resveratrol is efficacious in reducing cellular ROS suggesting that this molecule may

have potential for the prevention of VSMC adaptations that lead to cardiovascular disease. Efforts are currently underway to determine how resveratrol may affect the activation of mTOR, Akt, p70S6k and ERK1/2. It is anticipated that the findings of this study will further our understanding of how resveratrol may exert its protective effects in the cardiovascular system.

O-HH-G-6

Conservation Strategies for a Rare Anti-Tumor Plant, *Scutellaria ocmulge* Small. B. Richardson*[1], D. Ellis[2], and N. Joshee[1], [1]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; and [2]National Center for Genetic Resources Preservation, Ft. Collins, CO 80521.

Scutellaria ocmulgee Small (skullcap) is a medicinal plant that is rare and endemic to the state of Georgia. *S. ocmulgee* has recently been found to possess anti-tumor properties in cell and animal model systems. These factors make *S. ocmulgee* a prime candidate for conservation. The final goal of this project is to develop cryopreservation protocols for *S. ocmulgee* to assist long-term conservation. We have developed and optimized shoot meristem excision and culture protocols to ensure a constant supply of sterile, asceptic plants for experiments. Plant tissue culture medium (MS) supplemented with a cytokinin (benzyl adenine) and auxin (naphthalene acetic acid) was required to attain high multiplication rates in meristem explants. Various short- and long-term storage and preservation techniques that are being screened are alginate encapsulation (2, 3, and 4%), vitrification using different plant vitrification solutions (PVS2 and PVS3) and slow cooling. Encapsulation is being carried out using shoot tip and nodal segments of the in vitro raised plants. The encapsulated explants are placed at 4˚C for various lengths of time. Alginate beads will be taken out from 4˚C at biweekly intervals to test explant viability and regeneration potential. Vitrification is being done using PVS2 and PVS3 as pretreatment solutions for the explants before cooling takes place. Explants will then be placed in liquid nitrogen for storage. Slow cooling includes cooling the explants to different temperatures (4˚C, -20˚C, -60˚C, and –120˚C) to determine their freezing tolerance at different low temperatures. Results obtained in these experiments will be presented during the meeting.

O-HH-G-7

Transgenic Sweetpotato Expressing Synthetic Lytic Peptide Genes as a Plant-Based Treatment against HIV Replication. S. Samuels*, M. Egnin, J. Jaynes, and J. Jackson, Department of Agricultural and Environmental Sciences, Tuskegee University, Tuskegee, AL 36088.

Epidemic diseases such as AIDS caused by human immunodeficiency (HIV) virus are responsible for millions of deaths annually. In 2010 CDC estimated around 1.2 million people infected in the US, especially within the Black Belt region which holds the highest HIV rates in rural America. Many epidemic diseases are now being fought by a new revolution of plant-based therapeutic treatments, which greatly reduce production processes such as posttranslational modifications, and synthesis of traditional modes of administration. Thus, synthetic lytic antiviral peptides JC41N and JC41ND, which are capable of inhibiting HIV progression, have been developed at Tuskegee University. To engineer these peptides in *planta*, two *de novo* synthetic gene constructs were designed and synthesized to facilitate cloning in bacteria and accumulation in plants without lethality. The constructs were cloned into the T-DNA borders of binary plasmid, pGPTV-kan, containing a kanamycin resistance gene. *Escherichia coli (E. coli)* DH5α cells were transformed with recombinant plasmid pGPTV/*jc41N* and pGPTV/*jc41ND*. Recombinant plasmids were mobilized in disarmed *Agrobacterium tumefaciens* strain EHA105 and utilized in sweetpotato cell transformation. Fifty-five kanamycin resistant embryos of D-3 transformed with *jc41N* and j*c41ND* genes were obtained and germinated on MM supplemented with Timetin 100mg/l and Kanamycin 12.5mg/l, resulting in twenty four putative transgenic plantlets. Through three transformation events, *jc41N* generated embryos with frequencies ranging from 16 to 45, and *jc41ND* ranging from 4 to 58%, respectively. The integration of the trangenes in sweetpotato D-3 is currently under investigation through PCR, qRT-PCR, and Southern analyses.

O-HH-G-8

Chemopreventive Potential of Coffee and Cocoa against Azoxymethane-Induced Aberrant Crypt Foci in a Rat Model. L. Shackelford*, M. Verghese, D. Asiamah, J. Boateng, S. Ogutu, and L. T. Walker, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Although antioxidant properties of chocolate and cocoa have been known, there has been no examination of its place as a chemopreventive agent. Purpose was to investigate chemopreventive potential of cocoa (CC) and coffee (CF) as meal and drink on Azoxymethane-induced aberrant crypt foci (ACF) in Fisher 344 rats and to determine Glutathione S-transferase (GST) and Catalase (CAT) activities. Fisher 344 rats were randomly assigned to five groups after a one-week acclimatization period. One group (n=5) was assigned to a control diet (C) (AIN-93G) and four groups (n=5) were assigned to CF and CC as drink and meal (0.5% and 1%). Rats received 2 s/c injections

of AOM at 7 and 8 wk of age @ 16mg/kg body weight. At 17 wk of age, rats were killed. Colon and liver samples were collected. ACF in C was significantly ($p<0.05$) higher (120) compared to 0.5% and 1% CF (69.5, 62.3) and CC (100.8, 71.2) as meal, CF (60, 44.52) CC as drink (79, 64). CF drink was more effective in reducing ACF compared to other treatments. GST (µmol/min/ml) was significantly ($p<0.05$) higher in rats fed CF (1.550) and CC (1.789) compared to C (0.477). CAT activity (µmol/ml) was 0.84, 0.81 (CF), 0.86 and 0.85 (CC) in rats fed 0.5 and 1% as meal and 0.78, 0.8(CF) and 0.88, 0.74 (CC) at 0.5 and 1% as drink compared to C (0.2). Consumption of CF and CC reduced Azoxymethane-induced ACF and may have implications in prevention of chronic diseases such as colon cancer.

O-HH-G-9

Antiproliferative Activity of Phytolacca Americana Extracts and Their Fractions on Cancer Cells. L. M. Wishon*[1], B. Hardy[2], I. Goktepe[2], and M. Ahmedna[3], [1]Department of Energy and Environmental Sciences, and [2]Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411; and [3]Center of Excellence in Postharvest Technologies, Kannapolis, NC 28081.

Phytolacca americana is a plant native to North and South America and East Asia. Pokeweed antiviral protein (PAP) has been extracted from this plant and its antiviral activity towards plant and human viruses was demonstrated. It has been shown to inhibit the proliferation of Acute Lymphoblastic Leukemia blasts. Since studies involving the activities of *P. americana* extracts on various cancer cell lines are limited, the objectives of this study were to 1) evaluate the antiproliferative effect of crude ethanol (PRE) and its fractions, methanol, and water extracts from *P. americana*, and PAP against human breast (MCF-7) and colon cancer (HCT-116) cells *in vitro* using the MTT assay; and 2) Determine the changes at the protein level using caspase assays and gene level using the Human Cancer Pathway Finder Realtime PCR Profiler. The antiproliferative activity of PRE against HCT-116 cells was much stronger than the methanol and water extracts. No extract showed a significant antiproliferative activity against MCF-7 cells. The water fraction (PREW) derived from PRE showed the greatest antiproliferative activity on HCT-116 cells compared to the ethyl acetate and butanol fractions. The effect of PAP on the proliferation of HCT-116 cells fluctuated with concentration. Caspases 6 and 9 showed increases in activity in HCT-116 cells exposed to PRE, while caspases 3, 8, and 9 had increases in activity in HCT-116 cells exposed to PREW. For the Cancer Pathway Finder, PRE at 3200 µg/ml had the most desirable gene changes in the treatment of colon cancer.

Scientists (14)

O-HH-S-1

Glycoxidative Modification of 2'-deoxycytidine (dC) in Relation to Diabetes: Estimation of Carboxymethyl-2'- deoxycytidine (CMdC) and Carboxymethyl- 2'- deoxyadenosine (CMdA) in Fasting Human Urine. M. Ahmed*[1], Z. A. Lila[1], K. Manzano[1], G. Jenkins[1], T. M. Polite[1], M. Williamson[1], and R. Idris[2], [1]Department of Biological and Physical Sciences; and [2]Department of Family and Consumer Sciences, South Carolina State University, Orangeburg, SC 29117.

Glycoxidation reactions of 2'-deoxycytidine (dC) with D-glucose and D-ribose led to the detection of carboxymethyl-2'-deoxycytidine (CMdC) by HPLC and LC-MS spectroscopy. The identity of CMdC was confirmed by its synthesis from dC and chloroacetic acid. CMdC compound occurs in fasting human urine samples identified by HPLC and LC-MS spectroscopy thus indicating invivo modification of 2'-deoxycytidine (dC) residue having implications in diabetes, mutations of DNA and other disease processes. Carboxymethyl- 2'- deoxyadenosine (CMdA) compound was previously detected from invitro glycoxidation reactions, fasting human urine, calfthymus and human DNA. Estimation of CMdC and CMdA in fasting human urine specimens using creatinine present therein as internal standard indicated increasing amounts of CMdC and CMdA in subjects with higher age group compared to younger groups of people investigated. These results are indicative of protein-like modifications of DNA bases with possible implications in age related diseases such as diabetes, alzheimer diseases, and mutations of DNA leading to cancer and other similar disease processes.

O-HH-S-2

Molecular Assessment of Sincronized *in vitro* Red Cell Cultures of American Native Grapes. A. O. Ananga*, S. Krastanova, S. Sutton, and V. M. Colova (Tsolova), CESTA, Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL 32317.

The common *muscadinia* possesses one of the highest antioxidant levels among fruits. Due to the different biological activities of plant secondary metabolites, their regular consumption may have significant consequences

for human health. Study of 13 differentially expressed genes in the flavonoid biosynthesis was carried out to confirm their expression in *in vitro* cell suspensions from berries of *muscadinia* and *aestivalis* as a system for genomics studies and relevant source for production of grape nutraceuticals. Cell suspensions were initiated from 'Noble' and 'Cynthiana', American native grape varieties. The presence and expression of 13 differentially expressed genes involved in critical steps of the flavonoid pathway was verified in the 'Noble' *muscadinia* var. and 'Cynthiana' *aestivalis* var. cell suspension, respectively, by real-time PCR. Similar expression patterns were revealed in 'Noble' and 'Cynthiana' with 11 gene transcripts, and two transcripts showed the expression patterns that were significantly different in each of the varieties. Out of the 13 analyzed genes involved in the flavonoid biosynthesis, 11 revealed similar expression patterns in 'Noble' and 'Cynthiana'. The results of this study act as a preliminary research that will lead to the assessment of the medicinal value of commercial American native grape varieties and a feasible strategy for using *in vitro* red cell suspensions as an alternative, more reliable, and efficient source for molecular farming. This is the first step towards understanding the expression of nutraceutical compounds under predictably produced and controlled in vitro cell culture in North American grapes.

O-HH-S-3

Characterization of Physiological and Anatomical Parameters with Increasing Age in Male Japanese Quails. K. L. Arora*, V. Vatsalya, and B. Biswas, Department of Veterinary Science, Fort Valley State University, Fort Valley, GA 31030.

Changes in some physiological and anatomical parameters with increasing age were studied in Japanese quail males ranging from d8 to d52. After hatching, the chicks were reared in brooders for the first three weeks under a constant light and then shifted to cages at 75±2º F and 16L:8D with free access to feed and water. Starting with d8, and then at 4-day intervals, 8 to10 birds were selected randomly, weighed and blood sampled from a wing vein for determination of packed cell volume (PCV), glucose and plasma proteins. PCV was determined using hematocrit tubes, plasma proteins with a refractometer, and blood glucose using Glucose Test Strips. After blood collection, the birds were euthanized with CO_2 for harvesting testes and measuring shank length. Body weight of birds increased linearly between d8 and d36 and then growth rate slowed, reaching maximum at d52. PCV increased following d36 (40.0%) and reached the highest level at d52 (48.5 %). Plasma proteins increased from d8 to d28 and then leveled off. Shank length increased from d8 to d24 and then leveled off with age. Glucose level decreased with approaching sexual maturity. Testes weight increased rapidly after d28 and reached maximum at d44. After d32, PCV, testes size and plasma proteins were positively correlated and may be used as indices of approaching sexual maturity.

O-HH-S-4

Assessment of Pesticide Safety Practices and Nutritional Status of Certified Pesticides Applicators. F. N. Bebe*, A. M. Topé, and M. Panemangalore, Nutrition and Health Program, Kentucky State University, Frankfort, KY 40601.

Compliance with pesticide use guidelines and maintenance of good nutritional status are important in reducing toxicity and disease outcomes, especially among farming related workers. However, their compliance to safety measures has not been adequately assessed in all the groups that are occupationally engaged with pesticides. Our objective was to determine the extent of adherence to safety practices by the certified pesticide applicators and maintenance of nutritionally balanced and health dietary habits. A group (n=112) of certified applicators was surveyed for demographic characteristics, knowledge of pesticide exposure and application, safety practices, and nutritional and health status, which was assessed using 24hour dietary recall and two week diet record methods. Nutrient intake was analyzed using the Nutritionist Pro software. Descriptive statistics were used to analyze pesticide use and safety practices. Preliminary analyses indicate workers being generally in good health; 1/6 reported some metabolic disorders; 50% had vision problems and work-related illness, allergies and headaches, though work performance was not adversely affected. Only 50% adhered to pesticide safety practices, despite the knowledge of their adverse health effects. The importance of a balanced diet was acknowledged, but nutrient intake evaluation indicated that sodium was three times RDA, dietary fiber, fat and cholesterol were 55%, 148% and 122% below or above RDA, respectively ($p<0.05$). Intake of some important micronutrients was inadequate. Adherence to pesticide safety and hygiene practices by workers was suboptimal. The long-term implications of the nutritional status and occupational safety of agricultural workers demand periodic emphasis on awareness and health education.

O-HH-S-5

Antioxidant Activity, Induction of Apoptosis and Inhibition of Cell Proliferation by Peanut and Almond Extracts in Human Colon Cancer Cells. J. Boateng*, and M. Verghese, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

There is little information on chemopreventive potential of nuts. Our aim was to examine the antioxidative, apoptotic and antiproliferative properties of extracts from peanuts and almonds (with, without skins and skins alone) on human colon cancer cells (Caco-2). Caco-2 Cells were seeded in Dulbecco's Modified Eagle's Medium (DMEM) until monolayer developed. Cells were treated with peanut and almond extracts and incubated for 24 and 48 h. Lactate dehydrogenase (LDH) release, Caspase -3- activity, DNA fragmentation using ELISA and gel agarose was used to assess apoptotic properties of extracts. Antiproliferative properties were determined using MTT (3-4, 5-dimethylthiazol-2-yl-2, 5-diphenyltetrazolium bromide). LDH (%) release from Caco-2 cells treated with nut extracts was significantly ($p<0.05$) increased (7.45 to 89.81), with peanut and almond skins showing the highest release. MTT (%) showed significant ($p<0.05$) inhibition of cellular proliferation (2.9-14.6) compared to control. Cell Death ELISA was increased by 1.2 to 5 folds, relative to control. 48h of exposure of Caco-2 cells to nut extracts showed apoptotic characteristics with DNA fragmentation. Results indicated significant ($p<0.05$) increases in apoptotic, cytotoxic and antiproliferative activities in cells exposed to extracts of peanut and almond, and skins alone. This could be explained by increased antioxidant activities; DPPH (%) (64.19-88), FRAP (μM/g dw) (0.116-9.86), TEAC (mM trolox/g dw) (79.23-1764.2), total phenolics (mgGAE/g dw) (10.59-281.74) and flavonoids (mgCE/g dw) (9.97-197.7) content of whole nuts and skins extracts. Significant phytochemicals in nuts are found in skins, which contribute to their total antioxidant capacity and may perhaps explain their associated health benefits.

O-HH-S-6

Formulation and Quality Evaluation of Weaning Foods Based on Orange-Fleshed Sweetpotato (OFS) Flour to Alleviate Infant Malnutrition in Ghana. E. Bonsi*, W. Plahar, R. Zabawa, P. Doamekpor, E. Kebede, D. Mortley, and C. Bonsi, George Washington Carver Agricultural Experiment Station, Tuskegee University, Tuskegee, AL 36088.

In Ghana, West Africa, new varieties of sweetpotato have increased levels of beta-carotene. Seen as an excellent source of vitamin A, these new varieties have the potential to address vitamin A deficiency and also serve as a source of food for lactating mothers and as weaning food for children. Orange-fleshed sweetpotato (OFS) flour was used to develop six different weaning foods based on the Ghanaian traditional roasted corn flour popularly known as Tom Brown. Four products were developed with 25 and 50% OFS to simulate the traditional weaning food, while two products were based on the fermented corn meal weaning food also formulated to contain 25 and 50% OFS. The products were evaluated for their sensory characteristics, consumer acceptability and chemical composition. All six samples had appreciably high contents of protein, energy and minerals to ensure good nutrient density, while the moisture content was low enough for storage stability. The contribution of β-carotene by the OFS in the formulations further enhanced the nutritive value of all the blends. Sensory evaluation of the products indicated high consumer acceptability for the products containing 25% OFS with the roasted corn meal based foods. Overall acceptability scores showed 'very much liking' for the two products, while the other four products recorded only 'moderate liking'. It is concluded that the OFS flour has the potential to be used in the formulation of a highly acceptable good quality weaning food, to help alleviate macro- and micro-nutrient malnutrition problems in Ghana and other West African countries.

O-HH-S-7

Influence of Tomato and Broccoli on the Bone Status of Growing Female Rats with Different Levels of Calcium Intake. L. Huang*, C. Wang, and C. Butler, Human Nutrition Program, Kentucky State University, Frankfort, KY 40601.

Vegetables contain various bioactive compounds that may affect bone metabolism, and the skeletal effects of vegetables may be dependent on the calcium status. The objective of this study was to determine the effects of tomato and broccoli on bone status of growing female rats with different levels of calcium intakes. A total of 130 weaning female SD rats were allowed one week of adaptation before they were randomly assigned into 13 treatment groups (10 rats per group). The baseline group was killed at the beginning of the experiment. Groups A, B, C and D were fed the AIN93G diet containing 0.1% calcium; groups E, F, G and H were fed the AIN93G diet containing 0.25% calcium; and groups I, J. K and L were fed the AIN93G diet containing 0.5% calcium. For groups B, F, and J, corn starch (20% of the diet) was replaced by tomato powder; for groups C, G and K, corn starch was replaced by broccoli powder; for groups D, H and L, corn starch was replaced by a 50:50 mixture of tomato and broccoli powders. The rats were fed the assigned diets for 8 weeks before they were sacrificed. Bone length, ash, calcium

content and breaking strength became higher as dietary calcium concentration increased. Substitution of the corn starch by tomato, broccoli or a mixture of the two vegetable powders did not significantly affect the bone status of rats fed diets containing 0.25% or more of calcium. However, tomato and broccoli improved the bone status of rats fed diets containing only 0.1% calcium. These results indicate that vegetables such as tomato and broccoli can have beneficial effects on bone when calcium intake is inadequate.

O-HH-S-8

Perceptions and Implementation of Family Meal Messages by Low Income Families. R. Idris*, E. Edwards, and K. Stephenson, Department of Family and Consumer Sciences, South Carolina State University, Orangeburg, SC 29117.

This study investigated awareness, use, feasibility and perception of common childhood obesity prevention messages such as eating together as a family by low-income mothers. Participants (n=20) were women of low income families from the local community with at least one child aged 3 to 10 years old. One-on-one interviews included questions related to nutritional education messages such as eating together as a family and breakfast consumption. Brief demographic information was also collected. Interview transcripts were used to identify common response themes and descriptive statistics were conducted. Participants were volunteers, were African American women, and on average were 30.5 years of age. Common response themes revealed that all mothers were aware of the messages about benefits of eating together as a family and eating breakfast every day, but 60% and 55% implemented the messages all of the time, respectively. Additionally, over 75% thought it would be more difficult for other families to follow these recommendations. Furthermore, while mothers felt that these messages were important for their family, they didn't always follow the message (breakfast eating) themselves. Many mothers (65%) also didn't know how family meals and breakfast eating could help prevent childhood obesity. While most mothers were aware of common childhood obesity prevention messages, these results reveal ongoing difficulties for low-income mothers in order to implement these recommendations for their family. This warrants further probing about the specific barriers to implementation.

O-HH-S-9

Antioxidant Capacity and Anticancer Property of Pawpaw (*Asimina triloba*). H. Kobayashi*****, C. Wang, and K. W. Pomper, Land Grant Program, Kentucky State University, Frankfort, KY 40101.

Pawpaw (*Asimina triloba*), a deciduous species of the eastern U.S., has the largest edible fruit of all native woody species. Pawpaw fruit, rich in phenolic and antioxidant components in addition to essential amino acid, vitamins, and minerals, has also been identified as a major source of anticancer compounds, acetogenins. The objectives of the study were to investigate the antioxidant capacity and cytotoxicity of lyophilized pawpaw extract and fractioned extracts with a carcinomic human alveolar basal epithelial cell line, A549. Extracts used in this study included the whole extract, Fraction 1 (F1), Fraction 2 (F2), and Fraction 3 (F3), and Fraction 5 (F5). Pawpaw pulp was extracted with 100% acetone twice, and then lyophilized. Acetonic extract was first made with fruit pulp of popular pawpaw cultivar 'PA Golden', which was lyophilized and then reconstituted with double distilled water (DDH_2O), followed by fractionation with different solvents in the order of DDH_2O, 50% methanol (MeOH), 100% MeOH, 100% acetone and 50% acetone. Fractioned extracts were lyophilized again and phenolic content (PC) and antioxidant capacity (AC) were estimated with Folin-Ciocalteu assay and ferric reducing/antioxidant power (FRAP) assay. Cytotoxicity of pawpaw extracts was assessed by cell proliferation assay with A549. Both AC and PC of F5 were the greatest of all extracts tested. While antioxidant capacity of F3 was modest, this fraction showed considerable toxicity to this cell line. The present findings suggest the possible usefulness of fractioned pawpaw extracts in cancer treatment regimens.

O-HH-S-10

Engineering Solution to Global Malnutrition Problems. Y. O. Li*, School of Agriculture & Consumer Sciences, Tennessee State University, Nashville, TN 37209.

In principle, there is enough food for the world's growing population, however, the World Health Organization (WHO) estimates that about one-half of the world's population suffers from malnutrition, in one of the three forms - hunger, micronutrient deficiencies (or "hidden hunger"), and over-consumption. Severe health problems associated with malnutrition include impaired work capacity and increased risk to infectious and chronic morbidity and mortality, consequently slowing down the social and economic development worldwide. The compliance to a healthy, balanced diet is the primary solution to malnutrition, but is constrained by social and economic factors. Additionally, traditional lifestyles likely lead to resistance to dietary changes, which then requires education through several generations. Food-based interventions including micronutrient-fortified and functional

foods, when designed properly, are highly cost-effective in addressing the problems in a long-term run. Despite the relatively small quantities required for micronutrients and nutraceuticals in developing value-added foods, the technical challenge is the safe and effective delivery of these active ingredients through food production, distribution, and consumption; therefore, innovative technologies are required. Microencapulation technologies promise to be feasible in fulfillment of the technical needs. An extrusion-based microencapsulation technology platform has been developed and demonstrated feasibility in the application of fortifying staple foods - salt, sugar, and rice with multiple micronutrients. This technology platform combines several unit operations based on chemical engineering concepts, e.g., extrusion-agglomeration, surface modification, and fluidized-bed coating, and is adaptable to developing customized delivery systems for broader applications. Research results and opportunities will be discussed.

O-HH-S-11

Sensory Properties, Nutritive Content and Glucosinolates Identification of Fresh, Canned and Frozen Turnip Greens (*Brassica rapa*) as a Functional Food in Deep-Dish Pizza. T. C. Warren[1], and O. G. Sanders*[2], [1]Alabama Cooperative Extension System; and [2]Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

African-Americans and native Southerners (children, teens, and young adults), 25 years and younger, have the lowest consumption of green leafy vegetables which may pose a higher risk for health related problems (obesity, diabetes, cancer, etc.) compared to other ethnic and age groups. This research study focused on increasing the consumption of green leafy vegetables, such as turnip greens, in the diets of African-Americans and native Southerners by developing an acceptable functional food product. The phytochemical, glucosinolates, is found in turnip greens and known for disease prevention in the promotion of a healthier lifestyle. The product developed were pizzas (greens pizzas) containing fresh, frozen, and canned turnip greens with other ingredients. The nutritive content of the greens pizzas were determined by nutrition facts analysis (lower in fat and sodium). The sensory qualities were determined by experienced and consumer panelists. The consumer panelists were recruited from Alabama Cooperative Extension Systems' Urban Centers (Lawrence, Madison, and Morgan counties). The majority of the panelists was composed of 25 years old and younger (57%), females (69%) and African-Americans (91%). The panelists significantly preferred the flavor of pizzas made with fresh greens than the frozen and canned greens. For texture, there was no significant preference among the greens pizzas. Twenty-one glucosinolates were isolated and identified from the greens pizzas. Of the twenty-one, ten were common among all greens pizzas at a concentration of 70% or above. In conclusion, turnip green pizzas were preferred and acceptable products based on their sensory characteristics, nutritional values and glucosinolates concentrations.

O-HH-S-12

Assessment of Oxidative Stress in Young African American Population with Metabolic Syndrome (MetS): A College Study. A. M. Topè*, and P. F. Rogers, Land Grant Program, Kentucky State University, Frankfort, KY 40601.

There are ethnic disparities in the prevalence of obesity in the US population. African Americans (AA) continue to report higher rates for obesity than any other ethnic group. Overweight and obesity are linked to greater risk for Metabolic Syndrome (MetS), a frank indicator of risk of future chronic and cardiovascular diseases (CVD). One of the possible mechanisms for increasing the risk for CVD is through the excessive generation of Reactive Oxygen Species (ROS) produced either endogenously or exogenously that can attack lipid, protein and nucleic acid in the living cells. 8-hydroxydeoxyguanosine (8-OHdG), an oxidized nucleoside of DNA, is the most frequently detected and widely studied DNA lesion and its urinary level is used as a good biomarker of generalized, cellular oxidative stress. There are limited data on prevalence of MetS and levels of 8-OHdG in young AA adults (18-24years). In the current study on evaluation of prevalence of MetS in college freshmen, fasting urine samples were collected from consenting healthy (n=300) and students detected with MetS (n=80), in the last two years. The average age of the participants was 19.5 years. Using ELISA technique, the urine samples are being analyzed for assessing the levels of 8-OHdG. We plan to do multivariate analysis between 8-OHdG levels with individual and collective parameters of MetS .The findings of the study will offer greater insight in designing effective nutritional and life style related strategies in better management of MetS, especially in young AA adults.

O-HH-S-13

Pedigree and Sibship Analysis in Peach (*Prunus persica* L. Batsch) Germplasm Using Single Sequence Repeats Markers. G. Viji*[1], D. L. Harris[1], D. Zhang[2], W. R. Okie[3], and A. K. Yadav[1], [1]Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030; [2]USDA-ARS, Sustainable Perennial Crops Lab, PSI,

BARC-W, Beltsville, MD 20705; and [3]USDA-ARS, SE Fruit & Tree Nut Research Lab, Byron, GA 31008.

Peach (*Prunus persica* L. Batsch) is an important fruit crop in the United States, with an annual production of 1.1 million tons. Use of DNA fingerprinting tools for cultivar identification, parentage and sibship analysis, and assessment of diversity has great potential for peach genetic improvement, especially with the increasing constraints in peach production in the United States. In this study, 15 single sequence repeat markers (microsatellites) were used in the identification and characterization of 38 peach accessions. The fingerprinting data were generated using a CEQ 8000 DNA analyzer and fluorescent-labeled primers. Alleles were scored using fragment analysis software and edited based on the bin list using a SAS program. Polymorphic information content, allele frequencies, and heterozygosity were calculated using the program GenAlex 6.0 and Powermarker v. 3.0. The 15 microsatellite primers detected a total of 83 alleles, with an average of 5.53 alleles per locus. The mean observed heterozygosity was 0.219, whereas the mean inbreeding coefficient was 0.635, indicating a high degree of inbreeding among the 38 peach accessions. Based on the multi-locus data, Bayesian inference of admixed ancestry was analyzed. Parentage analysis was also performed to verify the known pedigrees using the likelihood method implemented in the CERVUS program. The 38 accessions grouped into four clusters and were largely compatible with the known pedigree and origin of these accessions. The results indicated that single sequence repeat markers could serve as an important tool for peach genetic breeding and improvement programs.

O-HH-S-14

Childhood Experiences with Vegetable Consumption Impacts Current Body Weight Status of Kentucky Adults. C. Wang*, L. Huang, and C. Butler, Human Nutrition Program, Kentucky State University, Frankfort, KY 40601.

Low consumption of vegetables may be one of the major reasons for the obesity epidemic in the United States. The objective of the project was to determine how experiences with vegetable consumption in childhood might affect vegetable consumption and body weight status of adults. Visitors to the 2009 Kentucky State Fair were recruited to fill out a questionnaire before they were given a free analysis of their body composition (body fat %) with a Tanita TBF-521 body composition analyzer. Among the 200 participants, 69% were female and 31% were male; 88% were Caucasian and 9% African Americans. Majority of the participants had positive views of milk and vegetables. Among the people surveyed, over 90% of them prefer fresh vegetables. When they were children, 44% of them were allowed to eat whatever they liked, 41% were given a fixed amount of vegetables to eat, 17% of them were forced to eat vegetables, but nearly 10% had no vegetables. Those who had no vegetables during childhood had the highest rate of overweight (43%) and obesity (25.6%), whereas those who were given a fixed amount of vegetables or had vegetables as snacks had the lowest rate of overweight (27%) and obesity (11.8%). These results indicate that childhood experiences with vegetable consumption have serious consequences for the body weight status of people in their adult life.

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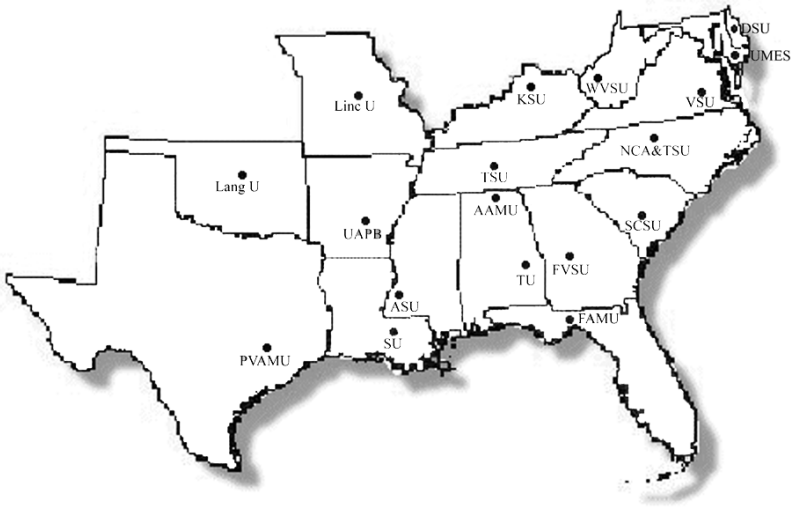

Abstracts of Human Health, Nutrition, and Obesity Prevention Posters Papers

Undergraduate Students (17)

P-HH-U-1

Sensors for Analysis of Flavonoid Content in Foods. J. Burrell*[1], Y. Jones[1], S. Barnes[1], D. Miambo[2], J. Hossenlopp[2], and F. Josse[3], [1]Department of Chemistry and Physics, Alcorn State University, Alcorn State, MS 39096; and [2]Department of Chemistry, and [3]Department of Electrical Engineering, Marquette University, Milwaukee, WI 53233.

The health benefits of natural polyphenolic compounds including flavonoids have been well documented. Many such compounds demonstrate antioxidant, antibacterial, antiviral, and anticancer potential. In an effort to increase consumption of these compounds among the population, many researchers are studying methods for increasing the content of these compounds in the foods that we consume. The most commonly used standard analytical method for analysis of these compounds is high performance liquid chromatography. This method, while highly reliable, is time consuming and requires the use of large volumes of organic solvents that must be disposed. This research investigates the development of small robust sensors for rapid analysis of the flavonoid content in foods. Mass sensitive acoustic wave sensors with chemically sensitive recognition materials were developed and evaluated for analysis of flavonoids. Sensors are small, easy to use, and require the use of substantially smaller volumes of solvents. Full optimization of this technology is expected to enable researchers to more quickly optimize breeding lines for optimal flavonoid content and be more environmentally sustainable.

P-HH-U-2

Prodentia of the Rectum. D. Campbell*[1], J. McNeally[1], R. Hagerty[1], A. D. Alexander[1], and K. Srivastava[2], [1]College of Agricultural, Environmental, and Natural Sciences, and [2]College of Veterinary Medicine, Nursing and Allied Health, Tuskegee University, Tuskegee, AL 36088.

The network of muscles, ligaments and skin in and around the rectal area of the mouse, acts as a complex support structure that holds organs, tissues, and structures in place. Various parts of this support system may eventually weaken or break, causing a common condition called rectal prolapse in which the bowel may begin to prolapse, or fall, out of its normal position. Without medical treatment or surgery, these structures may eventually prolapse further. Several prolapsed IL-10 -/- mice were discovered during routine husbandry. We hypothesize that the absence of the IL-10 gene is a factor in causing murine rectal prolapse. The mice were separated immediately from their cages to discourage any aggressive behavior towards their removed cage mates. Changes in grooming, appearance and feeding behavior were monitored for any signs of discomfort or pain in these mice. To treat the prolapses, mice were swabbed daily with a solution of sugar and water, based on literature indicating a medicinal effect of sugar on rectal prolapses. The procedure was conducted three days a week for a four-week period. Based on the data collected, the use of sucrose was a moderately effective treatment of rectal prolapse in mice.

P-HH-U-3

A Myotonic Goat Calcium Signaling Gene as a Biomarker for Human Muscular Dystrophy. J. E. Caviness*, and M. M. Corley, Virginia State University, Petersburg, VA 23806.

Myotonic Dystrophy is an inherited form of Muscular Dystrophy (MD), characterized by debilitative, progressive muscle wasting and weakness. Myotonic Dystrophy is known to affect the lower legs, hands, neck, and face. Individuals with Myotonic Dystrophy often have prolonged muscle tensing (myotonia) and are not able to relax certain muscles after use. Other characteristics include weak muscle tone (hypotonia), breathing problems, delayed development, and intellectual disability. Myotonic Dystrophy is inherited in an autosomal dominant pattern, caused by a genetic mutation. Over expression of Transient Receptor Cation Channel 3 (TRPC3), a protein responsible for calcium influx in muscle tissue causes an elevation in calcium influx, which results in a phenotype of MD. Furthermore, calcium itself is sufficient to induce muscular dystrophy MD. Myotonic goats (*Capra hircus)* are the oldest known animal model for inherited MD. Evaluation of the *trpc3* gene as a marker for MD using Myotonic goats has not been conducted. Therefore the objective of this experiment was to evaluate gene expression of the *trpc3* gene in Myotonic vs Spanish goats (control). Total RNA was isolated from whole blood samples. Cross species primers were designed from the human, bovine, and mouse *trpc3* cDNA alignments. After DNA sequence confirmation of *trpc3* gene isolation, Quantitative Real Time Polymerase Chain Reaction (qRT-PCR) was performed. Results of qRT-PCR showed that gene expression of *trpc3* was higher in Myotonic than Spanish goats indicating that the *trpc3* gene is a potential biomarker to study human MD.

P-HH-U-4

Efficacy of Anti-Inflammatory Synthetic Peptide in a Murine Model of Ulcerative Colitis-Linked Colon-Cancer: IL-10-/- Mice. K. Cromwell*, F. Chestnut III, J. Koester, J. McNeilly, K. Pickett, I. Tigner, D. Campbell, D. Freeman, D. Hampton, O. Mitchell, J. Jaynes, and D. Alexander, Department of Agriculture and Environmental Science, Tuskegee University, Tuskegee, AL 36088.

Interleukin 10 (IL-10) is a cytokine with anti-inflammatory properties that is produced by monocytes and lymphocytes. IL-10 down regulates the expression T helper cells (Th 1), and prevents the binding of the major histocompatibility complex (MHC) class II antigens. Our goal was to better understand the relevance of IL-10 in ulcerative colitis and the possible benefits of the synthetic peptide 2A21-10 (10N). The 10N peptide is an IL-10 homolog that has been shown to have anti-angiogenic and anti-inflammatory properties. We hypothesized that the 10N peptide would abrogate inflammation and prevent ulcerative colitis, and ultimately, colon cancer, in an experimental disease model. To test this hypothesis, we set up experimental groups to test the peptide and its efficacy. IL-10 Knockout mice and Wildtype mice were split into six experimental groups: Untreated (Control), Sham (0.9% saline solution), 0.5mg/kg body weight dosage Prophylactic Treatment group, 5mg/kg body weight dosage Prophylactic Treatment, 0.5mg/kg body weight dosage Frank group, and 5mg/kg body weight dosage Frank group. The injections were administered once a week for ten weeks and then euthanized and dissected. Conclusively, animals had varying stages of disease with adenocarcinomas frequently occurring in IL-10 KO mice that were reared under conventional husbandry conditions. The preliminary results seem to indicate a role for 10N in the treatment of colitis and colitis-induced cancers. It is our greater hope that the results will lead to new treatment avenues for individuals with inflammatory diseases and neoplasms.

P-HH-U-5

Efficacy of Anti-Inflammatory Synthetic Peptides in a Murine Fungal Infection: IL10 Deficient Mice. D. Freeman*[1], J. Koester[1], J. Jaynes[1], K. F. Srivastava[2], and A. D. Alexander[2], [1]College of Agricultural, Environmental, and Natural Sciences, and [2]College of Veterinary Medicine, Nursing and Allied Health, Tuskegee University, Tuskegee, AL 36088.

Interleukin 10 (IL-10) is a cytokine that is known for its anti-inflammatory properties. It is produced in the body by lymphocytes and monocytes. IL-I 0 is known to counteract inflammation due to allergic reactions, sever injuries, and bacterial infections. A synthetic peptide, 2A21 ION, has the same anti-inflammatory properties as IL-IO. The 2A21 ION synthetic peptide also possesses antimicrobial and anti-angiogenic properties. The purpose of this study is to determine if this synthetic peptide will cure a murine model fungal infection of *Aspergillus fumigatus* due to its antimicrobial properties. IL-IO knockout, affected and unaffected and wild-type mice were used for three-weeks with the anti-inflammatory peptide 2A21-I0N to study the effects on the fungal infection present in the mice. Control and sham groups were also used. Compared to control mice, it was determined that there was colitis in the knockout mice and that the mice receiving the peptide treatment had less inflammation and were less affected by fungus. More research in this area is needed to verify the efficacy of synthetic peptides like 10N peptide as anti-inflammatory treatments for those with fungal and other types of infections.

P-HH-U-6

Sex, Stress, and Inflammation in a Murine Model of Ulcerative Colitis. D. Hampton*, I. Tigner, D. Campbell, J. McNeally, K. Cromwell, D. Freeman, T. Purdie Jr., D. Grant, F. Chestnut, O. Mitchell, and A. D. Alexander, College of Agricultural, Environmental, and Natural Sciences, Tuskegee University, Tuskegee, AL 36088.

Perhaps one of the most compelling sources of stress is the desire of animals to procreate. The sex/mating ritual is an aggressive, sometimes violent act that causes stress in mice, as characterized by a number of behavioral and physical symptoms. IL-10 is an interleukin that inhibits inflammatory cytokine production by macrophages. IL-10 knock-out (KO) mice are unable to cope with stressors, are hypersensitive to inflammation and may exhibit altered responses to sex-related stressors. Six week (young) to six month-old (old) male and female 129 SvEv wild-type mice were reared in shoebox cages. Half of the animals had previously been used in mating pairs (experienced) and the other half were naïve (virgin) mice. We then introduced the singly-housed mice to singly-housed mice of the other sex. The experimental design included mice that were confined so that the other mouse of the other sex could see, smell and touch but not copulate with the mouse and included cage pairs that were freely able to mate (wild-type controls). Mice were calm and resting before being introduced to the mouse of the opposite sex. After the introduction, the mating pairs were observed for one hour. Data collected included number of attempts at mating, number of copulations, and behavioral and physical changes, comparing treated mice to wild-type controls. The old experienced male mice were more aggressive than the young male mice.

P-HH-U-7

Effect of Processing on Chemopreventive Potential of Grapes and Beets in Azoxymethane-Induced Fisher 344 Male Rats. J. Hull*****, S. Appiah**,** M. Verghese, J. Boateng, L. Shackelford, B. Kanda, D. Asiamah, S. Ogutu, and L. T. Walker, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Phytochemicals in grapes and red beets may have complementary and overlapping mechanisms of action in cancer prevention including modulation of detoxification enzymes, scavenging of oxidative agents and others. Objective was to determine effects of selected processing techniques (freeze drying, cabinet drying) on phytochemicals in grapes and beets and their chemopreventive potential in a Fisher 344 rat model and their effects on antioxidants (AOX) enzymes such as Glutathione-S-Transferase (GST), Catalase (CAT), and Superoxide dismutase (SOD). Fisher 344 male weanling rats were assigned into eleven groups and fed diets containing AIN-93G (C), 2 & 4% beets and grapes processed as indicated above and 2 & 4% beet and grape juice. At 17wks of age, rats were killed by CO2 asphyxiation and total Aberrant crypt foci (ACF) and enzymes were determined using standard protocol. Highest ACF incidence among treatment groups was seen in groups fed 4% freeze dried grapes [61 in distal and 34 in proximal (total 95)]; however, this was lower compared to C, which developed a total ACF of 90 in the distal and 38 in the proximal (total 128). CAT (0.084-0.10 umol/min/ml) and SOD (0.13-0.15U/ml) activities in the treatment groups were higher compared to control (0.0550 umol/min/ml and 0.05U/ml). Similar results were seen with GST activity with treatment groups having higher activity compared to C. Results of this study will contribute to the search for efficient processing techniques to maximize the bioavailability of nutrients and phytochemicals in fruits and vegetables in the food industry to enable development of healthy food products.

P-HH-U-8

The Effects of Mineral Nutrients in Total Chlorophyll and Cellulose Content in Peanuts. S. F. Hyllam*, S. M. South, T. K. Brown, D. L. Johnson, and G. Osuji, Cooperative Agricultural Research Center, Prairie View University, Prairie View, TX 77446.

Peanut (*Arachis hypogaea* L.) is a very important food and oil seed crop globally next to soybean and cotton. Peanut is used in the manufacture of cosmetics, dyes, paints, plastics, nitroglycerin, and especially for gasoline from peanut cellulose. Cellulose is the most abundant macromolecule on earth, but its biosynthesis remains an unresolved topic. Cellulose is the primary component of economically important products such as wood, paper, and animal feed. Understanding the environmental regulation of cellulose biosynthesis might permit the production of modified cellulose with improved properties. Peanuts were grown and treated with different mineral nutrients. At maturity, the seeds were harvested and the cellulose was analyzed by gravimetry. The treatment of peanuts with mineral nutrients increased the cellulose content in the peanuts. The total chlorophyll was analyzed by the spectrophotometry. The total chlorophyll did not determine the cellulose content of the mineral treatments. The best mineral treatment for increasing the total chlorophyll in the peanuts was the ammonium chloride treated peanuts.

P-HH-U-9

Vascular Smooth Muscle Cell Structure and Function are Altered by Resveratrol. A. J. Johnson*[1], R. T. Harris[1], G. R. Hankins[1], and D. L. Turner[2], [1]Department of Biology, West Virginia State University, Institute, WV 25112; and [2]Biology Department, Mountain State University, Beckley, WV 25802.

Vascular smooth muscle (VSM) cell dysfunction is pivotal in progression of cardiovascular disease, with enhanced proliferation and migration being important in development of vascular pathologies. Resveratrol (RV), a natural compound associated with several health benefits, is believed to provide protection from vascular disease. While effect of RV on tumor cells has been investigated in some detail, its effects on VSM cells have been less well studied. Reports are controversial and mechanisms responsible for purported health benefits are unclear. Current work examined effects of RV on function of A7r5 VSM cells and human primary aortic cells (HASM) cells. Cells were treated with up to 100 µM RV and proliferation and survivability were determined. Results indicate that RV caused a dose-dependent decrease in proliferation that was matched by a decrease in cell viability. A given concentration of RV did not decrease viability to the same extent in non-dividing A7r5 cells. Growth of A7r5 and HASM cells on the Matrigel of a BD BioCoat Angiogeneis Assay plate resulted in rapid formation of tube-like structures that are reminiscent of small blood vessels. In general, RV blocked the formation of tube-like rings. In all cases, there was no tube formation in cells treated with 2, 10, or 100 µM RV. Unlike endothelial cells, tubes formed of VSM cells collapsed within 6 hrs of seeding, except when cells were exposed to a Rho kinse inhibitor. This effect was blocked however by co-treatment with an Erk1/2 inhibitor. Tube formation was also blocked by treatment with the anti-angiogenesis drug, Suramin. While significance of tube formation by VSM cells is unclear, results are remarkably similar to those observed with endothelial cells. However, consistent, RV treatment resulted in

differential expression of genes known to be associated with angiogenesis, including Vegfa, VEGFR1 (Flt1), TSC22, and Gata3 that were all down regulated.

P-HH-U-10

Novel Implantable Optical Nanobiosensor for Diabetes. B. Moore*, M. Dweik, J. Greene, K. Hayes, and A. Molitoris, Nanotechnology Research Laboratory, Cooperative Research Programs, and Department of Life and Physical Sciences, Lincoln University, Jefferson City, MO 65101.

Development of an *in vivo* optical sensor requires the utilization of Near Infra Red (NIR) fluorophores since these fluorophores can operate within the biological tissue window. The fluorophores, Alexa Fluor 750 (AF 750) and Alexa Fluor 680 (AF 680), are NIR fluorophores that were examined as potential fluorescence resonance energy transfer (FRET) dye pairs. AF 680 and AF 750 were conjugated to streptavidin and biotin, respectively, and the percent energy was determined. Next, the dye pair was utilized in a competitive binding assay to detect glucose. Concanavalin A (Con A) has an affinity to dextran, but in the presence of glucose, Con A will bind to glucose. This protein and inhibitor system is utilized as a glucose biosensor. In this study, the effect of dextran size on FRET was examined in order to obtain optimal energy transfer. Dextran with molecular weights of 10,000 and 3000 and Con A were labeled with AF680 and AF750 respectively, and incubated to form the dextran/Con A complex. The percent energy transfer was then obtained upon exposure to glucose. The experiments revealed that dextran with molecular weights of 10,000 demonstrated the highest energy transfer in responding to glucose between 3.33 and 13.29 mM. In conclusion, the NIR pair of AF 680 and AF750 was a viable FRET pair that can be utilized to determine glucose via a competitive binding assay of dextran (10,000) and Con A. These results will help improve the development of FRET based optical glucose biosensors.

P-HH-U-11

Nanomaterial Sensors of DNA Structures Associated with Human Neurodegenerative Diseases. A. Orridge*, N. Glasgow, and R. Mahtab, Department of Biological and Physical Sciences, South Carolina State University, Orangeburg, SC 29117.

Novel methods for the detection of DNA are highly desirable for genetic defect detection. Many, if not most, diseases have their roots in our genes. More than 4,000 diseases are thought to have stemmed from mutated genes inherited from one's mother and/or father. Diabetes, sickle cell anemia, certain cancers, and obesity, have a higher occurrence among the people of African and Asian origin. Other human neurodegenerative diseases such as Fragile X syndrome, Huntington's disease, Mytonic Dystrophy, Alzheimer disease have been traced to genetic mutations. A particularly interesting and rapidly expanding area of nanoscience and nanotechnology involves research in which inorganic materials and biological molecules converge. Everything interesting, either useful or harmful, that occurs with DNA, occurs when DNA changes from the normal regular B-form. Our work is focused on developing inorganic nanomaterials as optical probes of disease related non-B DNA conformations, and, on studying how modifications of the surfaces of these nanomaterials affect their functionality for sensing sequence directed DNA structures. Long-term potential applications of this research at the DNA-nanomaterial interface include the development of nanoparticles as optical DNA diagnostics, nanoparticle DNA delivery agents, as well as a more thorough understanding of the operating parameters for DNA-based nanodevices.

P-HH-U-12

Genetic and Metabolomic Diversity in Bitter Melon (*Momordica charantia* L.). Z. Perry*, S. K. Ponniah, U. K. Reddy, and P. Nimmakayala, Gus R. Douglass Land-Grant Institute and Department of Biology, West Virginia State University, Institute, WV 25112.

Bitter melon (*Momordica charantia* L.) is an economically important member of the Cucurbitaceae that is widely cultivated across the world. The fruits of bitter melon are used as vegetable in different parts of the world. Apart from their use as a fresh vegetable, the fruits are reported to possess wide range of pharmacological properties that are hypoglycemic, antidiabetic, antifungal, and antioxidant effects. Several studies using modern techniques have authenticated its use to cure diabetes and as antibacterial as well as antiviral agent. The fruits are used traditionally as anthelmintic, antiemetic, carminative, purgative and for the treatment of anemia, jaundice, malaria and cholera. The objective of current study is to investigate the diversity of various metabolic compounds across the cultivars and also their genetic diversity using SSR markers. Molecular diversity analysis of 24 diverse bitter melon cultivars will be performed using 50 watermelon SSRs. Polymorphism testing will be done using a high resolution agarose gel system. Diversity analysis at genomic and metabolomics levels will be discussed.

P-HH-U-13

A Survey of Kaolin Consumption within Macon County, Alabama. T. Purdie, Jr.*[1], K. Pickett[2], L. Keith[2], L. Thomas[3], A. D. Alexander[4], and P. Curtis[5], [1]Department of Chemical Engineering; [2]Department of Animal Science; [3]Department of Biology; [4]Department of Pathobiology, Tuskegee University, Tuskegee, AL 36088; and [5]Southwest Dekalb High School, Tuskegee, AL 36088.

Kaolin, commonly referred to as "white dirt", is a clay that is naturally found by riverbeds and lakes. Kaolin is mostly composed of the mineral kaolinite. Kaolinite and kaolin are found in a wide variety of substances and products that Americans use every day, like paint, medicine, paper, ceramics, ink, rubber processing products, and other items. Both humans and animals also consume kaolin; this consumption is called geophasia, which is the ingestion of dirt or soil. Kaolin consumption is not limited to a certain geographic region or ethnicity, but is a worldwide phenomenon. In the United States, kaolin consumption is typically associated with rural populations in the Southeastern regions, where consumers of kaolin can purchase "white dirt" in local stores and gas stations. Some of these reasons have been attributed to pregnancy, anemia, and diarrhea. In Macon County, AL several grocery stores and gas stations that sold kaolin were surveyed in order to better understand why people buy kaolin with the intentions of consuming it. This survey is intended to be the initial stages of a study to see if kaolin is in fact a prebiotic material.

P-HH-U-14

Free Radical Scavenging Capacity of Polyphenol Extracts from Different Parts of Grape Pomace. I. Smith*, M. Ahmedna, and J. Yu, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Free radicals are produced by oxidation reactions. In turn, these radicals can initiate chain reactions that damage biological molecules such as DNA, protein and lipids. Antioxidants terminate these chain reactions by removing free radical intermediates, and inhibit other oxidation reactions. Grape pomace (GP) is a polyphenol antioxidant rich by-product of the wine industry. GP is composed of skins, seeds and small portion of stems that differ in polyphenol composition, which may lead to different antioxidant activities. In this study, muscadine nobel and cabernet sauvignon pomaces were obtained from two North Carolina wineries. They were freeze dried and manually separated into seeds, skins and stems, and each part was ground into powder. The powders were extracted with a water/methanol mixture. The extracts were then purified using ethyl acetate (EtOAC). After partitioning, water fractions and EtOAC fractions were obtained from each extract. Total phenolics (TP) and total antioxidant activity (TAA) of each fraction was determined using the Folin-Ciocalteu method and the DPPH free radical scavenging method, respectively. Results show that muscadine seeds and skins had higher TP than Cabernet seeds and skin, respectively, and seeds had higher TP than skins. More polyphenols were solubilized in EtOAC. At low TP concentration, the seed extracts showed higher free radical scavenging capacity (FRSC) than skin extracts. At TP concentration above 150 ppm, both seed and skin extracts showed similar FRSC. Therefore, both grape seed and skin extracts are potent antioxidants. They may be used as natural preservatives in foods to prevent lipid oxidation and rancidity development.

P-HH-U-15

Application of Power Ultrasound to Improve Adhesion of Honey on Roasted Peanuts. H. Tegete*, M. Verghese, and P. Wambura, Nutritional Biochemistry, Food Engineering, Processing, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Adhesion of honey coating to hydrophobic food products is often poor because of difference in chemical properties. Use of power ultrasound (sonication) as a processing aid to extract lipid from peanuts has been explored. Extent of honey coating retention on the surface of untreated and sonicated peanuts was studied to evaluate efficacy of sonication to improve adhesion of honey on the peanuts, as penetration of oxygen through honey coating depends, on how much honey is retained on peanut surfaces. Valencia type peanut samples, 150 g each, were subjected to sonication in 450 ml petroleum ether for 5, 10, and 15 min. After sonication 25 ml of honey was poured and stirred over 50 g peanuts, then roasted in an oven at 178^{o}C for 10 min. Samples were removed from oven and sprinkled with 25 g of sugar. Honey coating adhesion was determined. Samples were stored at 40^{o}C. Honey coating and sonication on storage oxidative stability was monitored by oxidative stability instrument. Results showed that weight of honey coating was 7, 16, 19, 21, and 21 g on control, dipped, 5, 10 and 15 min sonicated sample, respectively. Honey coating adhesion was improved by 64, 68 and 67% for 5, 10 and 15 min sonicated samples, relative to control. Oxidative stability of dipped, 5, 10, and 15 min sonicated samples was improved by 37, 73, 93, and 71%, respectively, as compared to control. Removing some lipids from peanut surface by power ultrasound improved adhesion of honey coating and storage oxidative stability.

P-HH-U-16

Selected Herbs and Spices Reduce Azoxymethane (AOM)-Induced Colon Tumors in Fisher 344 Male Rats. J. Thomas*, L. Dukes, M. Verghese, J. Boateng, L. Shackelford, L. T. Walker, and K. Campbell, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Colon cancer is a highly preventable disease. Objective was to test chemopreventive effects of selected spices/herbs, cinnamon (CM), clove (CL), rosemary (RM), and oregano (OR) at 150ppm on azoxymethane (AOM)-induced colon tumors in Fisher 344 male rats. Following a one-week acclimatization period, rats were divided into five groups and fed an AIN93G (C) and four treatment diets. Rats received 16mg/kg body weight of azoxymethane at 7 and 8 wk of age. Body weights and feed intakes were recorded. Diets were administered until CO2 asphyxiation at 46 wk of age. Tumor incidence (%) in colons of rats fed C, CM, CL, RM, and OR were 100, 90, 0, 30, and 77.7, respectively. Tumors per tumor-bearing rat ratios for C, CM, CL, RM, and OR were 3.9, 2.66, 2.0, 1.9 and 2.25. Tumor numbers in C, CM, CL, RM, and OR were 55, 24, 16, 19, and 18, respectively. Tumor size (mm) in C, CM, CL, RM, and OR were 6.5, 4.7, 4.2, 1.7, and 1.9, respectively. Glutahione-S-Transferase activity (U/g) ranged from 16.59 in the OR fed rats, 19.48 (CL), 27.53 (RM) to a high of 32.18 in CM fed rats. Superoxide dismutase activity (U/g) ranged from 4.98 in OR fed rats, 8.05 (RM), 8.92 (CL), to a high of 10.13 in the CM fed group. Lowest CAT activity (U/g) was seen in rats fed OR (36.09) and highest seen in rats fed CM (59.29). Consumption of phytochemical compounds present in cinnamon, cloves, rosemary, and oregano offered protection during the carcinogenesis process.

P-HH-U-17

A Role for IL-10 in Stress Response. I. Tigner*, D. Hampton, D. Campbell, J. McNeilly, K. Cromwell, D. Freeman, T. Purdie Jr., D. Grant, F. Chestnut, O. Mitchell, and A. D. Alexander, College of Agricultural, Environmental, and Natural Sciences, Tuskegee University, Tuskegee, AL 36088.

Stress is defined as anything that causes an animal to feel threatened. Stress can come in many different forms such as emotional, economic, or physical. Stress can cause the body to release pro-inflammatory cytokines, chemicals that help promote inflammation and neoplasia. The focus of our experiment was to determine the relationship between stress and inflammation. IL-10 deficient mice are unable to cope with stressors compared to wild-type controls, suggesting a link between stress and inflammation. IL-10 is an interleukin that inhibits inflammatory cytokine production by macrophages in the body. IL-10 knock-out (KO) mice are hypersensitive to inflammation and may exhibit altered responses to environmental stressors. Six week to six month-old male and female 129 SvEv wild-type mice were reared in shoebox cages. We challenged the mice to noise, tactile, wet bedding, rotational forces, intermittent noises and other environmental stressors. Mice were then assessed for whether or not they resumed regular mouse behaviors between responses. Parameters of stress included irritability, startle response, whether they isolated themselves from others, and whether they exhibited regular motor skills. We then observed the behavioral and physical changes in the mice, comparing treated mice to wild-type controls. We report here the results of preliminary experiments designed to establish the best practices for evaluating stress response in IL-10 KO mice compared to wild-type control mice. We believe that the lessons learned in these and future experiments will lead to greater understanding of the possible causes of stress and how stress can be abrogated.

Graduate Students (17)

P-HH-G-1

Nanomaterials for Enhancing Bioavailability of Quality Nutrients. L. Brady*[1], Y. Jones[2], and S. Barnes[2], [1]Department of Biotechnology, and [2]Department of Chemistry and Physics, Alcorn State University, Alcorn State, MS 39096.

Though the potential health benefits of polyphenolic compounds including flavonoids have been well documented, one of the barriers for the full realization of these compounds in treating human disease is their short half-life and limited bioavailability in the body. Nanoencapsulation of these compounds has become an attractive approach toward the fulfillment of the potential antioxidant, antibacterial, antiviral, and anticancer benefits of these compounds. This research investigates the nanoencapsulation of flavonoid compounds for targeted release in the body. Two approaches for synthesis of nanoparticles containing flavonoid compounds are pursued. The nanoparticles are evaluated for the kinetics of flavonoid release from the nanoparticles and compound viability upon release.

P-HH-G-2

Assessment of Dietary Patterns Associated with Colon Cancer Risk among Selected Races in North Alabama. K. Campbell*, M. Verghese, J. Boateng, J. Thomas, J. Hull, J. Thomas, S. Ogutu, D. Asiamah, R. Miller, L. T. Walker, and B. Kanda, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Cancer is the second most common cause of death in the U.S. Risk factors such as dietary patterns, lifestyle and genetics play a critical role. The objective was to determine the dietary patterns associated with colon cancer risk in selected races of different age and gender groups in North Alabama. A three-day food intake was collected from 50 males and 50 females of different age groups (18-25 y, 26-35 y, 36-45 y, 46-55 y, >55 y) and races (African Americans and Caucasians) in North Alabama. Two dietary assessment tools were used: NIH Food Frequency Questionnaire (FFQ) and a Food Collection and chemical/proximate analysis (protein, fat, carbohydrates, fiber, and calcium). Daily food intake was collected by triplicate portions collection technique. Participants were asked to set aside one-fourth of their daily intake for a three-day period of one week. Group means were compared for each age group, race and sex. Significant differences between groups were determined by multiple comparison tests using a statistical soft ware. Among the age groups, 36-45 y males had the highest calorie intake (2858.99 Kcal) while 26-35 y females had the lowest calorie intake (1639.24 Kcal). Highest protein intake (102.61 g) was seen in the 46-55 y males and the lowest protein intake (53.38 g) was seen in the 26-35 y females. The highest fat intake was seen in the 18-25 y male group (56.15%). The results of the study showed poor dietary patterns (high calorie, high fat intake and low fiber intakes) especially among African Americans.

P-HH-G-3

Using Shiitake Mushroom Extract to Enhance the Growth of Lactic Acid Bacteria and Bifidobacteria. O. Hassan*[1], D. Song[1], S. Ibrahim[1], O. Isikhuemhen[2], A. Shahbazi[2], and A. Abughazaleha[3], [1]Department of Family and Consumer Sciences; [2]Department of Natural Resources, North Carolina A&T State University, Greensboro, NC 27411; and [3]Department of Animal Science, Food & Nutrition, Southern Illinois University, Carbondale, IL 62901.

Probiotics are defined as live microorganisms that, when administered in adequate amounts, confer a health benefit on the host. Some of the beneficial effects of lactic acid bacteria consumption include: (1) improving intestinal tract health; (2) enhancing the immune system by synthesizing and enhancing the bioavailability of nutrients; (3) reducing symptoms of lactose intolerance; and (4) reducing the risk of certain cancers. The shiitake mushroom (*Lentinus edodes*) contains high quantities of polysaccharides, which enhance the viability of probiotic cultures. The objective of this study was to investigate the effect of a shiitake mushroom extracts on the growth of lactic acid bacteria and bifidobacteria. Varying concentrations (0, 1, 2, and 4%) of the extract were used to test the viability of *Lactobacillus reuteri* CF2-7F, *L. reuteri* DMS20016, *Bifidobacterium breve* (ATCC 15701) and *B. adolescentis* (ATCC 15704). Bacterial growth was monitored at two-hour intervals by measuring turbidity (optical density at 610 nm), changes in pH values and titratable acidity. Results showed the growth of all tested strains was significantly enhanced in the presence of mushroom extracts ($p<0.05$). CF2-7F grown on MRS medium with the 4% shiitake mushroom extract had the highest log cfu/ml compared to the control during an eight-hour incubation. Acid production was increased and pH was decreased due to the rapid growth of bacteria. Results suggest the potential use of shiitake mushroom extract as a natural additive to probiotic food products to improve the growth of lactic acid bacteria and bifidobacteria.

P-HH-G-4

Substituting Applesauce for Fat (Butter) in Chocolate Chip Cookies. S. Hayek*[1], S. A. Ibrahim[1], and H. J. Khouryieh[2], [1]Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411; and [2]Food Processing and Technology, Western Kentucky University, Owensboro, KY 42303.

Being overweight or obese is a significant contributing factor to a number of health problems including diabetes and heart disease. Currently, about 31%, or about 59 million people in the U.S. are obese and 65% are either obese or overweight. Estimates suggest that nearly four out of ten adults in the U.S. will be obese within five years if current eating trends continue. Fat in diet contributes the largest amount of calories, so replacing the fat with lower calorie alternatives could have substantial impact on the incidence of obesity. The objective of this study was to examine the consumer acceptability of fat free chocolate chips cookies made with applesauce as fat replacement. Three versions of the cookies were prepared in this study, the original recipe using butter, and one in which applesauce replaced 50% of butter, one version in which applesauce replaced 100% of butter. Cookies were also evaluated for appearance, color, flavor, texture, and overall acceptability using a nine-point hedonic scale. Sensory evaluations were completed at North Carolina Agricultural and Technology University with a group of faculty, staff

and students. The overall results of the sensory ratings indicated that acceptance was higher for 50% replacement cookies. Our results indicate that applesauce might be an acceptable substitute for fat in cookies, which would contribute to lowering the consumption of fat in the American diet. Further work is needed to determine the chemical and physical characteristics as well as the shelf life stability of cookies made with applesauce.

P-HH-G-5

Processing Effects on Phytochemical Content and Bioavailability of Carrots Using a Rat Model. B. Kanda*, M. Verghese, J. Boateng, L. Shackelford, L. T. Walker, S. Appiah, R. Miller, L. Dukes, K. Campbell, J. Thomas, and S. Ogutu, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Carrots are an important source of phytonutrients and offers advantages over dietary supplements due to its low cost and wide availability. Aim was to investigate processing effects on phytochemical content in processed carrots and effects on Azoxymethane-induced aberrant crypt Foci in Fisher 344 male rats. Fisher 344 male rats were divided into control (C) and ten treatment groups and fed Freeze-dried (FD) and Conventional frozen (CF), Steam blanched (SB) - (2 & 4%), boiling water blanched (BWB) (2 & 4%), and 2 and 4% carrot juice (CJ) following 1-wk acclimatization period. Rats received AOM injections at 7 and 8 wk of age @ 16mg/kg body weight. At 17wks of age rats were killed. Colons were removed and fixed, liver and cecum were collected and stored at -80ºC. Body weights, feed intake, ACF, and selected detoxification (Glutathione-S-Transferase (GST) and antioxidative Catalase (CAT) enzymes were determined using standard protocol. Rats fed 2 (38) and 4% (29) CJ had lowest number of ACF compared to 2% FD (55-109) and 4% FD (65-74). Rats fed 2 and 4% CF (SB) carrots had lower ACF (53-69) compared to those fed CF (BWB) carrots. GST and CAT activities (µmol/min/ml) were significantly ($p<0.05$) higher in rats fed treatment diets (68-78-GST) and (0.125-0.150-CAT), respectively, compared to those fed control diet. Results show that 4% CJ and 4% FD carrots had greater effects in reducing AOM-induced ACF compared to other treatments. Processing methods have significant implications in the health benefits associated with the consumption of fruits and vegetables.

P-HH-G-6

Establishing Physicochemical Profiles for High Nutrient Dense Purslane Pasta. J. D. Kelly*, N. L. Dawkins, and R. D. Pace, Department of Food and Nutritional Sciences, Tuskegee University, Tuskegee, AL 36088.

Purslane (*Portulaca Oleracea*) is eaten extensively as a vegetable in soups and salads in the Eastern Mediterranean countries where the incidence of both heart disease and cancer is low, which may be attributed to purslane consumption. Purslane is generally characterized as a health promoting green leafy vegetable with high amounts of antioxidants and phenolic compounds. The goal of this research was to increase purslane utilization and to enhance the nutritional quality of a traditional pasta product. Pasta is a highly popular food product consumed worldwide and generally accepted by adults and children that makes it an ideal food product for such innovation. The objectives of this study were to develop nutrient dense pasta with three levels of purslane (3.5, 5, and 10%) and determine their physicochemical properties. Purslane was purchased from Gwinnett International Farmer's Market, Duluth, Georgia, freeze dried and ground into powder which was subsequently used in the formulation. Physicochemical properties (carbohydrates, fat, moisture, ash, protein, color, and texture profile) were conducted. Protein content was highest at 10 compared to 3.5, 5%, and the control. Colorimetric values reveal higher 'a' and 'b' values for product containing higher amounts of purslane powder. Fat was lower in all formulated products compared to the control while ash values were higher. Available carbohydrate was higher in the control compared to nutrient dense pasta. Preliminary results suggest that the physicochemical properties of purslane base pasta are nutritionally superior to commercially available products.

P-HH-G-7

Dairy Consumption: A Potential Risk Factor For Prostate Cancer. A. Moore*, S. McWhinney, and B. Dixon, Department of Agriculture, Nutrition & Human Ecology, Prairie View A&M University, Prairie View, TX 77446.

Dairy products have been consistently associated with prostate cancer risk, yet the underlying relationship remains unknown. Recent hypotheses established that high calcium intake, that down-regulates 1,25 dihydroxy vitamin D_3 in the prostate, is a potential risk for prostate cancer. This project was conducted to examine the conclusions of various studies conducted over the past several years on prostate cancer risks. One study in the US found a positive association with increase calcium intake and prostate cancer risk. A case control study in Sweden concluded that a western style diet might lead to increased risk for prostate cancer, especially aggressive prostate cancer. In this metanalysis data collection was obtained from articles published in the years 1993-2008 examining the relationship between the consumption of dairy products or milk and prostate cancer. Ten published studies were

available for this analysis. When combing all articles, 50% of the studies concluded an increased relationship between dairy products and prostate cancer risk. Dietary fat also exhibited increased risk for prostate cancer. This study supports the hypothesis that dairy consumption is a potential risk factor for prostate cancer.

P-HH-G-8

Reduction of Azoxymethane-Induced Colon Tumors in Fisher 344 Male Rats Using Processed Dry Beans. L. Mounts*, R. Field, M. Verghese, J. Boateng, and L. Shackelford, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Dry beans (*Phaseolus vulgaris* L.) are rich in phytochemicals (flavonoids, and anthocyanins) and may have significant implications in health. Objective was to determine effects of feeding processed (cooked (C), toasted (T), fermented (F), and germinated (G)) dry beans (kidney beans (KB) and navy beans (NB)) (5%) on Azoxymethane (AOM) induced colon carcinogenesis in Fisher 344 male rats. Selected hepatic enzymes were determined. Following one-week period of acclimatization, rats were assigned to six (n=10) treatment and one control group (C) (fed AIN-93G). At 7 and 8 wk of age rats received AOM (s/c) at 16mg/kg body weight. Rats were killed at 46 wk. Tumor incidence in rats fed beans was 50-81% compared to C (100%). Lowest tumor numbers were seen in KBC (10) and KBG (10). Tumor numbers were lower in rats fed processed KB (10-14) compared to NB (18-23) (50-78% reductions compared to C -46). Tumor size (mm) and TBR ratio was lowest in rats fed KBG (1.11, 1.66) and NBC (2.84, 2.25). Tumor size (mm) in rats fed C (7) was larger than KB & NB-1.1-4.1). TBR ratio in rats fed C (3.25) was higher compared to rats fed NB (2.05) and KB (2) diets. Cecal weight (g) was significantly higher ($p<0.05$) in rats fed beans (1.94-1.99) compared to C (1.01). Rats fed KB (43-47µmol/mg) had significantly higher hepatic GST activity compared to NB (28-33µmol/mg). Processed dry beans offered protection against AOM- induced colon tumors.

P-HH-G-9

Changes in Biomarkers of Spontaneously Hypertensive Rats Fed Novel Sources of Vegetables. M. Powe*, N. L. Dawkins, and R. Pace, Department of Food and Nutritional Sciences, CAENS, Tuskegee University, Tuskegee, AL 36088.

Purslane, sweet potato and collard greens display high antioxidant potential that is associated with the prevention and reduction of chronic diseases. The purpose of this study was to determine if the consumption of these greens decreased blood pressure, weight, lipid profile and kidney damage associated with hypertension. Five week old Spontaneously Hypertensive (SHR) rats (n = 44) were separated equally into four diet groups: control (AIN-76A diet), purslane, sweet potato and collard greens each at 4% and were fed their respective diets for six weeks. Blood pressure measurements and weight were recorded weekly and twice per week, respectively. Animals were euthanized and the kidneys were removed and placed in 10% formalin. Tissues were prepared on two slides, stained with hematoxylin and eosin stain (H&E) and the other stained with Periodic acid-Schiff (PASH). Minimal variation in food intake was observed among the treatment groups, however, a significant reduction in systolic blood pressure in animals fed purslane and sweet potato greens were observed. Decreased levels of total cholesterol, LDL-C and TAGs were observed compared to the control. Renal morphology revealed minimal to mild injury among all groups. The results from this study indicated that novel and traditional vegetables showed considerable promise in significantly reducing risk factors associated with heart disease and other inflammatory chronic diseases.

P-HH-G-10

Chemopreventive Potential of Almonds and Pecans Against the Development of Azoxymethane-Induced Tumorigenesis in Fisher 344 Male Rats. H. Reid*, A. Miller, M. Verghese, J. Boateng, L. Shackelford, L. T. Walker, L. Dukes, R. Field, S. Appiah, B. Kanda, R. Miller, L. Disney, D. Asiamah, and K. Campbell, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Almonds (*Prunus dulcis*) and pecans (*Carya illinoinensis*) contain phytochemicals such as phytosterols, isoflavones, ellagic acid, and polyphenols such as phenolic acids, flavonoids, and stilbenes. Objective was to test chemopreventive potential of almonds and pecans on Azoxymethane (AOM) induced colon carcinogensis. Following a one-week period of acclimatization, 30 rats were divided into 3 groups. One group was fed AIN93G (C) diet, three groups were fed almond (A) and pecan (P) diets (5% in C). At 7 and 8 wk of age rats received AOM (s/c) at 16mg/kg body weight. At 46 wk of age rats were euthanized. Colon, liver, and cecal samples were collected. Cecal weight, cecal pH, tumor incidence, activity of selected enzymes; glutathione-s-transferase (GST), catalase (CAT), superoxide dismutase (SOD) were determined. Tumor incidence (%) in rats fed P & A was lower (78 & 70) than C (100). Tumor numbers were lower in rats fed A (11) compared to P fed (17) group with C having (34) tumors. Tumor size (mm) was smaller in rats fed P and A (5.92, 2.35) compared to C (18.4). TBR ratio was lowest

in A at (1.57) compared to P fed group (2.42), with the highest ratios seen in C (5.8mm). Activity of selected enzymes (µmol/mg); GST , CAT and SOD were significantly higher in rats fed A (3.33, 1.35, 36.54) and P (4.25, 1.37, 32.33) compared to C (1.35, 0.055, 1.08). Consumption of nuts rich in phytonutrients and omega 3 fatty acids may play a beneficial role against various chronic diseases.

P-HH-G-11

Head Start: Jump Start on a Healthy Lifestyle Program/Pilot Study. M. A. Schwarz*, and V. Zoumenou, University of Maryland Extension, University of Maryland Eastern Shore, Princess Anne, MD 21853.

In an effort to reduce the ever increasing childhood obesity problem, the Head Start Jump Start Pilot Program was tested as a means to introduce nutrition experiential learning into preschool daily activities. This study aims to promote healthful nutrition and physical activity behaviors in preschool children at a Head Start (HS) center in Somerset County, on Maryland's Lower Eastern Shore through interactive educational programming. HS teachers received training on the Eagle Book Series Curriculum that includes nutrition lessons, food safety, games, and gardening activities. The HS cafeteria staff was also trained on how to prepare and introduce fresh fruit and vegetables into the daily menus. Plate waste methodology was used at mealtime to measure the children's fruit and vegetable preferences and consumption. In collaboration with HS teachers, preschool children completed pre and post surveys. The results showed that the nutrition lessons through stories were effective in emphasizing healthy food choices and food origin. In addition, food demonstration sessions helped to encourage the tasting of new fruits and vegetables. The fresh fruits and vegetables served during mealtime were positively received by staff and students. The consumption of new foods increased over time as they gained acceptance. Survey results also showed that the preschool children's drink choices and food portion size choices improved, especially among girls and younger preschoolers. These results indicate that introducing fresh fruit and vegetables into HS menus and gardening activities into HS activities may help to improve preschool children's food preferences and choices.

P-HH-G-12

Chemopreventive Effects of Bitter Melon (*Momordica charantia*) Against Colon Tumorigenesis. L. Shackelford*, D. Asiamah, M. Verghese, J. Boateng, L. T. Walker, A. Miller, L. Dukes, R. Miller, K. Campbell, B. Kanda, S. Appiah, S. Ogutu, V. Gourineni, and D. Gajula, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Bitter melon (BM) *Momordica Charantia i*s used to treat Diabetes Mellitus. However, studies on its role in chemoprevention are scarce. Objective was to investigate chemopreventive properties of BM on Azoxymethane induced colon tumors in Fisher 344 rat model and to determine activity of selected enzymes. Fisher 344 rats were randomly assigned to three groups after a one week acclimatization period. One group (n=8) was assigned to a control diet (C) (AIN-93G) and two groups (n=8) were assigned to C+2% BM and C+4% BM. All rats received 2 s/c injections of AOM at 7 and 8 wk of age @ 16mg/kg body weight. At 45 weeks of age rats were killed. Tumor incidence (%) in C, 2% BM and 4% BM was 100, 87.5 and 57.1. Tumors/tumor bearing ratio (TBR) was 3.9, 1.57 and 1.4 for C, 2% BM and 4% BM. Tumor size (mm) was larger in C (6.50) compared to rats fed treatment diets (3.36 and 1.35 for 2% and 4% BM). Glutathione-S-transferase (GST) activity was significantly ($p<0.05$) higher in BM compared to C, superoxide dismutase (SOD) activity (U/ml) was 98.20 and 81.58 U/ml for 2 and 4% BM. Catalase activity (µmol/ml) was 0.362, 0.122 and 0.055 for 4% BM, 2%BM and C, respectively. Bitter melon reduced Azoxymethane-induced colon tumors. Consumption of bitter melon may have implications in prevention of chronic diseases such as colon cancer with significant implications for food product development by the food industry.

P-HH-G-13

Primary Oxidation Products Produced during Low-Heat Thermal Oxidation of Dietary Oils Sold to Consumers. D. Skeene*, D. McKinney, L. Doore, and V. McWhinney, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Dietary oils can potentially be subjected to auto, photo and thermal oxidation. The products produced by the three processes can differ in types and amounts. Thermal oxidation due to exposure to low or high heat produces different ratios of different product. Some of these products are toxic and may be associated with different diseases and their risk factors. Weight reduction was reported in animals consuming oxidize oil. This study examined the effect of high-heat thermally oxidized sunflower oil consumption of the glutathione, glutathione reductase, and glutathione peroxidase in piglets that had suckled from sows that had either consumed a diet with or without the oxidized oil. The study is significant to and will add to the body of knowledge in the understanding of dietary oil's oxidation role in obesity, diabetes and other cellular processes.

P-HH-G-14

Genetic Transformation of Synchronized *in vitro Muscadinia* Grape Cell Cultures. S. Sutton*, S. Krastanova, A. Ananga, S. Leong, and V. Colova (Tsolova), Center for Viticulture and Small Fruit Research, College of Engineering Sciences, Technology and Agriculture, Florida A&M University, Tallahassee, FL 32317.

Muscadine grapes are considered among the most important *Vitis* species cultivated in the Southern US. They contain several unique flavonoid compounds that are known to have beneficial nutraceutical properties. The genetic enhancement was performed in muscadine grape cell suspensions in order to investigate regulation of the biosynthetic pathways of flavonoid compounds in varieties such as, 'Noble', 'Supreme', and 'Darlene'. The *Muscadinia* pericarp cells from the super epidermis of the cell line from 'Noble' and the embryogenic cell lines from the petioles of 'Darlene' as well as 'Supreme' were transformed using *Agrobacterium tumefaciens* harboring the *MYB* gene. Molecular analysis confirmed the proper integration and overexpression of the *MYB* gene. The purpose of this work was to verify the feasible bio-process strategy needed to shift the metabolic flux towards overexpression of flavonoids in genetically enhanced *in vitro* grape cell cultures. This approach will allows us to assess the nutraceutical value of commercial North American grape varieties, and to contribute knowledge about genomic mechanism affecting the production of flavonoid compounds in grape. In addition, it proves to be a feasible technology for using genomic sequences to improve nutritional and health benefits of the native grapes.

P-HH-G-15

Changes in Composition and Antioxidant Activities in Milled Flaxseed Periodically Exposed to Oxygen. B. Taliaferro*, H. Li, and J. Parry, Virginia State University, Petersburg, VA 23806.

Linolenic acid (18:3n-3) is an omega-3 fatty acid that has three double bonds. Fatty acids with more double bonds will generally oxidize faster than those with less. Linolenic acid comprises more than 50% of the fatty acids in flaxseed. The objective of this study was to determine if periodic exposure of milled flaxseed to oxygen would lower the concentration of linolenic acid and antioxidants. Six known flaxseed varieties were analyzed for fatty acid profile, total phenolic content (TPC), and antioxidant capacities including the oxygen radical absorbance capacity (ORAC) assay, $DPPH^{\bullet}$ and $ABTS^{\bullet+}$ scavenging activities. Samples were milled then exposed to oxygen every other day for 80 days and measured at days 0, 40, and 80. Fatty acids were extracted using a Soxhlet apparatus with hexane as the solvent. Results showed that "Carter" and "Omega" varieties had the highest and lowest concentrations of the 18:3n-3, which were 57 and 48 % of the total fatty acids, respectively. There was no significant change in 18:3n-3 in any of the varieties over 80 days. However, TPC, ORAC and $ABTS^{\bullet+}$ values were lower at day 40 and 80 compared to day 0 in all. This data may indicate that 18:3n-3 in milled flaxseed stored at ambient temperature may be protected by antioxidant compounds such as tocopherols and phenolics under these conditions.

P-HH-G-16

Establishing Micropropagation and *Agrobacterium*-Mediated Genetic Transformation Protocols for *Scutellaria barbata*: A Potential Anticancer Plant. K. Venkatesan*, A. K. Yadav, and N. Joshee, Agricultural Research Station, Fort Valley State University, Fort Valley, GA 31030.

Drug discovery and ethnobotany continues to be a major focus of medicinal plant research. *Scutellaria barbata* D. DON (Family Lamiaceae) has been used in oriental herbal medicine for its anti-inflammatory and hepatoprotective properties. Accumulating evidence demonstrates the anti-carcinogenic potential of flavonoids and other bioactive compounds extracted from this plant. It is important to develop efficient micropropagation methods for lab research and commercial use. Micropropagation and alginate encapsulation protocols will aid in conservation and preservation efforts. MYB proteins are transcription factors playing regulatory roles in developmental processes and defense responses and control processes such as epidermal cell differentiation, stomatal aperture, flavonoid synthesis, cold and drought tolerance, and pathogen resistance. To achieve introduction of a MYB gene to study its role in the biosynthesis of desired therapeutic flavonoids, genetic transformation of *S. barbata* using three strains of *Agrobacterium tumefaciens* (LBA4404, EHA105 and AGL1) was evaluated. A binary plasmid vector (pq35SGR; 14239 bp) with GFP reporter and Kanamycin selectable marker gene under CaMV 35S promoter was used for transformation. A number of factors that are known to influence transformation efficiency, such as bacterial strain/density, co-cultivation duration, effect of vacuum infiltration, and type of explants were optimized. Additionally, the effect of adding acetosyringone during co-cultivation conditions was also observed. Putative transgenic shoots that regenerated in selection medium and were identified on the basis of GFP expression were further subjected to molecular analyses to record the presence of MYB gene.

P-HH-G-17

The Difference in the Impact of Oxidized Dietary Sunflower Oil on the Gluthione-Glutathione Enzyme Complex in Lean and Obese Piglets. H. White-Reese*, J. Washington, R. Green, L. Doore, and V. McWhinney, Cooperative Agricultural Research Center, Prairie View A&M University, Prairie View, TX 77446.

Dietary oils can potentially be subjected to auto, photo and thermal oxidation. The products produced by the three processes can differ in types and amounts. Thermal oxidation due to exposure to low or high heat produces different ratios of different product. Some of these products are toxic and may be associated with different diseases and their risk factors. Weight reduction has been reported in animals consuming oxidize oil. This study examined the effect of high-heat thermally oxidized sunflower oil consumption of the glutathione, glutathione reductase, and glutathione peroxidase in piglets that had suckled from sows that had either consumed a diet with or without the oxidized oil. The study is significant to and will add to the body of knowledge in the understanding of dietary oil's oxidation role in obesity, diabetes and other cellular processes.

Scientists (15)

P-HH-S-1

Comparison of Health Benefits of Vegetables Commonly Consumed by African-Americans in Southwest Mississippi. S. L. Barnes*[1], J. Gibbs[1], Y. Jones[1], S. Johnson[2], T. Washington[2], and V. N. Njiti[3], [1]Department of Chemistry; [2]Department of Biological Sciences; and [3]Center for Biotechnology and Genomics, Alcorn State University, Alcorn State, MS 39096.

This research focused on studying the potential health benefits of various vegetables commonly consumed by African-Americans in Southwest Mississippi. These potential benefits were compared by analyzing the phenol and flavonoid content, as well as the free-radical scavenging ability of mustard greens (*Brassica juncea*), turnip greens (*Brassica rapa*), collard greens (*Brassica oleracea*), sweetpotatoes (*Ipomoea batatas*), squash (*Cucurbita* spp.), corn (*Zea mays*), and purple hull peas (*Pisum sativum*) using the Folin-Ciocalteu method, Aluminum Chloride method, and DPPH assay. High Performance Liquid Chromatography (HPLC) was used to identify the flavonoid quercetin as a major contributor to the phytochemical properties of greens. This study revealed that components in greens (collards, mustards, and turnips) are excellent radical scavengers, high in total phenol and total flavonoids and thus greens are excellent sources of phytochemicals compared to the other vegetables studied. Squash and sweetpotatoes were also good sources of phytochemicals. Of the vegetables studied, corn and purple hull peas contained the least amount of phytochemicals. Therefore, African-Americans are encouraged to consume more greens.

P-HH-S-2

Processing Effects on Phenolics in Selected Fruits. J. Boateng*, M. Verghese, P. Wambura, L. Shackelford, S. Ogutu, and L. T. Walker, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Postharvest processing and storage may have substantial impact on stability of bioactive components. Aim was to determine how processing operations individual quick freeze (IQF), conventional freezing (CF), ultra low freezing (ULF) and canning (CAN) affect total phytochemical and antioxidant content in fruits (mangoes, plums, red grapes, apples and peaches) after 4 weeks of storage. Total soluble phenolics (TSP) and flavonoids (TF) were analyzed, results expressed as means mg gallic acid equivalents (GAE) and mg catechin equivalent (CE)/100g. Texture, microstructure analysis, color measurements, total monomeric anthocyanins (TMA) pigment contents and antioxidant activity including DPPH (1,1-diphenyl-2-picryl-hydrazyl) were also determined. TSP (mgGAE/100g) and TF (mgCE/100g) decreased significantly. TSP and TP contents were highest in CF and ranged from 54.75 (grapes) to 176.41 (plums) for TSP and 6.40 (mangoes) to 52.4 (plums) for TF. CAN show highest reduction (TSP and TF) contents 10.9 (mangoes) to 123.8 (plums) and 1.30 (mangoes) to 35.7 (plums), a decrease of 25% to 41% and 47% to 87%, compared to control (fresh fruits). Although antioxidant activities remained constant in fruits, CAN resulted in significant losses of DPPH (%) [46.5% (peach) to 86.9% (plums)] and pigment as detected by decrease in TMA (cyd-3-glu, mg/100g) ranged from 0.050 in peach to 1.06 in plums compared to 6.65 and 36.5, in fresh samples. Mangoes and peaches showed highest reduction in total phenols; mangoes exhibited high levels of antioxidant activity. Canning contributed to significant losses in total phenolic contents while CF retained significant amount of phenolic compounds.

P-HH-S-3

An Assessment of the Diet and Physical Activity of Children in Child Care Centers on Maryland's Eastern Shore. M. D. Cecil*, and N. L. Bennett, Department of Human Ecology, University of Maryland Eastern Shore, Princess Anne, MD 21853.

Overweight and obesity among children have reached epidemic proportions nationwide and have become two of the most critical health issues of our time. In 2002, the Pediatric Nutrition Surveillance System reported the prevalence of overweight in children ages two to five years was 14% in Maryland, a substantial increase from 8.2% in 1997. In addition, an increasingly high percent of young children spend time in care outside of their homes. The National Household Education Survey conducted in 2001 reported that 74% of all children ages three to six years are in some form of non-parental care, and 56% are in center-based child care programs. A literature search revealed a lack of available data on the weight status and activity levels of young children in Maryland. The purpose of this research is to study current influences on the dietary patterns and activity levels of children enrolled in child care centers on Maryland's Eastern Shore and develop best practices for decreasing the prevalence of childhood obesity. Information presented in this poster will be preliminary descriptive data gleaned from the analysis of nutrition and physical activity self-assessment surveys completed by child care directors, teachers, and parents of children enrolled in child care centers on Maryland's Eastern Shore. Data will include demographic information about the participants, child care center nutrition and physical activity policies, play environment in the centers and home, menu offerings in the centers and home, and interest in nutrition education and training for both child care center staff and parents.

P-HH-S-4

Acceptability and Consumption Trends of Value-Added Meat Products. J. Gager*, C. Atkinson, P. McLean-Meyinsse, A. Howard, and C. Chisley, Department of Human Nutrition and Foods, Southern University Agricultural, Research and Extension Center, Baton Rouge, LA 70813.

Goat meat has been established as lean meat with favorable nutritional qualities. Goat meat's value may be increased through the introduction of more convenient and traditional products on the market. A survey instrument was developed to determine consumption frequency of patties, sausages and hams made from traditional meats; consumption frequency, preparation practices of goat and rabbit meats; and likelihood of purchasing goat products. A consumer panel evaluated formulated goat products for acceptability using a nine-point hedonic scale. ANOVA was used to evaluate difference in parametric variables. Cross-tabulation and chi-square (χ^2) tests were utilized to determine the relationship between consumer's consumption, meat preparation patterns and the likelihood of purchasing goat patties, hams, and sausages against selected demographic variables. Goat sausages received high acceptability scores ($p<0.05$) from consumers 18-30 years and those older than 40. Goat ham was preferred ($p<0.05$) by patrons older than 40 years. The likely purchase of goat sausage, ham and patties was significantly influenced by age and gender. More males (80%) would purchase goat ham than females (74%). More whites (86%) consumed sausage than blacks (79%) and Asians (50%). Consumers who earn <$20,000/year consumed sausages more frequently ($p<0.05$) than those with higher incomes. Consumers (81%) with high school education consumed hamburgers more frequently ($p<0.05$) than those with college and graduate degrees (72%). Traditional meat products formulated from goat meat were highly accepted. Therefore, the potential for increased utilization of goat meat is promising based on the large percentage of respondents that indicated their willingness to purchase these meat products.

P-HH-S-5

Potential Anticancer Activities of Select Medicinal Plants. G. Hacisalihoglu*, Biology Department, Florida A&M University, Tallahassee, FL 32307.

Plants played a significant role in drug discovery and development. Cancer is one of the fastest growing health problem in the U.S. and worldwide; therefore, research into developing more effective cancer drugs becoming increasingly important. Hundreds of medicinal plants are used as traditional medicine to treat diseases. Some of these plant properties may be linked to treatment of diseases such as cancer, a disease that brings suffering to millions of people worldwide. The aim of this study was to identify new plant species with potential anticancer properties. This study evaluated the anticancer effect of select plant extracts on cancer cell lines by methods of ethanol extraction and cell culture. Initially, we have identified the plant species to be investigated in this study. The initial results were promising and proved that plant extracts help to induce apoptosis in carcinoma cells. Furthermore, this study showed that extract of select medicinal plants strongly inhibited cell growth of cancerous cells. Further analysis of the plant extracts is underway and will be presented and discussed.

P-HH-S-6

Impacts of Freezing and Subsequent Thawing on Texture Properties of Goat Sweet Cream Butter. J. H. Lee*, B. Kouakou, R. Drake, and R. Ragan, Agricultural Research Center, Fort Valley State University, Fort Valley, GA 31030.

Although freezing is a suitable procedure to extent shelf life of food products, it is not commonly applied to dairy industries because freezing damages the texture properties. Numerous studies have been focused on the texture properties of frozen dairy products from cow milk, but not from goat milk. The objective of this study was to evaluate impacts of freezing and subsequent thawing on texture properties of goat sweet cream butter (GSCB). Three batches of GSCB were manufactured at the University creamery. Each batch of GSCB was divided into two portions and stored at 4°C for 1 wk. One portion was continuously stored at 4°C. The other portion was stored at –18°C for 24 hr and then subsequently thawed at 4°C. Texture properties of unfrozen or frozen and subsequently thawed GSCB were measured using a TA.XT plus texture analyzer. The texture properties of hardness, adhesiveness, springiness, cohesiveness, and resilience were affected by freezing/subsequent thawing of the GSCB samples. However, neither gumminess nor chewiness was affected by the freezing/subsequent thawing. Hardness (1.57 vs. 0.876 kg) and adhesiveness (73.5 vs. 18.5 g·sec) were significantly decreased by the freezing and subsequent thawing, whereas, freezing and subsequent thawing increased the springiness (0.36 vs. 0.19), cohesiveness (0.09 vs. 0.06), and resilience (0.03 vs. 0.02) of the GSCB. The results imply that freezing and subsequent thawing might provide softer and creamier texture properties to goat sweet cream butter.

P-HH-S-7

Survey of Lactose Intolerance among Students at the University of Arkansas at Pine Bluff (UAPB). M. A. Lihono[1]*, F. E. Stigger[1], and U. Adamu[2], [1]Department of Human Sciences; and [2]Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

Lactose intolerance is the clinical condition caused by the inability to digest lactose in milk and dairy products due to hypolactasia. Hypolactasia or lactase nonpersitence results from the fact that there is low lactase activity in comparison to the amount of lactose ingested. Thus, lactose cannot be digested into monosaccharides resulting in maldigestion. Persons affected by lactose intolerance show symptoms of abdominal bloating, pain, diarrhea, and flatulence. These individuals reduce their intake of milk and dairy products that results in reduced intake of calcium. Approximately 60-80% of African-Americans are affected by lactose intolerance. This preliminary study was conducted at UAPB to identify students who are lactose intolerant for a subsequent clinical lactose intolerance test. Forty-two African-American students completed the survey. Twenty-one percent (9 out of 42) thought that they were lactose intolerant and milk intolerant while only one was clinically diagnosed as being lactose intolerant. While 36% observed gas after drinking milk, only 12% observed a combination of symptoms of diarrhea, bloating, and borborygmi. The frequency of African-Americans thought to be lactose intolerant in this study (21%) is below the 60% average suggested by literature. Thus, it may be that some of the respondents are lactose intolerant without knowing it as 48% of respondents do not tolerate cow's milk and 43% have adopted a low lactose diet. Clinical test of lactose challenge will be conducted to confirm the lactose intolerance survey results.

P-HH-S-8

Antioxidant Activity of Rice Bran Added to Goat Meat Sausages. F. Malekian*, and M. Khachaturyan, Southern University Agricultural Research & Extension Center, Baton Rouge, LA 70813.

A scientific consensus on the relationship between diet and obesity related diseases such as diabetes, heart disease, stroke, and some forms of cancers have emerged. Obesity, a growing problem in the United States, is a major risk factor for cardiovascular disease, which is due to the consumption of the primary red meats, pork and beef. Goat meat has the potential to replace these traditionally consumed meats due to the fact that it is low in fat and saturated fatty acids, but high in unsaturated fatty acids. The unsaturated fatty acids are proven to possess hypocholesteremic properties that improve the health of susceptible population without taking meat products out of their daily diet. Rice bran, a byproduct of the rice milling process, is a naturally rich source of antioxidants, vitamins, and minerals. Rice bran is a good source of Vitamin E, which has antioxidant activity, and can lower cholesterol and prevent cardiovascular diseases. In this study, 0%, 1.5% and 3% of stabilized rice bran was incorporated into the formulation of goat meat sausages. The proximate analysis, fatty acid composition and antioxidant activity of fresh and cooked sausages was determined using AOAC approved and the DPPH radical scavenging methods. For antioxidant activity, the absorption of 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical was measured at 515 nm on UV-Vis Beckman Coulter spectrophotometer and result expressed in terms of micromole equivalents of Trolox (TE) per 100 grams of sample. The results show the effect of cooking on the nutritional content and antioxidant activity of the products.

P-HH-S-9

Chemical Composition, Antioxidant Activity, and Cancer Antiproliferation Effects of Pomace. J. Parry*, J-R. Liu, and H. Li, Virginia State University, Petersburg, VA 23806.

Pomace from Ida Red and Winesap apple varieties and Hanover and Trust tomato varieties were tested for components including total oil, fatty acid profile, individual phenolics, and total phenolic content (TPC). Antioxidant activities were examined using oxygen radical absorbance capacity (ORAC), DPPH•, and ABTS•+ scavenging capacity tests. Cytotoxicity and antiproliferative activities against Caco-2 and HT-29 human colon cancer cell lines were also analyzed. The Ida Red apple pomace contained the highest level of total individual phenolics at 229 μg/g dry weight; however, the Winesap apple had a significantly higher TPC value than the Ida Red indicating that the group of phenolic acids tested may not represent the compounds primarily responsible for the antioxidant activity. Ida Red pomace had the highest ORAC value of 221.8 μmol Trolox equivalents (TE) per g pomace (μmol TE/g) followed by Winesap at 173.8 μmol TE/g. Both Ida Red and Winesap apple pomace extracts had a cytotoxic effect on the HT-29 cells following 24 h, but no cytotoxicity was seen in the Caco-2 cells. However, both apple and tomato pomace extracts showed antiproliferation effects in both cell lines following 72 and 96 h of treatment. These data suggest that apple and tomato pomaces may serve to significantly enhance food products with natural sources of antioxidants, and other possible health beneficial components.

P-HH-S-10

Sensory Quality of Canola (*Brassica napus*) Greens Grown in Huntsville, Alabama. N. A. Sistani*, R. L. Miller-Cebert, E. Cebert, and C. M. Smith, School of Agricultural & Environmental Sciences, Alabama A&M University, Normal, AL 35762.

Three traditional cruciferous vegetables, cabbage (*Brassica oleracea* var. capitata), collard greens (*Brassica oleracea* var. acephala) and kale (*Brassica oleracea* var. viridis), were compared with canola greens through sensory analysis to evaluate panelists' acceptance of canola as a potential source of leafy-green vegetable. Canola cultivars were grown at Alabama A&M University, Winfred Thomas Agricultural Research Station, Hazel Green, Alabama, and harvested at the rosette stage. Traditional vegetables were obtained from a local food store that specializes in organically grown produce. All vegetables were washed and refrigerated overnight. On the day of testing, vegetables were chopped uniformly in preparation for cooking. Using a nine-point hedonic scale, vegetables were rated for color, flavor and texture. Overall preference was rated using most favorite, second favorite and third favorite. Color of prepared canola was preferred significantly over other vegetables. There was no significant difference in preference based on texture among canola, collard greens and kale; however, cabbage was significantly preferred by panelists for texture and flavor. The rating for color and texture indicated significant difference among age groups. The results suggest that canola greens have the appeal of being accepted as an additional tasty *Brassica* vegetable. This research provides the framework for additional studies on a crop that is fast becoming widespread in North America.

P-HH-S-11

Exploring African American College Students' Health Orientations and Behaviors. D. Staten*, and B. Manson, Department of Human Services, South Carolina State University, Orangeburg, SC 29117.

In light of national data highlighting the poor health status of African American young adults, exploring individual-level and institutional-level factors impacting health orientations and behaviors for this population may yield information that increases our understanding on the optimal approaches to reduce the incidence of obesity, raise awareness about health issues, and improve the health of African Americans in South Carolina and throughout the United States. Furthermore, given the dearth of research literature and empirical information regarding the health of African American college students and because this population is central to the advancement of the African American community, the purpose of the study is to examine African American college students' health-related perceptions and behaviors to better understand their current practices and health orientations. Additionally, this study seeks to examine the direct effects of selected precollege factors, institutional characteristics, and college experiences on African American college students' health orientations and behaviors. Given the prevalence of health disparities that plague African Americans, it is important to further our understanding about issues impacting African Americans' health. This presentation seeks to contribute to the research base on this topic by pursuing the following objectives: (a) assessing African American college students' health concerns, preventative strategies, and risk factors; (b) measuring the extent to which health issues impact African American college students' academic orientations and educational outcomes; and (c) assessing African American college students' attitudes regarding health care.

P-HH-S-12

Extension Supervisors and Their Frontline Staff's Observations on Acceptance of Nutrition Education Messages to Prevent Childhood Obesity in Low Income Families in South Carolina. K. Stephenson*, E. Edwards, and R. Idris, Department of Family and Consumer Sciences, South Carolina State University, Orangeburg, SC 29117.

The study investigated observations of extension supervisors and their frontline staff on factors influencing the implementation of nutritional education information and preventing childhood obesity in low income families. The Extension's supervisors and the frontline staff of South Carolina State University in Orangeburg, SC were interviewed. The interviews were scheduled and conducted with each individual by a trained interviewer using a set of pilot-tested questionnaires. The interview responses were later transcribed. The surveys gathered were coded into 32 or more different categories. The survey results showed that the extension supervisor believes that factors such as finances, education, time management, and reaching the parents on their level of understanding are some of the main issues limiting families' abilities to improve eating and physical activity habits of their family. The frontline staff agreed that finance is a major issue. Lack of availability of resources and positive encouragement are added barriers to practicing healthy living information. A few exemplars noted were a) the three-pronged approach to treatment, b) making unhealthy eating 'uncool', c) educating both parents and children, and d) not handing out printed information to children only. Overall, some program practices are quite effective and a few others need a closer look to be more effective in promoting healthy living and in preventing childhood obesity.

P-HH-S-13

Adoption of the Recommended Dietary Guidelines by African-American University Students in the Delta to Prevent Obesity. F. Stigger*, and Y. Abbey, Department of Agriculture, University of Arkansas at Pine Bluff, Pine Bluff, AR 71601.

College often presents new freedoms and new opportunities for students like never before and healthy eating habits and physical activity schedules often fall prey to such. Sixty-nine African American students from the University of Arkansas at Pine Bluff participated in seven focus group sessions discussing the eating habits and physical activity patterns of African American college students. Students were from all four college year classifications and ranged in age from 18 to over 24. Forty-four females and 25 males were asked 32 questions about their knowledge of proper nutrition, as well as what they eat, why they make those choices, where they eat and just how physically active they are and if they are not, why aren't they. The vast majority of participants had some knowledge of the USDA Dietary Guidelines for Americans and/or the Food Guide Pyramid but down played their importance to their health and wellbeing. About half of the participants stated they would be interested in healthy eating classes two or three times a week for duration of 30 to 60 minutes. Some of the desired approaches were hands on activities, and visuals of what unhealthy eating does to the body over a period of time, not just lectures. Prevention of weight gain and maintenance of a healthy weight during the college years could result in a reduction of the increasing number of obese individuals twenty-five and older.

P-HH-S-14

Antimutagenic Effect of Fermented Soy Milk with *Bifidobacterium* Strains. M. Tajkarimi*, S. A. Ibrahim, and D. Song, Department of Family and Consumer Sciences, North Carolina A&T State University, Greensboro, NC 27411.

Soy-based foods containing antimutagenic factors has been reported to have significant impact on lowering the prostate, breast and colon cancer recorded in Asian countries. The objectives of this study were: (1) to determine association between the antimutagenic dose of Fermented Soy Milk (FSM) with bifidobacteria, and (2) to optimize antimutagenic condition for bifidobacterium and soy milk. Fermented soymilk samples with four *Bifidobacterium* strains (*Bifidobacterium adolescent*, *Bifidobacterium breve*, *Bifidobacterium* sp. 9, and *Bifidobacterium* sp. 36) have been tested against the mutagenesis test (Ames) induced by 4-nitro-o-phenylenediamine (4-NOPD). No mutagenic activity has been observed on soymilk and the *Bifidobacterium* strains. Strong association between fermentation and increasing effect on antimutagenesis of the soymilk based on the *Bifidobacterium* strains has been shown. The antimutagenic effect of soymilk samples fermented with the four strains was between 48 to 54%. The antimutagenic result of added *Bifidobacterium* to soymilk and soymilk were 48% and 45%, alternatively. According to the results, consuming a probiotic diet that includes fermented soymilk has a strong potential and association with antimutagenic effects of soymilk.

P-HH-S-15

Anticancer Effects of Phytochemical Extracts from Sorrel Calyx. M. Verghese*, R. Sunkara**,** S. Ogutu, J. Boateng, L. T. Walker, L. Shackelford, and E. Cebert, Nutritional Biochemistry, Department of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Sorrel *(Hibiscus sabdariffa L.)* calyx is consumed as fresh juice, concentrate, and sauces. Little information is available on phytochemical content and anticancer properties. To explore such benefits, dried sorrel calyx was extracted and phytochemical content (total flavanoids, phenolics and anthocyanins) were determined. Caco-2 cells was cultured and incubated with extracts for 24 and 48 hrs at various (0-40 mg/ml) concentrations. Induction of cytotoxicity (LDH release), apoptosis (Caspase-3 activity, DNA fragmentation and morphological changes) was analyzed. Extracts contained 152.28 ± 1.42 mg CE/100g of total flavonoids, 858.12 ± 16.95 mg GAE/ 100g of phenolics, and 117.22±5.11 mg/ 100g anthocyanins. After 24 and 48 hr incubation, a greater percentage of LDH was released from cells treated with 40 mg/ml of dried sorrel calyx extract. No differences in LDH release were observed with 30 mg/ml for 24 (32.88%) and 48h (33.29%). An increase (84.52%) in LDH release was observed with 40 mg/ml of sorrel extract for 48 h. Enrichment factor (ER) for quantitative DNA fragmentation was increased with longer incubation time and higher concentrations (30 and 40 mg/ml) of sorrel extract. Caspase-3 activity increased by 4 fold in cells treated with sorrel extracts at 40mg/ml compared to other doses (<2.10 fold). Extracts induced nucleosomal DNA fragmentation in a dose-dependent manner after 24 h incubation. Cells treated with dry sorrell at 20 mg/ml showed membrane destabilization and signs of blebbing. Results suggest a protective role of sorrel calyx against colon cancer by induction of apoptosis and has application in formulating value added health foods.

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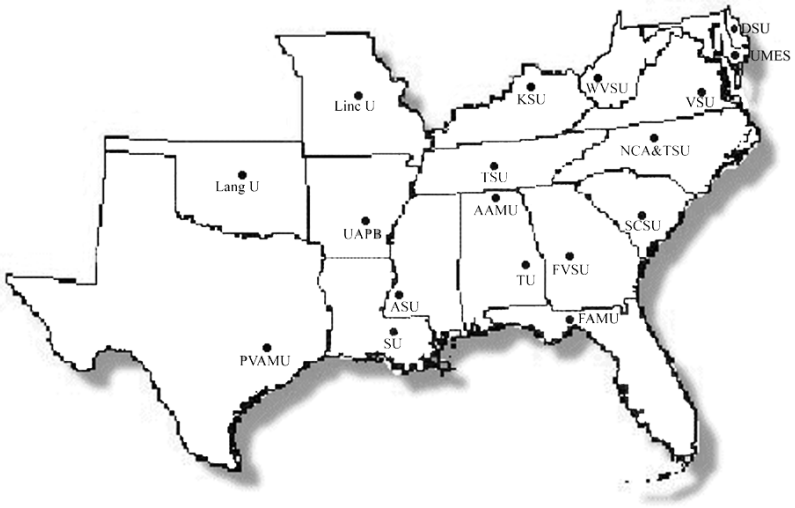

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