Researchers at Virginia State University have identified a potential alternative pollinator for Virginia's orchards. The blue orchard bee is a Virginia native that emerges just prior to apple tree bloom. These bees show promise in providing a pollination option beyond the European honey bee, upon which orchards have relied heavily and which is under threat.

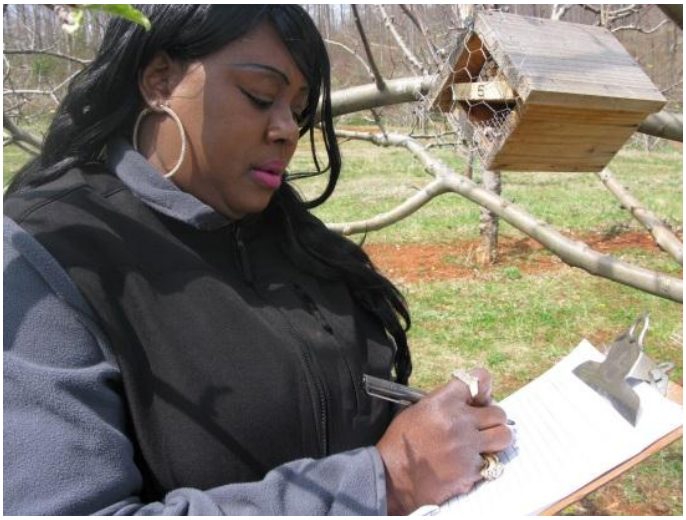
Development of a native bee for orchard pollination

Who cares and why?

Pollination is required for a third of the nation's food supply, but overreliance on a single pollinator, the European honey bee, puts many crops at risk, as honey bees have many threats including parasites, predators, diseases, and disorders. An estimated $10 billion of the United States' food production is affected by crop pollination, and $35 million of that is from Virginia apple crops, alone. For greater diversity and food security, our country needs to identify early-emerging native bee species that can be managed for spring fruit pollination.

What has the project done so far?

Scientists at Virginia State University have studied a native bee, *Osmia lignaria* Say, commonly known as the blue orchard bee, which emerges in early spring in synchrony with the Eastern redbud tree. This bee nests in beetle holes and other cavities, which allows for easy management and population increase through the provision of artificial shelters. Over several years, scientists evaluated five Virginia and North Carolina orchards containing mostly apple but also peach, plum, apricot and cherry trees. Bee nesting was greatest during apple-bloom periods, and the bees preferred to construct nests in forested areas adjacent to orchards rather than within them. The majority of the pollen sampled from nest cells was from orchard trees except when the Eastern redbud tree, *Cerci Canadensis* L., was blooming nearby. Proximity of Eastern redbuds near orchards could reduce orchard pollination by this bee, but the tree may be used to produce commercial bee populations for release into orchards.



Scientists only found two significant parasites of these bees: pollen mites and an emerald green wasp, *Chrysura kyrae*. Mites were controlled by using protective cardboard tubes for nests and providing new nesting holes annually.

Because this bee is commonly found throughout temperate areas of the Eastern U.S., local populations could be developed and adapted to regional climates. Use of the blue orchard bee would reduce reliance on the honey bee, enhance pollinator diversity, and allow smaller orchards to be more self-sufficient.

Impact Statements

- **Identified the blue orchard bee as a potential new pollinator for Virginia orchards**
- **Increased understanding of the biology of the blue orchard bee, including nesting behavior, emergence dates, pollen preference, and potential pests**
- **Established blue orchard bee populations within and near orchards and showed population increases of up to several-fold per year**
- **Identified Eastern redbud tree as the preferred forage for the blue orchard bee; therefore, limiting the presence of this tree near orchards will increase pollination activity within orchards by eliminating competing forage opportunities**
- **Determined two parasitic threats to blue orchard bee populations and recommended control methods for the parasites**

Strategic Priority: This project addresses the NIFA research priority Plant Management Systems (205).

What research is needed?

To help retain bee populations, we need to better understand why bees choose a nest location. It is especially important to understand this in orchards that are near areas offering competing nesting holes in old trees, such as forests. We also need to better understand how to control the parasitoid wasp, perhaps through using larger colonies where more bees are present to protect nests.

Want to know more?

Dr. M.E. Kraemer
Virginia State University
mkraemer@vsu.edu, (804) 524-5952

Strategic Priority: Plant Health/Products/Production

Additional Links: http://www.umes.edu/ard/Default.aspx?id=46285

Year and Institution: 2014, Virginia State University

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