

Sniffing out overwintering stink bugs

March 19 2015, by Sharon Durham



USDA-APHIS detector dog named “Tig.” In 2013, ARS scientists used detector dogs, like Tig, to find stink bugs with their sense of smell. The dogs were helpful in finding locations where stink bugs overwinter. Credit: Doo-Hyung Lee

Since their first official detection in the United States in 2001, brown marmorated stink bugs have been eating our crops and invading our homes and businesses. Most stink bugs, however, seek shelter outdoors in order to survive the cold winter months.

Agricultural Research Service entomologist Tracy Leskey and her team at the Appalachian Fruit Research Station in Kearneysville, West Virginia, surveyed forests in Maryland and West Virginia to find out where stink bugs are hiding. They found that stink bugs like to overwinter in large, dry, dead trees that have a circumference of more than 23 inches.

"Oak and locust trees seem to be favorite stink bug overwintering sites," Leskey says. "The porous dead tissue and peeling bark make a great place for the bugs to crawl into and hide. The survey found stink bugs in 33 percent of the trees that fit those parameters."

The 2013 survey team included two detector dogs. The dogs were first trained to recognize the odor of adult stink bugs. Then, in indoor trials, they were guided by their handlers to find bugs hidden in cardboard boxes. Next, the dogs were trained in the field, where bugs were hidden beneath pieces of bark attached to living trees. In both indoor and outdoor trials, the dogs accurately detected target insects with greater than 84 percent accuracy. Next, the dogs were taken to woodland areas along the Appalachian Trail in Maryland. In these real-world conditions, the detector dogs were also able to find wild overwintering stink bugs.



USDA-APHIS training specialist Jennifer Anderson and detector dog “Opal” successfully found overwintering stink bugs in a dead, standing tree in a wooded area. Credit: Doo-Hyung Lee

As part of a project known as the "Great Stink Bug Count," citizens from the Mid-Atlantic, Midwest, and Pacific Northwest regions of the United States recorded daily counts of stink bugs, along with their locations on residences and the time of each tally.

In the first year's results from the Great Stink Bug Count, five types of locales were noted: mixed agriculture and woodland, agriculture, woodland, suburban, and urban. "Landscape type seemed to have the greatest influence on overall stink bug numbers arriving at specific homes," says Leskey. "We found that homes located in mixed

agriculture and woodland sites had the greatest number of stink bugs. On average, these homeowners counted over 3,000 stink bugs. This was followed closely by agriculture and woodland locations." Suburban and urban dwellers counted fewer stink bugs.

In addition to landscape, home color plays a part in where stink bugs roam. "The greatest numbers of stink bugs were reported on homes with darker colors, particularly brown and green," says Leskey. "Fewer bugs were reported on white and yellow homes. However, this was not always the case, and other factors likely had an influence on total [stink bug](#) populations arriving at particular homes."



ARS scientists found these brown marmorated stink bug adults beneath the bark of a dead standing tree. Trees like this one provide cool, tight, dry, and protected

locations for the bugs to spend the winter. Credit: Doo-Hyung Lee

Leskey notes that a home's exterior material matters, too. "Homes with wooden exteriors had the greatest number of stink bugs. Those with cement and stone also had high counts," says Leskey. "On average, lower counts were observed on homes with other materials, but again, this was not always the case. The variation we observed was likely influenced by other factors."

The Great Stink Bug Count was conducted again in 2014 to learn more about this variation. Many homeowners participated for a second year.

"Knowing where brown marmorated stink bugs overwinter is essential to future sustainable mitigation strategies, including integrated pest management programs," says Leskey. "Field surveys of highly dispersed and concealed overwintering stink bugs can be facilitated by the use of detector dogs. Such use should improve the accuracy and efficacy of sampling efforts."



A detector-dog team searches for brown marmorated stink bugs in a wooded landscape. USDA-APHIS training specialists Jennifer Anderson (left) with “Opal” and Jodi Daugherty with “Tig” search for their targets. Credit: Doo-Hyung Lee

Provided by Agricultural Research Service

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