

Brown Marmorated Stink Bug

Biology, Ecology, and Management in Specialty Crops



Mobilizing against an invader

The brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål), was accidentally imported from Asia to North America in the late 1990s. The pest caused severe damage to mid-Atlantic sweet corn, pepper, tomato, apple, and peach crops in 2010, and it continued to present season-long pressure and significant problems in 2011. With funding from USDA's Specialty Crop Research Initiative, a team of 51 researchers is collaborating to understand the biology and phenology of BMSB and is using new knowledge to develop monitoring and management tools such as traps and lures, biopesticides, and natural enemies.



"Corking" damage to fruit seems minor just after feeding but it becomes more visible over time. Photo by T. Leskey

Protecting crops—a team approach

A voracious eater with a huge host range, BMSB feeds on over 300 species, including tree fruit, small fruit, vegetables, row crops, ornamentals, and woodland trees. The value of susceptible crops in the states where BMSB has been detected exceeds \$21 billion. Because of the magnitude of this threat to crops, the project includes five cross-institutional commodity teams that are developing sustainable solutions specific to orchard crops, small fruit, grapes, ornamentals, and vegetables.



First instars are more brightly colored than BMSB adults, with red and black markings. Inset photo by D. Matadha

Identifying the culprit

Like other stink bugs, BMSB has a shield-shaped body. Adults are about 17 mm long and have a mottled brownish-grey color. Unlike other stink bugs, BMSB has a white band on its antennae and darker bands on abdominal segments that protrude from beneath its wings. Its underside is white, sometimes with grey or black markings, and its legs are brown with faint white banding. BMSB has five nymphal stages ranging from 2.4 mm to 12 mm in length. Its light green eggs are often laid on the underside of leaves, deposited in masses of approximately 28 eggs.



Black pyramid traps are used in conjunction with testing of BMSB attractant, odor #10. Photo by B. Butler

Luring and trapping—the search for a winning pheromone

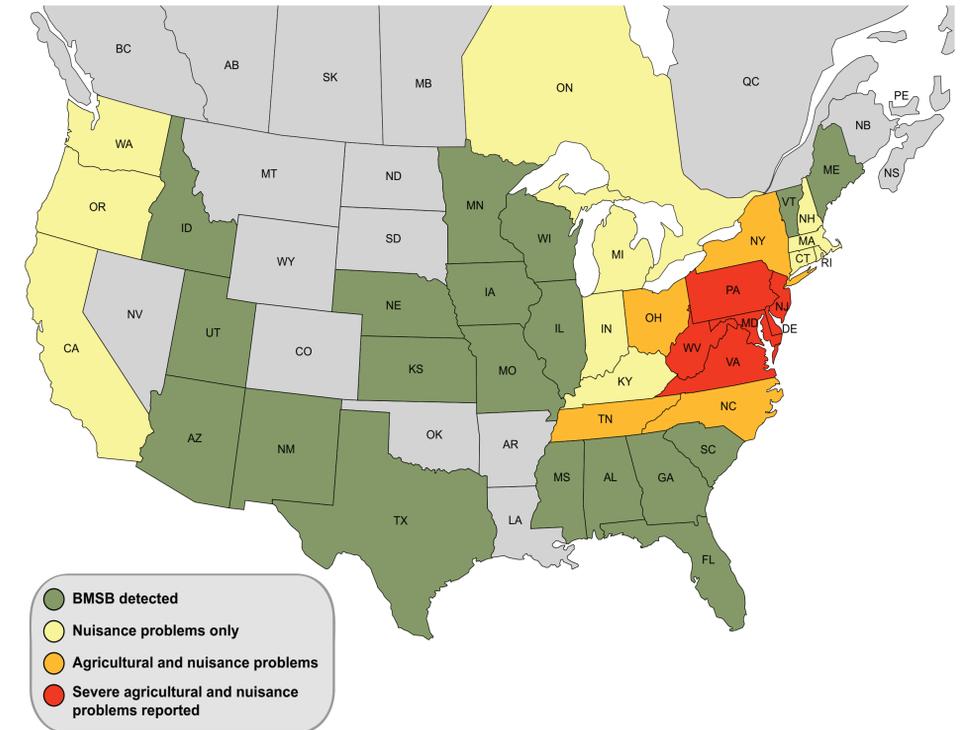
Guided by integrated pest management (IPM) principles, project researchers are monitoring the presence, abundance, and seasonal activity of BMSB to assess when and where control measures may be needed. But BMSB is an elusive pest, not easily lured into traps even when significant populations seem to be present. In 2011, project leaders hit upon an odor that might reliably lure the insects into traps throughout the growing season. In 2012, researchers are conducting early season trials of "odor #10" in nine states to confirm whether this is the true pheromone and an effective attractant for BMSB. If so, commercial forms will follow.



Trissolcus, a tiny wasp from Asia, feeds on BMSB egg masses. Photo by K. Hoelmer

Seeking natural enemies for long-term management

In the short term, aggressive spraying has been used to keep BMSB in check on farms, but this approach threatens beneficial insects and undermines IPM programs that growers have worked hard to establish and maintain. Researchers are studying parasites or predators that could provide landscape-scale control of BMSB in the future. Parasitoids—like a tiny wasp from Asia that feeds on BMSB egg masses (left)—are being considered for potential release in the United States, once USDA's Animal and Plant Health Inspection Service is convinced the imported species will not threaten other insects, like beneficial stink bugs.



About the Project

PROJECT DIRECTOR

Tracy Leskey (Tracy.Leskey@ars.usda.gov), USDA-ARS Appalachian Fruit Research Station, Kearneysville, WV

CO-PROJECT DIRECTORS

- Art Agnello (Cornell Univ., Geneva, NY)
- Chris Bergh (Virginia Polytechnic Institute and State Univ., Winchester, VA)
- Jay Brunner (Washington State Univ., Wenatchee, WA)
- George Hamilton (Rutgers Univ., New Brunswick, NJ)
- Jay Harper (Pennsylvania State Univ., University Park, PA)
- Cerruti Hooks (Univ. of Maryland, College Park, MD)
- Carrie Koplinka-Loehr (Cornell Univ., Ithaca, NY)
- Grzegorz Krawczyk (Pennsylvania State Univ., University Park, PA)
- Peter Shearer (Oregon State Univ., Hood River, OR)
- Jim Walgenbach (North Carolina State Univ., Mills River, NC)
- Joanne Whalen (Univ. of Delaware, Newark, DE)

To learn more about this project and find links to BMSB information, visit



This project was established through the efforts of the Brown Marmorated Stink Bug IPM Working Group, which has been coordinating research and outreach efforts for BMSB since 2010 with funding from the Northeastern IPM Center.

Funding



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Specialty Crop Research Initiative
Grant #2011-01413-30937

Collaborating Institutions



Cornell University

