

Stink Bugs & IPM in Pest Control

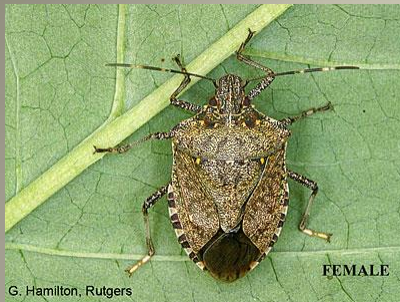
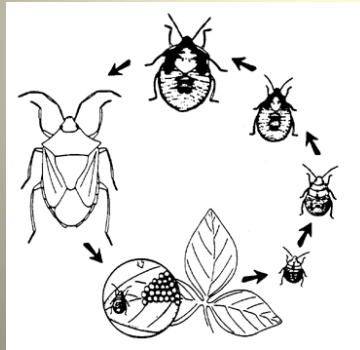
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Background

- The brown marmorated stink bugs (BMSB) was first detected in 1996 in Allentown, Pennsylvania.
 - It was later found in New Jersey, Maryland and Delaware, and in 2004 it was found in Virginia, and in Tennessee in 2008.
 - It is currently found in 39 states.
- In its native China, there are 2-6 generations. It appears that there are two in our area.
- BMSB has a host range of about 300 species of plants and trees. Both nymphs and adults cause feeding injury in plants and fruits.
- Adults overwinter in protected places, often invading houses in large numbers. This is another aspect of its pest status, becoming a severe nuisance.

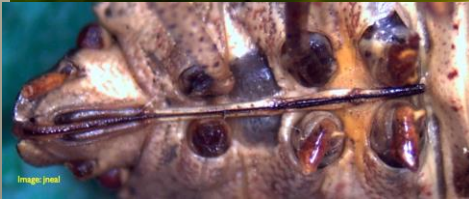
Life Cycle

- The female lays barrel-shaped eggs in masses of 25-30, on the undersides of leaves. Nymphs emerge 4-5 days after eggs are laid. Each instar lasts about one week.
- Adults fly, and become sexually mature about two weeks after their final molt. She can lay as many as 400 eggs in a season.



Crop Damage

- They are responsible for causing major economic damage to fruit and vegetable crops at a number of orchards and farms.



Crop Damage



Crop Damage

- Feed on all kinds of fruits and vegetables including soybeans, corn and even pecans.
- Brown stink bugs are causing millions of dollars in crop damage, with the apple industry being hit the hardest.
- Growers in the mid-Atlantic region have reported the worst problems with about 18% of the crop ruined.
- In 2011, the industry has reported \$37million in damage to apple growers in Maryland, Pennsylvania, Virginia and West Virginia.

Invaders

- When the weather turns cool at night, adult BMSB look for overwintering sites and can be found:
 - on the outsides of buildings
 - inside near doors, windowsills, and other entry points.
 - They can also be found in leaf litter and vegetation outdoors.
- Once inside, they congregate almost anywhere.
 - These pests will not cause structural damage or reproduce in homes. They do not bite people or pets.
- These stink bugs are highly attracted to artificial lights in September.



Control

- The BMSB is very tolerant of pyrethroids, need to use a more expensive insecticide with a different mode of action.
- The use of insecticides has very short-lived effect. Even where insecticide is effective, repopulation occurs through migration from non-treated areas.
- On-farm insecticide use is not ideal due to disruption of integrated pest management programs.
- Pheromone traps are being studied to be used in control efforts.

Control and Exclusion

- **Chemical control:** Pyrethroids have limited effectiveness on the control of BMSB, these pesticides may fail to control immigrating stink bugs after a few days.
- Some neonicotinoids, such as dinotefuran are also effective in the short term.
 - The mode of action of neonicotinoids is similar to the natural insecticide nicotine. In insects, neonicotinoids cause paralysis which leads to death, often within a few hours.
 - Neonicotinoids act on the nervous system of insects with very low toxicity to mammals and minimal environmental impact and therefore, considered a reduced-risk pesticide.
- Venom and Scorpion are the two approved commercial products of dinotefuran.
- Best to treat wooded area around fields rather than treating the whole field.

Control and Exclusion

- **Biological Control** - There are natural enemies that attack native stink bugs, but many of these have limited success attacking BMSB.
- A scelionid wasp native to China has been reported to have high parasitization rates, and is now in quarantine for research in the US.

Control and Exclusion

- **Physical Control:** Adult brown marmorated stink bugs can enter homes through cracks and crevices.
- A few simple tips to help keep them from entering homes are:
 - Caulk windows inside and out.
 - Weather strip entry doors
 - Rake away all debris and edible vegetation from your home's foundation to keep from attracting pests.
 - Inspect for and seal foundation cracks
 - Secure crawl space entries.
 - If your home has a fireplace, cap or screen the top of the chimney
 - Both live and dead BMSB can be removed from interior areas with the aid of a vacuum cleaner

IPM Techniques

IPM

- Integrated Pest Management (IPM)
 - An effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices.
- IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment.
- This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.

IPM

- IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls.
- In practicing IPM, follow a four-tiered approach. The four steps include:
 - Set Action Thresholds
 - Monitor and Identify Pests
 - Prevention
 - Control

Techniques

- Set Action Thresholds
 - Before taking any pest control action, IPM first sets an action threshold, a point at which pest populations or environmental conditions indicate that pest control action must be taken.
 - Sighting a single pest does not always mean control is needed. The level at which pests will either become an economic threat is critical to guide future pest control decisions.

Techniques

- Monitor and Identify Pests
 - Not all insects require control. Many organisms are innocuous, and some are even beneficial.
 - IPM programs work to monitor for pests and identify them accurately, so that appropriate control decisions can be made in conjunction with action thresholds.
 - This monitoring and identification removes the possibility that pesticides will be used when they are not really needed or that the wrong kind of pesticide will be used.

Techniques

- Prevention or Source Reduction
 - As a first line of pest control, IPM programs work to manage the crop, lawn, or indoor space to prevent pests from becoming a threat.
 - These control methods can be very effective and cost-efficient and present little to no risk to people or the environment.

Techniques

- Control
 - Once monitoring, identification, and action thresholds indicate that pest control is required
 - Evaluate the proper control method both for effectiveness and risk.
 - Effective, less risky pest controls are chosen first
 - Highly targeted chemicals, such as pheromones to disrupt pest mating, or mechanical control, such as trapping or weeding.
 - If further monitoring indicate that less risky controls are not working, then additional pest control methods would be employed
 - such as targeted spraying of pesticides. Broadcast spraying of non-specific pesticides is a last resort.

Example

- IPM in mosquito control consists of:
 - Public Education
 - Source Reduction
 - Trapping and Surveillance
 - Larviciding
 - Adulticiding

Public Outreach

- Set up booths at various events
- Educate citizens in neighborhoods
 - Dump standing water around yard to reduce “tiger mosquitoes.



Trapping & Surveillance

- Helps in monitoring mosquito populations and types of mosquitoes present in an area.
- Helps identify possible disease carrying mosquitoes.
- Allows us to manage our control and treatment efforts better.
- Serves as a tool to see if our control efforts are working.



Larviciding

- The use of biological or chemical control to eliminate mosquito larvae and pupae.
- We use Bti and BspH, biological products
 - Specific to mosquitoes, some flies and midges



Adult Control

- Adulticides are typically applied as an Ultra-Low-Volume (ULV) spray where small amounts of insecticide are dispersed by truck-mounted equipment.
- Last option of control for most programs.



Questions?

Thank you