Managing Brown Marmorated Stink Bug in and Around Homes

Kadie Britt, Graduate Student; Chelsea Standish, Graduate Student;
Jerome Grant, Professor; and Karen Vail, Professor
Department of Entomology and Plant Pathology

The brown marmorated stink bug (BMSB), *Halyomorpha halys*, is a true bug in the order Hemiptera. An invasive species from Asia, BMSB was first identified in the United States from Allentown, Pennsylvania in 1998, but experts suspect it was present since 1996. It was later documented in Knox County, Tennessee, on October 30, 2008, and is now well established in Tennessee. The known distribution of BMSB in Tennessee is shown in Figure 1, but it is likely more widely distributed at low population levels across the state. A severe agricultural pest, BMSB is capable of damaging some of Tennessee's important crops, such as tomatoes, okra, beans, peppers, soybeans, sweet corn and, most notoriously, apples and peaches. BMSB's agricultural pest status varies throughout the country (Figure 2). In addition to fruit trees and vegetables, BMSB may damage many common ornamental plants.

The brown marmorated stink bug is also a common urban pest, often a a nuisance to homeowners in the fall while seeking protected locations for overwintering. This publication focuses on managing BMSB to prevent home invasions. Recommendations for BMSB management on plants can be found in the UT Extension publication PB1690 Insect and Plant Disease Control Manual.

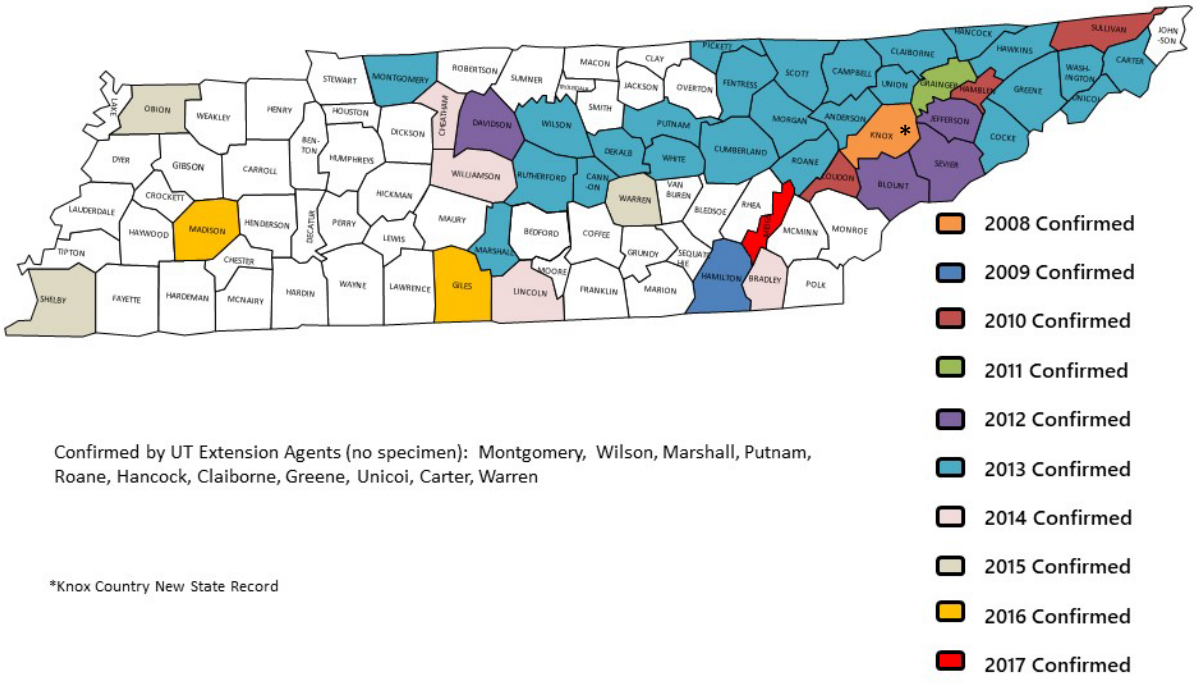

Figure 1. Brown marmorated stink bug distribution from 2008-2017 in Tennessee. Map courtesy of Scott Stewart, University of Tennessee.

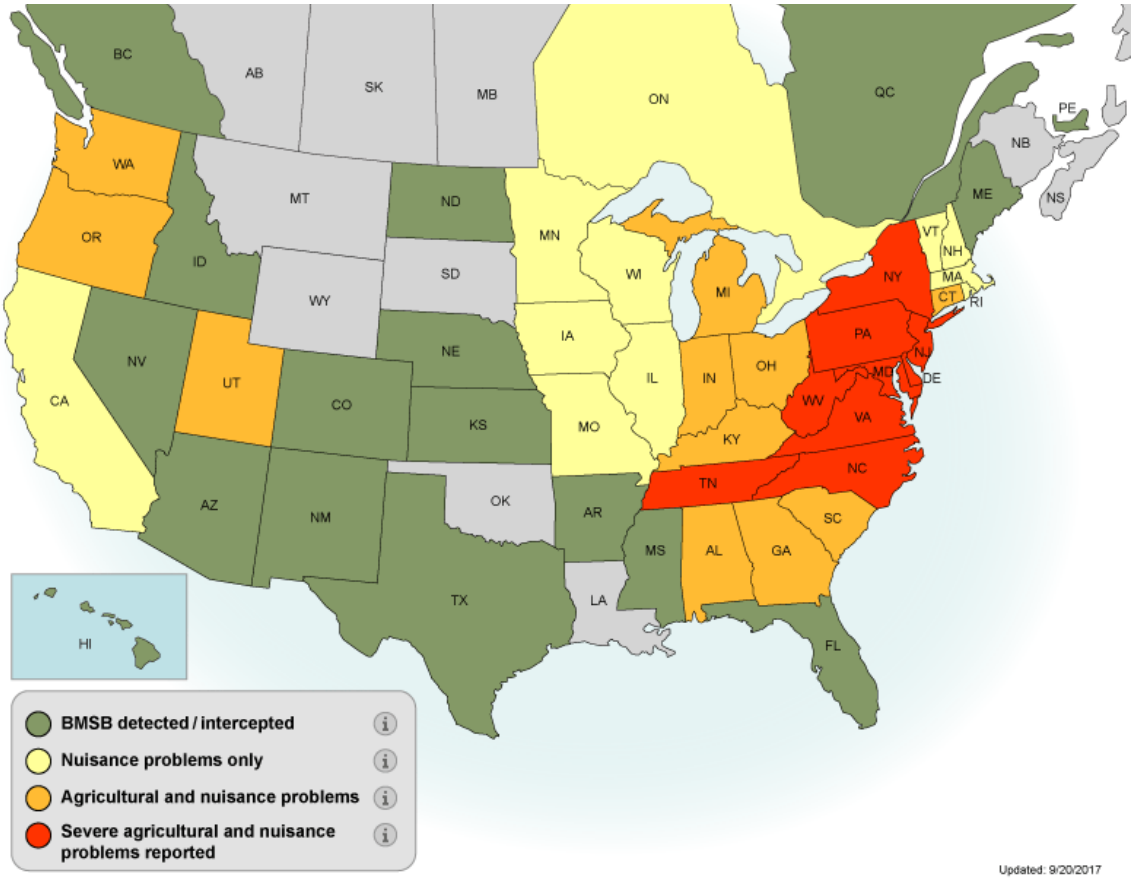

Figure 2. Distribution map showing current distribution of brown marmorated stink bug and its agricultural and nuisance pest status. Map courtesy of U.S. Department of Agriculture.

Description

Adult BMSB are approximately 1 inch long and about ¾ inch wide. BMSB and all other stink bugs belong to the insect family Pentatomidae. When disturbed, brown marmorated stink bugs emit a pungent, cilantro-like odor produced from a gland located between the first and second pair of legs and the upper surface of the abdomen.

Adults have a mottled coloration containing various shades of brown or light pink/purple and are distinguishable from other stink bugs (particularly the native brown stink bug, dusky stink bug and spined soldier bug) by alternating white bands on the last two antennal segments as well as alternating dark and light bands along the edge of the abdomen (Figure 3).

Alternating dark and light bands are also commonly found on the nymph's legs. There are five nymphal stages (instars) of BMSB. First instars are orange and black in coloration and aggregate around the egg mass after hatching (Figure 4). Second through fifth instars are dark brown with some beige and purple coloration; the appearance remains the same, but size increases as bugs develop and molt through these instars (Figure 5). BMSB eggs are laid on a variety of surfaces and are commonly found on the underside of leaves. The number of eggs laid per mass can vary, but the average number of eggs per mass is 28. BMSB in our area typically have two generations per year. At the end of the second generation, adults overwinter in protected areas including homes and other structures and subsequently begin the life cycle again the following spring.

Figure 3. Brown marmorated stink bug with distinguishable characteristics: alternating white and dark bands on antennae and abdomen. Photo courtesy of Frank Hale, University of Tennessee.

Figure 4. First instars aggregated around the egg mass. Photo courtesy of Gary Bernon, USDA APHIS, bugwood.org.

Damage

The invasion of homes and structures by adults causes no structural damage. Limited evidence indicates that people with allergic reactions to cockroaches and lady bugs may have similar reactions to BMSB due to an airborne allergen that it emits. Dermatitis may be caused if the insect is crushed against exposed skin. However, this condition is primarily an issue for

Figure 5a. Spiny third instar. Photo courtesy of Susan Ellis, bugwood.org.

Figure 5b. Fourth instar. Photo courtesy of Scott Stewart, University of Tennessee.

Figure 5c. Nearly mature fifth instar brown marmorated stink bug. Photo courtesy of Scott Stewart, University of Tennessee.

individuals who work in crops where BMSB is present. For most Tennesseans, BMSB are primarily unwanted nuisance pests in the home due to their large numbers and the unpleasant odor released when disturbed.

When feeding on plants, BMSB use their straw-like, piercing mouthpart to feed on fruit, stem, leaf and other plant tissue. They do not have chewing mouthparts, thus they do NOT bite people, chew holes in plant leaves, or cause defoliation.

Prevention

The first step in preventing brown marmorated stink bug from becoming a nuisance in the home is to monitor its presence, especially in September-October when temperatures begin to decrease. Even if BMSB is not found in or around the exterior of the home, it could still become a problem later when temperatures decrease even more. Once an individual bug is found, proper identification is key as various insects may also be found in or around the home. Your local Extension agent can help confirm the bug's identification.

One way to prevent BMSB and other occasional insect invaders from entering the home is to use exclusion or pest-proofing techniques to seal any cracks and openings leading into the home. Pests can easily be excluded by using tight-fitting doors, windows and properly sealed walls. These techniques may involve adding door sweeps; installing weather stripping to doors, windows and the edges or tracks of sliding glass doors; caulking openings in window frames; and repairing holes in window screens or adding window screens. If you are unsure whether a door fits tightly, observe the door from outside when it is dark and an interior light is on. If light is seen around the edges of the door, then you do not have a good seal. Seal holes in outside walls, eaves and other external surfaces. Screen vent openings in foundation walls and attics. Pest proofing should be conducted after insects leave the home in the spring and before they re-enter in the fall.

Many of the trees attractive to BMSB are considered volunteers (not intentionally planted). These include tree-of-heaven, princess tree, mimosa and boxelder that tend to grow along fence lines. Removing volunteer trees may reduce the number of BMSB in the near proximity of your residence and thus reduce the risk of home invasion. Because this pest can feed on many other hosts, it is unlikely that tree removal will eliminate BMSB in the area. In addition, neighborhoods containing a higher concentration of homes may see less invading BMSB per home due to the number of overwintering possibilities. Lights around the home also can attract BMSB. Yellow bug lights or sodium vapor lights close to the home are less attractive to insects. Mercury vapor or incandescent lights placed away from the home may make the structure less attractive at night.

Management

If BMSB is found on inside or outside walls in large numbers, removal can be accomplished by using a collection device that takes advantage of their natural behavior. The top of a capless plastic soda bottle can be removed at the widest part of the neck, inverted, and placed back on the bottle to create a funnel trap (Figure 6). Always be careful when using sharp knives or other tools. When the edge of the modified bottle is moved up the wall toward a BMSB aggregation, bugs will reflexively tuck their legs and drop into the trap. Soda bottles can be sealed in a plastic bag and placed in the freezer for a few days or bugs can be tapped out of the bottle into soapy water. Frozen or drowned bugs can be disposed of outdoors in a garbage can or compost pile. Bugs found in the home can also be collected, sealed in a plastic bag, and the bag disposed of in an outside garbage can. Flushing

BMSB down the toilet will waste water and is not recommended.

Figure 6. Assembled bottle funnel trap. When the edge of a bottle funnel trap is moved up a wall towards a BMSB aggregation, the bugs will drop into the trap. Photo courtesy of Karen Vail, University of Tennessee.

The use of a vacuum cleaner is an effective way to remove large numbers of BMSB but may cause the release of a foul odor. By placing a knee-high stocking inside the vacuum tube and folding the elastic over the end of the attachment, BMSB can be collected and also prevented from getting into the vacuum reservoir (Figure 7). After the pests have been vacuumed, the stocking is removed, tied off, placed in a sealable plastic bag, and disposed of in an outdoor trash can.

Descriptions of various homemade light traps can be found online. One created by Virginia Tech researchers involves placing a desk lamp over a pan of soapy water in a darkened room. While this technique may trap and kill BMSB, users should be cautioned about the safety risk of using an electrical source near water. A battery-powered LED light placed in the bottom of the soda bottle funnel trap described above attracts BMSB down the inverted top where the bugs are trapped. LED lights are less attractive to BMSB than other lights, but may provide some relief in this situation. Light traps work best in darkened rooms or attics and should be effective in the late winter or spring when BMSB are seeking a mate and the outdoors. When temperatures begin to decrease and BMSB invade homes in fall, insects are seeking safe overwintering sites and are attracted to darker areas. During this period, the best method of eliminating infestations is to vacuum insects into a knee-high stocking as described previously.

Figure 7. Placing a knee-high stocking in a vacuum for easy and effective elimination of brown marmorated stink bug in the home. Photo courtesy of Karen Vail, University of Tennessee.

Insecticides can supplement pest-proofing techniques. Professionally applied insecticides to cracks, crevices and entry points on the outside of your home should be completed before mid-September when bugs start to search for overwintering sites. Insecticides suggested by UT Extension for outdoor application to entry points can be found in PB 1303 and W 658 at extension.tennessee.edu/publications/Documents/PB1690.pdf. Indoor application of insecticides is not recommended due to other home pests, such as carpet beetles, that might be attracted to dead BMSB.

References

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UT Extension: PB1690 Insect and Plant Disease Control Manual https://extension.tennessee.edu/publications/Documents/PB1690.pdf

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