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Brown Marmorated Stink Bug

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The brown marmorated stink bug, *Halyomorpha halys*, is a plant pest that was recently introduced into the United States from its native range in Japan, Korea, and China. The word marmorated refers to its marble-like coloration. Sometimes called the yellow-brown stink bug or the East Asian stink bug, it was first reported in the United States in 2001 from Allentown, Pennsylvania. It has since spread to New Jersey, Maryland, Delaware, Virginia, West Virginia, the District of Columbia, New York, and as far west as Pittsburgh. Specimens have also been found in Massachusetts and Ohio, but existence of breeding populations in those two states is uncertain as of December 2007. Established populations also exist in Oregon and California, possibly due to hitchhiking via human commerce from the mid-Atlantic region, or from separate introductions. The brown marmorated stink bug feeds on fruits and seed pods of a wide range of plants. It is also a nuisance pest that invades buildings in the autumn.

Host Plants

Reported hosts of the brown marmorated stink bug in the United States include the following.

- Fruit crops: peach, Asian pear, pear, apple, cherry, raspberry, grape, currant.
- Agronomic crops: soybean, corn.
- Vegetable crops: green bean, asparagus, pepper.
- Ornamental trees: paulownia (empress tree), crabapple, persimmon, catalpa, walnut, maple, basswood, sweet gum, redbud, American holly.
- Ornamental shrubs: butterfly-bush, serviceberry (shadbush), pyracantha, viburnum, rose, honeysuckle.

In its native range in Asia, additional hosts of the brown marmorated stink bug are pea, apricot, fig, mulberry, hibiscus, as well as some weeds such as burdock.

Damage and Economic Importance

The first reports of damage by the brown marmorated stink bug in Pennsylvania were on ornamental plants such as butterfly-bush and paulownia (empress tree), and on backyard peach and pear trees. Beginning in 2006, commercial fruit growers reported damage in apple and pear orchards in eastern Pennsylvania and western New Jersey. In Pennsylvania, this pest is also found in high populations in soybeans. Based upon its known habits, it is likely to invade agricultural areas and will pose a risk to other crops as it continues to expand its geographic range.



Figure 1. Adults of the brown marmorated stink bug on a peach fruit (photo by G. Bernon).



Figure 2. Top side of an adult brown marmorated stink bug (photo by D. Shetlar).



Figure 3. Underside of an adult brown marmorated stink bug (photo by D. Shetlar).

The brown marmorated stink bug is highly mobile and can switch hosts, moving from plants with early-ripening fruits to those with late-ripening fruits. Because it has a broad host range, almost any crop that has fruit is at risk of attack. Like other true bugs, the brown marmorated stink bug feeds by sucking on plant juices with its beak, which is made of straw-like mouthparts. Its damage can range from mild to severe.

On beans, damage is found on the immature seeds within the pods. On fruit crops, its feeding causes small necrotic spots. If fruit is damaged early in the season, the result is cat-facing, which is grooves or distorted brown lines on the fruit surface. Fruits damaged in late summer can have lesions that look like water soaked spots on the surface or beneath the skin (Figure 1). Damage on fruit can be compounded by secondary infections and scarring as the fruit matures.

In apples, stink bug damage is commonly confused with the physiological disorder cork spot. Stink bug damage can be distinguished by a pithy area underneath the skin that is white to brown, contiguous with the fruit skin, and cone-shaped.

Leaf feeding is characterized by light-colored stippling or crows-foot shaped lesions about 3 mm (1/8 inch) in diameter. The lesions sometimes coalesce and turn brown over time.

Its additional status as a nuisance pest makes the brown marmorated stink bug different than other plant-feeding stink bug species. The adults enter homes and other buildings in the autumn when seeking sheltered sites to spend the winter. The bugs are harmless, but they can become a nuisance when they congregate in large numbers outside

and inside buildings. In extreme cases, hundreds can invade a home. They enter buildings through any small opening, mostly around windows. When disturbed, the bugs produce a characteristic pungent acrid odor that many humans find offensive. They do not bite humans or pets.

Appearance

Adults of the brown marmorated stink bug have the typical shield-shape of stink bugs. They are approximately 15 mm (5/8 inch) long and 8 mm (3/8 inch) wide. The upper side of the body is mottled shades of brown and gray, and is covered with dense puncture marks (Figure 2). The underside of the body is white, sometimes with grey or black markings (Figure 3). They have dark red eyes. The legs are brown with faint white banding.

The adults of the brown marmorated stink bug can be distinguished from other species of stink bugs by the alternating dark and light bands on the last two segments of the antennae. The exposed side edges of the abdomen also have alternating light and dark banding.

Eggs are light green, barrel-shaped, and found in clusters (Figure 4). The immature stages, called nymphs, are oval-shaped and somewhat tick-like in appearance. Young nymphs (Figure 4) are yellowish brown, mottled with black and red. Older nymphs (Figure 5) are darker, with light bands on dark legs and antennae, similar to the adults. Nymphs have red eyes. As shown in Figure 5, nymphs of the brown marmorated stink bug are sometimes found together with other stink bug species; the brightly colored nymph near the top of Figure 5 is the green stink bug, *Acrosternum hilare*.



Figure 4. Young nymphs of the brown marmorated stink bug emerging from eggs (photo by G. Bernon).



Figure 5. Older nymphs of the brown marmorated stink bug on a black cherry leaf shown together with one nymph of the green stink bug (photo by G. Bernon).

Life History

The brown marmorated stink bug overwinters in the adult stage in houses and other protected places. The adults begin to fly to these overwintering sites in the middle of September, and peak flight activity is in late September or early October.

Adults emerge from their overwintering sites in the spring, usually in early May. After they feed for about two weeks, they mate, and the females begin to lay eggs. Eggs are laid in clusters of about 28 eggs on the undersides of leaves from June to August. A single female can lay up to 400 eggs. Eggs hatch in three to seven days.

The nymphs pass through five instars (sub-stages), with a molt between each instar. Each instar lasts about one week, before the final molt into the adult stage. New adults start to appear in late July or August. There is one generation per year in the mid-Atlantic region.

Management Outdoors

Management planning is under development for this newly introduced pest. Researchers at Rutgers University

are currently studying the biology of this insect and testing pesticides for its control on fruit crops. Damage thresholds need to be determined. Although existing management strategies used for other stink bug species might apply, research is needed to tailor management tactics to this pest species.

Management Indoors

The brown marmorated stink bug can be mechanically excluded from homes and buildings by sealing cracks and other openings in the buildings. If bugs are entering the living areas of the home, the openings where the insects gain access first should be located, then sealed. Typical entry points include cracks and crevices around window and door trim, window-mounted air conditioners, exhaust fans, ceiling fixtures, baseboards, and chimneys. Cracks or openings should be sealed with caulk to prevent entry by the stink bugs. Torn window screens should be repaired, and window-mounted air conditioners should be removed. Live and dead stink bugs can be removed from buildings with a vacuum cleaner or shop vac, and the vacuum bag should be promptly removed and discarded. Insecticides should not be used inside houses after the insects have gained access. Using an insecticide indoors is not recommended because this will not stop additional invasions, and exposure of humans and pets to pesticides should be avoided.

Reporting

Entomologists need to document the expanding range of this pest. Anyone who finds specimens that seem to be the brown marmorated stink bug can report them to their county Extension educator or to the centralized web site: <https://njaes.rutgers.edu/stinkbug/report.asp>

Classification

Halyomorpha halys (Stål); Order Hemiptera, Family Pentatomidae, Subfamily Pentatominae, Tribe Pentatomini.

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