DIVISION OF AGRICULTURE
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University of Arkansas System

Agriculture and Natural Resources

FSA7080

Brown Marmorated Stink Bug: A Potential Pest of *Arkansas Fruits and Vegetables*

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The brown marmorated stink bug (*Halyomorpha halys* (Stål), Family: Pentatomidae) is likely to invade Arkansas where it poses a threat to a variety of agricultural commodities (fruits, citrus, vegetables, corn and soybeans) and invades homes to overwinter. As of 2010, the brown marmorated stink bug was found in at least 26 states, two of which border Arkansas – Tennessee and Mississippi.

Background

The brown marmorated stink bug (BMSB) is native to Asia and was likely introduced into the United States via shipment of trade goods. BMSB is a serious pest on fruits, vegetables and farm crops where it is established in the U.S. This pest has two generations per year in the mid-Atlantic area, and overwintering adults can be a serious nuisance where they enter homes to seek shelter.

Identification

The adult BMSB is shield shaped and approximately 15 mm long and 8 mm wide (Fig. 1). The dorsal surface of adults is brown/gray and is covered with dense puncture marks. Their eyes are dark red, and they have brown legs with faint white banding. The most diagnostically distinguishable features of BMSB are the alternating dark and light bands on the last two segments of the antennae, and the same alternation of colors also occurs on the exposed edges of the abdomen.

FIGURE 1. Adult BMSB with alternating dark and light bands on the last two antennal segments.
Photo: Tracy Leskey, USDA-ARS

BMSB overwinter as sexually immature adults (Watanabe et al. 1994). Overwintering adults emerge in spring (Leskey 2010; Nielsen and Hamilton 2009) and feed for approximately two weeks before mating and ovipositing. Gravid females then lay around 240 eggs (throughout their lifetime) on the undersides of leaves in clusters of about 28 (Nielsen et al. 2008; Wermelinger et al. 2008).

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FIGURE 2. Four nymphal stages, adult male and adult female (L to R).

Photo: Tracy Leskey, USDA-ARS

The eggs appear light green and barrel shaped. Eggs hatch in about three to seven days, and the nymphs pass through five instars (Fig. 2) (Nielsen et al. 2008). Each instar lasts about a week.

If there are two generations a year, then the summer generation will feed and mate around July before ovipositing a second generation. The second-generation adults emerge around September and feed for about a month until they leave their host plants to overwinter (Leskey 2010).

Hosts

The BMSB has a wide host range. Primary hosts in the United States appear to be tree fruits (Fig. 3), legumes and deciduous trees (Leskey 2010; Wermelinger et al. 2008), but BMSB can also feed on corn, some vegetables and a variety of ornamentals. A 2010 pest risk report by the USDA-APHIS-PPQ has a more exhaustive list of BMSB hosts (Holtz and Kamminga 2010).

Damage

BMSB nymphs and adults extract fluids from plants by inserting their proboscis into the host's tissue. Digestive enzymes released during feeding kill surrounding cells, and small necrotic areas form at the feeding site. These areas appear brown and pithy in mature fruit (Fig. 4). In apples and peaches, if feeding occurs immediately following bloom, the fruit will be aborted prematurely. BMSB damage in corn causes failure of kernels to develop (Fig. 5), and damage caused to soybeans leads to delayed senescence and pod discoloration and distortion (Nielsen et al. 2010; Welty et al. 2008).

Nuisance Indoors

In addition to being an agricultural pest, overwintering BMSB adults can be a serious nuisance to homeowners. BMSB congregate in large numbers in and around structures, and when disturbed, they release an offensive odor.

A recent article on the Extension web site provides management suggestions for the homeowner when faced with BMSB or any other overwintering insect that invades a home. Go to *www.uaex.edu* and search for *"The Brown Marmorated Stink Bug: Coming to a Location Near You!"* (Hopkins 2011).

Monitoring

BMSB adults and nymphs are attracted to yellow, green or black pyramid traps baited with methyl (2E, 4E, 6Z) decatrienoate (Khrimian et al. 2008). BMSB nymphs appear to respond to these traps throughout the season, but the adults primarily don't respond to the lure until late August (Leskey 2010).

FIGURE 3. Adult BMSB on peach fruit.
Photo: Gary Bernon, USDA-APHIS

FIGURE 4. BMSB damage on outside of apples (top photo) and corky appearance inside (bottom photo).
Photo: Steve Jacobs, Pennsylvania State University

FIGURE 5. BMSB damage on corn.
Photo: Steve Jacobs, Pennsylvania State University

Trapping with the baited pyramid traps can be used to monitor densities and dispersion of established populations, but the traps are not useful for detecting new populations. In New Jersey, the use of blacklight traps was an effective means for detecting new populations before damage was apparent (Nielsen et al. 2010). Crop densities of BMSB nymphs and adults can be monitored by hand counting. More precise protocols for sampling BMSB densities in the field are currently being developed.

Biological Control

There are currently no known parasitoids endemic to the United States that show promise for controlling BMSB populations. However, *Trissolcus halyomorphae* Yang (Hymenoptera: Scelionidae), a solitary egg parasitoid in its native range of China, has been shown to cause an average annual egg parasitism rate of 50 percent on BMSB populations (Yang 2009). This parasitoid is the only known natural enemy of BMSB identified to cause a mortality rate above 10 percent (Nielsen et al. 2010), but it has not been found in any of the United States populations.

Exclusion

BMSB can be excluded from entering homes and shelters where it overwinters by sealing up cracks and holes leading into the structures and by removing other potential passageways into them like air conditioners.

Chemical Control

Some pyrethroid and neonicotinoid insecticides have been shown in lab trials to control adults and fifth instars, but these chemicals are restricted during periods of peak BMSB populations in tree fruits and results in the field are still unresolved (Nielsen et al. 2010). Chemicals that are safe and effective for controlling BMSB are still being developed. Please follow label instructions and safety procedures, and check to make sure the chemical you are using is registered for use in your crop.

Reporting

Watch for brown marmorated stink bugs so that we can delay their establishment in Arkansas as long as possible. Pathways of potential introduction include hitchhiking in shipped boxes from infested states. Entomologists need to document the expanding range of this pest. Anyone who finds specimens that seem to be the BMSB can report them to their county Extension agent, the USDA-APHIS-PPQ (Little Rock) at 501-324-5258 or the Arkansas State Plant Board at 501-225-1598.

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Much of the information obtained for this fact sheet was gathered by the authors at the University of Arkansas, Fayetteville.

All chemical information is given with the understanding that no endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned. Before purchasing or using any pesticide, always read and carefully follow the directions on the container label.

Printed by University of Arkansas Cooperative Extension Service Printing Services.

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FSA7080-PD-4-12N

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