

# Brown Marmorated Stink Bug: A Potential Pest of Arkansas Row Crops

Scott Akin  
Assistant Professor and  
Extension Entomologist

Gus Lorenz  
Professor and IPM  
Coordinator

Donn T. Johnson  
Professor and Extension  
Entomologist

Glenn Studebaker  
Associate Professor and  
Extension Entomologist

The brown marmorated stink bug (*Halyomorpha halys*, family Pentatomidae) is an exotic pest that has caused economic damage to fruit, vegetable and farm crops across the mid-Atlantic region and has the potential to become problematic across other parts of the U.S. This pest is often spread via human-assisted means such as vehicles or trains (i.e., “hitchhiking”) and could eventually pose a threat to Arkansas row crops such as soybeans, corn and possibly cotton.

## Background

The brown marmorated stink bug (BMSB) is native to Asia and was likely introduced into the U.S. via shipment of trade goods. It was initially reported near Allentown, Pennsylvania, in the late 1990s and spread rapidly throughout the eastern U.S. The range of this pest includes at least 26 states, from Maine to North Carolina in the eastern U.S., westward to Iowa; BMSB also has been reported from California. In the northeastern U.S., this pest was initially reported as a nuisance pest that overwintered in houses and commercial buildings. As the population rapidly increased, injury on vegetable and fruit crops (e.g., peaches, apples) was observed the following season. In 2010, major losses of fruit crops were reported in some areas of the region.

## Identification

Eggs of BMSB are barrel-shaped, similar to other stink bug species



Figure 1. Egg mass (A), newly hatched nymphs (B), older nymph (C) and adult (D) of the brown marmorated stink bug (BMSB).

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observed in Arkansas crops. The eggs are typically light green or yellow to almost white in color and tend to darken with age. Eggs are laid in clutches of 25 to 30 (Nielsen et al. 2008, Wermelinger et al. 2008), which would likely hatch in 3 to 5 days in Arkansas (Figure 1A).

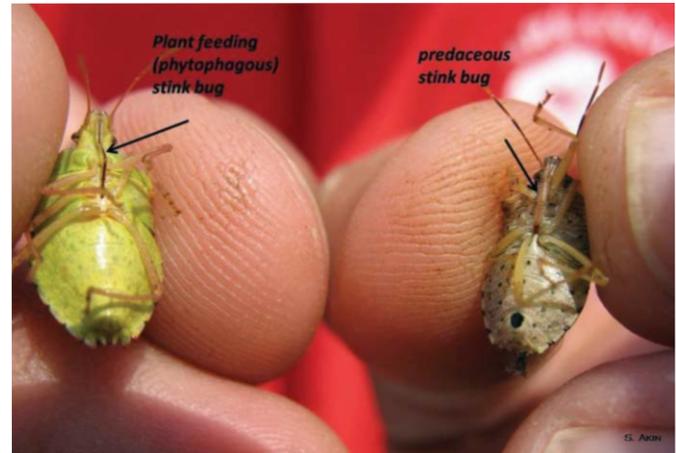
The yellowish-red-and-black nymphs of BMSB are relatively easy to see. Their dark red eyes are easily distinguishable on the black head (Figure 1B). The abdomen of fifth instars is off-white with reddish spots. The legs, head and thorax of BMSB nymphs are black, and antennae have black with white bands (Figure 1C).

As with other stink bug species, adults of BMSB have a shield-shaped body (Figure 1D). They are typically  $\frac{1}{2}$  to  $\frac{5}{8}$  inch long and, in contrast to nymphs, are harder to see due to their mottled brown-grey color. The most notable characteristic of the BMSB adult is that several abdominal segments protrude out the side from beneath the wings, resulting in a black-and-white checkerboard-like appearance on the edges of the abdomen. The next-to-

last (fourth) antennal segment has a white band, and the legs are brown with what appears to be faint white banding. The white band on the antenna easily distinguishes this species from other native brown-colored stink bug species (Figure 2). Adults also have patches of small and rounded copper or bluish-metallic colored depressions on and just behind the head. BMSB produces a pungent, malodorous chemical that is readily emitted when the insect is disturbed; thus, the odor is easily detected when handling the bug.

Stink bug species whose adults can be confused for BMSB are the brown stink bug (*Euschistus* spp.) (Figure 2A) and spined soldier bug (*Podisus* spp.) (Figure 2B). The brown stink bug adult has essentially no white and few abdominal segments showing

when viewed dorsally. The beneficial spined soldier bug also can have easily viewed abdominal segments from above but has little white coloration and has sharp points on the pronotum (i.e., shoulders). Predaceous stink bugs also typically have a more robust proboscis relative to the plant-feeding stink bugs (Figure 3).



**Figure 3. Thin and thick piercing/sucking mouthparts of plant-sucking stink bug (left) and predaceous stink bug (right).** Photo by Scott Akin.

## Biology

BMSB typically overwinters as sexually immature adults (Watanabe et al. 1994), often in houses and other structures. One characteristic unique to this stink bug species is the very large size of the aggregations of overwintering adults – sometimes hundreds in a single mass. There is sufficient evidence that suggests BMSB may also overwinter in wooded areas and along field edges, especially in regions with temperate climates similar to Arkansas. BMSB will emerge in the spring (Leskey 2010, Nielsen and Hamilton 2009) and feed for approximately two weeks before mating. A female BMSB with fully developed eggs can lay 200 to 250 eggs in her lifetime.

Eggs of BMSB are typically laid on the underside of leaves. This pest has five nymphal instars that range in size from 2.4mm to 12mm in length (0.1 inch to 0.5 inch). As with other stink bugs in Arkansas, first instars are not very active and remain in close proximity to the hatched egg mass. BMSB has been reported as undergoing one to two generations per year in the northeastern U.S., but little is known regarding the number of generations it would undergo in Arkansas. Records from subtropical China have reported four to six generations per year, depositing eggs from May through August.

This pest, as with other stink bugs, is relatively mobile and selective and can move from host to host



**Figure 2. Stink bugs that resemble brown marmorated stink bug include (A) brown stink bug and (B) spined soldier bug.**

based on food quality or other cues. BMSB is also susceptible to interstate movement, as it is known for “hitchhiking” via RVs, automobiles, semi trailers and even trains.

## Damage

BMSB, as with all true bugs, sucks plant juices with the proboscis (i.e., “beak”). During feeding, digestive enzymes kill surrounding cells, resulting in necrotic areas around the feeding site. This species has an extremely wide host range, with documented hosts including apples, peaches, citrus fruits, figs, mulberries, persimmons, blackberry, wine grapes, field corn, sweet corn, ornamental plants, soybeans, tomatoes, lima beans, green peppers, as well as various trees, woody shrubs and weeds. A full list of hosts of BMSB is reported in a pest risk report by the USDA-APHIS-PPQ (Holtz and Kamminga 2010). Because of its overwintering habit, BMSB is also known for being a nuisance pest in areas of the U.S. where it is well established, with complaints commonly reported by homeowners, hotel and conference center operators, schools, businesses and managers of public buildings.

BMSB damage in corn can cause failure of kernels to develop, and damage caused to soybeans can lead to delayed senescence (called “stay green” or “green stem” syndrome) and pod discoloration and distortion (Nielsen et al. 2010, Welty et al. 2008). Research is underway to develop a better understanding of how BMSB damages soybeans and if thresholds should differ from those used for native stink bug species. Preliminary research and observations in Maryland show that BMSB exhibits a strong edge-effect pattern in soybean fields – a characteristic that could be exploited in future management programs. The presence of BMSB in soybeans should be determined by visual observations or sampling with a sweepnet, the latter of which is the most common method of sampling soybeans for stink bugs in Arkansas. Extension

entomologists in states where BMSB is occurring in soybeans (Delaware, Maryland and Virginia) are recommending using traditional thresholds until more information is available.

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**DR. SCOTT AKIN** is assistant professor and Extension entomologist, Southeast Research and Extension Center, Monticello. **DR. GUS LORENZ** is associate department head and Extension entomologist, Lonoke. **DR. DONN T. JOHNSON** is professor and Extension entomologist with the University of Arkansas in Fayetteville. **DR. GLENN STUDEBAKER** is associate professor and Extension entomologist, Northeast Research and Extension Center, Keiser. All are with the University of Arkansas Division of Agriculture. FSA7077-PD-8-11N

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