The invasive brown marmorated stink bug (BMSB), *Halyomorpha halys*, is a serious threat to Oregon specialty crops, including hazelnuts, tree fruits, small fruits, vegetables, and wine grapes. This insect pest also attacks ornamentals, agronomic crops, and native plants in Oregon. Typically, the most important damage from BMSB results after it feeds on the fruiting parts of crop plants, although damage to growing shoots and leaves is possible.

Single egg masses, usually consisting of about 28 eggs, are laid on the underside of leaves. After nymphs hatch from the barrel-shaped eggs, the insects grow and molt five times as they mature to the adult stage. Second-instar nymphs are the first life stage to feed on the plant. BMSB have sucking mouthparts that pierce leaf, fruit, or nut surfaces, allowing the bug to suck out plant juices. BMSB feeding can cause deformation of developing fruits, nuts, and vegetables. Injury from BMSB can worsen over time as damaged tissues darken from exposure to the air. Damage can also allow bacteria and fungi to gain a foothold at the feeding site, causing more decay.

Damage may not be readily seen on the surface but is visible inside affected fruits and vegetables. It is important to cut into suspected feeding sites to properly identify the damage. BMSB damage resembles the damage of other stinkbugs, and other large, piercing-sucking insects such as leaffooted bugs. See *Brown Marmorated Stink Bug (EM 9054)* for identification of life stages and damage symptoms.

Monitoring for BMSB

Monitoring for BMSB can be done several ways, including using beat sheets, pheromone traps, and visual observations. The likelihood of finding BMSB is increased when monitoring efforts are focused on preferred habitats adjacent to the crop as well as crop borders near potential sources of BMSB. For example, BMSB frequently rests and feeds on English holly, maple, tree of heaven (*Ailanthus*), empress tree (*Paulownia*), catalpa, ash, dogwood, and Himalayan...
blackberry. These are good plants to sample. Growers can predict whether the pest will be a serious problem before harvest by knowing the extent of BMSB infestation in areas bordering the crops.

**Monitoring with beat sheets**

BMSB can be monitored by beat-sheet sampling (Figure 1). This requires a beating tray, which is available from integrated-pest-management or insect-supply companies, and a padded pole or dowel with which to strike the branches. Padding will reduce plant damage. The tray is placed beneath the sampled plant’s foliage, and the branch supporting the foliage is struck sharply 2 to 3 times to jar bugs onto the sheet. This method can collect more bugs than pheromone-baited trapping, but it requires physical effort and is time consuming.

**Monitoring by visual observation**

It can be difficult to observe BMSB in plant canopies. Adults often move into and out of the crop without being observed. The less-mobile nymphs cannot fly, but are capable of walking considerable distances. All life stages are quick to perceive danger and hide. Even so, visual observation can be an effective method to detect BMSB. These insects move more slowly when temperatures are below 50°F, such as in the early morning. They may be seen basking on leaves or actively seeking feeding sites. It is important to move slowly and observe carefully.

In order to compare samples in different areas or taken on different dates, use a consistent method for beat-sheet sampling and visual monitoring, such as 50 beats or a 15-minute observation period. Record the number of each life stage of BMSB for each sampling event, the date, and the location of the sample or observation.

**Monitoring by trapping**

Pheromone trapping can be used as an additional, less time-consuming tool to detect BMSB. All life stages of BMSB, including nymphs and adult males and females, may be drawn to traps baited with aggregation pheromones. The attraction to aggregation pheromones is greater in the late season. There are many unknowns about the value of traps in designing a management plan for BMSB. For that reason, finding BMSB in pheromone traps should not be the only information used to decide how to manage BMSB.

The 4-foot pyramid trap is commonly used to capture BMSB. This trap has fins that taper up to a collection jar fastened to the top of the trap (Figure 2a). The collection jar contains a pheromone lure.
and a killing agent. The lure can also be placed just below the collection jar.

**Trap deployment:**

- Install the pyramid trap on level ground surrounded by low-growing vegetation.
- Secure the trap with tent stakes or rebar at each corner of the trap base to stabilize it. Connect the base of the trap to the stakes with zip ties or twine.
- Clip an unwrapped pheromone lure to a wire suspended from the top of the collection jar. Take care that the lure does not block the opening of the cone.
- Attach the collection jar to the pyramid trap using bungee cords or another secure method (Figure 2b).
- A smaller version of the pyramid trap can be hung directly in foliage and installed so that it hangs as vertically as possible (Figure 2c). The fins of this trap should make contact with the surrounding foliage, allowing BMSB nymphs to crawl into the trap.
- Place traps near orchard borders, particularly at the edge of woods or other vegetation.
- Maintain vegetation around the trap base with a mower or weed eater.

  Caution: Placing traps too close to the crop can cause an increase in crop damage near the trap. Here’s why: the BMSB pheromone causes adults and immature nymphs to aggregate within a short distance of the pheromone source. BMSB attracted to the pheromone do not always enter the trap, but instead may linger nearby and feed on the crop.

**Pheromone lures for BMSB**

Several companies market lures for BMSB. Effective combination lures contain the chemicals bisabolol and MDT (methyl 2,4,6-decatrienoate). In some cases, the components are contained in separate lures that must be combined. Change lures every 3 to 6 weeks or based upon manufacturers’ recommendations.

Adding an insecticidal strip in the collection jar will prevent captured insects from escaping. Only half of a strip is needed and should last 6 to 8 weeks. Attach kill strips with a wire or clip inside the collection jar. Alternatively, a collar may be fitted over the cone to prevent escape of the BMSB (Figure 2c).

Always wear proper personal protection equipment when handling insecticides or any hazardous material.

**Record the data**

Check traps weekly and record the number of BMSB before discarding them. The bodies of the dead stink bugs can decay rapidly, leaving an indistinguishable mess, especially if any moisture seeps into the jar. For this reason, it is important to check traps frequently and to clean out the collection jar. Spiders often take up residence beneath the
collection jar in the cone (Figure 3a). This area must be kept free of webs or other debris (Figure 3b) for the trap to function properly.

Current BMSB chemical management guidelines are detailed in the PNW Insect Management Handbook.

Resources for Monitoring

Bioquip: https://www.bioquip.com/

Alpha Scents, Inc.: http://www.alphascents.com/
Rescue! Sterling International Inc.: http://www.rescue.com/
Trécé Incorporated: http://www.trece.com/

The information provided here is based on preliminary research findings. It reflects our best understanding of the behavior and biology of BMSB. Use this information to help make BMSB trapping effective.

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