K-STATE Research and Extension

Harlequin Bug

The harlequin bug, *Murgantia histrionica* (Hahn.) is a destructive insect pest of certain vegetable crops, especially those in the cole crop family (Brassicaceae). Harlequin bugs are native to Central America and Mexico. They were first reported in the United States in 1864 and in Kansas in 1870. Common names include Sherman bug, fire bug, terrapin, calico back, harlequin cabbage bug, Texas cabbage bug, and collard bug. This publication presents information on identification and biology, host plants, damage, and management strategies that can be implemented to alleviate problems associated with harlequin bugs.

Identification and Biology

Harlequin bug adults are ½ to ⅝ inch (12.7 to 15.8 mm) in length and shield-shaped as are other Pentatomids (stink bugs and shield bugs). They are brightly colored orange to red with black and white markings on the body (Figure 1).

Figure 1. Harlequin bug adult.

Figure 2. Harlequin bug nymphs.

Nymphs resemble adults. They are black, orange, and white in color, but with a smaller and more rounded shape, and lacking wing covers (Figure 2). Harlequin bugs overwinter as adults in crop residues and weed debris. Adults emerge in late spring to early summer and may feed on weeds such as wild mustard. In general, females live longer than males. After finding a suitable host plant, adult females lay eggs on the undersides of leaves to shade them from direct sunlight. Eggs are deposited on the underside of leaves in uniform batches of 12 in two rows of six. Each adult female can lay between 300 and 500 eggs during her lifetime, although female reproduction may be influenced by variations in temperature and host plant suitability. Eggs are barrel-shaped with two distinct black bands and white striping (Figure 3). They are covered with a sticky, glue-like substance, which helps fasten them to leaves. Nymphs emerge from eggs, then congregate and feed near where the egg mass was deposited. By remaining close, the first-instar nymphs obtain a symbiotic gut bacterium from feeding on the residual egg mass. Nymphs take five to six weeks to develop into adults with five nymphal instars. In late fall, harlequin bug adults congregate on host plants before overwintering. There may be two or three generations per year.

Figure 3. Harlequin bug eggs on leaf.

Host Plants

Both harlequin bug nymphs and adults feed primarily on cole crops including broccoli, Brussels sprouts, cabbage, cauliflower, collards, kale, kohlrabi, rutabaga, and turnip. In the absence of cole crops, they will feed on other plants such as asparagus, bean, eggplant, horseradish, okra, potato, and tomato. Harlequin bugs also feed on ornamental plants including roses, sunflowers, and chrysanthemums. They may feed on alternative or wild hosts (weeds) such as bittercress, lambsquarters, pigweed, ragweed, shepherd's purse, watercress, and wild mustard when cultivated cole crops are not present. After emerging from overwintering, mustard, radish, turnip, and cabbage have been reported to be preferred host plants. Certain host plants may be more susceptible than others because of resistance associated with the production of secondary defensive compounds.

Damage

Harlequin bug adult and nymphs use piercing-sucking mouthparts to withdraw fluids from stems and leaves.

Harlequin bug feeding causes white blotches on leaves (Figure 4) that eventually turn yellow-brown (Figure 5). Extensive populations can result in leaf distortion and plant stunting (Figures 6 and 7). They may kill plants depending on the severity of the infestation and plant size. Adults or nymphs feeding on fruit may cause scarring or "cat-facing." Harlequin bugs may leave "old" plants to feed on the tender, young growth of "new" plants. They tend to feed in sunny locations, but during the warmest parts of the day in summer, harlequin bugs may move to undersides of leaves (Figure 8) to escape direct sunlight, which can kill them. Harlequin bugs do not directly transmit any plant diseases.

Management Strategies

Nonchemical

Harlequin bug populations can be suppressed by handpicking adults and nymphs and placing them in a container filled with soapy water. Be sure to wear gloves as they will emit a foul odor when handled. This procedure reduces populations quickly to prevent damage. Both adults and nymphs may fall to the ground when disturbed. Trap harlequin bugs by placing old turnip or cabbage leaves on the ground. Harlequin bugs that congregate under the leaves can be killed immediately.

Trap cropping, which involves planting preferred host plants near the main crop, is another way to minimize feeding damage. Crops such as mustard, kale, and cabbage can be planted to lure adult harlequin bugs, which emit aggregation pheromones that attract more bugs to the site. Destroy or treat trap crops with an insecticide when harlequin bugs become abundant.

Weed management in and around the garden reduces the potential for alternative hosts and overwintering sites. Destroying overwintering sites, such as crop residue and weed debris, may alleviate problems with harlequin bugs the next growing season. Eliminate weeds from surrounding areas, especially fall weeds that may protect bugs during the winter. Weeds in abandoned fields may also harbor this pest.

Figure 4. White blotches on leaves are characteristic of harlequin bug feeding.

Figure 5. Extensive feeding by harlequin bugs may cause leaves to turn yellow to brown.

Figure 6. Leaf distortion is a common symptom of harlequin bug feeding.

Figure 7. Plant stunting as a result of heavy feeding by harlequin bugs.

Figure 8. Harlequin bugs congregate on the undersides of leaves to avoid direct sunlight.

Figure 9. Black and orange coloration protects harlequin bugs from predators.

Chemical

Insecticides can be used to suppress harlequin bug populations, but keep in mind that nymphs are more susceptible than adults. Pyrethroid, organophosphate, carbamate, and neonicotinoid insecticides may be effective against both adults and nymphs. Other commercially available insecticides for suppression of harlequin bug populations include pyrethrins and potassium salts of fatty acids (insecticidal soap). Before applying any insecticide, read the label to ensure it is legal to use on a specific crop and that "bugs" are on the label.

To enhance treatment effectiveness, target nymphs and repeat applications if necessary. Cover all plant parts thoroughly to maximize contact and kill as many bugs as possible before they damage plants. Because leaf surfaces of cole crops and the body covering of harlequin bugs are waxy, it may be necessary to add an adjuvant such as a spreader-sticker or surfactant to the spray solution to maximize the effectiveness of foliar insecticide applications. Insecticide options for organic producers are limited and include spinosad, pyrethrins, and azadirachtin. These insecticides, as well as the chemical insecticides mentioned, are more effective against nymphs than adults.

Harlequin bugs have several defenses against natural enemies (parasitoids and predators). Highly visible black and orange markings warn predators, and the hard body covering is difficult to penetrate. Harlequin bugs also have the ability to store compounds such as glucosinates, which are distasteful to many predators including birds, and to produce these defensive chemicals when disturbed.

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