K-STATE Kansas State University

Home and Horticultural PESTS

Elm Leaf Beetles

Beetles of the family *Chrysomelidae* are commonly known as leaf beetles. Leaf beetles form a large taxonomic group — an estimated near 10 percent of all known beetle species. Although relatively small in size, many species attract attention because of their striking body patterns and brilliant colors. As their common name implies, adult leaf beetles and/or their larvae feed on plant foliage. Large concentrations can destroy desired foliar displays.

Elm trees, noted for their shading qualities, are attacked by two species of leaf beetles. Elm calligrapha beetles (Figure 1) occur sporadically, but can cause extensive defoliation. Of greater importance, elm leaf beetles (*Xanthogaleruca luteola*) are found throughout Kansas. In many years they are responsible for the undesirable browning of tree foliage during summer months when tree shade is of primary importance.

Figure 1.

Figure 2.

Figure 3.

Life Stages

Adults—Adult elm leaf beetles are approximately ½-inch long. "New" adult beetles are yellowish with black, fairly broad stripes down the outer edges of their wing covers, and a thin stripe where edges of the wing covers meet when wings are folded over the body (Figure 2). Black spot-like markings are located at the base, where wing covers meet the thorax, with additional marks on the thorax and head. As adult beetles age, the lines and markings become less distinct, blending into the overall body color and changing to a darker, somewhat olive to gray hue.

Eggs—Clusters of 5 to 25 eggs laid in 2 to 3 parallel lines are generally found deposited along veins on lower leaf surfaces. Eggs are bright yellow and somewhat pointed at their apical ends (Figure 3). Each female can deposit 400 to 800 eggs.

Larvae—Newly emerged elm leaf beetle larvae are 1 to 1½ millimeters long, black, and somewhat hairy-looking. As larvae grow, their color becomes dull yellow to olive. Darker lateral lines encrusted with black tubercles give larger larvae a striped appearance (Figure 4). The dorsal aspect remains distinctly lighter, and it is also speckled with black tubercles. Larvae possess abundant long, prickly body hairs known as setae.

Pupae—Pupae are bright orange-yellow when newly formed. They take on a more dull-yellow to yellow-brown color (Figure 5) as they develop.

Seasonal Life History

While the life history of elm leaf beetles in Kansas has not been documented, there are most certainly two generations per year, with a partial third likely to occur in years with early breaking springs, followed by favorable and extended fall conditions. The timing of events may vary, depending upon the location in Kansas.

During the fall, adult elm leaf beetles seek the protection of sheltered sites for the purpose of surviving the rigors of winter. Outdoor sites include any imaginable nook and cranny that beetles can squeeze into or under. Many beetles seek indoor refuges including homes, garages, sheds and outbuildings.

When leaves begin to develop and unfurl in the spring, overwintered elm leaf beetles seek out new foliage on which they begin foraging and mating. Eggs are deposited, and a week to 10 days later, first-generation larvae emerge and begin feeding in groups on lower leaf surfaces. As larvae near the completion of their development 2 to 3 weeks later, they become more solitary. By late June to early July, many mature larvae descend or drop to the ground where they pupate (on the soil surface or under soil debris). Many larvae may remain in the tree, pupating in the cracks and crevices of the bark, as well as branch crotches. Pupation requires 7 to 10 days.

Newly emerged adults deposit the eggs that produce second-generation larvae. By mid- to late August, second-generation pupae produce the adult beetles that seek refuge for overwintering.

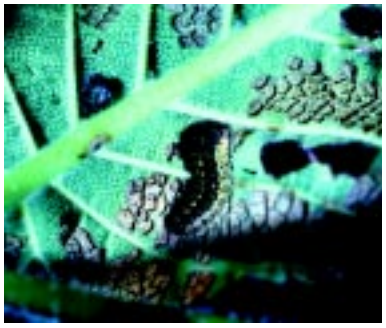

Figure 4.

Figure 5.

Figure 6.

Damage

While adult elm leaf beetles will cause damage in the form of holes chewed through the leaves, it is their larvae that are responsible for causing the most serious damage. Larvae feed on lower epidermal and leaf cells, which provide moisture and protect leaves against water loss. Skeletonized leaves turn brown and die (Figure 6).

Auxiliary buds will provide a new flush of foliage within 2 to 3 weeks. However, that growth may be damaged by second-generation larvae. Branch dieback or even tree death has been reported for trees that have experienced elm leaf beetle damage for several consecutive years. Although some trees may not appear to be suffering to any degree, they could be weakened and, therefore, more susceptible to attack by other insect pests and diseases.

Control

Naturally occurring factors such as climate, predators, parasites and diseases may suppress elm leaf beetle populations to non-damaging levels. However, when elm leaf beetle populations reach epidemic proportions, several tactics can be implemented. Bear in mind that the efforts of individual or cooperating neighbors may prove futile if hordes of beetles from nearby ignored sites inundate treated areas.

Sticky Trunk Bands—The effectiveness of sticky bands relies on the habit of elm leaf beetle larvae crawling down tree trunks for to pupate on top of the soil at the base of the tree. A band of sticky material applied around a tree trunk traps migrating larvae. Keep in mind that some larvae may simply drop out of trees onto the ground, while others remain higher up in the trees, pupating in cracks and crevices of the bark, or in branch and trunk crotches. Also, tree banding is an after-the-fact tactic intended to eliminate mature larvae, which may already have caused extensive foliar damage. However, subsequent elm leaf beetle populations will be smaller, because larvae were killed before they were able to pupate.

Foliar Insects—Insecticides should be applied to foliage when adult beetles are present and before egg deposition occurs. Or treatments can be directed toward larvae, preferably after most have hatched, but while they are still small and incapable of causing extensive feeding damage. Such timing can only be accomplished with close and periodic inspections. The ease of monitoring for scouting activities depends on the sizes and numbers of trees to be protected.

Various insecticides targeting insect nervous systems are registered for use against elm leaf beetles. They are available for purchase by homeowners from local garden centers and other retail outlets. Active ingredients (always listed on product labels) include acephate, bifenthrin, carbaryl, cyfluthrin and permethrin. Given that many different companies use the same active ingredients when formulating their respective product lines, it is not plausible to list the myriad number of products available through local merchants. Rather, homeowners must read individual labels to determine a product's active ingredient. Product labels must be closely scrutinized to ensure that the specific pest targeted for control is listed on the product label. For instance, a company may market six different products containing the active ingredient permethrin, but only one specifically lists elm leaf beetles. Technically, only that single product can legally be used against elm leaf beetles.

Horticultural soaps and oils are especially effective against soft-bodied insects, or immature stages of hard-bodied insects, such as beetles. Oils and soaps cause cuticular and cellular membrane disruptions. Total plant coverage with these treatments is essential to ensure their directly contacting elm leaf beetle larvae. Once dried, oil and soap treatments do not provide any residual control of insects.

Systemic Insecticide—When properly used, various systemic insecticides provide effective control of elm leaf beetles. Systemics directly enter tree vascular systems when injected into trees, or indirectly when applied as soil injections or drenches for uptake into trees through their root systems. For homeowners, the active ingredient imidacloprid, is available for purchase and use as a soil drench treatment around the intended targeted tree(s). Homeowners may also choose to contact arborists who have access to additional systemic insecticide products, as well as tree and soil injection equipment.

Robert J. Bauernfeind, Entomologist

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-2392 October 2002