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, therefore, 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) are rather sporadic in occurrence, but nonetheless can cause extensive defoliation. Of greater importance, elm leaf beetles *(Xanthogaleruca luteola)* are found throughout Kansas, and in many years are responsible for the aesthetically undesirable "browning" of tree foliage during summer months when tree shade is of primary importance.

Figure 1.

Figure 2.

Figure 3.

Description of Life Stages

Adults—Adult elm leaf beetles are approximately ½-inch long. "New" adult beetles are yellowish with black markings in the form of fairly broad stripes down the outer edges of the 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 lose their distinctiveness more closely blending into the overall body color and change 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 in length and have a black, somewhat hairy appearance. As larvae grow, they take on a more dull yellow to olive coloration. Darker lateral lines encrusted with black tubercles gives larger larvae a striped appearance (Figure 4). The dorsal aspect remains distinctly lighter, although it too is "speckled" with black tubercles. Larvae possess setae (abundant, long body hairs), giving them a hairy/prickly appearance.

Pupae—Pupae are bright orange-yellow when newly formed. However, they take on a more dull-yellow to yellow-brown coloration (Figure 5) as the developmental process within pupae progresses.

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 summer conditions. The timing of events may vary, depending upon one's 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 the new foliage on which they begin foraging and mating activities. 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 matured larvae descend or drop to the ground where (atop the soil surface or under soil debris) they pupate. Many

Figure 4.

Figure 5.

Figure 6.

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.

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 great degree, conceivably 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 expended by an individual or cooperating neighbors may prove futile if hordes of beetles from nearby "ignored" sites inundate treated areas.

Foliar Insecticides—Foliar insecticide applications can be applied to kill foraging larvae. Preferably, treatments should be applied after most of the larvae have hatched, but while they are still small and incapable of causing extensive feeding damage. Such timing can only be accomplished if close and periodic inspections are made. The ease of such scouting activities depends on the sizes and numbers of trees to be protected.

Numerous insecticidal products are registered for use against elm leaf beetles, but most are not available to homeowners. Available products include formulations of Dursban, Orthene, Sevin and horticultural oils. Horticultural oils are only effective against soft-bodied leaf beetle larvae.

Systemic Insecticides—When properly used, various systemic insecticides provide effective control of elm leaf beetles. Systemics enter tree vascular systems directly when injected into trees, or indirectly when applied as soil injections for uptake into trees via their root systems. Systemic products and/or injection equipment are not available for use by the general public. However, certified personnel with commercial tree service companies have access to systemic insecticides.

Tree Banding—The effectiveness of tree banding relies on the habit of elm leaf beetle larvae crawling down a tree trunk for the purpose of pupating on top of the soil at the base of the tree. A band of sticky material applied around a tree trunk entraps migrating larvae. Or, spraying a band around or treating an entire trunk with an insecticide registered for elm leaf beetles kills migrating larvae as they cross over the insecticide-treated surface. However, 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 have already caused extensive foliar damage. However, subsequent elm leaf beetle populations will be smaller, due to larvae that were killed before they were able to pupate.

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