K-STATE Kansas State University

Home and Horticultural PESTS

Elm Leaf Beetles

Beetles of the family *Chrysomelidae* are commonly known as leaf beetles. Nearly 10 percent of all known beetle species are leaf beetles. Although relatively small, 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 foliar displays.

Elm trees, noted for their shade, are attacked by two species of leaf beetles. Elm calligrapha beetles (Figure 1) occur sporadically, but can cause extensive defoliation. Elm leaf beetles (*Xanthogaleruca luteola*) are found throughout Kansas and are responsible for the undesirable browning of tree foliage during the summer.

Figure 1. Calligrapha

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 spots 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 olive or gray.

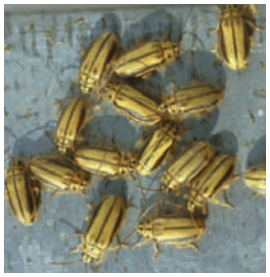

Figure 2. Elm leaf beetles

Eggs — Clusters of five to 25 eggs laid in two to three parallel lines are generally found 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.

Figure 3. 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 have abundant long, prickly body hairs known as setae.

Figure 4. Larva

Pupae — Pupae are bright orange-yellow when newly formed. They turn dull yellow to yellow-brown as they develop (Figure 5).

Figure 5. Pupae

Seasonal Life History

While the life history of elm leaf beetles in Kansas has not been documented, there are definitely two generations per year, with part of a third in years with early springs followed by a favorable and extended fall. 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 overwintering. Outdoor sites include any space 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 new foliage on which they forage and mate. 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 two to three weeks later, they become more solitary. By late June to early July, many mature larvae 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 seven to 10 days.

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

Damage

Major elm leaf beetle damage is caused by larvae feeding on epidermal tissues of lower leaf surfaces. When stripped of the protective epidermal layer (Figure 6), leaves dry out and turn brown. First-generation larval populations in the spring are generally low,

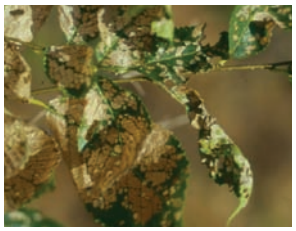

Figure 6. Feeding damage

and trees recover when auxiliary buds produce new foliage in two to three weeks. However, late in the summer under the extreme pressures exerted by massive populations of second-generation larvae, entire trees take on a burnt or brown appearance. Despite this startling appearance, trees are still alive and produce normal foliage the ensuing season. While some branch dieback has been reported, it appears that large established trees are capable of withstanding frequent defoliations with little damage.

Control

Tree Banding — The effectiveness of tree banding relies on the habit of elm leaf beetle larvae crawling down a tree trunk to pupate on the soil or beneath soil litter at the base of the tree (Figure 7). A band of sticky material applied around the tree trunk traps the migrating larvae. Drawbacks to sticky bands are that they are sticky and may need to be reapplied after accumulations of dirt, dust and debris have eliminated their tackiness. In addition, many larvae bypass sticky bands by dropping to the ground or pupating in cracks and crevices of the bark or crotches of branches in the tree. While tree banding might be desirable as a nonchemical control, remember that mature migrating larvae will have already inflicted extensive damage to tree foliage.

Figure 7. Beetles on tree trunk

Insecticides — Numerous insecticides are registered for use against elm leaf beetles. Preferably, treatments should be applied after larvae have hatched and while they are small and incapable of causing extensive feeding damage. Such timing can only be accomplished with routine close-up inspections. The ease of such scouting activities depends on the sizes and numbers of trees to be protected.

Insecticides available to the general public have two modes of action. Most are contact insecticides applied as foliar sprays. However, the imidacloprid active ingredient acts as a stomach poison. Imidacloprid has plant systemic activity and is applied as a drench treatment to the soil around the tree base. After entering through the root system and moving into leaf tissue, it is consumed by foraging larvae.

Many products available to the general public contain the same active ingredients. It is not possible to list all products registered for use in Kansas, nor does every retail outlet stock all products. When purchasing an insecticide, users should refer to the active ingredient listed on the product label to determine its proper use.

Active Ingredients In Insecticidal Products Available At Retail Outlets

Active Ingredient	Specific "Target Pest" Wording
acephate	elm leaf beetle
bifenthrin	elm leaf beetle
carbaryl	elm leaf beetle
cyfluthrin	elm leaf beetle
deltamethrin	elm leaf beetle
esfenvalerate	Japanese beetle*
horticultural oil	leaf beetle larvae
imidacloprid	elm leaf beetle
insecticidal soap	elm leaf beetle larvae
lambda-cyhalothrin	elm leaf beetle
malathion	Japanese beetle*
neem oil	immature elm leaf beetle
permethrin	elm leaf beetle
rotenone/pyrethrin	elm leaf beetle larvae
spinosid	leaf-feeding beetles

Companies may include or exclude specific pests and sites. The user is responsible for reading the product label to ensure safe and legal use.

**Although not registered for use against the specific pest, the product may legally be used against the unnamed pest if applied in compliance with K.S.A. Number 2-2470 (Allowable pesticide applications by the applicator) and K.A.R 4-13-28 (Target pests that are not specified on the pesticide's label or labeling).*

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