

Elm Leaf Beetle

Chewed leaves look scorched

Name and Description—*Xanthogaleruca luteola* (Müller) (= *Pyrrhalta luteola* [Müller]) [Coleoptera: Chrysomelidae]

The wing covers of overwintering adult elm leaf beetles are dark olive-green (fig. 1). The wing covers change in color during spring to yellow or a dull yellowish green with a longitudinal, dark stripe along the edges and a dark spot at the base of each wing cover (fig. 2). Adults are about 1/4 inch (6 mm) long with three black spots present on the thoracic shield behind their heads. Eggs are bright yellow to yellowish orange, droplet-shaped, and laid in clumps or irregular rows. Small larvae are dark and hairy. Mature larvae are 1/2 inch (13 mm) long and dull yellow with two dark, longitudinal stripes along their side and black-colored heads, legs, and tubercles (fig. 3). Pupae are bright orange-yellow with a few black bristles and are about 1/5 inch (5 mm) long. Elm leaf beetle is a European species established in North America for over 150 years and now occurs throughout most of the United States and eastern Canada.

Hosts—Elm leaf beetle feeds upon all elms, particularly Siberian and English, as well as American, rock, slippery, and other native, Asian, and European species of elm.

Life Cycle—Elm leaf beetle has from one to three generations per year, depending upon weather and location, with two per year being most common in the Great Plains. About the time elm buds begin to swell in late April and early May, overwintering adults emerge from protected sites and move to elm trees to feed and mate. After a few weeks, beetles will begin to lay eggs, typically in masses of 5-25 eggs, each attached to veins on the undersides of lower leaves, totaling 400-800 eggs per female. Larvae hatch in 10-14 days, feed for about three weeks, and then crawl down the trunk in search of pupation sites. Most pupate at the base of the tree, but some do so in bark crevices. Adults emerge in 10-15 days. Most will mate and reproduce, beginning a second generation, but some adults may seek a sheltered location and enter diapause to overwinter. The proportion of the elm leaf beetle population becoming dormant after one generation is weather-dependent, and larger second generations are associated with warmer weather. A partial or complete third generation may occur rarely. At the end of summer, all adult beetles move to dry, sheltered areas and go dormant until spring.

Damage—Elm leaf beetle is a serious pest of shade and ornamental elms but is of little significance in the forest. Larvae feed on the undersides of leaves between the major veins, seldom penetrating the upper surface, in a behavior called skeletonizing (fig. 3). Damaged leaf areas dry out and turn brown, giving severely affected leaves and branches a scorched appearance (fig. 4). Leaf feeding by adults results in a “shot hole” effect (fig. 5). Heavily injured leaves may be shed by the tree prematurely. Because young larvae require tender leaf tissue, the first generation is usually the most damaging. Elm leaf beetle feeding can greatly affect the appearance of elms, rendering them unsightly, and can reduce growth and weaken them, particularly when large beetle populations persist for several years. A secondary impact occurs when overwintering elm leaf beetles enter homes in swarms, particularly during warm winter episodes,



Figure 1. Overwintering elm leaf beetles in reproductive diapause. Photo: Whitney Cranshaw, Colorado State University, Bugwood.org.



Figure 2. Adult elm leaf beetles displaying coloration typical of the growing season. Photo: Clemson University, USDA Cooperative Extension Slide Series, Bugwood.org.



Figure 3. Mature elm leaf beetle larva showing skeletonizing feeding pattern. Photo: William M. Ciesla, Forest Health Management International, Bugwood.org.

Elm Leaf Beetle - page 2



Figure 4. Larval leaf skeletonizing dries and browns leaves, shown on Siberian elm. *Photo: Whitney Cranshaw, Colorado State University, Bugwood.org.*



Figure 5. Adult elm leaf beetle feeding produces a "shot hole" appearance, shown on American elm. *Photo: Pennsylvania Department of Conservation and Natural Resources, Forestry Archive, Bugwood.org.*

which can be so severe that it can rival the box elder bug as the primary nuisance insect invader of homes in the Great Plains.

Management—Important natural controls include extreme winter temperatures and late spring frosts, as well as a native parasitic wasp and native insect predators, including earwigs, stink bugs, and a ladybird beetle. Attempts to introduce natural enemies from Europe have met with some success in California, but there are no reports of this being attempted in the Great Plains.

Destroying egg masses on leaves by hand can reduce localized, small populations, but care must be exercised to avoid damaging the ladybird beetle eggs that are somewhat similar in appearance.

There are several labeled, registered chemical and biological insecticides that readily control elm leaf beetle populations when sprayed on the foliage. Effective applications against the first generation generally suppress populations sufficiently such that a second application is not necessary. In addition, soil systemic application of appropriate insecticide can also provide effective control.

Another strategy is to apply a contact insecticide in about a foot-wide band around the trunk of infested trees just as larvae begin moving down to pupate. If this strategy is employed area-wide, defoliation by the second generation and nuisance populations of overwintering elm leaf beetles can be reduced. Migration from untreated trees in the area will accomplish rapid reinfestation.

Elm species, hybrids, and horticultural varieties vary in their resistance to elm leaf beetle feeding. In ornamental settings, planting the most beetle-resistant and climate-appropriate elms will minimize elm leaf beetle problems.

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