



# TREES & SHRUBS

## Elm Leaf Beetles

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### Quick Facts...

Elm leaf beetles feed on elm tree leaves. During heavy infestations, leaf chewing affects the appearance of elm trees.

Spray with insecticides to control elm leaf beetles.

Trunk banding or systemic insecticides are alternative means to control elm leaf beetles on trees.

Elm leaf beetles may be serious nuisance problems when they enter homes to overwinter. They may become active during warm periods until they move outdoors or die.

Elm leaf beetles do not feed or reproduce when indoors.



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Elm leaf beetles can be serious pests of elm throughout Colorado. The insects feed on elm leaves and cause them to dry up and die. Heavily infested leaves die and give trees an unsightly, general brown color. Repeated injuries also weaken trees and make them prone to branch dieback and wind injury. Elm leaf beetles favor Siberian elms, but all elm species may be damaged during beetle outbreaks.

Elm leaf beetles do not transmit Dutch elm disease. This serious disease of American elm is spread by another insect, the European elm bark beetle. See fact sheet 5.506, *Dutch Elm Disease*.

Elm leaf beetles also are common nuisance pests in houses. Large numbers of beetles may seek overwintering shelter in and around homes. Masses of beetles become active in late winter and spring. They can be found crawling on windows and furnishings. Although elm leaf beetles do not reproduce indoors, their presence often causes concern.

### Life History and Habits

Elm leaf beetles overwinter in the adult (beetle) stage in protected locations. Cracks in homes, woodpiles and under debris are typical overwinter sites. During the wintering, the insects are in a state of suspended development and do not feed nor reproduce. However, beetles periodically become active during warm days and may move about in homes.

In midspring, beetles become increasingly active. When elm foliage emerges, the beetles fly to the trees and feed on expanding leaves. Feeding injuries by the adult beetles appear as small holes in the leaf. Over several weeks, female beetles lay a series of yellow egg masses on the leaves. The individual eggs resemble small footballs (Figure 1).

The immature larval (or grub) stage also feeds on the leaf, usually on the underside (Figure 2). They avoid the upper leaf surface and the larger leaf veins. Areas around the feeding site dry up and die. When a large area of the leaf has been fed on, the leaf may drop prematurely.

The larvae grow and molt (shed skins) repeatedly and go through three larval stages (instars). Within a few weeks, the larvae are full grown and cease feeding. At that time, they pupate (Figure 3). Most pupation takes place at the base of the tree, although some also occurs in folds in the bark. Within one to two weeks, the adult stage emerges from the pupae (Figure 4).

A second generation occurs in midsummer. Occasionally, in the southern areas of the state or where temperatures are warm, a third generation may occur. A cycle of leaf feeding injury may be associated with each generation. As day length shortens in August to less than 14 hours, adult beetles stop producing eggs. They then feed for a short while and seek overwintering shelter.



Figure 1: Females lay a series of yellow egg masses.



Figure 2: Elm leaf beetle larva.



Figure 3: Most pupae can be found at the base of the tree.



Figure 4: Adults emerge one to two weeks after pupation.

## Natural Controls

Few natural enemies feed on elm leaf beetles. Insect predators, such as predacious stink bugs and plant bugs, may feed on various stages of the elm leaf beetle. Pupae may be killed by a small wasp that develops in the insects. Small numbers of pupae also may be killed by fungus disease.

Weather probably is the most important factor that affects elm leaf beetle populations. Long winters or a late spring freeze may kill large numbers of overwintering beetles. Small larvae are susceptible to being blown or rubbed off trees during wind storms. This may be particularly common when larvae are forced to feed on older, tough leaves. This increases their wandering and many die in the process.

## Control on Trees

### Insecticides

Several insecticides (Table 1.) are effective controls when sprayed on foliage at the proper time in the life cycle. These treatments often are best applied after most eggs are laid by the overwintering females but before the larvae start to cause significant injury to the leaves. This typically occurs in early to mid-June.

Before applying insecticides, determine if the damaging stage is still present and threatens injury. Often, peak injury is apparent at the end of a feeding cycle and controls have little benefit. A single application made to control the first generation may provide adequate season-long control.

### *Bacillus thuringiensis*

Certain strains of *Bacillus thuringiensis* (Bt) have been developed to control certain beetles. These new strains (e.g., “san diego” strain, “tenebrionis” strain) are different than earlier types of Bt, which were effective only against the caterpillar stage of certain moths and butterflies. See 5.556, *Bacillus thuringiensis*. Bt insecticides that are effective against elm leaf beetle include M-One and Novodor.

An important advantage of the Bt products is their high degree of safety to humans, pets and wildlife.

Disadvantages include short persistence on foliage, typically less than 48 hours. Also, larger larvae are less susceptible than young larvae. These limitations require carefully timed treatments. Repeat treatments if egg laying extends over several weeks.

### Systemic Insecticides

Systemic insecticides move through the sap stream of elm. Of particular interest are those that can be picked up by plant roots after soil application or that may be injected into the trunk. They eliminate the need to spray, reducing problems with pesticide drift.

Presently there is one systemic insecticide, imidacloprid, registered for soil and trunk injection on elm. Trade names for commercial applicators include Merit (soil treatment) and Pointer (trunk injection). Furadan 15G and Disyston, applied as granules to the root system, were formerly labeled for control of elm leaf beetle. **These uses are no longer legal.**

Imidacloprid can provide excellent season-long control of elm leaf beetles. Furthermore, in some sites control the following season has been observed. However, because imidacloprid moves slowly in soil, it typically takes six to eight weeks after a soil application to effectively control elm leaf beetles feeding on the leaves. The treated area must be regularly watered following soil applications.

**Table 1: Insecticides useful for control of elm leaf beetle when applied as foliar sprays.**

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acephate (Orthene)  
bifenthrin (Talstar, etc.)  
carbaryl (Sevin)  
cyfluthrin (Tempo, etc.)  
deltamethrin (Deltaguard)  
neem (Azatin, etc.)  
permethrin (Astro, etc.)  
spinosad (Conserve)

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**Always read and follow label instructions for any insecticide.**

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## Trunk Banding

Some control of elm leaf beetle populations is possible by banding trunks with insecticide. Larvae that crawl across the band are killed.

Band trunks with insecticide sprays before larvae start to crawl down trunks in search of pupation sites. This period varies by location and season but often occurs in mid- to late June.

The bands should be at least 1 foot wide and placed on the trunk just below where the lowest major branches join the trunk. If needed, retreat in midsummer to control the second generation of beetle. It is important to treat most neighborhood elms if trunk banding is to adequately reduce the elm leaf beetle populations.

Any insecticide registered for use on elm or shade trees can be used for trunk banding. However, rates of dilution and use must not exceed the amounts indicated on the pesticide label. Pyrethroid insecticides, such as bifenthrin, permethrin, and cyfluthrin have shown effective persistence when used as trunk bands. Other insecticides, such as Sevin and Dursban, also may be suitable.

The advantages of trunk banding include ease of application, reduction of pesticide drift, and reduction of pesticide quantity used.

A major disadvantage of trunk banding is that it cannot prevent damage by the first generation larvae. Because overwintered adults lay eggs directly on the leaves, contact with the trunk band is not possible until after larvae finish feeding. If a thorough program is applied, expect to see a suppression of the second and third generation larval injury and a reduction in the numbers of overwintering beetles that shelter in homes. This requires that banding be properly applied and include most of the elms in the area.

Periodic sweeping or a shop vacuum can destroy larvae and pupae that gather at the base of a tree.

## Control in the Home

Houses located near heavy infestations of elm leaf beetles often suffer the immigrations of overwintering beetles into the home. Preventive steps and beetle control on nearby trees can reduce problems in homes.

Prior to periods when beetles move to homes, seal all cracks that allow entry. Caulk areas around window molding or under siding. Screens should be in place. Typically, adult beetles start to migrate to overwintering shelter in mid-August, but movements greatly increase by early September.

Some increase in control is possible if sealing is accompanied by spot insecticide treatment of the building exterior. Several household formulations of pyrethroid insecticides containing permethrin, bifenthrin and related compounds are available for this use from nurseries and similar outlets.

Regular vacuuming is most effective for beetles that are found within a home. This is best done during warm periods when most of the beetles are active and mass on windows or walls. During cooler periods, the overwintered beetles often return to sheltered areas.

Remember that elm leaf beetles do not reproduce in homes. Although they are periodically active, overwintered beetles do not feed or damage household foods and furnishings. Nuisance problems can be severe but will end by midspring, after all beetles have gone outdoors or died.

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