EUCALYPTUS TORTOISE BEETLE

Integrated Pest Management for Home Gardeners and Landscape Professionals

The eucalyptus tortoise beetle *(Trachymela sloanei)*, an Australian leaf beetle (family Chrysomelidae), was found in 1998 in Riverside County. It now occurs throughout southern California, in the Central Valley, and in the San Francisco Bay Area. Because adults are strong fliers, it is expected to spread to most locations where eucalyptus trees grow.

DAMAGE

Adult beetles and larvae chew semicircular or irregular notches along edges of eucalyptus leaves (Fig. 1). The beetles can remove most of a leaf's surface, leaving only the midvein. Adult beetles will also snip off young terminals as new foliage is produced by trees. Heavily infested trees lose most of their leaves, which increases tree stress. Although the eucalyptus tortoise beetle alone is not known to kill trees, this species adds to the more than one dozen new eucalyptus pests introduced into California during the last two decades. One or more of these other pests (such as longhorned borers or redgum lerp psyllid) or several pests or maladies in combination can kill trees, especially if growing conditions or tree care practices are not optimal.

The *Eucalyptus* species preferences of eucalyptus tortoise beetle have not been well documented, but certain tree species are apparently preferred or avoided by this beetle and other major eucalyptus pests as summarized and compared in Table 1.

IDENTIFICATION AND LIFE CYCLE

Eucalyptus tortoise beetle adults are hemispherical and brown with darker mottled spots (Fig. 2). Adults are about ¼ to ⅜ inch long and superficially resemble a large lady beetle. Female beetles lay 5 to 40 or more eggs in an irregular group under loose eucalyptus bark. Eggs are pinkish brown when laid and become dark purplish before hatching. Larvae resemble caterpillars (larvae of butterflies and moths) but can be distinguished by their appendages. Larvae of tortoise beetles (Fig. 2) and other leaf beetles have three pairs of true legs on their thorax and do not have any prolegs (fleshy, round, leglike protuberances) on their abdomen. Caterpillars and sawfly larvae have three pairs of true legs on their thorax plus several pairs of prolegs on their abdomen.

Tortoise beetle larvae are reddish brown to green and have a black head and black prothoracic shield (top and sides of the first segment behind the head). Larvae develop through four immature stages before pupating beneath loose bark adhering to trees or dropping from the canopy to pupate in the soil or litter around the base of host trees. At warm temperatures, development time from egg to adult may be as short as 5 weeks. There are several generations each year from late winter through fall.

Eucalyptus tortoise beetle can readily be distinguished from the only other eucalyptus tree defoliator reported in California, the eucalyptus snout beetle or gumtree weevil (*Gonipterus scutellatus*). Eucalyptus snout beetle adults are reddish brown weevils with an elongate head, as opposed to the hemispherical shape of the tortoise beetle. The legless snout beetle larvae are yellowish green with a slimy coating. Young snout beetle larvae feed by scraping leaf surfaces, leaving discolored trails of tissue and causing elongated holes in the center of leaves. Older snout beetle larvae feed along the margins of leaves and consume large irregular patches of leaf tissue. This snout beetle feeding pattern is distinctly different from the leaf-edge

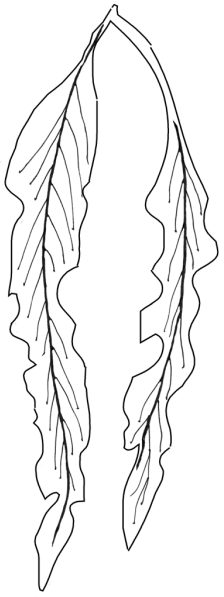

Figure 1. Eucalyptus tortoise beetle adults and larvae chew irregular notches along leaf edges.

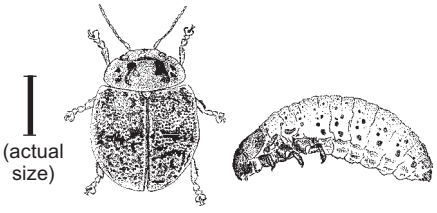

Figure 2. Eucalyptus tortoise beetle adult (left) and larva.

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Table 1. Approximate Relative Susceptibility of *Eucalyptus* Species to Several Introduced Pests in California.

Common name (gum)	*Eucalyptus* species	Longhorned borers[1]	Redgum lerp psyllid	Tortoise beetle
Australian beech	*polyanthemos*	—	L	L
blue	*globulus*	M	I–L[2]	M
desert	*rudis*	—	M	I
dollar leaf	*cinerea*	—	L	—
flooded	*grandis*	I	I	M
forest red	*tereticornis*	—	M	—
gray ironbark	*paniculata*	—	L	—
hybrid	*trabutii*	L	—	—
Karri	*diversicolor*	M	I	—
lemon	*citriodora*	L	I[3]	L
long flowered	*macandra*	—	I	—
manna	*viminalis*	M	I	M
mountain	*dalrympleana*	L	—	—
narrow leaved	*spathulata*	—	L	—
Nichol's willow leaved	*nicholii*	—	I	—
red flowering	*ficifolia*	—	L	L
red ironbark	*sideroxylon*	L	I–L	L
river red	*camaldulensis*	L	M	M
round leaved/red flowered	*platypus/nutans*	M	I–L	—
shining	*nitens*	M	M–I	—
silver	*crenulata*	—	—	L
silver dollar	*pulverulenta*	—	L[2]	—
spotted	*maculata*	—	—[3]	L
sugar	*cladocalyx*	L	I–L	—
swamp mahogany	*robusta*	L	L	—
Sydney blue	*saligna*	M	L	—
white ironbark	*leucoxylon*	—	I	—

— = information not available
M = more or most susceptible
I = intermediate susceptibility
L = less or least susceptible or reportedly not attacked

Redgum lerp psyllid = *Glycaspis brimblecombei*
Tortoise beetle = *Trachymela sloanei*

1 Longhorned borers = reported susceptibility to *Phoracantha semipunctata*, which is believed to be similar to the susceptibility to *P. recurva.*
2 Susceptible to bluegum psyllid (*Ctenarytaina eucalypti*), but this psyllid is generally under good biological control.
3 Susceptible to spotted gum psyllid (*Eucalyptolyma maideni*) and lemongum lerp psyllid (*Cryptoneossa triangula*).

Adapted partly from: Brennan et al. 2001, Hanks et al. 1995.

notching caused by tortoise beetles. Because eucalyptus snout beetle is under good biological control from an egg parasite (*Anaphes nitens*) introduced by University of California scientists, it is now uncommon and no longer a pest.

The cause of feeding damage and notched leaves of eucalyptus may not be obvious because most tortoise beetle larvae and adults hide under loose bark during the day and feed primarily at night. Also, they may be concentrated high in the tree. If no leaf-feeding adults or larvae are observed on foliage, inspect beneath loose bark where adults, egg masses, larvae, and possibly pupae can be observed and collected for identification.

MANAGEMENT

Eucalyptus trees are attacked by several other insects, including eucalyptus longhorned borers, redgum lerp psyllid, and other psyllids. For more information on these pests, see the *Pest Notes* listed in References. Some eucalyptus insects are now under good biological control, including bluegum psyllid (*Ctenarytaina eucalypti*) and eucalyptus snout beetle. Learn how management efforts may affect these introduced pests before taking any actions against eucalyptus tortoise beetles. Provide trees with good cultural care and avoid actions that are harmful to natural enemies being introduced to control this pest and other eucalyptus pests.

Cultural Control

Minimize tree stress by providing eucalyptus trees with proper cultural care and protecting them from injury. Depending on the situation, consider providing trees with supplemental water during periods of prolonged drought, such as during summer and fall in much of California. Some eucalyptus species are drought-tolerant, but others require more moisture. If irrigating, avoid frequent, shallow watering that is often used for lawns. A general recommendation is to irrigate eucalyptus trees infrequently (possibly once a month during drought periods) but with sufficient amounts so that the water penetrates deeply into the soil (perhaps about 1 foot or more below the surface). This can be achieved by applying water slowly through drip emitters that run continuously for several days. In areas without an established irrigation system, a water tank truck can be used to temporarily flood soil. However, avoid prolonged waterlogging, especially around the root crown, because eucalyptus trees are susceptible to pathogens such as Armillaria and Phytophthora root rot, which are favored by wet soils. The specific amount and frequency of water needed varies greatly depending on the site and tree species.

Biological Control

Eucalyptus tortoise beetle is not normally a pest in its native home of Australia; presumably natural enemies there keep beetle populations low. University of California scientists are introducing a tiny egg parasite (*Enoggera reticulata*, family Pteromalidae), originally from Australia, into California in an effort to control the beetle. This parasite searches under eucalyptus bark and in cracks and fis-

sures, laying its eggs in tortoise beetle eggs. The parasite larva feeds inside the egg, turning it reddish orange, often with black spots. An adult parasite then emerges to seek and attack more beetle eggs. In addition to beetle eggs killed by parasite larvae, adult female parasites feed on the eggs, which kills many additional beetle eggs.

It is not currently known whether biological control will become effective for the eucalyptus tortoise beetle. But whenever possible, avoid applying broad-spectrum, persistent insecticides to eucalyptus trees because these insecticides are often harmful to beneficial parasites.

Chemical Control

There is no research on pesticide effectiveness for controlling this pest, nor are there any pesticides specifically registered for use against this insect in California. Certain insecticides recommended for leaf beetles (see *Pest Notes: Elm Leaf Beetle*, listed in References) may be effective, but this is uncertain. Eucalyptus trees are often very large and difficult to treat. In contrast to leaf beetle species that spend most of their time on foliage, eucalyptus tortoise beetle often rests under loose bark where it may be protected from pesticides, making foliar spray applications less effective. Many eucalyptus trees are stressed from other problems, and tree stress can reduce pesticide efficacy as well as increase a tree's sensitivity to damage by the pesticide (called phytotoxicity). If insect damage cannot be tolerated and pesticides will be applied, make sure that trees are receiving good cultural care before making a pesticide application.

Systemic insecticides such as imidacloprid (Imicide, Merit) are most likely to be effective against eucalyptus tortoise beetle, although this has not been documented. Some of these products (Bayer Advanced Garden Tree & Shrub Insect Control) are available to home gardeners. Certain formulations of insecticides with systemic or translaminar activity (able to penetrate leaf tissue) can be sprayed onto foliage, but soil applications and tree injections (if labeled for these methods of application) minimize environmental contamination, are less disruptive of natural enemies of other insect pests, and are likely to be more effective against the tortoise beetle, which rests under loose bark and thus may not be contacted by a foliage spray.

When using systemic insecticides, consider making a soil application instead of spraying foliage or injecting or implanting trees whenever possible. Injecting or implanting trunks or roots injures trees, and it is difficult to repeatedly place insecticide at the proper depth. Especially avoid methods that cause large wounds, such as implants placed in holes drilled in trunks. Do not implant or inject roots or trunks more than once a year.

Based on use against other pests, the most effective time to apply imidacloprid on or into soil beneath trees is early spring, just before new leaves emerge. Make an application before rainfall, or follow the application with irrigation. Efficacy is delayed until sometime after application. Depending on the product label directions, the insecticide can be applied to soil immediately adjacent to the trunk or nearby bare soil, lawn, or planting beds where tree roots occur.

Because pesticide recommendations, registrations, labels, and products change regularly, check current product labels or contact the University of California Cooperative Extension in your county for the most up-to-date recommendations on the use of insecticides for controlling tortoise beetles.

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For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

AUTHORS: J. G. Millar, T. D. Paine, K. A. Campbell, R. W. Garrison, and S. H. Dreistadt
EDITOR: B. Ohlendorf
TECHNICAL EDITOR: M. L. Flint
DESIGN AND PRODUCTION: M. Brush
ILLUSTRATIONS: Fig. 1: S. H. Dreistadt; Fig. 2: R. W. Garrison

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