

Eucalyptus snout beetle detected in California

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The eucalyptus snout beetle is a defoliator with tremendous potential to damage urban and commercial forest plantings of eucalyptus. It has just recently been detected in California, but experience gained from other parts of the world gives us advance knowledge of its life history and host preferences. As with other recently introduced eucalyptus pests, use of host resistance and biological control appear to be the most appropriate management options.

Eucalyptus trees were long considered to be nearly insect-free trees suitable for planting in California. Since their introduction in 1856, various species have been widely planted for wood fiber production and as ornamentals in landscapes. Over the last decade, we have seen the introduction of three major eucalyptus pests. In 1984 *Phoracantha semipunctata* (Fab.), the eucalyptus longhorned borer (see page 34), was found in Orange County and in 1991 blue gum psyllid, *Ctenarytaina eucalypti* (Froggatt), was found in Prunedale (Monterey County).

The most recent pest to arrive is a eucalyptus defoliator, *Gonipterus scutellatus* Gyll., the eucalyptus snout beetle. An adult and many larvae of this familiar weevil were first found in mid-March in Ventura. Since then, populations have also been found in Somis and Camarillo (Ventura County), and in Malibu (Los Angeles County). This beetle has been extensively studied where it was accidentally introduced in southern and eastern Africa, Italy, France, Spain, New Zealand and Brazil. The following review of eucalyptus snout beetle biology is drawn mostly from experiences in those countries.

The eucalyptus snout beetle has life history traits peculiar to its own sub-

family, of which there are no examples native to North America. Unlike familiar weevils, which feed as larvae on the insides of plant tissues or in the soil, the larvae of eucalyptus snout beetle mostly feed on the outside of plant parts. Small grubs hatch from 2.5 mm long ootheca (egg capsules) about 10 to 20 days after these eggs are deposited. Like all weevils, the larvae of the eucalyptus snout beetle are legless. Adhesion to the leaf is probably enhanced by a secreted slime. The 11-mm long, fully grown larvae are light green, with rows of small black spots and a dark green stripe on each side. While larvae feed, they produce a fecal chain, in which the pellets remain linked to form a long coiling filament.

Young larvae eat tender leaf tissue, mostly between leaf veins, and leave either the upper or lower leaf epidermis intact. Older larvae chew on leaf edges, creating highly irregular notches. They also injure the sides and tips of soft new shoots. Apical buds are often killed by this feeding, forcing dormant lateral buds to break, which are fed upon. Intensive damage can kill larger branches, cause the branches to stop growing, or force stubby growth in a "witches broom."

Mature larvae lose some of their sliminess and drop from the foliage to burrow into the soil (30 to 40 days after egg hatch). There they form an earthen cell, in which they remain as prepupae (25 to 30 days), then as pupae (15 to 20 days), under warm conditions. When soil temperatures are cool, the prepupal and pupal development may require several months. Pupae molt to the adult stage, then remain underground until rain softens the soil, triggering their emergence. Under prolonged drought, there may be high mortality of adults trapped in the soil.

Adults are 6 to 10 mm long, with a short snout. The upper part of the body is a light rust to a dark brown.

Adults feed, scalloping leaf edges, for about a month before becoming reproductively mature. They can live quite a long time (3 to 6 months), during which time females can lay 700 to 800 eggs apiece. Oviposition only takes place on young leaves, so when trees are not actively growing, beetles enter a reproductive diapause.

Development of eucalyptus snout beetles, like all insects, is governed by surrounding temperatures. We expect two to three generations per year in southern California, with the three generations in inland areas. The adults are so long-lived that their presence overlaps that of their larval progeny, which will make determination of the number of generations more difficult.

When disturbed, the adults drop to the ground and feign death. They are very difficult to find because their color blends with the soil. Because eucalyptus trees are used extensively as windbreaks near the edges of agricultural fields and roads, we expect that adults dropping into fruit bins, nursery containers or onto vehicles may readily be transported to new locations. Both sexes are strong fliers, which assists in their rapid distribution over large areas. Other means of movement may be via eggs on leaves or pupae in the soil of transported plant material. In other parts of the world, infestations have advanced approximately 60 miles per year, with humans inadvertently contributing to additional movement.

The tree species known from surveys in South Africa to be most susceptible to damage is *Eucalyptus viminalis*, in which trees or large sections of trees are killed. *E. globulus* is nearly as heavily attacked; however, this species generally survives despite stunted growth. Extensive feeding will also take place on *E. robusta* and *E. sideroxylon*, while there is less damage to *E. leucoxylon*, *E. cladocalyx*, *E. citri-*

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erated losses of *E. viminalis* and *E. globulus*, and we expect suscepti-

bility of other *Eucalyptus* species to eucalyptus longhorned borer will be modified by the influence of defoliation stress caused by *Gonipterus*.

Nearly 80 years of experience has been gained in other areas of the world relating to management of the eucalyptus snout beetle. In South African and Mediterranean regions, the imported parasitic mymarid wasp has effectively suppressed snout beetle populations. A biological control program based on successful efforts in other parts of the world is currently being implemented by researchers at UC Riverside.

Until effective control measures are established for the eucalyptus longhorned borer and the eucalyptus snout beetle, new plantings of eucalyptus should consist of species such as *E. cladocalyx* and *E. citriodora*, which show resistance to both of these pests. Planting *E. viminalis* and *E. globulus* should be avoided. In addition, proper tree care that promotes tree vigor and reduces stress will help protect established eucalyptus. To assist in planning parasite releases, any suspected infestations of eucalyptus snout beetle should be brought to the attention of entomologists at county agricultural commissioner's offices.

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dora, *E. diversicolor*, *E. polyanthemus*, and *E. saligna* may be fed upon slightly by adults, or not fed upon at all.

Tree mortality due to eucalyptus longhorned borer is greatly increased when three conditions are met: 1) the species is susceptible, 2) local densities of adult beetles are high, and 3) the trees are stressed. Pollarding (removing the tops) of eucalyptus is one stress known to induce attack by the longhorned borer. Where eucalyptus longhorned borer and snout beetles are found together there may be accel-

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