

# Predator warfare in Calif.: Wasps gain ground in fight against eucalyptus borer, psyllid pest

**RIVERSIDE, Calif., SAN DIEGO—** Researchers here are making progress in their battle against the eugenia psyllid and eucalyptus borer; two hearty pests in landscape plants.

University of California Riverside entomologists report that arsenals of tiny, stingless wasps are effective against the eucalyptus longhorned borer, a pest which has the potential to destroy one of the state's favorite landscape trees.

The combination of biological predator control and tree selection should reduce the beetle borer population.

In San Diego, New Way Landscape Services Company has successfully colonized the eugenia psyllid wasp. The psyllid has been a chronic problem for about three years in San Diego. It stunts the foliage of eugenias, and leaves thousands of ugly bumps on the leaves.

UCR entomologists released the Australian wasps this year at six sites in Southern California and one site in Northern California, with much success.

The inch-long rust brown and yellow beetle is killing eucalyptus trees as far north as San Francisco.

The predator wasps—*Avetianella* and *Syngaster*—are the size of a grain of pepper. *Avetianella* lays its eggs inside those of the beetle, underneath the loose bark of eucalyptus trees. The newborn wasps feed on the eggs of the beetle, interrupting the breeding cycle. *Syngaster* lays its eggs inside the beetle larvae, the immature form of the beetle which is responsible for the tree damage.

Three other stingless wasps are being studied in the UCR lab for their potential against the borer.

**They're spreading.** "At all of the sites, we found eggs laid by beetles that were parasitized by the wasp," says Larry Hanks, a postdoctoral scientist at UCR working on the project with faculty members Timothy Paine and Jocelyn Millar.



The eucalyptus borer must be stopped in the larval stage.

Photo by Max Badgley

"They also appear to be parasitizing a high percentage of the eggs, in some cases up to 90 percent."

The Southern California release sites are in San Diego, Rancho Santa Fe, Fontana, Pacific Palisades and Riverside, where there are two sites on the UCR campus. The seventh release site is in Palo Alto on the campus of Stanford University.

The *Avetianella* wasp has been found 10 miles from the initial release sites. An estimated 45,000 of the egg-parasitizing

wasps have been released at the seven sites since July 1, with perhaps another 30,000 to be released by the end of the beetle's breeding season in early fall.

The experiments are being conducted in urban forests, where the large number of trees over large areas will improve the wasp's chances of reproducing and dispersing to other areas.

The eucalyptus longhorned borer is the

*continued on next page*

## Cultural control includes keeping trees healthy, better waste management

University of California Riverside entomologists Timothy Paine and Jocelyn Millar say a number of preventive measures will help protect eucalyptus trees from the borer pest.

Once an infestation is discovered, it is often too late to save a tree, say Millar and Paine, adding that the recently ended six-year drought provided ideal conditions for the beetle population to grow. Drought-stressed trees are especially vulnerable to beetle attacks.

Some eucalyptus varieties are less attractive to the borer. UCR research has shown that the swamp mahogany, red ironbark, red gum, lemon-scented gum and sugar gum varieties of eucalyptus are somewhat resistant to the beetle, while the Sydney blue gum, dwarf blue gum and manna gum are highly susceptible to the beetle.

- Healthy trees that receive adequate irrigation and proper pruning are better able to fend off a beetle attack. Healthy trees maintain a high moisture content in the outer bark; this drowns the newly hatched larvae as they try to mine into it.

- Prune between November and March, times when the beetles are not active. Egg-laying beetles are attracted to the smell of freshly cut trees and logs.

- Store beneath black plastic. This prevents beetles from reaching the freshly cut logs, and kills any larvae already beneath the bark. Chip the prunings for mulch.

- Remove all dead eucalyptus trees. Wood infested with beetles should be burned, buried, chipped or covered to destroy the germinating beetles.



first major pest of California's eucalyptus trees, first planted about a century ago for use as windbreaks, telephone poles, lumber, paper pulp and fuel. The evergreen tree has since become a popular urban



The *Syngaster* wasp lays its eggs inside beetle larvae.

Photo by Max Badgley

landscape feature because it grows fast and needs little maintenance.

The borer was first discovered in 1984 near El Toro in Orange County, throughout the state, in both coastal and valley areas, as far north as the Bay Area and the Sacramento valley.

The adult borers eat pollen and nectar, and do not damage trees. The larvae do all the damage, as they bore into the inner bark to feed on it and on the underlying cambium tissues.

The beetle has become a pest in part because it was brought here from Australia without its natural enemies. In Australia, a variety of natural enemies help keep the beetle population in check, according to University of California Riverside entomologists, who are studying five of those natural enemies.

In San Diego, Stan Rys, pest management director for New Way Professional Landscape Services, has been colonizing the eugenia psyllid wasp at 12 different breeding grounds, including North Park, Golden Hills and Mission Hills. The wasps were recently released in various parts of Southern San Diego.

New Way specializes in landscape maintenance for commercial properties, home owners associations and apartments. Its pest department specializes in biological alternatives to combat pest problems.

For more information about New Way's approach to predator research, contact Stan Rys or Randy Newhard, at (619) 566-1400.

## Considering IPM? First learn crew strengths, weaknesses

■ In an Integrated Pest Management program, pesticides are only placed where pests are causing a problem in the landscape.

If you want to begin an IPM program, you must train your people to be able to identify pests and diagnose problems.

Dr. Cliff Sadof, entomologist at Purdue University, offers these suggestions for proper IPM implementation:

● **What are your appearance standards?** Prioritize management so the plants you want to look their best do look their best.

● **Map your inventory.** Assess plant condition, and record the occurrence of pest, disease and cultural problems directly on the maps. This will simplify how you track plant quality during the season.

**F**ind out who knows what about IPM, and train those who need to know more. Ask your extension agent for tips on training and certification.

● **Monitor and keep records.** Use a rating system for plant condition, and record the cause of any decline, on a new map, at least twice a month. This helps you accurately communicate where and when to apply products.

● **Put scouts to work.** As used here, scouting refers to plant inspection and observation. A well-coordinated scouting program can reduce the time used for monitoring.

● **Choose treatments.** Know when a pest is most destructive. Spider mites, for example, cause leaves to lose color; the mites thrive in hot, dry weather. Therefore, they'd be a bigger threat in July than in September.

Look for trends that might hint at a rush of pest activity.

● **Treatment.** Apply chemical control products to small areas if possible. Use alternatives to long-lasting products. Natural predators should be preserved whenever possible.

Learn about insecticidal soaps and oils.

Some basics are listed below.

● **Evaluate.** Use your plant quality records to determine success. Have complaints or comments about pesticide use increased or decreased.

Summarize your IPM records to help you focus your future pest management efforts. Focus your attention on the handful of pests doing most of the damage.

### Soaps, oils favorite IPM weapons

**Insecticidal soaps**, like other soaps, are made from the salts of fatty acids. They are used to control soft-bodied pests such as aphids, thrips, scales in crawler stage, whiteflies, leafhopper nymphs and mites. The common insecticidal soaps now available commercially contain potassium oleate—the potassium salt of oleic acid—as the active ingredient.

Some soap products contain pyrethrins or citrus oil derivatives. Some insecticidal products contain soaps or shampoos in combination with organophosphates or other kinds of insecticides (such as pet shampoos).

The toxic action of the soap disrupts the insect's outer body covering, and may enter the respiratory system.

**Oils.** Essential oils are volatile (disperse as a gas), odorous oils from plant sources. Many are generally considered to be safe, however they can irritate skin and mucous membranes at high concentrations.

The most common oils used as repellants are cedar, lavender, eucalyptus, pennyroyal and citronella.

**Neem** products are derived from the Indian neem tree. Neem acts as a feeding deterrent in insects. In various forms it also serves as a repellent, growth regulator, suppressant, sterilant or toxin.

Susceptibility to neem differs by species.