

# 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.

## PRODUCT-OF-THE-MONTH

### Bioinoculant adds N to soil

TurfTech II, from Soil Technologies Corp., is a nonburning, odorless soil bioinoculant for managing soil fertility.

TurfTech II consists of dormant microorganisms in a wettable powder.

TurfTech II can be used on any turfgrass species. When applied to the soil, the legume-like microbes in TurfTech II come to life and begin producing organic compounds, including nitrogen from nitrogen fixation, polysaccharides and plant growth hormones.

According to the company, The chemistries delivered by TurfTech II produce the effect of a true biofertilizer. In research around the world, the cyanobacteria in TurfTech II have been shown to

add up to 1/2 to one lb. of nitrogen per 1000 sq. ft. per application.

"It does what it's supposed to do," says Bob Cohen, president of The Green Scene in Sun Valley, Calif.

For years, Cohen struggled to keep clients' lawns lush in spite of drought and heat stress. He thought just plain water would do the trick. He thought wrong, he realizes.

Cohen then tried TurfTech II in May 1992. "We loaded our 100-gallon tanks with 1-1/2 teaspoons of dechlorinator and two ounces of TurfTech II; we cut back the urea (the low-biuret type) from 40 lbs. per half-acre down to 10 lbs."

Cohen adds a half-pound of iron sul-

phate and a half-pound of 13 percent iron chelate for deeper color and quicker response.

"In the spring and fall," says Cohen, "we add some soluble P and K as well."

"...the material seems as safe as can be," reports Cohen. "Since we gave up wetting agents and humus extracts, the complaints of 'burn' have dropped to nil. In fact, nearly all of our 'poor color' complaints turn out to be dry areas caused by poor irrigation coverage."

Cohen reports that TurfTech II brings moderate green-up upon application (partly to the credit of the urea). "But instead of tailing off after a month or so, the green keeps on going. We service every eight weeks, and we haven't had a complaint about our lawns not staying green through the service period," says Cohen.

Cohen says ornamentals also respond well to the product.

"Seems that any planting that keeps the soil surface covered will respond well to TurfTech II treatment," says Cohen. "Without that typical N-surge of chemical fertilizers, the plants seem to seek out the 'right' combination of N-P-K to perform seasonally. And I believe we are also bringing the pH of our alkaline soils down with the built-in humic acids."

Soil Technologies Corp. is headquartered in Fairfield, Iowa.

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The test plot on the left shows initial green-up after TurfTech II application. No fertilizer was applied to the plot.

## PRODUCT SHOWCASE

### Compost bio-excelerator speeds humus production

Espoma Compost Bio-Excellerator makes composting easy, and helps speed the production of rich, fertile humus.

The bio-organic formula in Espoma Bio-Excellerator contains billions of microbes cultured for composting, as well as an energy source. The microbes in Espoma are especially cultured to thrive in moderate and high heat environments.

Natural organic compounds are included to neutralize the organic acids produced during composting.

The organic compost produced with Compost Bio-Excellerator can be used in flower beds, vegetable gardens, lawns and

potted plants.

Detailed instructions as well as additional suggestions for successful composting are contained on the bag.

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### Fertilizer company specializes in municipal, utility clients

MBT Fertilizers, Inc. is a contract service company that specializes in providing its Hou-Actinite natural organic fertilizer to municipal, utility and corporate clients. The Milwaukee, Wisc.-based company provides material handling, transportation and packing services.

Hou-Actinite has a guaranteed analysis

of 5-2-0, with two percent iron content.

The product is available as tiny pellets about the size of a pin head. The company says Hou-Actinite is non-burning and slow-release.

The company's new operating system guarantees the product particle size to be less than #6 mesh and greater than #35 mesh.

Plans include providing a product size of smaller than #6 and greater than #16 mesh for special industrial use.

Hou-Actinite meets or exceeds all EPA #503 regulatory requirements for Exceptional Quality Sludge.

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should be two weeks prior to overseeding. Multiple applications provide the best control, but require appropriate timing, multiple passes and careful planning.

Post-emergence annual bluegrass control is limited in overseeded situations, since Prograss is the only available material. To prevent undesirable turfgrass injury, Prograss should be used 30-45 days after overseeding when the bermudagrass is completely dormant. A subsequent application may be made—but not after January, or green-up may be delayed. Prograss is not recommended in subtropical areas like Florida where bermuda does not normally go completely dormant.

Post-emergence broadleaf weed control is also available with 2,4-D alone or combined with 2,4-DP, MCPP or dicamba. These should not be applied until the ryegrass has become fully established—generally, not until it has been mowed at least three times. Only the lowest recommended rate should be used on overseeded rye, and usually must be repeated in 10-14 days. Use these controls when temperatures are more than 40° F.

Basagran T/O can also be used to control selective annual winter broadleaf weeds, but generally is less effective on biennial or perennial weeds. Repeat applications may be required three weeks apart for complete control. Basagran T/O

is not available for golf greens or collars.

A serious weed adjacent to many overseeded areas is the off-site movement of overseeded ryegrass seeds. If a pre-emergent is not used, either Kerb or DMC Weed Control may be used post-emergence. These must be applied early (December), or control efficacy is reduced and time required for control significantly increases.

Do not use Kerb, simazine, atrazine or DMC Weed Control on or up-slope of desirable overseeded ryegrass.

—The author is turf specialist at the University of Florida in Gainesville.

(table on page 38)

**Table 1 Southern turfgrass tolerance to post-emergence herbicides**

Herbicide	Bahiagrass	Bermudagrass	Carpetgrass	Centipedegrass	St. Augustine	Zoysiagrass	Overseeded rye
atrazine (Aatrex +others)	NR	I <sup>2</sup>	I	S-I	S-I	I	D
Basagran T/O	S	S	S	S	S	S	S-I
2,4-D	S	S	I	S-I	S	S	S-I
2,4-D+dicamba	S	S	I	S-I	I	S	S-I
2,4-D +dichlor- prop(2,4-DP)	S	S	I	S-I	I	S	I-D
2,4-D +MCPP	S	S	I	S-I	I	S	I-D
2,4-D + MCPP+ dicamba	S	S	I	S-I	I	S	I-D
2,4-D+MCPP+ 2,4-DP	S	S	I	S-I	I	S	I-D
dicamba (Banvel + others)	S	S	I	S-I	I	S	I
MCPA+MCPP+ 2,4-DP	S	S	I	S-I	I	I	I-D
MCPP	S	S	I	S-I	I	S	I
DMC weed control	D	S	NR	S-I	S-I	S	D
Kerb	NR	S	NR	NR	NR	NR	D
simazine (Princep+others)	NR	I <sup>2</sup>	I	S-I	S-I	I	D

S=safe at labeled rates; I=intermediate safety, use at reduced rates; D=damaging, do not use; NR=not registered for use on this turfgrass.

<sup>1</sup> Atrazine and simazine should be used on bermudagrass only during fall and early winter. Do not use during spring green-up.



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Table 2

## Susceptibility of broadleaf weeds to turf herbicides

Weed	Atrazine/ Simazine	2,4-D	Mecoprop (or MCPP)	Dicamba	2,4-D+ MCPP	2,4-D+ 2,4-DP	2,4-D+MCPP +dicamba	2,4-D+ triclopyr	DMC Weed Control
Florida betony	S-I	I	I	I-S	I	I	I-S	—	—
Hairy bittercress	—	S	I	S	S	S	S	—	—
Black medic	—	R	I	S	I	S	S	—	—
Burclover	—	I-R	S	S	S-I	S	S	—	—
Buttercups	I	S-I	I	I-R	S	S	S	—	—
Wild carrot	—	I	I	S	I	S-I	S	—	S
Common chickweed	S	R	S-I	S	S	S	S	S	S
Chicory	—	S	S	S	S	S	S	—	—
Cinquefoil	—	S-I	S-I	S-I	S-I	S-I	S-I	—	—
Hop clover	S	I	S	S	S	S	S	S	—
White clover	S	I	S	S	S	S	S	S-I	S
Dandelion	I-R	S	S	S	S	S	S	I-S	S
Wild garlic	—	S-I	R	S-I	S-I	S-I	S-I	—	S-I
Carolina geranium	—	S	S-I	S	S	S	S	—	S-I
Healall	—	S	R	S-I	S	S	S	—	—
Henbit	S	I-R	I	S	I	S-I	S	S	S-I
Ground ivy	—	I-R	I	S-I	I	I-S	S-I	—	—
Knawel	—	R	I	S	S-I	S-I	S	—	—
Wild mustard	S	S	I	S	S	S-I	S	—	I
Wild onion	—	I	R	S-I	I	I	S	—	S-I
Parsley-piert	S	R	S-I	S-I	S-I	R	S-I	S	—
Lawn pennywort	S	S-I	S-I	S-I	S-I	S-I	S-I	—	—
Pepperweed	—	S	S-I	S	S-I	S	S	—	—
Shepherd's-purse	—	S	S-I	S	S-I	S	S	—	—
Corn speedwell	S	I-R	I-R	I-R	I-R	I-R	I-R	—	—
Spurweed	S-I	I	S-I	S	S-I	I	S	S	—
India mock strawberry	—	R	S-I	I	R	S-I	—	—	—
Thistles	—	S-I	I	S	S-I	S-I	S	—	I
Violet, johnny jumpup	—	I-R	I-R	S-I	I-R	I	I-R	—	—
Yellow rocket	—	S-I	I	S-I	S-I	S-I	S	—	—

S=Susceptible; I=intermediately susceptible, good control sometimes with high rates; however a repeat treatment three to four weeks later each at the standard or reduced rate is usually more effective; R=resistant in most cases. Not all weeds have been tested for susceptibility to each herbicide listed.





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# GOLF

## 'SCAPING

# Multi-course management tricks

**If you've got more than one golf course to maintain, you'll want to know these 'tricks' to avoid getting pelted with tomatoes from your audience: the players and members.**

■ You, as a golf course superintendent, are a juggler. You try to keep all the plates spinning at one time: equipment, personnel, greens committees, budgets, members.

Now imagine that someone just tossed more plates at you. Now you've got to juggle the management of six golf courses.

That's what John Betts faces when he gets up every morning. And, by all accounts, he's not managed to break any plates yet.

Betts oversees five high-profile courses in Hilton Head, S.C., where he's one of a very few Certified Golf Course Superintendents. He has another course in Charleston. Each of the courses has its own super, though, making the juggling act a little easier to pull off.

"We try to manage our operation by staff consensus," Betts says, "but at the same time realizing that time comes when somebody has to make a decision.

"I try to involve as many qualified people in the decision-making. I didn't write a book on this stuff, but we've been successful doing things this way. That's not to say that I haven't made some wrong decisions, though, and I will in the future."

**People power**—The courses and their superintendents are: Robert Bagonzi at the Robert Trent-Jones- and George

**John Betts:** says it's not easy to fool Mother Nature. 'But we're dense. We don't learn very quickly.'



Fazio-designed courses at Palmetto Dunes; Rich Maxfield at Palmetto Dunes's Art Hills course; Tom Metzger at the Robert Cupp and Hills courses at Palmetto Hall; and Tom Arneman at Coosaw Creek in Charleston.

"I consider myself the fireman," Betts observes. "I can tour the courses and see things that don't come out and grab my superintendents like they do me. There are enough fires that there's always something to be addressed. But I try to stay out of their hair on a day-to-day basis."

The key to keeping things spinning is keeping employees—beyond the individual superintendents—happy.

"It's hard, when you have 60 or 75 employees, to treat everybody as individuals," says Betts. "But we do a darned good job of being fair and con-

sistent. That's not to say that we don't have our problems, but when you have that many individuals, the potential for problems is greater.

"Our employees all basically get along, and they're all treated well. They work hard, and I would give a lot of them the shirt off my back."

**Tweaking Mom**—Because of the inherent problems with running resorts in a high-profile area like Hilton Head, the golfing season is getting longer. So Betts is finding that he's having to "tweak" Mother Nature.

"The season gets a week longer each year," notes Betts. "February 15th is now a little earlier. And we're busy until Thanksgiving.

"The toughest thing in this business is

*continued on page 42*