Bronze Bug: A New Threat to Eucalypts in California

The bronze bug (*Thaumastocoris peregrinus*) (Fig. 1) a serious and potentially damaging, sap-sucking insect pest of eucalypts, has very recently been detected in southern California. This pest is reported to destroy extensive areas of leaf tissue, often giving it a bronze tint (yellow, red, and then brown to tan); eventually causing leaf loss, canopy thinning, branch die back, and even tree death. A wide host range among eucalypts and its ability to survive in a variety of climate zones have made this small pest especially invasive.

**History**

Native to Australia, little was known about the bronze bug prior to 2002 when significant populations of the pest suddenly occurred on ornamental landscape plantings in Sydney. The bronze bug has since spread rapidly to countries in Africa, Europe, South America, New Zealand, and now, North America. The bronze bug was first detected in California in early June 2016, on a eucalyptus tree (*Eucalyptus spp.*) in North Hollywood in the San Fernando Valley. It was found again in July in Long Beach (SE Los Angeles County) on *E. globulus* (blue gum). These sightings are apparently new records for North America. The pest is now likely widespread in eucalypt-rich southern California.

**Host Range**


**Insect Identification**

Adult bronze bugs have a flattened, elongated body and are very small (only 2 to 3 mm long, see Fig. 1). They are light brown, often shiny, and have darker or reddish brown areas.

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on the thorax and abdomen. The head is broad with bulging, red eyes and elongate, conspicuous mouthparts (tucked under the body). Antennae are light brown with black tips.

Eggs are laid in clusters on leaves and twigs (Fig. 3) and are dark, oval, 0.5 mm long, 0.2 mm wide and appear as tar-like marks (Fig. 4). Nymphs are orange with dark brown spots. The eyes and the area around dorsal abdominal scent glands are red (Fig. 5).

**Biology**

Bronze bug adults and nymphs typically occur together on the same leaves. Developmental time from egg to adult is about 20 days at temperatures between 63 and 68°F with 5 nymphal instars. Adult females live about 15 days and each female can lay up to 60 eggs. Eggs hatch in 4 to 8 days.

The bronze bug is thought to have dispersed to new regions primarily on infested plant material. Eggs can be found on leaves, bark, flowers and inflorescences, and fruit; adults on leaves and seedlings; and nymphs on above-ground stems, shoots, trunks, and branches.

Within a region, long-distance flight is thought to be the primary method of dispersal although wind and birds are also implicated as dispersal mechanisms. It is also possible that these pests can hitchhike on travelers’ clothes, aircraft, land vehicles, and luggage.

**Symptoms and Damage**

Because bronze bugs are gregarious and typically occur in high density colonies of nymphs and adults together, the first indication of an infestation might be the insects themselves, their black egg cases, and their black, shiny, varnish-like, tiny, pin-point fecal deposits (Fig. 6).

Initially, leaves may be heavily infested yet show no discoloration or other symptoms. To date, we have been unable to conclusively confirm incidences in California of the typical leaf discoloration reported in the literature as caused by the bronze bug. Leaf bronzing and other abnormal-appearing growth patterns are fairly common on healthy and pest-free trees across the genera *Corymbia* and *Eucalyptus*, and can be due to factors such as cultivation, senescence, and normal physiological responses (Fig. 7). Advanced and or heavy infestations eventually lead to extensive areas of chlorotic and necrotic tissue that is tannish or silvery, as if chlorophyll has been removed in irregular patches. In these instances, abundant adults, nymphs, and black egg cases are typically visible. Severe infestations can lead to leaf loss, canopy thinning, branch die back, and even tree death. Severe symptoms are especially common on *E. camaldulensis*, *E. grandis*, and *E. viminalis* while symptoms are often less severe in other species, and may include only silvering.

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The West Coast Rodent Academy (WCRA) is a three-day intensive educational workshop hosted by University of California Cooperative Extension in association with the Pest Control Operators of California, Target Specialty Products and Univar. The event was recently held at the University of California’s Agricultural and Natural Resources South Coast Research and Extension Center (SCREC) in Irvine, CA.

Managing rodents in urban environments can often be very challenging. The WCRA was created to help pest management professionals (PMPs) better understand rodent ecology and integrated pest management (IPM) of commensal rodents.

The unique workshop—which includes lectures, hand-on activities and break-out sessions—gives PMPs the opportunity to learn about rodent disease, monitoring, trapping, urban rodent surveys, and much more. Participants are also provided with opportunities to learn about good environmental stewardship practices and provided with updates on the laws and regulations concerning trapping and the use of pesticides.

WCRA instructors consist of University researchers, county-based biologists, and industry experts. They provide real-life scenarios at the Demonstration Landscapes at the SCREC, enabling students to attain a comprehensive and hands-on experience while learning about commensal rodent management in urban environments. There is limited space available at the bi-annual workshops; this allows for increased interaction with the instructors, leaving participants with a greatly enhanced understanding of commensal rodent management.

The next WCRA will be offered at the SCREC in October 2017. For more information on the Academy, please contact rodentacademy@ucanr.edu.

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Bronze Bug

Management

Because the bronze bug is primarily spread over long distances on plant material among urban centers by humans, better monitoring and control programs at transportation hubs are critical to prevent spread of this pest. Biological control might be one way to control the bronze bug. Two parasitic wasps have been established as egg parasitoids of the bronze bug in Australia but their effectiveness has not been thoroughly assessed.

Lacewings, assassin bugs, a predatory stink bug, and entomopathogenic fungi such as Beauveria bassiana and Erynia radicans, have all been reported as natural enemies of the bronze bug in other countries.

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Read the full article including cited references at http://ucanr.edu/sites/HodelPalmsTrees/ and direct link http://ucanr.edu/sites/HodelPalmsTrees/files/248430.pdf
Using Herbicides Safely Around Trees

It’s among every landscape professional’s worst nightmares: returning to a landscape recently treated with an herbicide to find previously healthy trees looking “strange.” These strange findings could be leaves with bleached-out veins, twisted shoots, dying twigs, or stunted new growth appearing in unusual places.

This nightmare situation occurred several years ago on coniferous trees in many Midwestern landscapes where a presumably “safe” herbicide labeled for use in turf, Imprelis, had been used (aminocyclopyrachlor; never registered in California and no longer being sold) (Fig. 1).

As landscapes become more complex – combining trees, shrubs, grasses, and forbs – and as their management goals widen to include water conservation, carbon storage, and even food production, landscape managers need to be vigilant about both the previously-unknown negative effects of herbicides as well as known-but-avoidable application mistakes, especially around mature trees – the most valuable component of our landscapes.

General concepts about herbicide use in landscapes

It is generally accepted that herbicides can be a part of an economical weed management program and can even be indispensable in some situations: on steep slopes or areas that are otherwise inaccessible to hand-weeding or mowing, for suppression of re-sprouting in woody weeds, for allergic weed species, fuel reduction, etc.

In many landscapes, weed suppression by mulching and mowing can be successful as primary management methods. In addition, weed control around older established trees is usually not as important as it is around younger ones whose establishment might be compromised by the competing weeds.

Because herbicides can damage or kill susceptible plants regardless of whether they are weeds or desired, they have at least some potential to damage trees. The risks in using herbicides around trees, both mature and establishing, should be carefully considered. We discuss below the issues and techniques that may help to minimize the chances of damage.

Before you use an herbicide:

- Read the label! Ensure that your chosen herbicide includes on its label both the weed species and site type where you intend to apply. Keep in mind that this is just the starting point. For example, Imprelis was used according to label guidelines on turf but nearby trees were nevertheless affected. Understand the risks of herbicide applications “moving around” the landscape (see table below on page 6).
- Check the site for environmentally sensitive areas: ponds, wetlands, historical plantings, etc. and reconsider your weed management options.
- Check the soil type and determine if there will be issues with runoff or leaching (see table on page 6). Also check the label for any guidelines or restrictions on soil types, and then apply the rate most appropriate for your site. Herbicide movement in the landscape can lead to serious damage to trees.

Avoid spray drift, runoff, and leaching

These are the three primary mechanisms by which herbicides “get around” the landscape. Volatilization is the movement of pesticide vapors through the air and some herbicides have been shown to volatize and cause injury in closed structures such as greenhouses. However, volatilization is generally not considered to be a problem for most herbicides outdoors unless air temperature during application is over 90°F (in which case you may also be in violation of other health and safety regulations).

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Herbicide Use Around Trees

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<table>
<thead>
<tr>
<th>Movement</th>
<th>in the air (spray drift)</th>
<th>in the water</th>
<th>with the soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happens when...</td>
<td>Herbicide spray droplets land on unintended plants: drift</td>
<td>Herbicide flows down into the soil (leaching), or flows away in runoff water</td>
<td>Herbicide moves on soil particles (erosion) either dry or in water</td>
</tr>
<tr>
<td>Importance</td>
<td>Can directly damage nontarget plants</td>
<td>Can damage plants in lower parts of the landscape (runoff) or tree roots (leaching)</td>
<td>Unusual in landscapes but soil erosion from treated areas to tree roots can cause injury</td>
</tr>
<tr>
<td>Prevention</td>
<td>Use granular formulations; apply only when winds are 3 to 7 mph; use larger droplets by changing nozzles and/or pressure, use a spray shield (Fig. 2), a wick or another spot-applicator (Fig. 3)</td>
<td>Avoid applying before heavy rains, avoid over-irrigating, check drainage patterns</td>
<td>Use mulch to reduce erosion, check irrigation for leaks, check erosion pattern</td>
</tr>
<tr>
<td>Remember</td>
<td>Train applicators about the specific devices in use; how to calibrate &amp; maintain equipment; how to prevent water runoff and soil erosion; and to pay attention during application!</td>
<td>Know your herbicide properties, landscape water system, and soil type!</td>
<td></td>
</tr>
</tbody>
</table>

To minimize chances of problems, understand these important factors:

**Know your herbicide**
- **Water solubility**
  - Amount of material that can dissolve in water (in ppm or mg/L)
  - Higher numbers indicate higher solubility
  - Herbicides that dissolve well in water can also wash off plants and run off easily!
- **Adsorption coefficient (K<sub>oc</sub>)**
  - Measures how strongly pesticide sticks to soil organic matter, ranges 2 - 100,000
  - Pesticides with high K<sub>oc</sub> bind to soil and are unlikely to be washed or leached away
- **Persistence (or half-life)**
  - Time an herbicide remains in its original form
  - Herbicides that remain for many weeks are more available to move in runoff

**Know your soil and water**
- **Soil Texture (aka soil type)**
  - Proportion of sand, silt and clay, the “feel” of the soil
  - Leaching is greatest (i.e. worst) in sandy soils, less in silt or loam, and least in clay
  - Watch out for leaching when herbicide is applied over a sandy soil, then watered!
- **Water availability (aka rain)**
  - Avoid applying herbicides just before rainfall
  - Do not over-water the landscape after application
  - Applied herbicide that is moved in water can damage surrounding plants!
- **Water movement**
  - Note where water will move; slopes, low spots, etc.
  - Greater chance for damage if treated area is on any of the above landscape features

**Know the damage symptoms**
- **Herbicide damage**
  - Severity varies by herbicide, and by plant
  - Can be difficult to diagnose, especially with systemic herbicides applied to soil
  - Little can be done to reverse the damage, so ensure careful application!
- **Typical symptoms**
  - Yellowing (chlorosis)
  - Bleaching
  - Root stunting
  - Distorted growth
  - Death of leaves
  - Yellow leaf veins

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Herbicide Use Around Trees ...continued from page 5

Special situations: look out for possible problems in these situations:

**Trees in turf**
Herbicides intended for turf can impact trees, especially trees with:

- **shallow roots** (systemic uptake, e.g. trichlopyr), or roots extending under pathways or other areas where non-selective herbicides are applied;
- **grafting roots** (i.e., roots naturally connected underground) where treating one tree may damage the adjacent trees of the same species;
- **low-hanging branches** (impacted by herbicide drift from turf);
- **with thin bark** (esp. glyphosate, which can penetrate if drifted onto thin bark).

**Shared equipment**
Application equipment (tanks, sprayers, etc.) that is used for herbicides should ideally not be used for anything else, and should be clearly marked. If you borrow spray equipment, do you know if it had been used for herbicides?

**“The Unknown unknowns”**
Finally, keep in mind that our understanding of how herbicides can affect trees is incomplete, especially for new products, like Imprelis, mentioned at the beginning of this article, but also for unusual landscape situations.

In other words, unhappy surprises are possible whenever herbicides are used in complex landscapes. If you are unwilling to risk damage to your landscape trees, consider carefully:

- Your need for a herbicide (could other management methods suffice?)
- Your understanding of the herbicide action, and movement;
- Your confidence in using the proper application technique.

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**PESTS IN THE URBAN LANDSCAPE**
ucanr.edu/blogs/ucipmurbanpests

**Check out our UC IPM urban pest management blog!**

Our blog provides readers with timely information about pests in and around homes, gardens, landscapes, and structures in California. We post short pieces about common seasonal pests, invasive pests, beneficials, and new UC IPM resources, including new and revised Pest Notes, training events, and other educational materials for residential audiences and pest management professionals.

View or subscribe to the blog at ucanr.edu/blogs/ucipmurbanpests.
**Ask the Expert!**

**Q:** Where can I find more information about identifying and managing weeds?

**A:** For help in identifying weeds in turf or landscapes, visit UC IPM’s Weed Photo Gallery at [ipm.ucanr.edu/PMG/weeds_intro.html](http://ipm.ucanr.edu/PMG/weeds_intro.html). The visual guide contains numerous pictures of seedlings, mature plants, and leaf shapes to help you quickly identify many common weeds in California. Visit our “Weeds” menu page to find links to management guidelines for specific weeds as well as general information about managing weeds in landscape situations in the Weed Management in Landscapes Pest Note [ipm.ucanr.edu/PMG/menu.weeds.html](http://ipm.ucanr.edu/PMG/menu.weeds.html).

**Q:** What impacts might the bronze bug have in California?

**A:** Because eucalyptus trees form an integral part of urban and non-urban California landscapes and the bronze bug feeds on several dozen species of eucalypts, the bug is likely to establish wherever these trees occur, causing aesthetic damage and other potential negative environmental impacts. The insects can spread locally by crawling, by wind, or by hitchhiking on animals, clothing, or equipment. They can also be transported long distances when infested plants or fresh plant parts are moved.

**Always read and carefully follow all precautions and safety instructions provided on the pesticide container label, as well as any other regulations regarding the use of pesticides. Not following label directions, even if they conflict with information provided herein, is a violation of state and federal law. No endorsements of named products are intended, nor is criticism implied of products not mentioned.**

**WHAT IS IPM?**

Integrated Pest Management (IPM) programs focus on long-term prevention of pests or their damage through a combination of techniques including resistant plant varieties, biological control, physical or mechanical control, and modification of gardening and home maintenance practices to reduce conditions favorable for pests. Pesticides are part of IPM programs but are used only when needed. Products are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.