

Do-It-Yourself Bed Bug Control?

Don't let the bed bugs bite? That's easier said than done, it seems. Bed bugs (Figure 1) continue to be important household pests globally, driving a growing sector of the pest control industry. Professionals have access to effective insecticides and specialized techniques, such as heat treatments, to control bed bug infestations. These services, however, can be expensive: a recent survey revealed the average cost of professional insecticide treatments and heat treatments to be \$425 and \$1,400, respectively (see complete survey results at pctonline.com/article/pct0915-bed-bugs-multi-unit-housing/). Many people faced with infestations cannot afford these treatments.

Your customers could be looking for do-it-yourself (DIY) ways to manage bed bugs, and your store may carry dozens of products claiming to provide cheap and easy bed bug control. Research has shown, however, that bed bugs are very difficult to eradicate, even for knowledgeable professionals equipped with advanced pest control methods. So how can you help customers, with less knowledge and limited tools, be successful?

Consider Tenants' Rights

Owners and managers of rental properties are required to maintain housing that is safe and habitable. Ask your customer if they are a tenant in a rental housing situation. If so, they should report infestations to their landlord or property manager. In cases where



Figure 1. Adult and nymph bed bugs.



Figure 2. Fecal spots and this shed exoskeleton are useful signs of bed bugs.

landlords refuse to help, there are regional tenants' rights groups that can help find justice for suffering tenants.

Identify the Problem

Bed bugs cannot be confirmed by dermal symptoms ("bites", wheals, or rashes). The bugs themselves or their signs; such as cast skins, fecal spots, or eggs (Figure 2); must be recovered to positively identify the problem and move forward with pest management. For help identifying a bed bug infestation go to ipm.ucanr.edu/PMG/PEST-NOTES/pn7454.html.

You can help your customer confirm a bed bug infestation by selling them bed bug monitors. Many models exist, though the most effective may be "interceptors," pitfall traps that can be placed under the legs of beds and other furniture items (Figure 3). For more on bed bug monitors, go to ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=15435.

Promote Nonchemical Tactics

Many times, small bed bug populations can be significantly reduced or even eradicated without using insecticides. Household washers and dryers used at the hot setting will kill all bed bug life stages within bedding, clothing, and other household items. Dissolving laundry bags will enable your customers to easily transport and wash infested items without spreading bugs around. Clutter management is crucial when battling bed bugs, since bugs can hide and breed within household clutter such as stacks of paper and piles of clothes. Sell customers storage and organizational products that help them manage clutter.

Mattress encasements (Figure 4), fine-mesh cloth covers for mattresses and box springs, help to prevent bed bug establishment by eliminating cracks and

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Bed Bug DIY ...continued from p.1



D.H. CHOE, UC RIVERSIDE

Figure 3. Interceptor monitors can help you detect where bed bugs may be present.



D. GOUGE, U OF ARIZONA

Figure 4. Mattress encasements can help prevent bed bug establishment. Cover both mattress and box spring for better protection.

crevices and can also be used to trap bed bugs within; they will eventually die of starvation. Vacuums are very effective at removing exposed bed bugs; ensure a HEPA filter is in place to minimize airborne allergens.

Consider Insecticides Carefully!

Insecticides can be dangerous when used incorrectly. Every year, people are injured while trying to control bed bugs.

Total-release foggers, or “bug bombs”, are especially dangerous since they may contain flammable propellants. In addition, most retail insecticides simply don’t work for bed bugs. Most liquid or aerosol products are “contact

insecticides” that only kill bugs that come into contact with the spray or wet residue. Bed bugs only come out of hiding for minutes at a time while seeking their hosts and feeding, so your customers are unlikely to have opportunities to directly spray them.

Desiccants such as silica gel and diatomaceous earth may work better for a DIY approach; these powders absorb the waxy cuticles of bed bugs, causing them to die of water loss. Desiccants should be applied to cracks, crevices, and void spaces where bed bugs live and breed. They should never be applied liberally in the open where they can be breathed in; this may cause respiratory irritation.

Finally, your store may carry products that claim to repel bed bugs, but almost none of them have been proven to work by research-based science.

Hopefully this information will help you to responsibly serve your customers the next time they come to you for DIY bed bug control. Please note, however, that professional services are almost always required to eradicate large infestations.

—Andrew Sutherland, Urban IPM Advisor, San Francisco Bay Area, amsutherland@ucanr.edu



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/.

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.

Recent Detection of Huanglongbing Disease in Riverside

The incurable citrus disease huanglongbing (HLB) has been detected in dozens of backyard trees in Los Angeles and Orange counties and most recently in Riverside. The bacterium that causes this disease is spread from tree to tree by Asian citrus psyllid (Figure 1). HLB, also known as citrus greening, has already devastated the citrus trees in Florida, Georgia, Louisiana, South Carolina, and Texas. There is no known treatment for the disease, which usually kills the tree within three to five years.

With this new detection of HLB, it is more crucial than ever to detect infestations of the Asian citrus psyllid. We are providing information about identification and monitoring of the Asian citrus psyllid for you or your customers to use when checking your citrus trees.

What Are Asian Citrus Psyllids?

The Asian citrus psyllid adult is tiny—about the size of an aphid. The wings are brown along the edge, with a clear area. The psyllid feeds with its rear end tilted up at a 45° angle, making the insect appear almost thorn-like on leaves and stems. The tilted body and wing pattern is unique to this pest. Juveniles (nymphs) produce white, waxy tubules or strands (Figure 2) and are always found on soft new leaf growth or young stems. The eggs of this insect are yellow and are also found on the newest leaf growth, nestled among unfolded leaves. Eggs are very tiny and hard to see without a hand lens.



M. E. ROGERS, U. OF FLORIDA

Figure 1. Adults, nymphs, and wax of Asian citrus psyllids.



M. E. ROGERS, U. OF FLORIDA

Figure 2. Asian citrus psyllid nymphs with waxy tubules.



B. GRAFTON-CALDWELL, UCCE

Figure 3. Damage on citrus leaves from Asian citrus psyllid feeding.



B. GRAFTON-CALDWELL, UCCE

Figure 4. Asymmetrical yellow mottling of leaves, symptom of huanglongbing.

Check citrus trees and closely related plants monthly. Whenever you see tiny new leaves forming, look closely for signs of the psyllids.

The best stage to look for is the nymphs because they don't move very much and their waxy strands are unique. Feeding damage from the nymphs cause the young citrus leaves to twist and curl or cause die back of the new shoots (Figure 3).

What Does HLB Look Like?

Citrus trees infected with huanglongbing develop mottled leaves (Figure 4) and produce misshapen fruit that stays green and tastes bitter. HLB causes blotchy yellow mottling which is not the same on both sides of the leaf. Later symptoms of HLB-infected trees include lopsided, small fruit with bitter juice, and excessive fruit drop. Eventually the tree will stop producing fruit and die.

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Resources on Asian citrus psyllid and huanglongbing

- UC IPM Pest Notes ipm.ucanr.edu/PMG/PESTNOTES/pn74155.html
- ACP/HLB Distribution and Management ucanr.edu/acp
- Science for Citrus Health ucanr.edu/sites/scienceforcitrushealth
- Newest Detection of Citrus Greening (HLB) is in Riverside ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=24776
- UC has boots on the ground in an unrelenting search for Asian citrus psyllid ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=24752
- Recognizing the stages of Asian citrus psyllid ucanr.edu/sites/KACCitrusEntomology/files/158632.pdf
- Detecting Asian citrus psyllid video youtu.be/QhQXL4bwnXI
- Citrus and closely related plants ucanr.edu/sites/ACP/files/169937.pdf

Huanglongbing Detected in Riverside ...continued from p.3

What Can I Do?

We all have a role to play in helping prevent this disease from destroying California's important citrus industry as well as our backyard citrus trees.

If you see any trees that display symptoms of HLB, contact your local agriculture commissioner or call the California Department of Food and Agriculture (CDFA) Hotline immediately at 1-800-491-1899.

For information on how retail nursery and garden centers can limit and reduce ACP introduction to citrus stock, see the

March 2016 edition of the *Retail Nursery and Garden Center IPM News*.

Psyllid Detection and Quarantine

In order to detect the spread of Asian citrus psyllids, CDEA hangs yellow sticky cards in citrus trees to capture adults. When a psyllid is found, a quarantine zone is established in the surrounding area. This means that plants and fruit that can host the psyllid (such as citrus and close relatives) can't be taken out of the area.

Quarantines help prevent psyllids from being moved to new, uninfested areas of California. Whether you are inside or outside a quarantine area, it is very important to assist with the effort to detect and eradicate the Asian citrus psyllid. Your efforts will reduce the potential for this psyllid to spread HLB and will provide more time for scientists to work on finding a cure for the disease. For maps and information about the current quarantine areas, see the ACP Distribution and Management Web site.

Be vigilant and help to protect California's citrus trees!

New Invasive Plants Resources

Invasive plants—plants that can disperse, establish, and spread without human assistance or disturbance—pose a serious problem in California's waterways, wildlands and rangelands. Common garden weeds, unlike invasive plants, don't generally thrive outside of cultivation.

About 1,500 non-native plant species are currently established in California, mostly in wildlands. Almost two thirds were intentionally introduced as ornamentals from the nursery industry, or for the purposes of soil stabilization, animal forage, human food, fiber or medicinal plants.

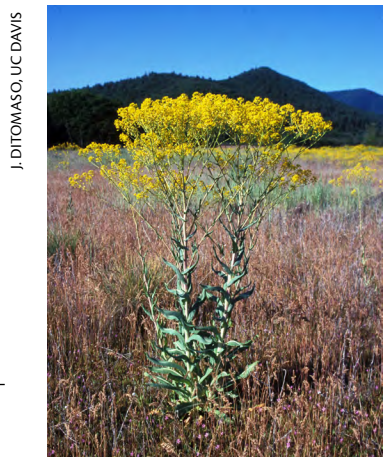
Invasive plants originally introduced as desirable ornamentals include pampas-grass, big periwinkle, and water hyacinth. Dyer's woad was once a valuable dye plant but now threatens rangeland in Northern California and other parts of the western United States. Many characteristics that make a plant successful as a landscape ornamental, such as ease of propagation and rapid growth, can also



Giant reed, Arundo donax, in a stream.

lead to invasiveness.

Impacts from invasive weeds include ecological damage and economic costs. From an ecological aspect, invasive plants can lead to reduction in biodiversity, threats to endangered species habitat, increased wildfire and flood danger, and change in soil fertility or salinity. Economic impacts from invasive plants include blocked waterways, as seen from *Arundo donax* (Giant reed) and other aquatic weeds, decline in livestock forage quality and quantity, and lowered land value.



Dyer's woad, Isatis tinctoria.

Learn how you can help reduce the introduction of invasive plants into landscapes. Read the recently revised UC IPM *Pest Notes: Invasive Weeds* by Joe DiTomaso and Cheryl Wilen, and *Pest Notes: Woody Weed Invaders* by Joe DiTomaso and Guy Kyser. The *Pest Notes: Dyer's Woad* by James Stapleton and Steve Orloff, published in early August, details this new invasive weed.

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For more information about managing pests, contact your University of California Cooperative Extension office listed under the county government pages of your phone book, or visit the UC IPM Web site at ipm.ucanr.edu.

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