

Critical use of and alternatives to pyrethroids around structures

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UCCE and UC Statewide IPM Program

Several slides courtesy of and modified from Dr. Andrew Sutherland, Area Urban IPM Advisor, CA SF Bay Area



UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

Statewide Integrated
Pest Management Program

Outline

- Pesticides and Water Quality in Urban Areas
- Integrated Pest Management
 - Ants
 - Cockroaches
 - Occasional Invaders
- UC IPM Resources



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Major users of pesticides in urban areas

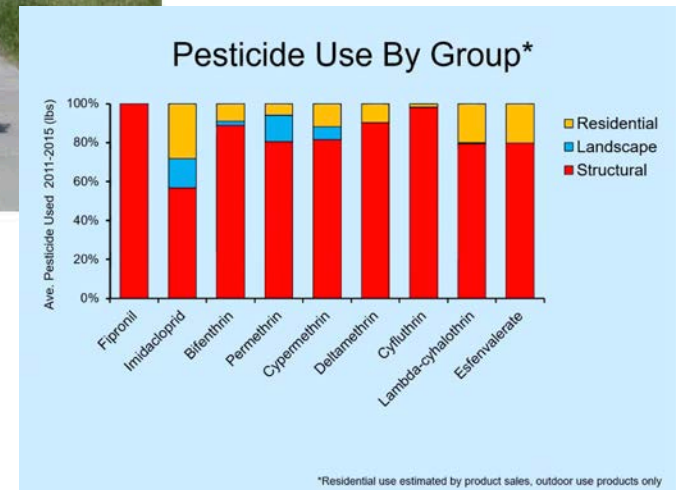
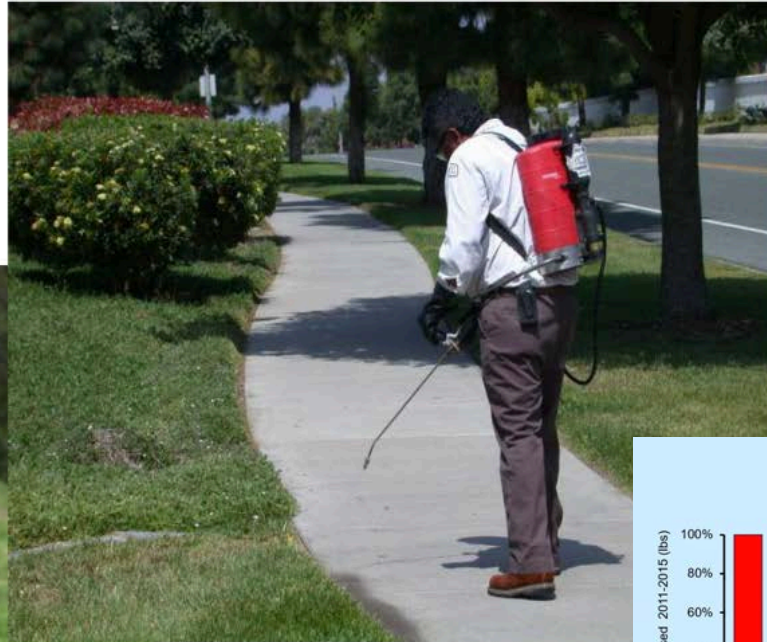
- General public
 - Residents / homeowners / tenants
 - Property owners / managers
- Pest management professionals (PMPs)
- Government agencies
- Agriculture
 - Non-crop: ornamental nurseries
 - Urban agriculture



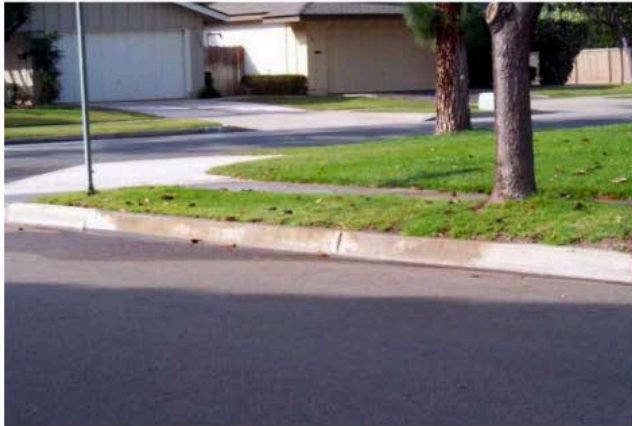
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Pesticide Application



“Urban Drool”



Photos: D. Haver

Integrated
Management Program

Pesticides and Water Quality

Ceriodaphnia dubia, a tiny aquatic invertebrate, is used as an indicator organism to measure toxicity in water.

Hyaella azteca is a 1/8- to 1/4-inch-long crustacean commonly found in lakes, ponds, and streams throughout North America.

They are an important link in the aquatic food chain and a food source for several predators, including fish and various invertebrates.

Pesticides such as pyrethroids from residential runoff have recently been discovered to kill *Hyaella*. Low numbers of aquatic organisms, like *Hyaella* and [*Ceriodaphnia*](#), is an indication of poor water quality.



Pesticides and Water Quality



Illustrations by Celeste Rusconi.

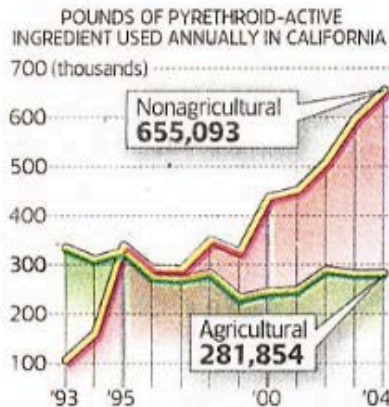


Illustrations by Celeste Rusconi.

Sacramento Bee
July 14, 2006

Pyrethroid use in California

Commercial use of pyrethroid pesticides in California has been increasing dramatically, mainly because of urban use. The data below do not include usage of retail products by homeowners, which does not have to be reported to regulators and is suspected to be much greater.



Sources: Prof. Donald Weston, UC Berkeley
Sacramento Bee/Nam Nguyen

State toughens rules on a household pesticide

Low levels of pyrethroid products kill aquatic life

By Matt Weiser
BEE STAFF WRITER

California next month will begin to regulate a broad class of pesticide that has become the dominant home and garden bug-killer.

The state Department of Pesticide Regulation in August will notify manufacturers of pyrethroid insecticides that they must share data on their products or those products will be banned from sale in California. The data will drive a regulatory review that could result in use restrictions or a ban on specific products.

In doing so, California steps out ahead of the federal government and other states in regulating pyrethroids, found to be deadly to aquatic life at very low concentrations.

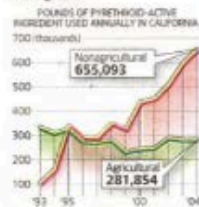
Mary-Ann Warmmedam, director of the Department of Pesticide Regulation, said it will be the biggest pesticide regulation effort in state history, involving 600 consumer products sold in hardware stores, garden centers and pet stores.

"We know we have enough caution flags, and that requires a

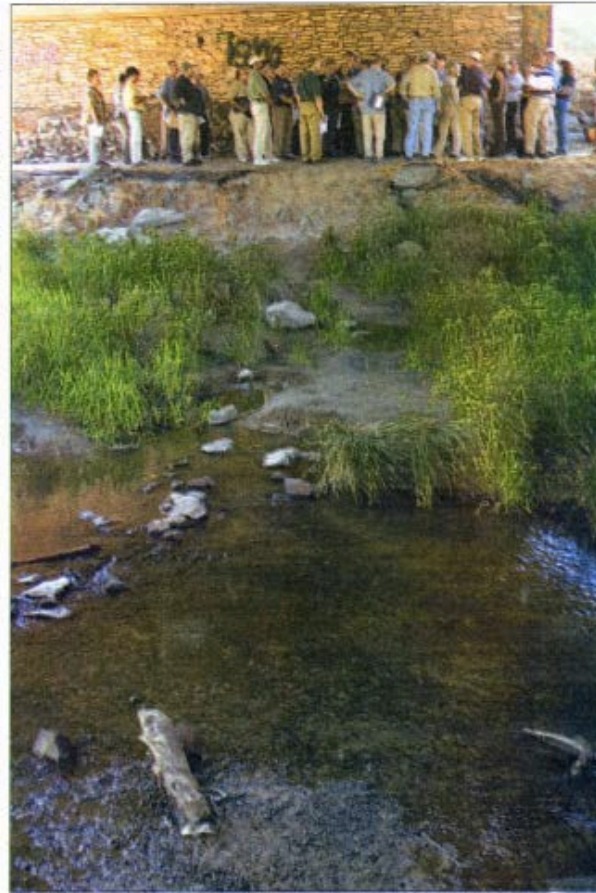
► PESTICIDE, Page A4

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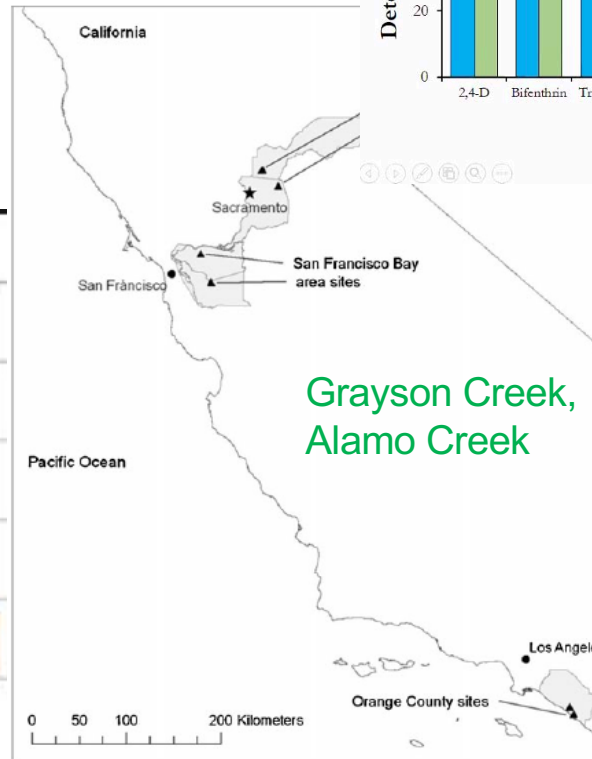
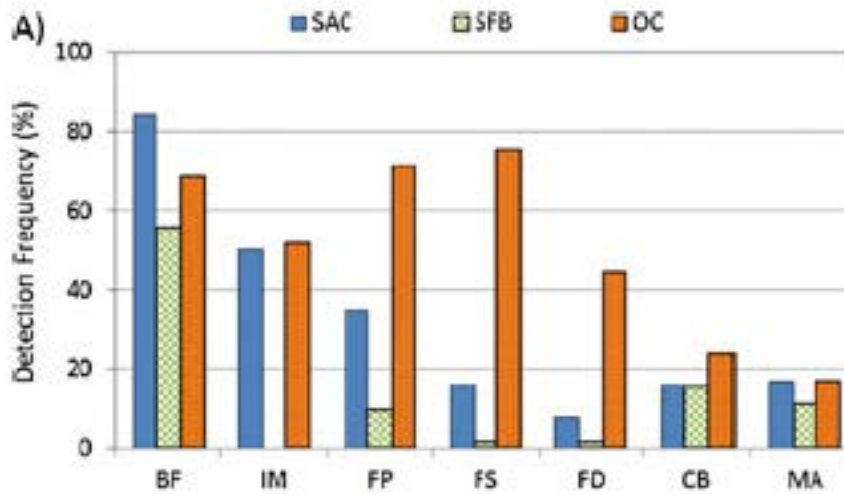
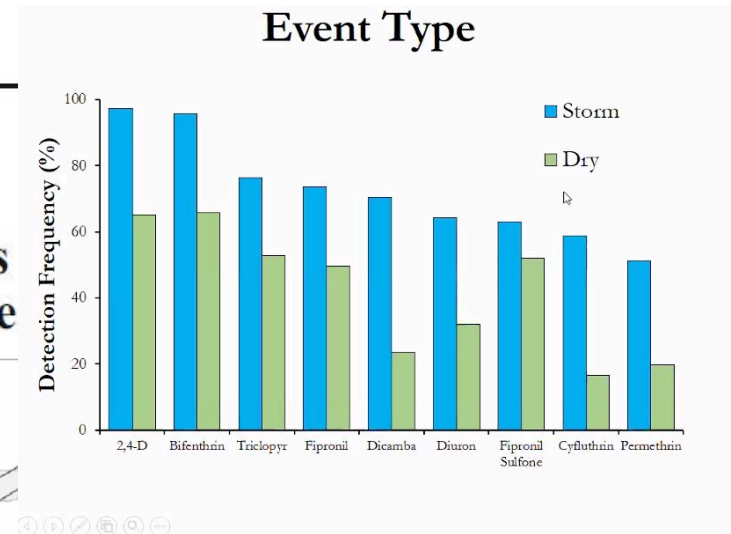


Sacramento Bee/Jay Pflaum

Researchers address people from government agencies Thursday at Roseville's Pleasant Grove Creek. The

Pesticide occurrence and aquatic benchmark exceedances in urban surface waters and sediments in three urban areas of California, USA, 2008–2011

Michael P. Ensminger • Robert Budd •
 Kevin C. Kelley • Kean S. Goh



Integrated Pest Management

- Focuses on long-term prevention of pests or their damage
- Combination of techniques such as exclusion, biological control, habitat manipulation, and pesticides.
- Monitoring helps decision-making and determining when, how and if treatments are needed.
- Goal of removing only the target organism without harming non-targets.
- Pest control strategies minimize risks to human health, beneficial and nontarget organisms, and the environment.



Components of IPM

- Identification and biology
- Prevention
- Monitoring
- Treatment thresholds
- Combination of methods
 - cultural
 - physical/mechanical
 - biological
 - chemical
- Evaluation



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Argentine Ants







- Most abundant urban ant pest in California
- Non-native species
- Unicolonial– free flow of workers between nests
- Multiple queens in one colony– high reproductive potential
- Forage over long distances



IPM for Argentine Ants

- Education
 - Correct identification of species
- Prevention
 - Exclusion, sanitation
 - Residential efforts
- Monitoring
 - Where are they? Indoor? Outdoor?
- Treatment Thresholds
 - Level of infestation

Characteristics such as food and nesting preferences along with physical characteristics to identify ants. A first step in identifying ants is to use a magnifier to determine if they have one or two nodes at the petiole, the first portion of the abdomen.

One-node ant	Node	Two-node ant	Nodes
Argentine ant <i>(Linepithema humile)</i> Food: sweets, sometimes proteins Nest: outdoors in shallow mounds Physical description: 1/8 inch, dull brown		Pavement ant <i>(Tetramorium caespitum)</i> Food: sweets, proteins, grease Nest: in lawns or under stones or boards; builds mounds along sidewalks and foundations or near water Physical description: 3/16 inch, dark brown to black	
Carpenter ant <i>(Camponotus species)</i> Food: sweets Nest: in tree stumps, firewood, fence posts, hollow doors or window frames; deposits sawdustlike frass outside nests Physical description: large, workers vary from 1/4 to 1/2 inch, black or bicolored red and black		Pharaoh ant <i>(Monomorium pharaonis)</i> Food: fats, proteins, sweets Nest: in wall or cabinet voids, behind baseboards or insulation, or outdoors in debris Physical description: 1/16 inch, yellow or honey-colored to orange	
Odorous house ant <i>(Tapinoma sessile)</i> Food: sweets, sometimes proteins Nest: in shallow mounds in soil		Red imported fire ant <i>(Solenopsis invicta)</i> Food: sweets, proteins Nest: in mounds with multiple openings in soil or lawns and	



IPM for Argentine ants

Indoor pest problem

- Seal cracks, crevices
- Eliminate leaks
- Proper sanitation and food storage
- Liquid / gel bait stations



No endorsements of named or depicted products are intended, nor is criticism implied of products not mentioned or included.



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IPM for Argentine ants

Outdoor pest problem

- Manage honeydew-producing pests
- Exclude ants from honeydew
- Sticky barriers
- Liquid bait stations
- Granular application, as needed



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Ants

Messages for your customers:

- Remove attractive food source—keep food in properly sealed containers
- Wipe up ants and their trails indoors
- Rely on contracted service and allow time for treatments to work
- DIY sprays will not keep ants out of your home
- Communicate with PMP



Quick Tips UC IPM

Ants

Although ants are annoying when they come indoors, they can be beneficial by feeding on fleas, termites, and other pests in the garden.



Argentine ants trailing on pavement.

While spraying chemicals inside the house might seem effective, doing so will not prevent more ants from entering. Because most ants live outdoors, focus efforts on keeping ants from entering buildings. Combine several methods such as caulking entryways, cleaning up food sources, and baiting when necessary. Avoid using pyrethroids (e.g., bifenthrin and cypermethrin), especially on hard surfaces such as driveways or sidewalks or around the foundation of buildings. These products pollute waterways.

Make your house less attractive to ants.

- Caulk cracks and crevices that provide entry into the house.
- Store food attractive to ants in closed containers.
- Clean up grease and spills.
- Ant-proof kitchen garbage pulls with sticky barriers such as petroleum jelly under the lip and place pet dishes in a moat of water.
- Remove or manage sweet food sources next to your house such as aphid-infested bushes and ripened fruit on trees.
- Keep plants, grass, and organic mulch at least a foot away from the foundation of buildings to reduce ant foraging and nesting.

For more information about managing pests, visit ipm.ucanr.edu or your local University of California Cooperative Extension office.

When ants invade your house.

- Sponge up invading ants with soapy water as soon as they enter.
- Plug up ant entryways with caulk.
- Take infested potted plants outdoors and submerge pots in a solution of insecticidal soap and water.
- Clean up food sources by wiping up spills or placing food in tight-fitting containers.
- Rely on outdoor baits to control the ant colony.
- Insecticide sprays shouldn't be necessary.
- If you hire a pest control company, ask them to use baits and spot treatments rather than perimeter treatments or monthly sprays.

How ant baits work:

Pesticide baits work by attracting worker ants who then take the product back to the nest where the entire colony, including queens, can be killed. The pesticide must be slow acting so workers won't be killed before they get back to the nest.



Ant bait stations.

How to use baits:

- Place baits near ant trails and nest openings.
- Prepackaged or refillable bait stations or stakes are the safest and easiest to use. Active ingredients in baits may include boric acid/borate, fipronil, avermectin, or hydramethylnon.
- Liquid borate (0.5-1% borate in sugar water solution) baits in refillable bait stations are best for severe Argentine ant infestations.
- Replace baits when empty and reposition them, or try a different bait product if ants don't appear to be taking it.
- It can take 5 to 10 days to see fewer ants.

What you do in your home and landscape affects our water and health.

- Minimize the use of pesticides that pollute our waterways and harm human health.
- Use nonchemical alternatives or less toxic pesticide products whenever possible.
- Read product labels carefully and follow instructions on proper use, storage, and disposal.



Cockroaches

In California, the main “roaches” regarded as pests are:

- Indoor species
 - German
 - Brownbanded
- Outdoor species
 - Oriental
 - American
 - Turkestan

Less problematic species include the field, Australian, smokybrown, and the newer three-lined cockroaches



Cockroaches

- Indoor resident spp.
 - Sanitation
 - Food containment, moisture management
 - Gel baits
- Outdoor invader spp.
 - Exclusion
 - Landscape / habitat / moisture management
 - Tolerance by resident
 - Granular baits? Sprays?



German cockroach life stages



Oriental cockroach (male, left; female, right)



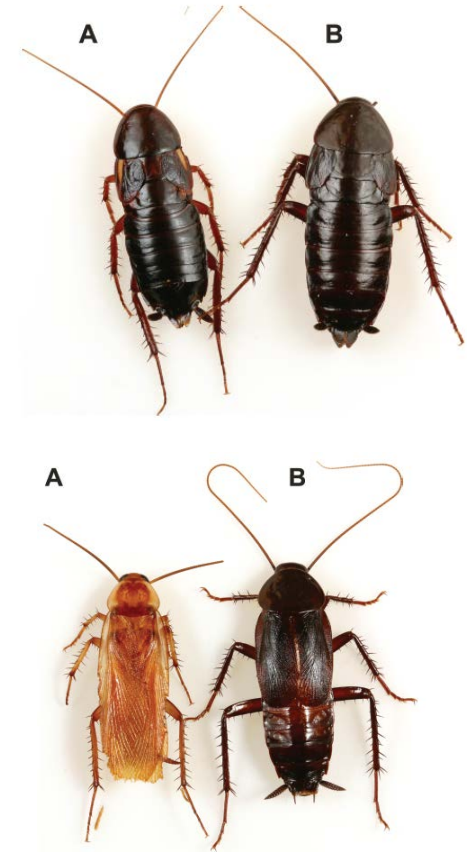
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Outdoor cockroaches

- Omnivorous detritivores
- Highly dependent upon moisture, humidity
- Typical habitat: water meter box, pavement voids, drains, loose mulch, compost, debris
- Warm weather = increased activity
- Low moisture = emergency water seeking
- Landscape dry-down = water seeking behavior



Photos: Dong-Hwan Choe



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IPM for outdoor nuisance cockroaches

- Education
 - ID and Biology
- Prevention
 - Moisture management
 - Habitat modification
 - Exclusion
- Monitoring
 - Sticky traps / glue boards



IPM for outdoor nuisance cockroaches

- Thresholds?
- Multiple tactics
 - Chemical
 - Baits
 - Granules
 - Gels
 - Bait stations
 - Foams
 - Liquid contact
 - Liquid barriers



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Structural exclusion and habitat modification



Baiting for outdoor cockroaches



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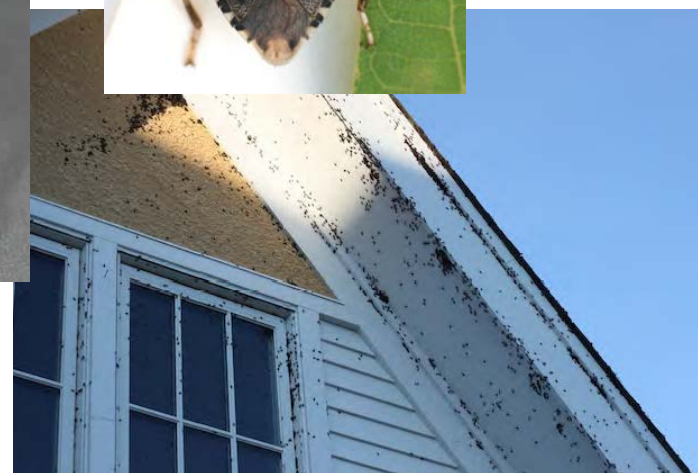


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Occasional invaders and seasonal pests



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IPM for occasional seasonal pests

- Identification and Biology
- Prevention
 - Exclusion services: first line of defense
 - Habitat modification / moisture management
- Monitoring
 - Insect perimeter for entry points, conducive conditions
 - Increase vigilance during autumn and early winter

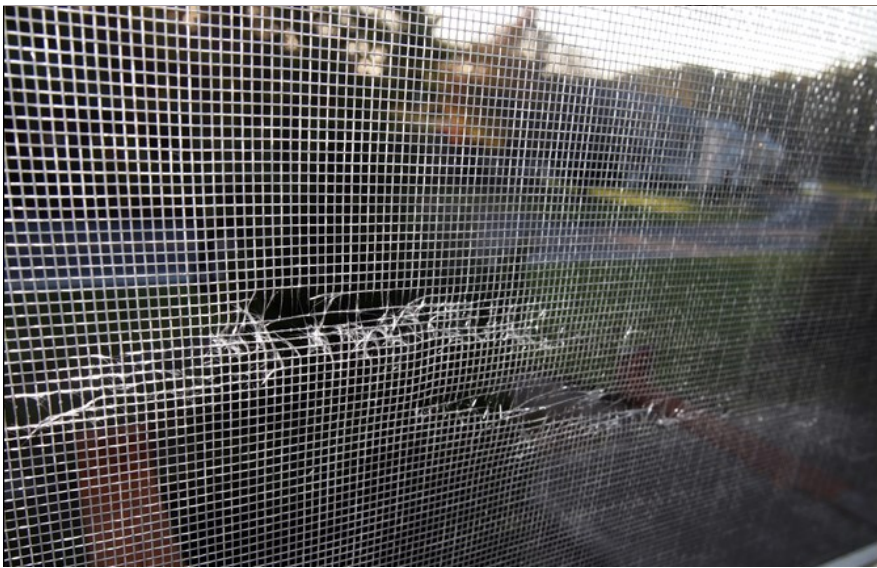


Brown marmorated stink bug (photo by B. Vallega)



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Exclusion is best

- Long-term solution.
- Look for common entry points and seal. Vents, cracks, chimneys, window AC units.
- Screens in attics and storage areas covered properly.
- Inspect window screens and ensure fits securely and tightly. No holes in the screens.
- Check weather stripping around all doors and screen doors to have a snug fit.

IPM for occasional invaders

- Thresholds
 - How many bugs on the house will be tolerated?
 - How many bugs in the house will be tolerated?
- Multiple Approaches
 - Cultural
 - Physical / nonchemical
 - Chemical
- Evaluation



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IPM for occasional nuisance pests

- Prevention and cultural control
 - Exclusion: door sweeps, caulk, repairs...
 - Habitat management: removal of host plants or plant material from landscape
- Physical
 - Vacuum (ensure HEPA filter in place)
- Chemical
 - Traditional perimeter protection (pyrethroids) restricted or not feasible
 - Follow CA regulations
 - Other repellents?



Alternative materials to pyrethroids

- Newer and reduced-risk products
- Fipronil
 - Very effective material
 - Professional use only
 - Nonrepellent
 - Slow-acting
 - Very toxic to aquatic invertebrates
 - Increasingly recovered at toxic levels in urban surface waters
- Integrated Pest Management!




Resources from the University of California IPM Program and Cooperative Extension



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Solve your pest problems with UC's best science

What's New

- **Pest Alert!** Agriculture: Peach Root-Knot Nematode Pest Alert. New nematode to California.
- Green Bulletin: Fall 2020
- Pest Notes: Pokeweed, Houseplant Problems and Armillaria Root Rot added, Spiders, Sooty Mold, Itching and Infestation: What's Attacking Me? revised
- Ag Pest Management: Citrus and Asparagus updated
- Weed Photo Gallery: Italian thistle and slenderflower thistle added.
- More...

QUICK LINKS

MAKE A GIFT | Support UC IPM's mission to make integrated pest management the way to manage pests

Home, Garden, Turf & Landscape Pests



Agricultural Pests



Natural Environment Pests



Exotic & Invasive Pests



UC IPM
website

ipm.ucanr.edu

HOME

ON THIS SITE

- What is IPM?
- Home & landscape pests
- Agricultural pests
- Natural environment pests
- Exotic & invasive pests
- Weed gallery
- Natural enemies gallery
- Weather, models & degree-days
- Pesticide information
- Research
- Publications
- Events & workshops
- Online training
- Links
- About us
- Contact us

Home, garden, turf, and landscape pests

University of California's official guidelines for managing pests in the home, garden, turf, and landscape. [\(More...\)](#)

Search home & landscape:

Pests of homes, structures, people, and pets

Household pests

- [Pests that sting, bite, or injure](#)
- [Wood-destroying, food, fabric, and nuisance pests](#)
- [Vertebrate pests](#): birds, mammals, and reptiles

Pests in gardens and landscapes

Choose a plant to find the most likely source of your pest problem

- [Flowers](#)
- [Fruit trees, nuts, berries, and grapevines](#)
- [Lawns and turf](#) (including comprehensive lawn guide)
- [Trees and shrubs](#) (including roses and other ornamentals)
- [Vegetables and melons](#)

Pests of homes, structures, people and pets

[Stinging and biting pests](#) | [Food, fabric, or wood pests](#) |

[Vertebrate pests](#) (birds, mammals, etc.)

Click on the **QT** next to a pest name for a brief overview of how to manage a pest.

Pests that sting, bite, or injure

- | | | |
|---|--|--|
| ▪ Ants QT (menu) | ▪ Head Lice QT | ▪ Ticks |
| ▪ Bed Bugs QT | ▪ Hobo Spider | ▪ Wasps |
| ▪ Bee and Wasp Stings | ▪ Lyme Disease in California | ▪ Yellowjackets and Other Social Wasps QT |
| ▪ Bee Swarms | ▪ Mosquitoes QT | ▪ Stings |
| ▪ Brown Recluse and Other Recluse Spiders | ▪ Poison Oak | ▪ What's Attacking Me? (Delusory parasitosis) |
| ▪ Conenose Bugs | ▪ Scorpions | ▪ Widow Spiders and Their Relatives (REVISED) |
| ▪ Delusory Parasitosis | ▪ Spiders QT | ▪ Yellowjackets and Other Social Wasps QT |
| ▪ Fleas QT | ▪ Brown Recluse and Other Recluse Spiders | ▪ Zoropsis Spider |
| ▪ Flies | ▪ Hobo Spider | |
| ▪ Eye Gnats | ▪ Widow Spiders and Their Relatives (REVISED) | |
| | ▪ Zoropsis Spider | |

Wood-destroying, food, fabric, and nuisance pests

- | | | |
|---|---|---|
| ▪ Ants QT (12 entries) | ▪ Cockroaches QT | ▪ Horsehair Worms |
| ▪ Bees, Carpenter | ▪ Conenose Bugs | ▪ Millipedes |
| ▪ Bee Swarms | ▪ Drywood Termites | ▪ Pantry Pests |
| ▪ Beetles | ▪ Earwigs QT | ▪ Silverfish |
| ▪ Carpet | ▪ Firebrats | ▪ Springtails |
| ▪ Wood-Boring in Homes | ▪ Flies | ▪ Subterranean and Other Termites |
| ▪ Boxelder Bug | ▪ Eye Gnats | ▪ Termites QT |



BROWN MARMORATED STINK BUG

Integrated Pest Management for Landscape Professionals and Home Gardeners

The brown marmorated stink bug (Halymeria halys) or BMSB is native to Eastern Asia, mainly China, Korea, Japan, and Taiwan. The first report of this species in the United States occurred in Pennsylvania in 2001, although it is likely to have established as early as 1996. It has been found in at least 40 states, either as reproducing populations or single sightings and the populations of single sightings has a list of states that were first found in Oregon and Washington. The brown marmorated stink bug was first found in California in 2004 and has spread through many parts of that state and into Washington. In California a reproducing population was first found in Pasadena and San Marino (Los Angeles County) in 2006, and it has since been detected in many other parts of California. In 2013, many other parts of California were large reproducing populations were discovered in Sacramento and Yuba City. As BMSB expands its range on the West Coast, it will likely continue to be found first in urban areas.

IDENTIFICATION
The adult BMSB is a typically-shaped bug, about 3/8 inch long, and has a brown marmorated stink bug (BMSB) on its back. The antennae segments are tiny light-colored striations where the antennae segments join (Figure 2). The coxopod stink bug, Euschistus conspersus, has banded abdomen edges like the BMSB but no bands on its antennae, and the legs have distinct dark spots rather than marbled markings and white bands. It is also a little smaller with a length of about 1/2 inch (Figure 3). Eggs are barrel-shaped, white to pale green, and laid in clusters on leaves (Figure 4). Nymphs shed their outer skin (molts) as they progress through five stages of growth on the antennae, although there are tiny light-colored striations where the antennae segments join (Figure 2). The coxopod stink bug, Euschistus conspersus, has banded abdomen edges like the BMSB but no bands on its antennae, and the legs have distinct dark spots rather than marbled markings and white bands. 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Table 1. Identifying Features of Common Household Ants.¹

Effective management approaches vary with ant species. Use behavioral characteristics such as food and nesting preferences along with physical characteristics to identify ants. A first step in identifying ants is to use a magnifier to determine if they have one or two nodes at the petiole, the first portion of the abdomen.

One-node ant	Node	Two-node ant	Nodes
Argentine ant (<i>Linepithema humile</i>) Food: sweets, sometimes proteins Nest: outdoors in shallow mounds Physical description: 1/8 inch, dull brown		Pavement ant (<i>Tetramorium caespitum</i>) Food: sweets, proteins, grease Nest: in lawns or under stones or boards; builds mounds along sidewalks and foundations or near water Physical description: 3/16 inch, dark brown to black	
Carpenter ant (<i>Camponotus</i> species) Food: sweets Nest: in tree stumps, firewood, fence posts, hollow doors or window frames; deposits sawdustlike frass outside nests Physical description: large, workers vary from 1/4 to 1/2 inch, black or bicolor red and black		Pharaoh ant (<i>Monomorium pharaonis</i>) Food: fats, proteins, sweets Nest: in wall or cabinet voids, behind baseboards or insulation, or outdoors in debris Physical description: 1/16 inch, yellow or honey-colored to orange	
Odorous house ant (<i>Tapinoma sessile</i>) Food: sweets, sometimes proteins Nest: in shallow mounds in soil		Red imported fire ant (<i>Solenopsis invicta</i>) Food: sweets, proteins Nest: in mounds with multiple openings in soil or lawns and	

Cockroaches

Integrated Pest Management In and Around Buildings

Cockroaches, or "roaches" (Figure 1), are among the most important household pests. Indoor cockroaches are known as significant public health pests, and outdoor species that find their way inside are considered serious nuisance pests as well as potential pests of public health. Cockroaches range in size from less than 1/8 inch long to almost 2 inches long and are mostly nocturnal insects that feed on a wide range of organic matter. Most cockroaches harbor within moist, dark crevices when not foraging for food. They crawl quickly and may climb rough surfaces. A few species can fly short distances or glide as adults during warm nights, but most have no wings, reduced wings, or otherwise do not fly.



Figure 1. Various life stages in a German cockroach colony.

There are five species of cockroaches in California that are commonly regarded as pests: German cockroach, brown-banded cockroach, oriental cockroach, American cockroach, and Turkestan cockroach. People are repulsed when they find cockroaches in their homes and other buildings. Indoor infestations of cockroaches are also important sources of allergens and have been identified as risk factors for developing asthma in children, especially in unit housing environments of allergens present have

correlated to both cockroach density and the conditions that contribute to heavy infestations, such as housing disrepair and poor sanitary conditions. Of all the cockroach species in California, the German cockroach is the most persistent and troublesome; it lives and breeds in indoor locations associated with food preparation and may pose health concerns due to contamination of food and production

IDENTIFICATION AND LIFE CYCLE

spread of typhoid and dysentery. The American cockroach, which may come into contact with human excrement in sewers or with pet droppings outdoors, may transmit bacteria that cause food poisoning (*Salmonella* spp. and *Shigella* spp.).

UC IPM Statewide Integrated Pest Management Program

UC IPM Home > Homes, Gardens, Landscapes, and Turf > Wood-Boring Beetles in Homes

How to Manage Pests of Homes, Structures, People, and Pets

Revised 6/10

In this Guideline:

- Identification and life cycles
- Management
- About Pest Notes
- Publication
- Glossary

Three groups of wood-boring beetles—powderpost, deathwatch, and false powderpost (Table 1)—invade and damage wood furniture as well as structural and decorative wood inside of buildings. The beetle larvae feed in and do most of the damage to wood, and when they reach the adult stage, they emerge through round exit holes, which they create by chewing through the wood surface. Adults of some species also bore exit holes through plaster, plastic, and even soft metals that might cover the underlying wood.

You might see other wood-boring beetles such as flatheaded or roundheaded borers and bark or ambrosia beetles in your home if you store infested firewood inside. However, these typically are forest insects that won't attack wood structures or furniture. They begin their life cycles on declining trees that are old or that have sustained fire or insect damage. Sometimes these forest insects are present in trees when they are milled into wood products, and they might cause alarm when they emerge from infested wood used in newly constructed buildings. However, they aren't able to reinfest the wood in these structures.

Certain species of wood wasps also might emerge from infested wood used in new structures. See Pest Notes: *Wood Wasps and Hornets* for more information. Invasive wood-boring insects often arrive as hitchhikers from other continents on solid wood packing material such as pallets or in a ship's dunnage, and some of the key beetle pests of wood in structures have likely established worldwide distributions this way.

IDENTIFICATION AND LIFE CYCLES

Powderpost Beetles

A subfamily of beetles in the family Bostrichidae (formerly referred to as the family Lyctidae) are known as powderpost beetles, because larvae create a fine, dustlike powdered frass (a mixture of feces and wood fragments) that has the consistency of baking flour or talcum powder. This boring dust is packed into the larval galleries (feeding channels) in the wood but occasionally falls out of exit holes into small piles on floors or other surfaces.

This fine, powdery frass distinguishes powderpost beetles from other wood-boring beetles in homes. It also differs from the larger, granular, and almost peppercorn pellets drywood termites leave behind; if you look closely at termite pellets, you will see they have ridges on their sides.

Powderpost beetles attack hardwoods, apparently because these woods have pores into which they can lay eggs;

BED BUGS

Integrated Pest Management in and around the Home

Bed bugs are blood-sucking insects in the family Cimicidae. Both nymphs and adults feed on sleeping or sedentary humans, mostly at night, a time when this pest's stealthy habits are difficult to observe.

Bed bugs are found worldwide in association with human habitations. The most common bed bug, *Cimex lectularius*, is a widely distributed species most frequent in the northern temperate and Central Asia. It occurs more sporadically in southern temperate regions. In tropical regions *C. hemipterus*, the tropical bed bug, is the dominant species. The most common species found in California is *C. lectularius*.

The growth and development of *C. lectularius* is optimal when it feeds on humans; however, it can also feed on birds and other species including chickens and bats.

Rats are some of the most troublesome and damaging rodents in the United States. They eat and contaminate food, damage structures and property, transmit parasites and pathogens, and are a nuisance to humans and animals.

IDENTIFICATION AND LIFE CYCLE

Adult bed bugs (Figure 1) are oval, wingless or mahogany. Their bodies are flattened, behind the head (the pronotum) expands forward on either side of the head, bearing many small hairs. The immatures (Figure 1), called nymphs, appear identical to the adults except for their smaller size (1/20–1/8 inch), thinner outer skeleton (cuticle), and lighter yellowish-white color.

Bed bugs are readily distinguished from another common blood-sucking species, fleas, by their smaller size, more rounded shape and lack of wings as adults. Conco nose bugs may be up to 1/4 inch long. (See Pest Note: *Conco Bugs in References*.)

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RATS

Integrated Pest Management for Home Gardeners and Landscape Professionals

Figure 1. Adult roof rat.

Figure 2. Norway rat.

Figure 3. Rat burrow beneath a pile of boards.

Figure 4. A RAT INFESTATION throughout the year. Periodically check for signs of their presence.

Statewide Integrated Pest Management Program

Green Bulletin e-newsletter

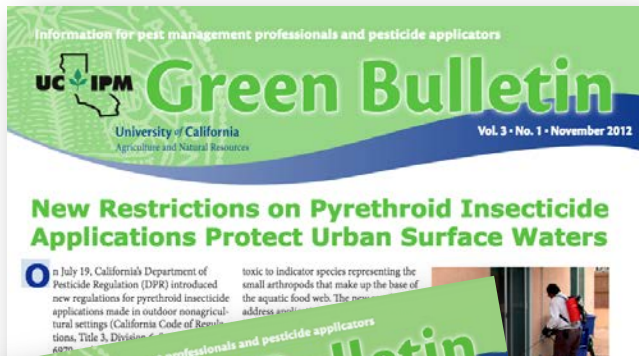
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New Restrictions on Pyrethroid Insecticide Applications Protect Urban Surface Waters

On July 19, California's Department of Pesticide Regulation (DPR) introduced new regulations for pyrethroid insecticide applications made in outdoor nonagricultural settings (California Code of Regulations, Title 3, Division 95, Chapter 95000).

taxic to indicator species representing the small arthropods that make up the base of the aquatic food web. The new regulations address several...



Stinky and Uninvited Winter Visitors

Brown marmorated stink bug (BMSB) is an invasive pest native to East Asia (China, Japan, Korea, Taiwan) which was first sighted in the United States in 1996 in Allentown, PA, and reached California in 2004 (Pasadena and San Marino). It is currently established in several regions in California including Los Angeles, Santa Clara, Stanislaus, San Joaquin, Sacramento, Yolo, Sutter, Butte, and Stanislaus counties.

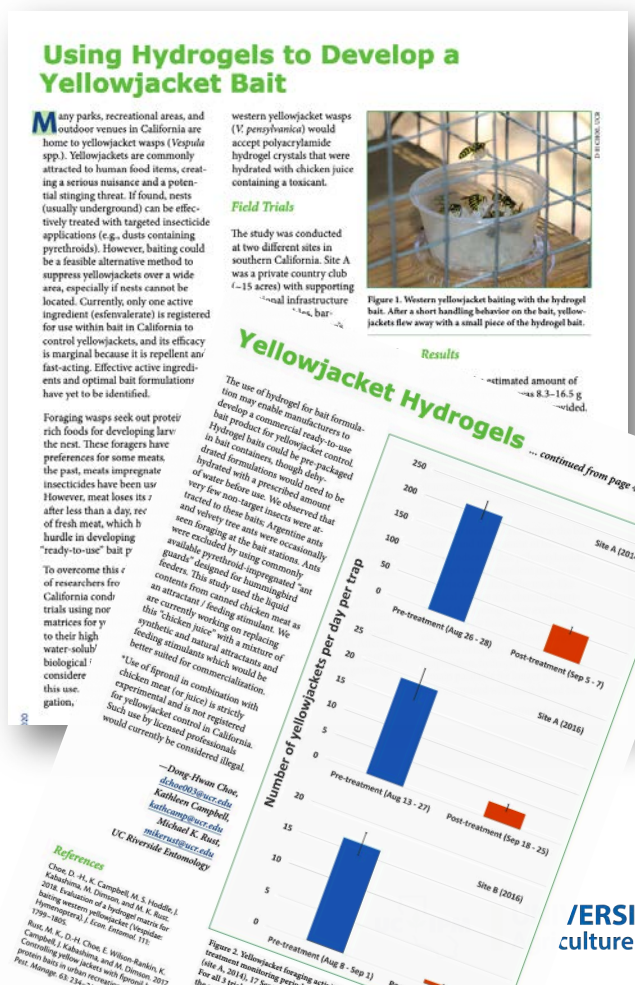
Since its introduction, BMSB has spread to 38 states on the East and West Coasts, where it has caused damage to fruits, vegetables, and ornamental plants. BMSB is also a significant nuisance pest for residents and businesses, since it may invade structures in large numbers for overwintering during the fall and winter. When disturbed or crushed, this bug produces a pungent odor (hence the name stink bug), unpleasant to many people.

In autumn, when temperatures begin to drop, BMSB adults seek shelter for overwintering and aggregate under dead tree bark, rocks, or in structures such as office buildings, houses, garages, and barns by entering through openings surrounding door frames and windows, vents, and other openings and cracks.

When individuals bug find a suitable place for overwintering, they release an aggregation pheromone that attracts other individuals. This is the reason that large numbers of bugs are often found in and around structures and on plants (Figure 2).

Once inside, they seek narrow spaces within buildings and may become active in winter days, they may become active again and might be seen on doors, walls, or flying around lights at night. Although BMSB does not damage structures or harm people, it is a nuisance, causing residents to seek control methods.

If BMSB adults find their way into a structure, the best ways to remove them are by sweeping, vacuuming, and hand-picking. However, these activities usually disturb the adults and trigger the release of their defensive odors, which can contaminate clothes and vacuum cleaner canisters. Rooms and vacuum cleaner canisters should be washed after use and vacuums can be sanitized by attaching a palm sander (or nylon stocking) to the tip of the tube to prevent bugs from entering the vacuum cleaner bag or canister while vacuuming. Adults are attracted to light sources, especially to white light (also black or blue light) and fly toward them at...



Using Hydrogels to Develop a Yellowjacket Bait

Many parks, recreational areas, and outdoor venues in California are home to yellowjacket wasps (*Vespa* spp.). Yellowjackets are commonly attracted to human food items, creating a serious nuisance and a potential stinging threat. If found, nests (usually underground) can be effectively treated with targeted insecticide applications (e.g., dusts containing pyrethroids). However, baiting could be a feasible alternative method to suppress yellowjackets over a wide area, especially if nests cannot be located. Currently, only one active ingredient (feroxalate) is registered for use within bait in California to control yellowjackets, and its efficacy is marginal because it is repellent and fast-acting. Effective active ingredients and optimal bait formulations have yet to be identified.

Foraging wasps seek out protein rich foods for developing larvae in the nest. These foragers have preferences for some meats. In the past, meats impregnated with insecticides have been used. However, meat loses its appeal after less than a day, which hinders the development of a "ready-to-use" bait.

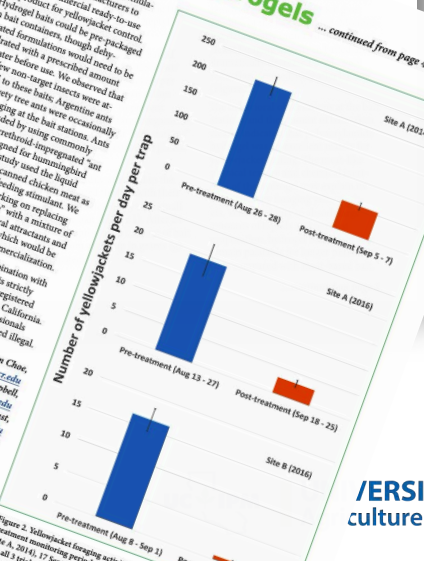


Figure 1. Western yellowjacket baiting with the hydrogel bait. After a short handling behavior on the bait, yellowjackets flew away with a small piece of the hydrogel bait.

The use of hydrogel for bait formulation may enable manufacturers to develop a commercial ready-to-use bait product for yellowjacket control. Hydrogel baits could be pre-packaged in bait containers, though dehydrated formulations would need to be hydrated with a prepackaged amount of water before use. We observed that very few non-target insects were attracted to these baits. Argentine ants and velvetweaves were occasionally seen foraging at the bait stations. Only available pyrethroid impregnated baits were excluded by using commonly used pyrethroids impregnated bait contents. This study used the liquid bait "chicken juice" with a mixture of synthetic and natural attractants and feeding stimulants which would be better suited for commercialization.

"Use of fipronil in combination with chicken meat (or rice) is readily experimental and is not registered for yellowjacket control in California. Such use by licensed professionals would currently be considered illegal."

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