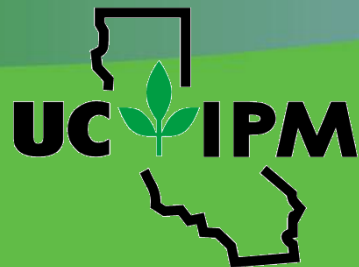


Adapting and Applying the Central tenets of IPM to Urban Landscapes



Andrew Sutherland
Bay Area Urban IPM Advisor
UCCE and UC IPM



University of California
Agriculture and Natural Resources

**Statewide Integrated Pest
Management Program**



Outline of presentation

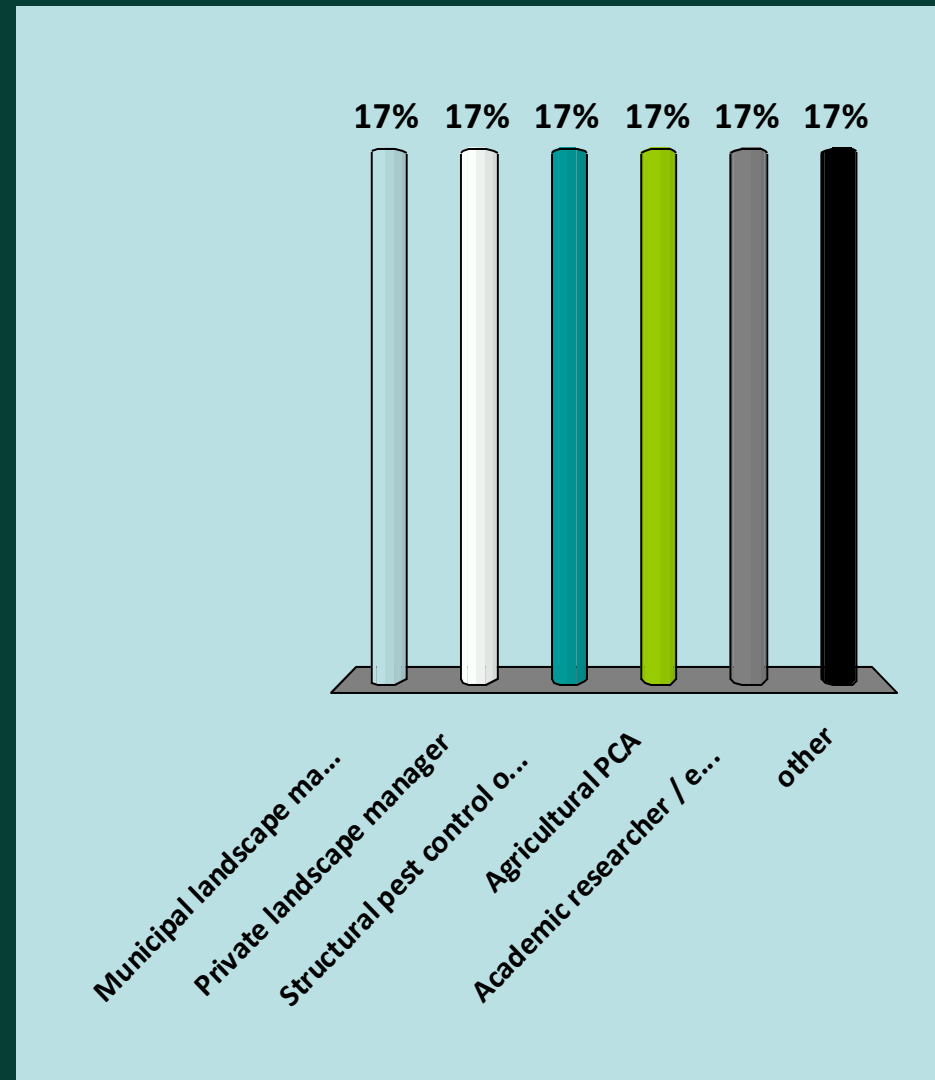
- Interactive TurningPoint presentation (stay awake)
 - The what, why, where and who of IPM
 - Central tenets of IPM
 - IPM for yellowjackets
 - IPM for white grubs
 - 2014: drought and pests
 - UCCE and UC IPM resources

What's an Urban IPM Advisor?!

- Andrew Sutherland: Bay Area Urban IPM Advisor
 - Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara counties
 - Professional / commercial landscape IPM
 - Structural / industrial IPM
 - Urban agricultural IPM
- amsutherland@ucanr.edu
- <http://ucanr.edu/sites/urbanIPM/>

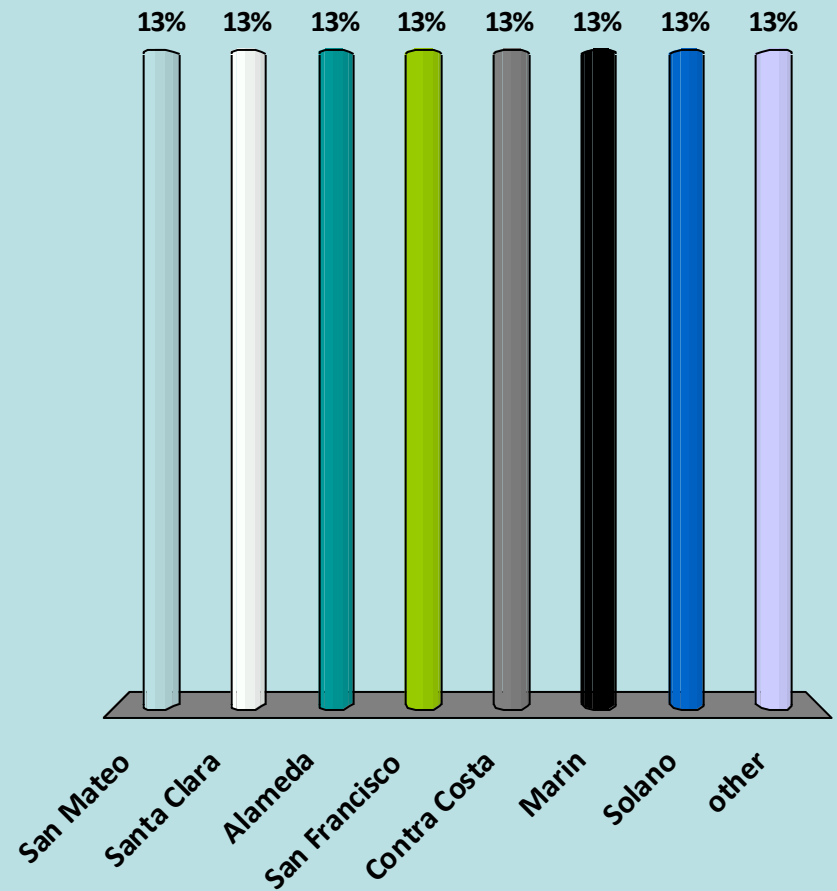
What is your primary profession?

- A. Municipal landscape manager
- B. Private landscape manager
- C. Structural pest control operator
- D. Agricultural PCA
- E. Academic researcher / educator
- F. other



Which is your primary county of operation?

- A. San Mateo
- B. Santa Clara
- C. Alameda
- D. San Francisco
- E. Contra Costa
- F. Marin
- G. Solano
- H. other



History of IPM

- ‘Supervised control’ 1949
 - California agriculture / cotton belt producers
 - Alfalfa, cotton
 - Control ‘supervised’ by entomologists
 - Applications made based on monitoring
 - New alternative to calendar-based programs

Supervised Control of Insects

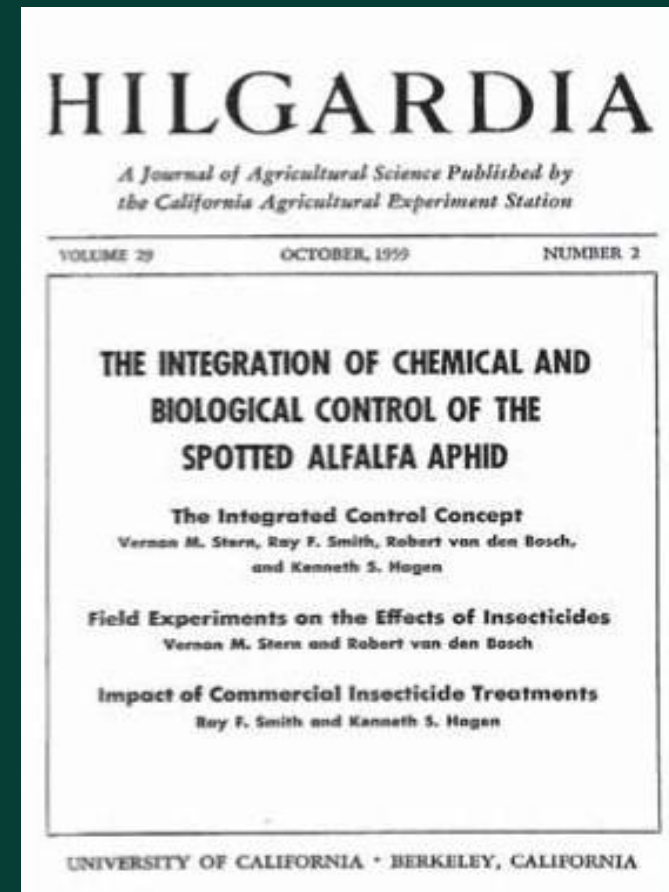
**utilizes parasites and predators and makes
chemical control more efficient**

Ray F. Smith and Gordon L. Smith



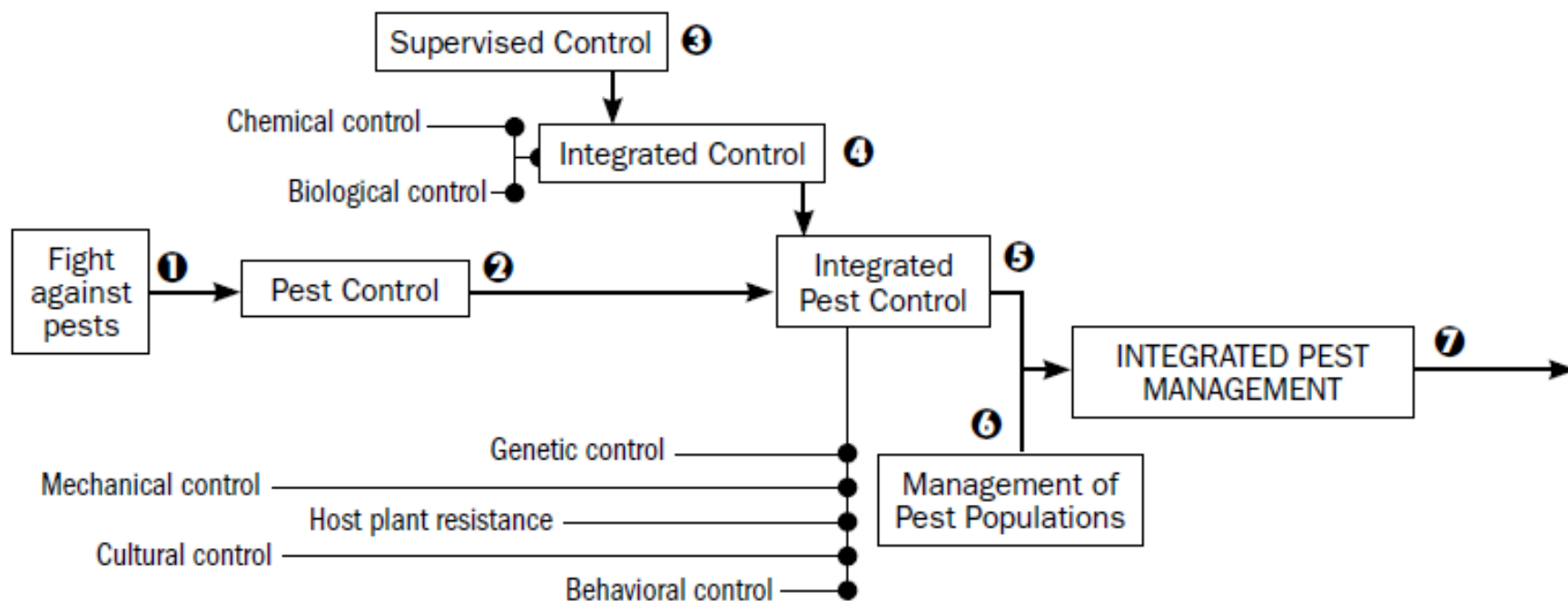
History of IPM

- ‘Integrated Control’ 1959
- UC Berkeley, UC Riverside
- ‘Applied pest control which combines and integrates biological and chemical control. Chemical control is used as necessary and in a manner which is least disruptive to biological control. Integrated control may make use of naturally occurring biological control as well as biological control effected by manipulated or induced biotic agents’



Chronology of the Evolution of Concepts in Fight Against Pests

Pre-1800s 1800s 1920s 1940s 1950s 1960s 1970s 1980s 1990s 2000s



Introduction of Practices or Concepts

- ❶ From initial stages of agriculture to early 1980s ❷ Empirical period – introduction of inorganic pesticides
 ❸ Michelbacher (1935) ❹ Michelbacher and Bacon (1952)
 ❺ Smith and Allen (1954) ❻ Geier and Clark (1961) ❼ Newsom and Brazzel (1968)

What exactly is integrated pest management (IPM)?

- ‘a decision-based process involving coordinated use of multiple tactics for optimizing the control of all classes of pests (insects, pathogens, weeds, vertebrates) in an ecologically and economically sound manner’ R.J. Prokopy, 2003

OK.....so...

- simultaneous management of multiple pests;
 - regular monitoring of pests, and their natural enemies and antagonists as well;
 - use of economic or treatment thresholds when applying pesticides;
 - integrated use of multiple, suppressive tactics.
- L. E. Ehler, 2006

Central tenets of IPM

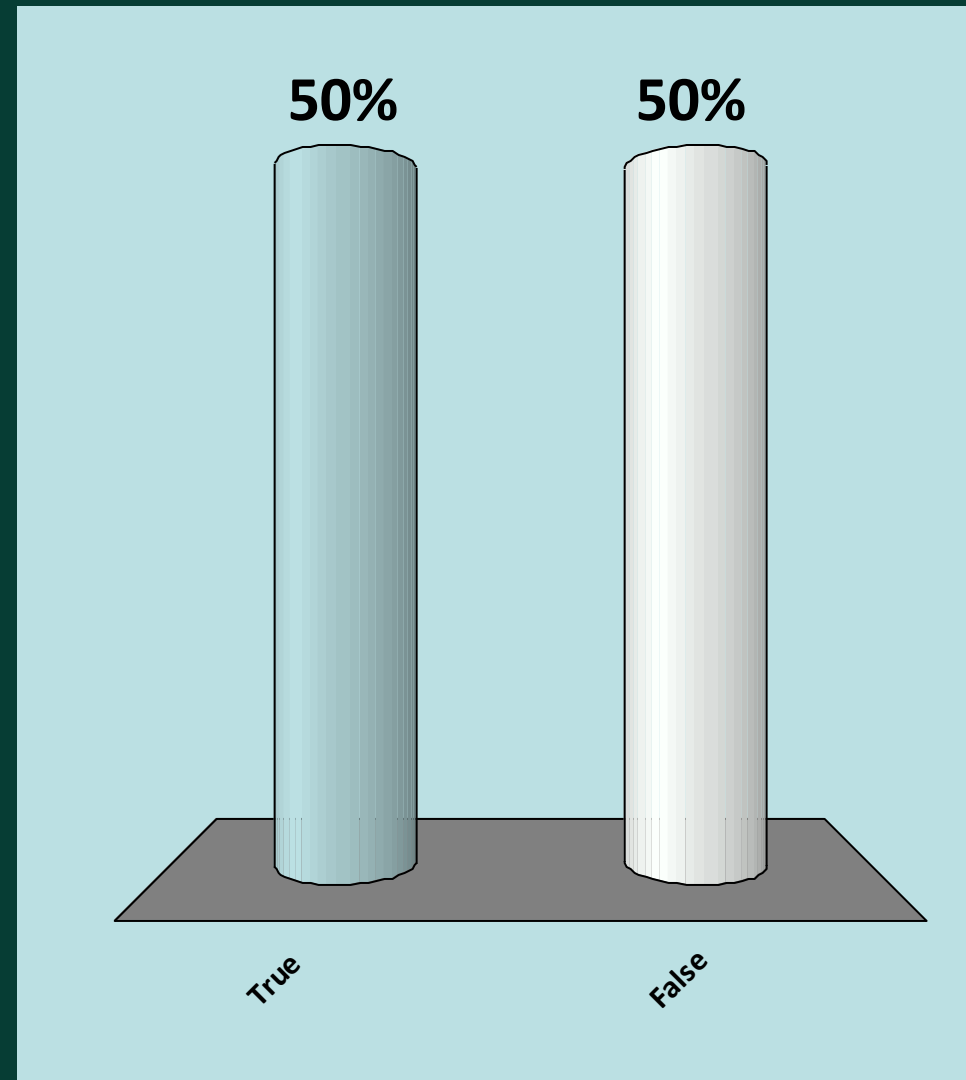
- **Education**
- **Prevention**
- **Monitoring**
- **Treatment Thresholds**
- **Multiple Tactics**
- **Integration**
- **Evaluation**



Pesticides are never utilized in IPM

A. True

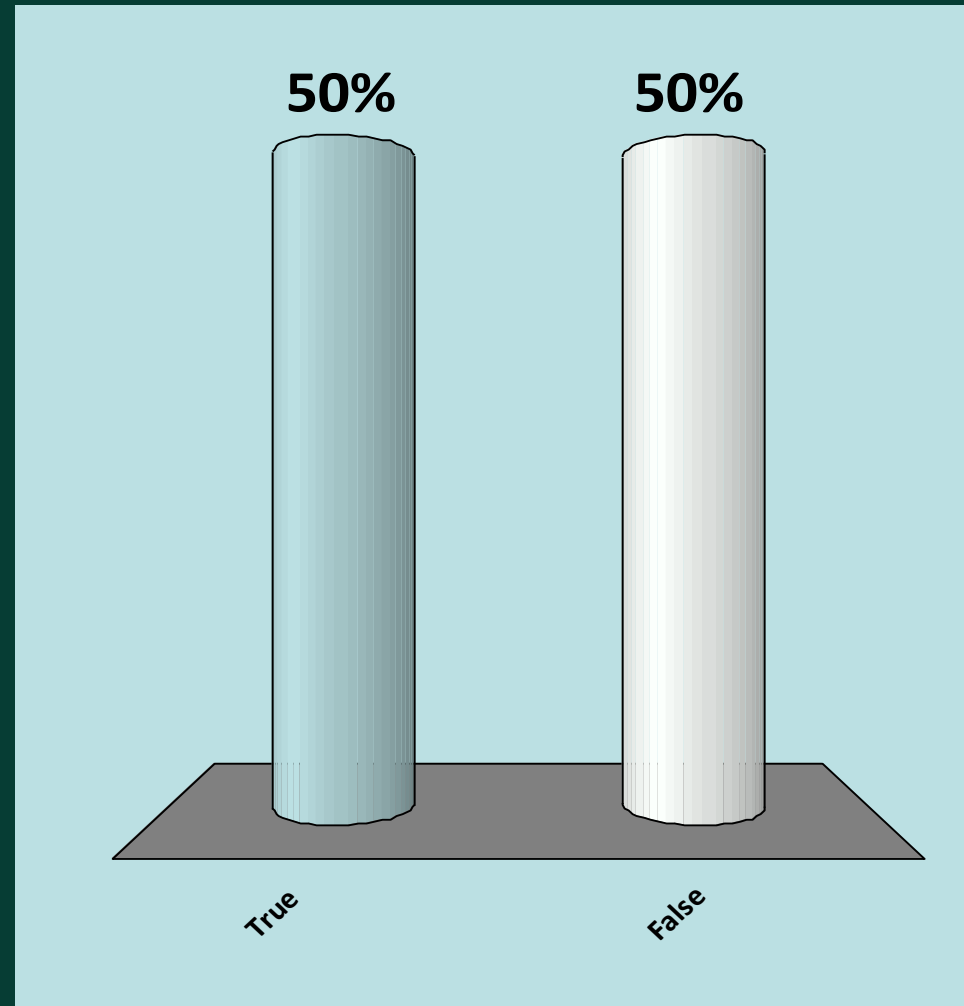
★ B. False




Relying on reduced-risk insecticides such as plant-based oils is one way of practicing IPM

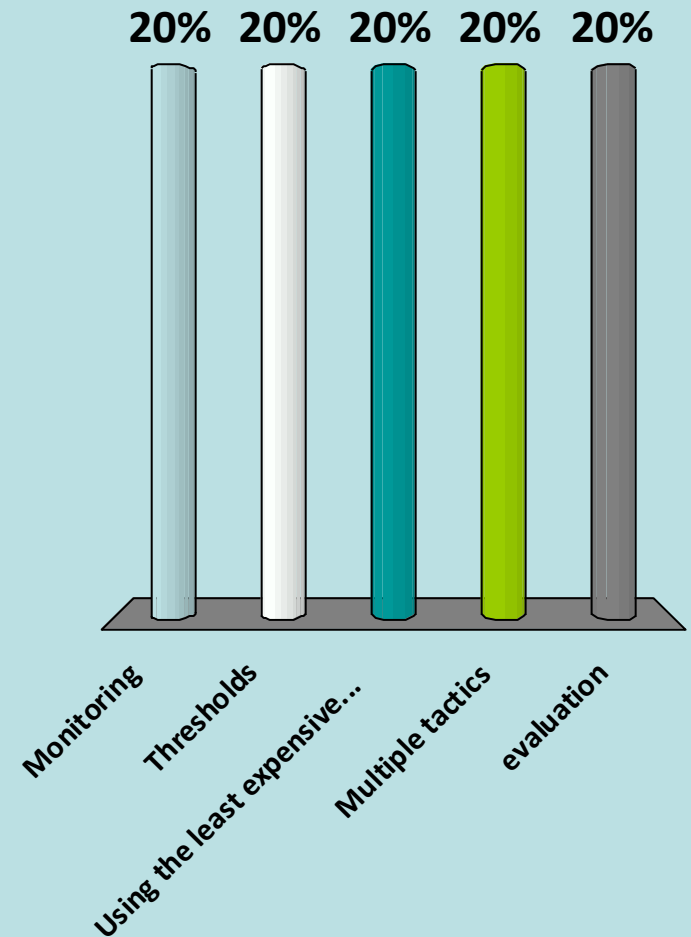
A. True

★ B. False



Which of the following IS NOT considered one of the central tenets of IPM?

- A. Monitoring
- B. Thresholds
-  C. Using the least expensive herbicide
- D. Multiple tactics
- E. evaluation



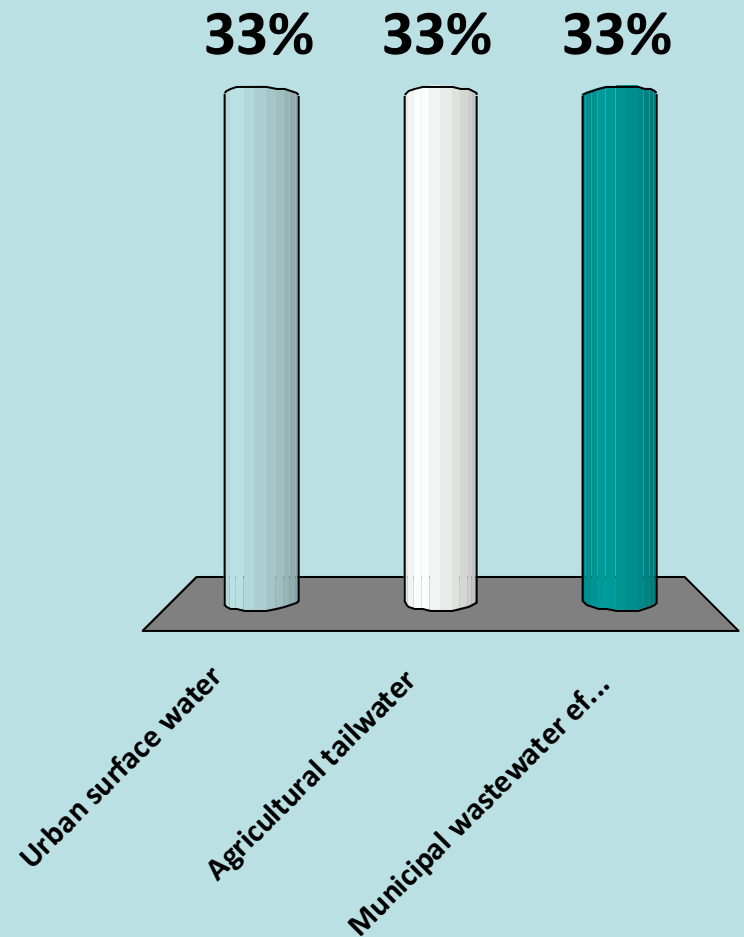
Central tenets of IPM

- **Education**
- **Prevention**
- **Monitoring**
- **Treatment Thresholds**
- **Multiple Tactics**
- **Integration**
- **Evaluation**



Which of the following typically contains the highest concentration of pesticides?

- ★ A. Urban surface water
- B. Agricultural tailwater
- C. Municipal wastewater effluent



Why Urban IPM?

- Urban surface water contamination (w / pesticides) levels 2 – 3 X higher than surface water in production ag areas
 - Diazinon and chlorpyrifos (Bailey et al 2000)
 - Pyrethroids (Weston et al 2005; Amweg et al 2006)
 - Fipronil (Lin et al 2009)
 - Herbicides and insecticides: East Bay creeks: 2,4-D, triclopyr, diuron, MCPA, bifenthrin, fipronil, imidacloprid, carbaryl, malathion (Ensminger et al, 2012)

Problems with pesticide use in urban areas

- Surface water, soil, groundwater contamination
- Human health concerns
- Disruption of ecosystem
- Economic costs
- Public perception



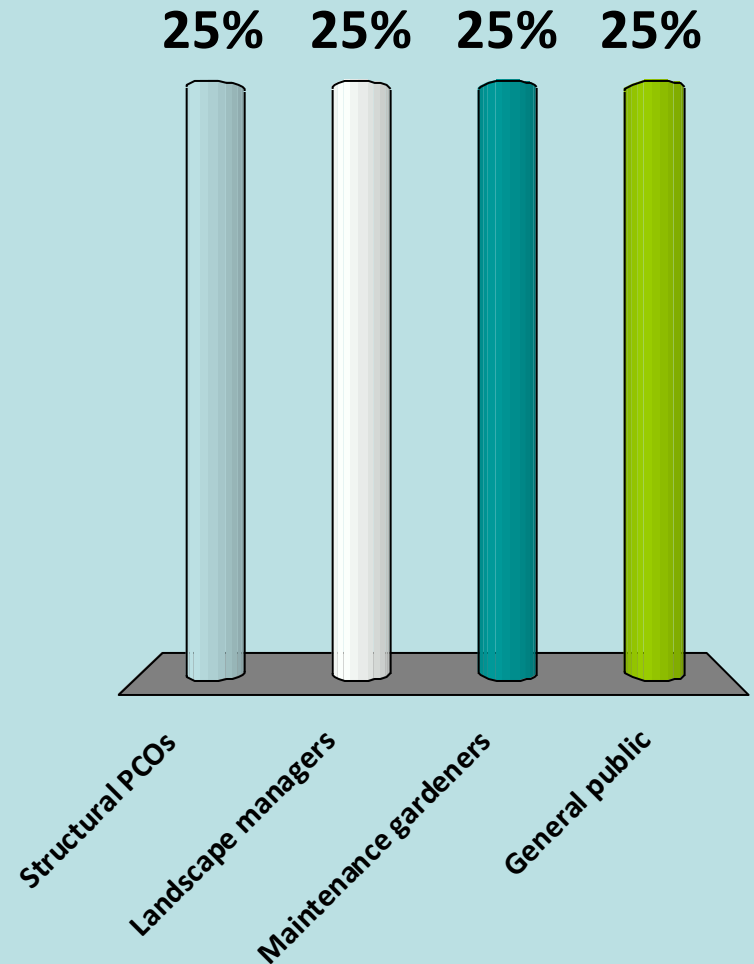
Who uses the largest amounts (a.i. AND # applications) of pesticides in urban areas?

A. Structural PCOs

B. Landscape managers

C. Maintenance gardeners

★D. General public



Major users of pesticides in urban areas

- General (residential) public
 - Homeowners / tenants
 - Property owners / managers
- Pest management professionals (PMPs)
- Government agencies
- Agriculture
 - Non-crop systems: ornamental nurseries
 - Urban ag systems

Central tenets of IPM

- Education
- Prevention
- Monitoring
- Treatment Thresholds
- Multiple Tactics
- Integration
- Evaluation




Communication!


IPM for yellowjackets

<http://wasps.ucr.edu/waspid.html>


- Education: ID
 - Western: *Vespula pennsylvanica*
 - German: *Vespula germanica*
 - May nest in structural voids, may be more cold tolerant, may be increasing in urban areas
 - Know how to distinguish yellowjackets, paper wasps, honeybees, etc.



yellow ring around eyes



yellow rings not continuous



yellow ring encircles eyes

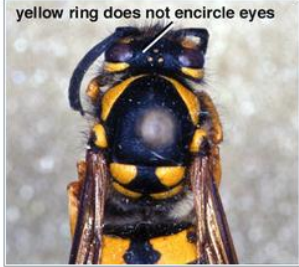
> if yes, it is the western yellowjacket, *V. pennsylvanica*. (There will also be a yellow blotch of pigment on the first antennal segment.)

> if no, continue to the next step

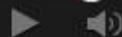
When looking straight down on the wasp's head, is the yellow ring broken up around the eyes?

> if yes, it is the German yellowjacket, *V. germanica*. (Also, the first antennal segment will be completely black).

> if no, either you don't have a yellowjacket, you have a male yellowjacket, or you have a species not considered here.



yellow ring does not encircle eyes



0:09 / 1:58



Distinguishing between yellowjackets, wasps, and look alikes



UCIPM · 28 videos

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670 views

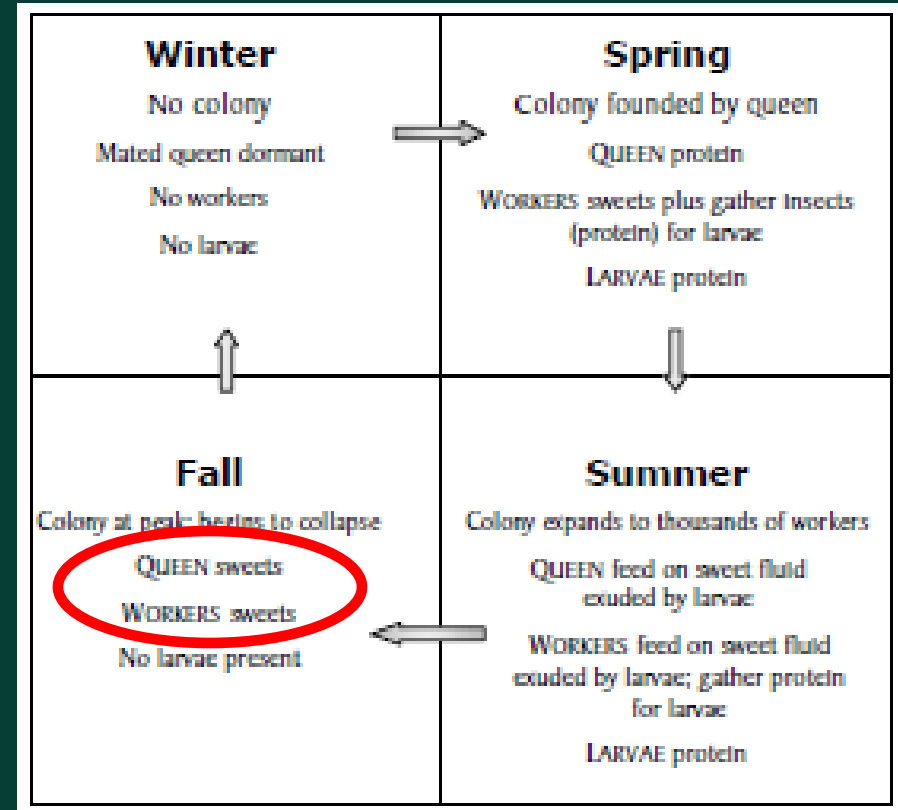
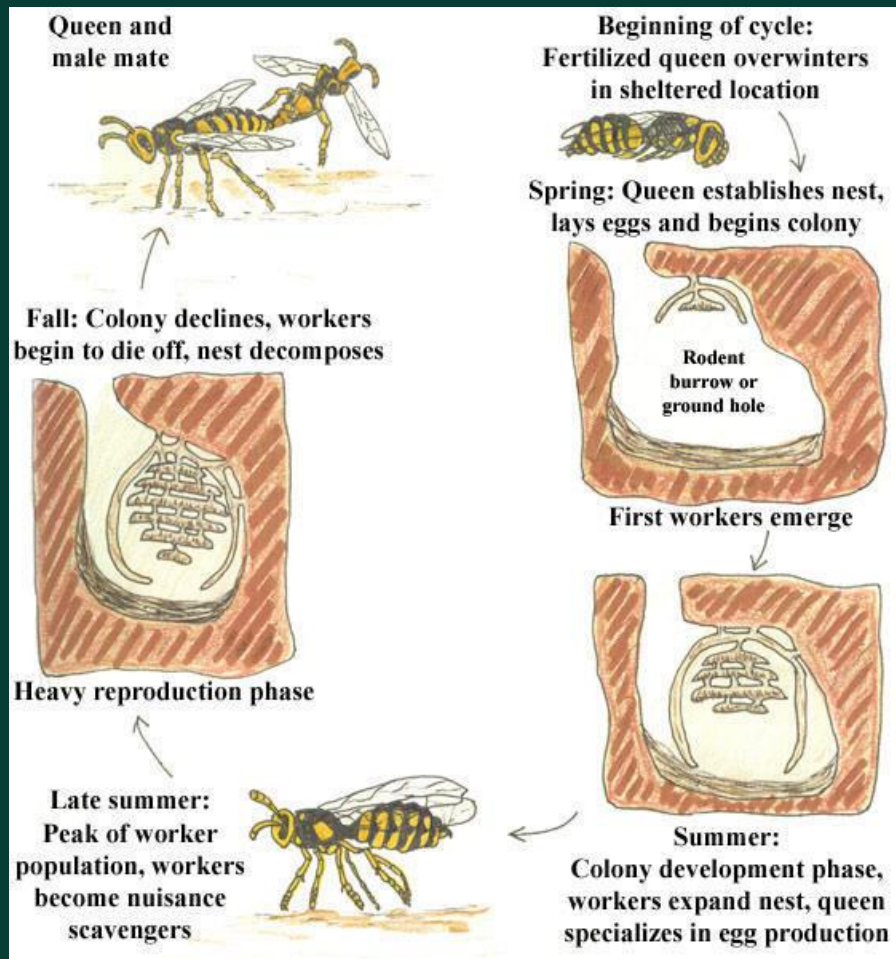
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<http://www.youtube.com/watch?v=PJHKA-Fre0k>

IPM for yellowjackets

- Education: life cycle



2014: queens are flying early!

- Photo sent by Walnut Creek client
- March 10
- Queen flight usually during April



IPM for yellowjackets

- Education
- Prevention
 - Eliminate nesting sites
 - Rodent burrows, dense vegetation, structural voids
 - Ensure proper sanitation
 - Use trash bags, tightly-covered trash cans
 - Prevent stings
 - Lids on sugary drinks, don't go barefoot

IPM for yellowjackets

- Education
- Prevention
- Monitoring
 - Spring and summer
 - Traps for queens in spring, foragers in summer
 - Active nests

Protein baits will be most effective during spring and summer; a piece of meat works great...



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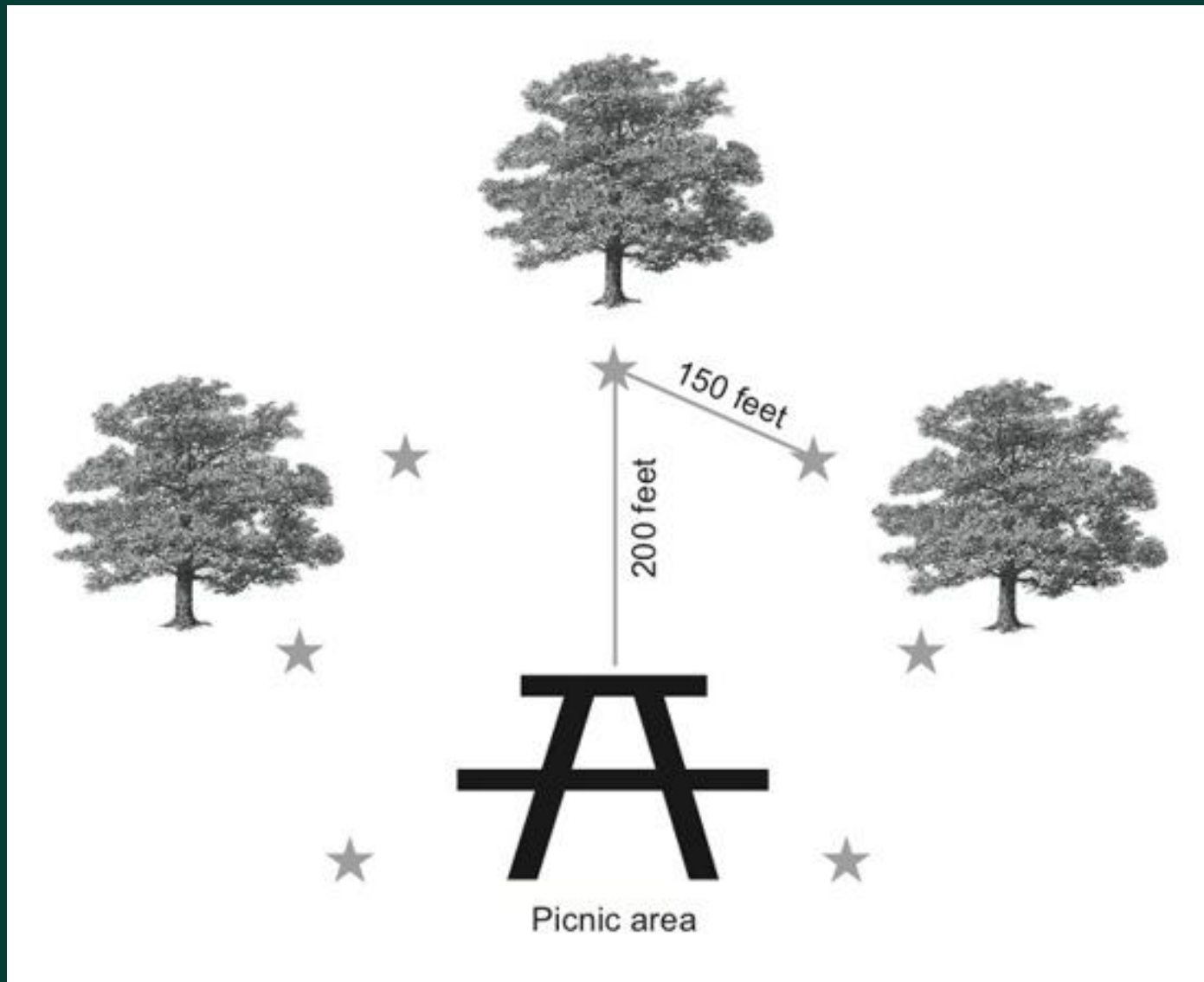
IPM for yellowjackets

- Treatment Thresholds
 - Yellowjackets are important predators...
 - How many represent a problem?
 - Usually situation-specific (public areas, schools vs. natural / remote areas)
 - Nest proximity to people: threshold may be distance rather than density...
 - Nests are much easier to control early in the season

IPM for yellowjackets

- Treatment Thresholds
- Multiple Tactics
 - Cultural tactics (see 'Prevention')
 - Physical tactics
 - Traps: proteins during spring and summer, sweets (commercial lures) during autumn
 - Nest removal (ensure proper PPE)

Trap Placement for Sting Prevention



IPM for yellowjackets

- Treatment Thresholds

- Multiple Tactics

- Cultural tactics
- Physical tactics
- Chemical tactics



- Some vector control service districts offer services (call state association at 916-440-0826)
- Direct nest treatments (ensure proper PPE!)
 - Pyrethroids
 - Oils (some may be EPA-exempt materials)

IPM for yellowjackets

- **Education**
- **Prevention**
- **Monitoring**
- **Treatment Thresholds**
- **Multiple Tactics**
- **Integration**
- **Evaluation**

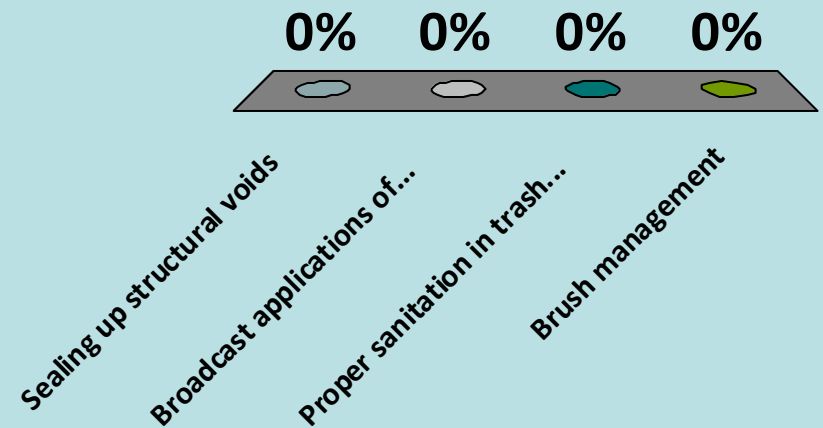


Did anyone get stung on the property this year?

Was I able to find nests early enough?

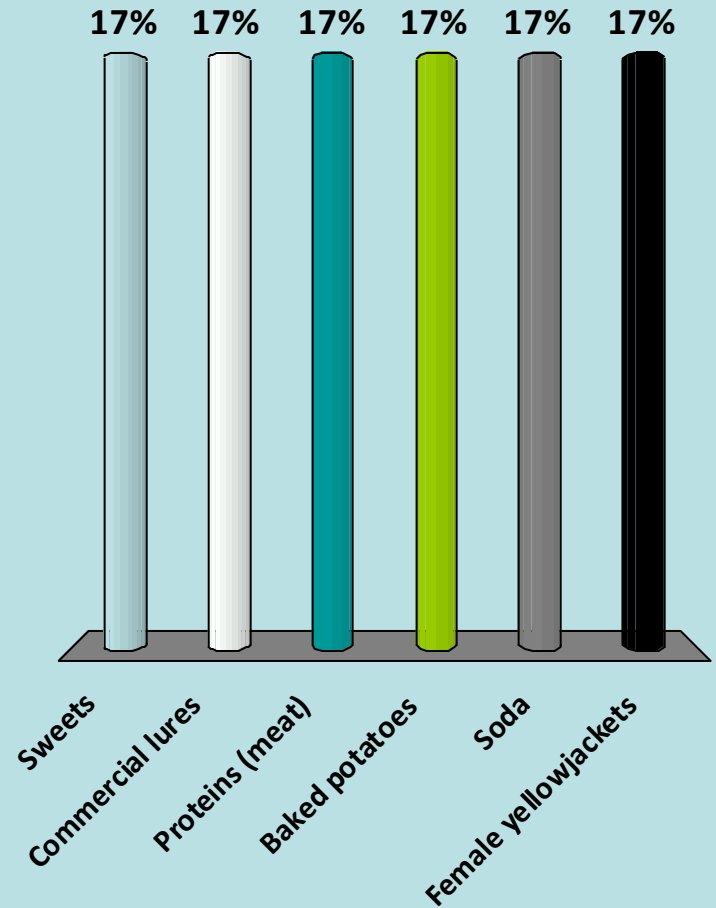
Which of the following is NOT considered prevention for yellowjackets?

- A. Sealing up structural voids
- ★ B. Broadcast applications of pyrethroids
- C. Proper sanitation in trash areas
- D. Brush management



What kind of lure will be most effective for use in monitoring (spring) traps?

- A. Sweets
- B. Commercial lures
- ★ C. Proteins (meat)
- D. Baked potatoes
- E. Soda
- F. Female yellowjackets



Central tenets of IPM

- Education
- Prevention
- Monitoring
- Treatment Thresholds
- Multiple Tactics
- Integration
- Evaluation



IPM for white grubs

- **Education**
 - Masked chafer larvae?
 - Black *Ataenius* larvae?
 - Billbug larvae?



IPM for white grubs

- **Education**
 - Masked chafer larvae?
 - Black *Ataenius* larvae?
 - Billbug larvae?



Look Ma, no
legs!



Masked chafer vs. black ataenius

- Both scarab beetles (Coleoptera: Scarabeidae)
- Size difference: MC: ~1"; BA: ~1/5" (5mm)
- BA: multiple generations / year
- MC: more common and more damaging



Masked chafer vs. black ataenius



Masked chafer biology and ecology

- Adults active May – July (can be monitored via light traps)
- Larvae feed on roots of all turf species in CA (damage more serious on ryegrass, bluegrass)
- Overwinters as mature larva in earthen cells
- Pupates in early spring





Damage usually becomes evident in autumn, when grubs are large...



Vertebrate predators such as skunks, raccoons may damage turf while foraging for grubs

IPM for white grubs

- Education
- Prevention
 - Warm season grasses more tolerant
 - Proper irrigation
 - Thatch removal



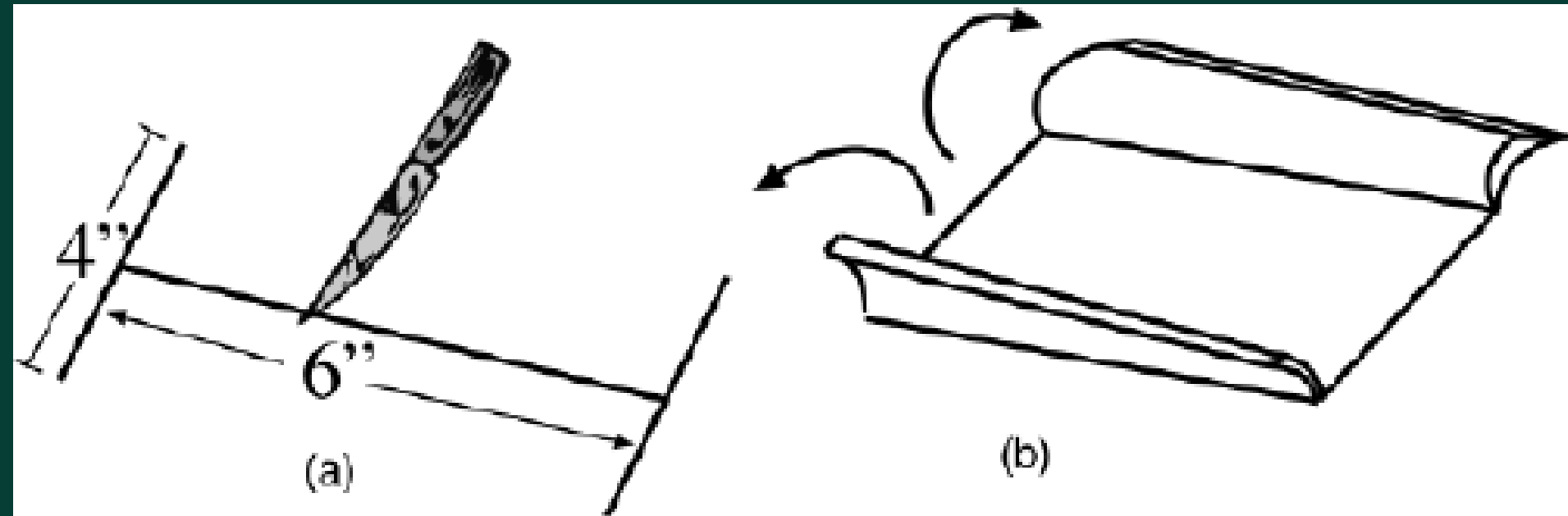
IPM for white grubs

- **Education**
- **Prevention**
- **Monitoring**

Infestations tend to reoccur in same area / region

- **Adult beetles attracted to lights (May-July)**
- **Cut / roll turf to expose grubs (June-...)**



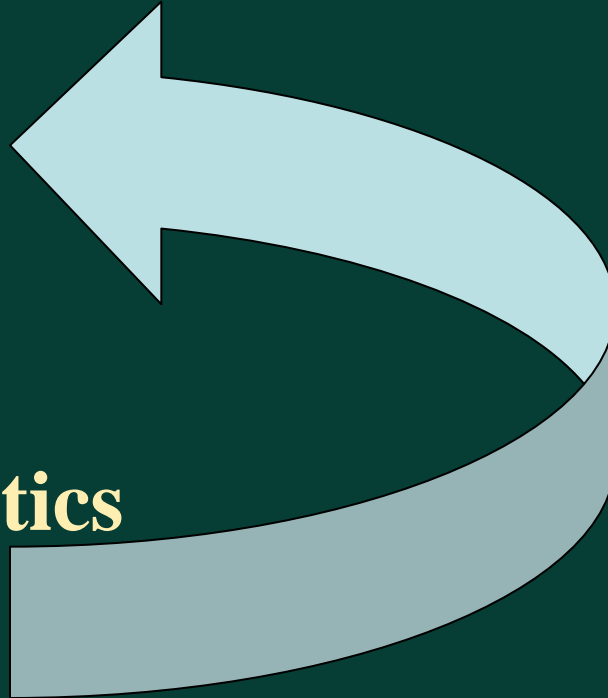


IPM for white grubs

- **Education**
- **Prevention**
- **Monitoring**
- **Thresholds**
 - ≥ 6 grubs in most turf situations
 - ≥ 1 grub in golf course greens
 - Vertebrate predation / turf damage?

IPM for white grubs

- **Education**
- **Prevention**
- **Monitoring**
- **Thresholds**
- **Multiple tactics**
 - **Cultural**
 - **Biological**
 - **Chemical**



Biological control for white grubs

- Entomopathogenic nematodes
 - *Heterorhabditis bacteriophora*
 - *Steinernema* spp. not effective



Biological control for white grubs

- Entomopathogenic nematodes
 - *Heterorhabditis bacteriophora*
 - *Steinernema* spp. not effective
 - Can be used at any time during grub stage
 - May not prevent vertebrate predation

Biological control for white grubs

- Entomopathogenic nematodes
- Tiphid wasps
 - Common larval parasitoids
 - May not reduce grubs below threshold



Biological control for white grubs

- Entomopathogenic nematodes
- Tiphid wasps
- Milky spore disease (*Paenibacillus* spp.)
 - May offer natural control
 - Not commercially available

Chemical control for white grubs

- **Neonicotinoids**
 - Imidacloprid
 - Thiamethoxam
 - Clothianidin
 - Must be applied when grubs are small
 - Most only work when applied just prior to egg hatch

Chemical control for white grubs

- Neonicotinoids
- Carbaryl (Sevin)
 - Can be used against large grubs
 - Disrupts soil biota
 - May be prohibited / regulated in cases
 - Should be considered last option

IPM for white grubs

- **Education**
- **Prevention**
- **Monitoring**
- **Thresholds**
- **Multiple tactics**
- **Integration**
 - **Broad spectrum insecticides may interfere with biological control agents**

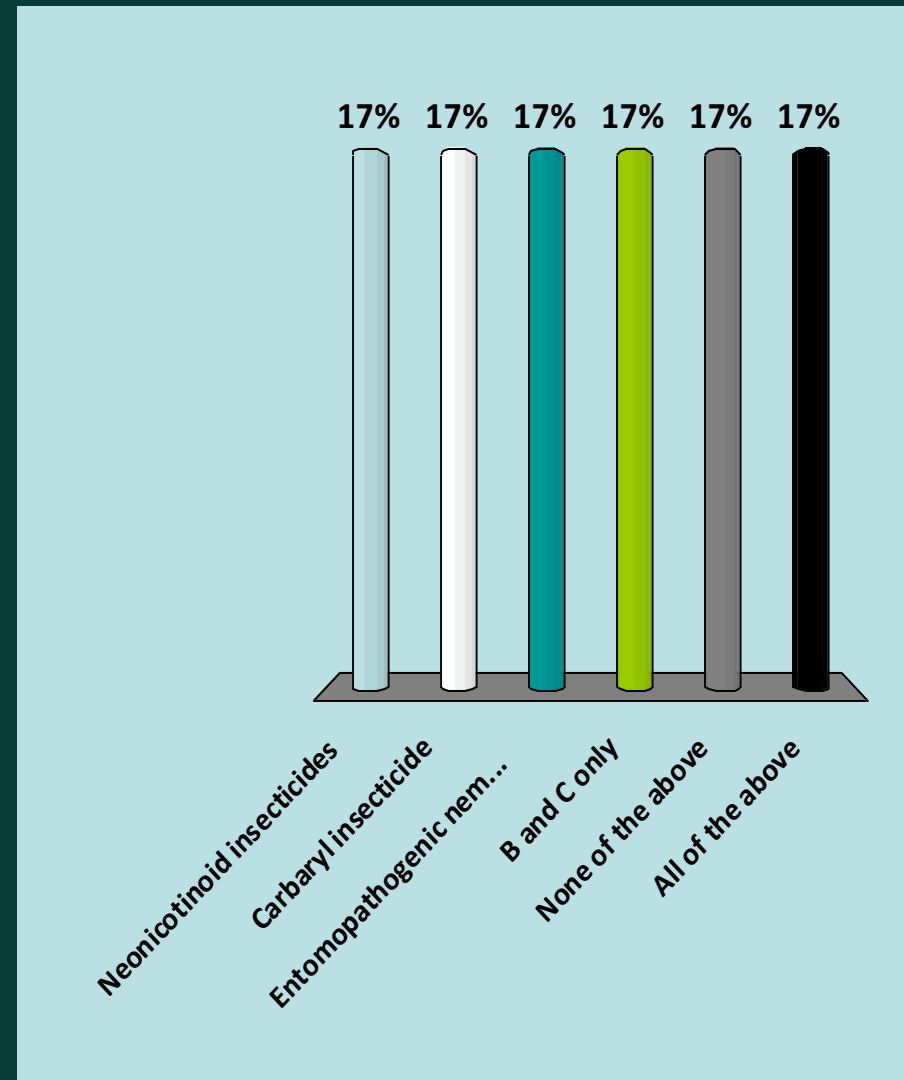
IPM for white grubs

- **Education**
- **Prevention**
- **Monitoring**
- **Thresholds**
- **Multiple tactics**
- **Integration**
- **Evaluation**
 - **Continue monitoring program**



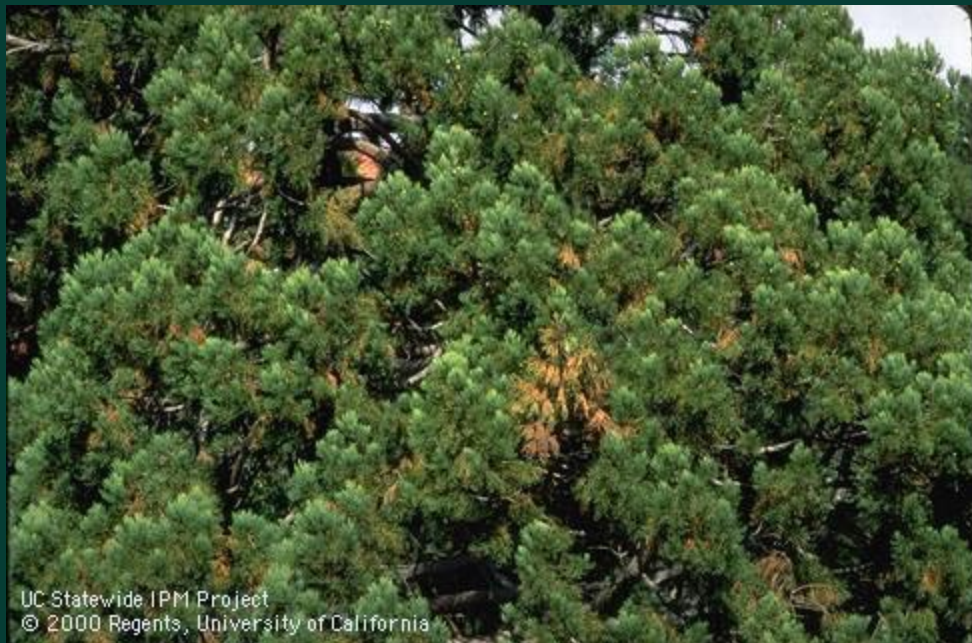
Which of the following tactics can be used against large grubs in autumn

- A. Neonicotinoid insecticides
- B. Carbaryl insecticide
- C. Entomopathogenic nematodes
- ★ D. B and C only
- E. None of the above
- F. All of the above



Drought and pests

- Drought stress predisposes plants to:
 - Some pathogens
 - *Armillaria* on oaks and other hardwood trees
 - *Botryosphaeria* on coast redwoods
 - Wood-boring insects
 - Beetles
 - Pitch moths and wood wasps



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Drought Messages for Landscape Managers

This resource for landscape managers includes hyperlinks within the text to more comprehensive references. An extensive list of drought resources and supplementary information for landscape managers and home gardeners can be downloaded [here](#). If you have additional resources to add to this list, please contact us at jjtso@ucdavis.edu.

Reduce irrigation.

Provide only as much water as the landscape requires [1] [2] [3] [4]. Most landscapes are given too much water and can flourish on less. Over-irrigation can actually predispose plants to other problems.

Prioritize the plants that will receive water.

During irrigation restrictions, select those plants that will receive the limited amounts of water available for irrigation. One way to determine this is to think about which plants can tolerate limited water [1] [2] or are more easily replaced. Lower priority plants may be removed from crowded areas to further conserve water.

Upcoming Events

Water Conservation Training for Government Facilities
- INDUSTRY

Mar 12, 2014

Pollinator Gardening Workshop

Registration Closes TODAY at 5:00 PM

Mar 15, 2014

Rose Day 2014

- PUBLIC

Rose Day 2014 is Saturday May 3rd and Sunday May 4th. Agenda will be posted in March.

May 03, 2014

[See more events](#)

News

Current Issues in Invasive/Emerging Pests & Diseases Workshop Available for Download

Feb 11, 2014

CCUH is on Twitter!

Jan 29, 2014

[More news...](#)

Featured

<http://ccuh.ucdavis.edu/industry/drought-messages-for-landscape-managers>

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California Drought Resources

In the midst of historic drought, California's academic institutions serve as a tremendous resource both in offering everything from near-term management advice to farmers and ranchers to the innovative work being carried out by researchers on a vast array of issues from drought resistant crops to snow sensors to climate change.

These pages are being continuously updated as we work to bring the resources of the state's universities and colleges to a broad range of communities.

- [Drought-related events](#)
- [Drought information and resources](#)
- [Drought experts list](#)
- [Media coverage featuring our experts](#)
- [Story highlights](#)



Follow us on Twitter [@ucanrwater](#) for drought-related news and updates.

"As California faces its worst drought in decades, water supply and quality for agricultural, urban, and environmental systems has become one of our biggest challenges. UC's California Institute for Water Resources

New stink bug pests!

- Brown marmorated stink bug
- Bagrada bug
- Both are significant agricultural pests
- Both aggregate in or on structures in autumn and may overwinter inside
- Disagreeable odor







Other recent invaders

- bagrada bug; *Bagrada hilaris*

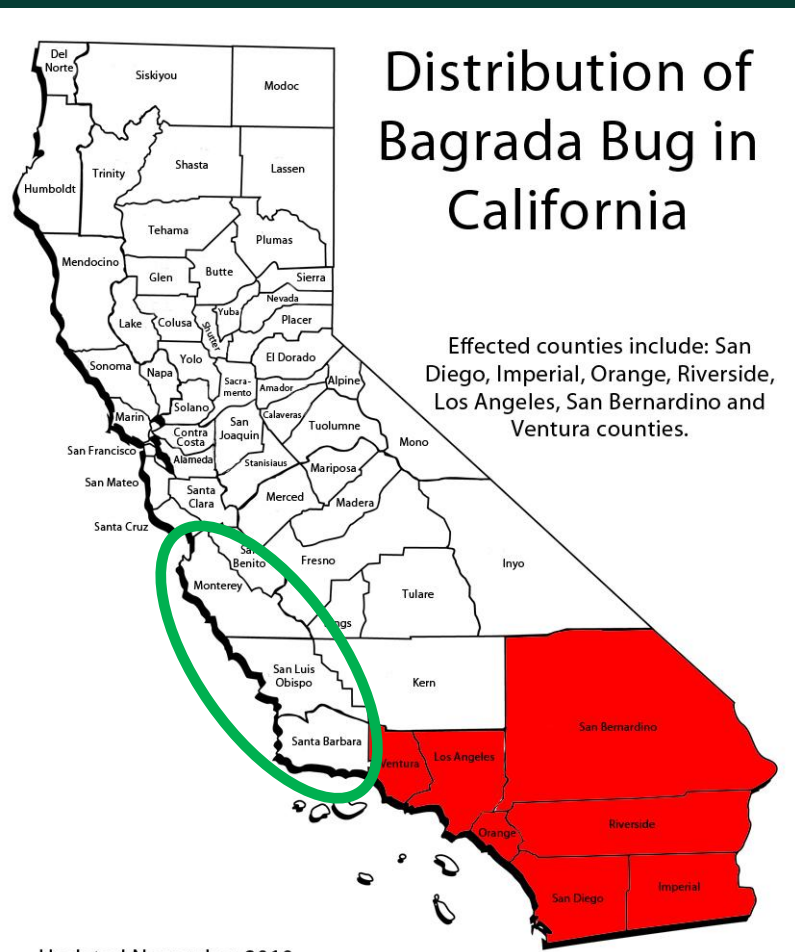


Photo by G. Arakelian

What if you find BMSB or bagrada?

- Report to County Agriculture Commissioner
- Pass out UC IPM fact sheet: Pest Alert
- Try to limit opportunities for further spread within state
 - Don't move firewood!

You can help stop a new pest by recognizing and reporting it.

Brown Marmorated Stink Bug

The brown marmorated stink bug (BMSB), *Halyomorpha halys*, has been detected in California. Wherever BMSB takes up residence, it **causes severe crop and garden losses** and becomes a **nuisance to people**. The ability of BMSB to hitchhike in vehicles and planes has allowed it to **spread rapidly** to new areas. Since it was introduced to the United States from Asia in the 1990s, BMSB has become established in the mid-Atlantic States as well as in Portland, Ore., and Los Angeles.

How to identify BMSB

DAVID R. LANGE/USDA ARS/REDA, BLOOMSBURG, MD



EGGS: Laid in clusters of 20 to 30 on underside of leaves, barrel-shaped, white to pale green

YOUNG NYMPHS: Abdomen orange with brown markings



Similar stink bugs (also known as shield bugs)

BMSB adults look similar to other brown stink bugs. Here are some tips for telling adults apart.

RED SHOULDERED STINK BUG
Edge of abdomen concealed; antennal bands, if present, are not white; less than 1/2 inch long



ROUGH STINK BUG Distinctive teeth jutting out from shoulder; no antenna bands; 1/2 inch long



CONSPERSE STINK BUG Legs dotted with dark spots; no antenna bands; 1/2 inch long

Impact of BMSB on crops and people

CROP DAMAGE BMSB may reach very high numbers, and since one bug can feed on many fruit, losses can be severe. Adults and nymphs suck juices from fruit and seeds, creating pockmarks and distortions that make fruit and vegetables unmarketable. Damaged flesh under the skin turns hard and pithy. BMSB damages fruits (e.g., apple, pear, citrus, stone fruits, and fig), berries, grapes, legumes, vegetables, and shade trees.



BMSB damage to tomato (left), peach (center), and pear (right)

NUISANCE TO PEOPLE BMSB seeks winter shelter, and large numbers may congregate on outside walls or invade homes by entering through small openings. It is also a pest in home gardens. These insects stink when disturbed.

How it spreads

BMSB travels long distances by hitching rides in vehicles or as stowaways when furniture or other articles are moved, often during winter months. As a result, most new infestations are found in urban areas.

Report any sightings

If you find a stink bug that you suspect might be a BMSB, place it in a container and carefully note where and when you collected it. Take the sealed container to your county agricultural commissioner or local UC Cooperative Extension office.

For more information, visit www.ipm.ucdavis.edu.

University of California
Agriculture and Natural Resources
Statewide IPM Program



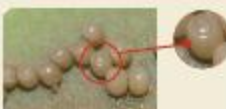
You can help stop a new pest by recognizing and reporting it.

Bagrada Bug

Bagrada bug, *Bagrada hilaris*, is an invasive stink bug spreading through western Arizona and southern California since 2008, **causing severe crop, nursery, and landscape losses**. Bagrada bugs gather on plants in large groups. In agriculture, Bagrada bug is a pest of cole crops and other mustard family plants. In home gardens it feeds on these same vegetables and on ornamental plants such as sweet alyssum and candytuft.

How to identify Bagrada bug

PETER HANWELL, UCD



EGGS: Laid singly or in small clusters on underside of leaves, stems, or on soil underneath plants. Eggs are initially white and turn orange-red as they get older.

WINGLESS NYMPHS: Young Bagrada bugs change color from bright orange to red with dark markings as they get older. Newly molted nymphs and adults are also red but quickly darken.

PETER HANWELL, UCD



UCCE / UC IPM resources for commercial landscape IPM

- UC IPM Pest Notes
 - <http://www.ipm.ucdavis.edu/PMG/menu.house.html>
- UC IPM Green Bulletin
 - <http://www.ipm.ucdavis.edu/greenbulletin/>
- UC ANR Urban Ants website
 - <http://ucanr.edu/sites/UrbanAnts/>
- Andrew's Urban IPM website
 - http://ucanr.edu/sites/urbanIPM/Commercial_Landscape_IPM/

FREE Pest Notes



for Home and Landscape from the University of California

Birds, Mammals, and Reptiles

Bats
Birds on Tree Fruits and Vines
Cliff Swallows
Coyote
Deer
Deer Mouse
Ground Squirrel
House Mouse
Lizards
Moles
Opossum
Pocket Gophers
Rabbits
Raccoons
Rats
Rattlesnakes



Carpenter Bees
Carpenterworm
Carpet Beetles
Citrus Leafminer
Clearwing Moths
Clothes Moths
Cockroaches
Codling Moth
Conenose Bugs
Cottony Cushion Scale
Drywood Termites
Earwigs
Elm Leaf Beetle
Eucalyptus Longhorned Borers
Eucalyptus Redgum Lerp Psyllid
Eucalyptus Tortoise Beetles
False Chinch Bug



Millipedes and Centipedes
Mosquitoes
Nematodes
Oak Pit Scales
Olive Fruit Fly
Pantry Pests
Psyllids
Red Imported Fire Ant
Redhumped Caterpillar
Removing Honey Bee Swarms and
Established Hives
Roses: Insect and Mite Pests and
Beneficials
Scales
Scorpions
Sequoia Pitch Moth
Silverfish and Firebrats

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ON THIS SITE

What is IPM?

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Agricultural pests

Natural environment pests

Exotic & invasive pests

Weed gallery

Natural enemies gallery

Weather, models & degree-days

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How to Manage Pests

Pests in Gardens and Landscapes

Pocket Gophers

Revised 9/09

[Download PDF](#)

[Quick Tip](#)

[Nota Breve](#)

In this Guideline:

- [Identification](#)
- [Biology and behavior](#)
- [Damage](#)
- [Legal status](#)
- [Management](#)
- [About Pest Notes](#)
- [Publication](#)
- [Glossary](#)

Related videos

- [How to set a Macabee trap](#)
- [How to place a Macabee trap](#)

Pocket gophers, often called gophers, *Thomomys* species, are burrowing rodents that get their name from the fur-lined, external cheek pouches, or pockets, they use for carrying food and nesting materials. Pocket gophers are well equipped for a digging, tunneling lifestyle with their powerfully built forequarters; large-clawed front paws; fine, short fur that doesn't cake in wet soils; small eyes and ears; and highly sensitive facial whiskers that assist with moving about in the dark. A gopher's lips also are unusually adapted for their lifestyle; they can close them behind their four large incisor teeth to keep dirt out of their mouths when using their teeth for digging.

IDENTIFICATION

Five species of pocket gophers are found in California, with Botta's pocket gopher, *T. bottae*, being most widespread. Depending on the species, they are 6 to 10 inches long. For the most part, gophers remain underground in their burrow system, although you'll sometimes see them feeding at the edge of an open burrow, pushing dirt out of a burrow, or moving to a new area.

Mounds of fresh soil are the best sign of a gopher's presence. Gophers form mounds as they dig tunnels and push the loose dirt to the surface. Typically mounds are crescent or horseshoe shaped when viewed from above. The hole, which is off to one side of the mound, usually is plugged. Mole mounds are sometimes mistaken for gopher mounds. Mole mounds, however, are more circular and have a plug in the middle that might not be distinct; in profile they are volcano-shaped. Unlike gophers, moles commonly burrow just beneath the surface, leaving a raised ridge to mark their path.

One gopher can create several mounds in a day. In nonirrigated areas, mound building is most pronounced during spring or fall when the soil is moist and easy to dig. In irrigated areas such as lawns, flower beds, and gardens, digging conditions usually are optimal year round, and mounds can appear at any time. In snowy



Adult pocket gopher, *Thomomys* species



Top view of a pocket gopher mound.

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Key to Identifying Common Household Ants

This key includes the ant species that are most likely to be a nuisance around California homes and structures. Many other ant species occur in California, but most are not home invaders. [References](#) | [Acknowledgment](#)

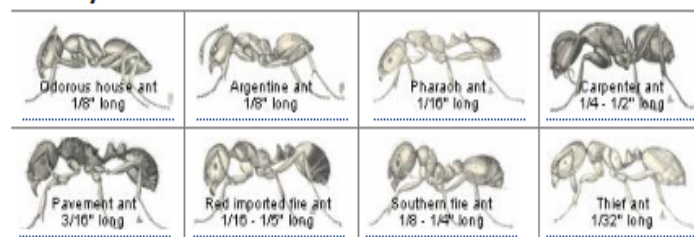
☐ [Begin key](#)

- Click through the key until you get to a summary screen of the ant that the key identified

Supplementary information

- [An introduction to ants](#)
- [Quick tips for identifying ants](#)
- [PDF version to print \(PDF\)](#)

Already know your species? Click on an illustration below to go directly to a summary screen



Related information

- [Ants Pest Note](#)

PDF: To display a PDF document, you may need to use a [PDF reader](#).



University of California
Agriculture and Natural Resources

Green Bulletin

Vol. 3 • No. 4 • August 2013

Neonicotinoid Insecticide Use Under Increasing Scrutiny

Tight new regulations being imposed by European Union authorities and a widely publicized mass die-off of native pollinators in Oregon (see page 3) have recently brought neonicotinoids to the public's attention. Neonicotinoid insecticides are increasingly being scrutinized by regulators and the public alike throughout the world.

First developed in the late 1980s, neonicotinoids represented the first new class of insecticides in over 50 years. They are nervous-system toxins widely used in agricultural, horticultural, veterinary, and structural settings for broad-spectrum management of pest insects. Desirable qualities such as reduced toxicity to humans and pets (as compared to some organophosphates and carbamates) and systemic activity in plants led to rapid and widespread use. Imidacloprid, the first neonicotinoid developed, is now the most widely-used insecticide in the world. (See Table 1 for other active ingredients and common product names.)

From the beginning, it was recognized that foliar applications of neonicotinoids were quite broad in activity and would have negative impacts on beneficial insects. However, the high water-solubility and environmental persistence of neonicotinoids meant that applications



S.H. DREISTADT, UCIPM

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Workshop: **Impact of New Regulations on Ant IPM**

November 1, 2012

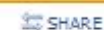
San José, CA

Topics (Click on title for a PDF of the presentation)

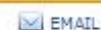
PRESENTATIONS FROM 2012 CONFERENCE

[IPM Strategies for Controlling Pest Ants](#)

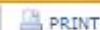
[UC Riverside, March 21, 2012](#)
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Commercial Landscape IPM

This page serves as a resource for professional landscape managers seeking information regarding IPM. Regular content updates will inform municipal employees, landscape contractors and supervisors, maintenance gardeners and CDPR licensees (Category B, Subcategory Q) of IPM-related educational programs, ongoing research and current events / topics.



[UC IPM Resources for Landscape Professionals](#)



[UC Urban Ants: Resources for Professionals](#)



[Great resource for child care clients!](#)

[IPM Curriculum for Early Care and Education](#)

Professional Landscape Managers Calendar

San Bruno CAPCA ED Seminar

Date: February 21, 2013

CAPCA ED is the premier provider of continuing education (CE) training for California PCAs, QALs, QACs, Private Applicators, Arborists, and other Licensed & Certificate Holders. Andrew will deliver an educational presentation entitled 'What does IPM look like in urban settings?'

Thanks!...Questions?

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