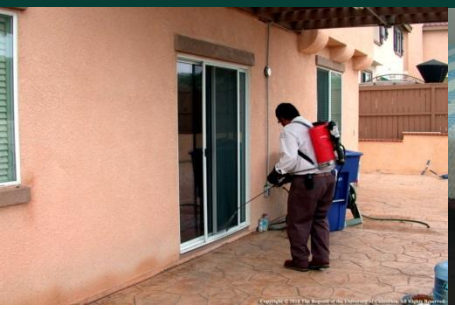
Local pest trends and issues



Andrew Sutherland
Bay Area Urban IPM Advisor
UCCE and UC IPM

UC IPM

University *of* California
Agriculture and Natural Resources

Statewide Integrated Pest Management Program

Making a Difference for California

Who's this guy?!

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

Outline of presentation

- Quick refresher: the what, why, where and who of IPM
- Quick refresher: central tenets of IPM
- Pyrethroid restrictions discussion
- Canine detection services discussion
- Trending pests (Bay Area observations)
- New (exotic, invasive) pests
- UCCE and UC IPM resources

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

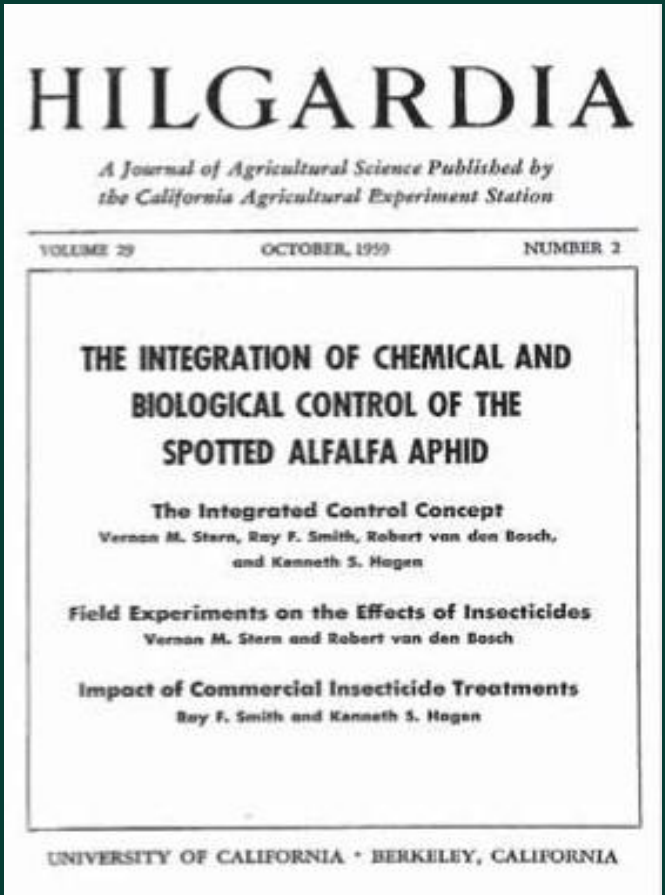

Supervised Control of Insects

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’



HILGARDIA

A Journal of Agricultural Science Published by the California Agricultural Experiment Station

VOLUME 29 OCTOBER, 1959 NUMBER 2

THE INTEGRATION OF CHEMICAL AND BIOLOGICAL CONTROL OF THE SPOTTED ALFALFA APHID

The Integrated Control Concept
Vernon M. Stern, Ray F. Smith, Robert van den Bosch, and Kenneth S. Hagen

Field Experiments on the Effects of Insecticides
Vernon M. Stern and Robert van den Bosch

Impact of Commercial Insecticide Treatments
Ray F. Smith and Kenneth S. Hagen

UNIVERSITY OF CALIFORNIA · BERKELEY, CALIFORNIA

Structural Pest Control Board and IPM

- '…a systematic decision making approach to managing pests, which focuses on long-term management or suppression with minimal impact on human health, property, the environment, and non-target organisms.'
- 'incorporates all reasonable measures to prevent problems by properly identifying pests, monitoring population dynamics, and using cultural, physical, biological, and chemical pest population control measures to reduce pests to acceptable levels.'

REGULATION UPDATE
April 2009

ALL BRANCH 2 AND/OR 3 LICENSEES, REGISTERED COMPANIES AND BRANCH OFFICES

The Structural Pest Control Board (Board) has amended sections 1937, 1950, 1950.5 and 1953 of title 16 of the California Code of Regulations. These amendments become effective April 19, 2009.

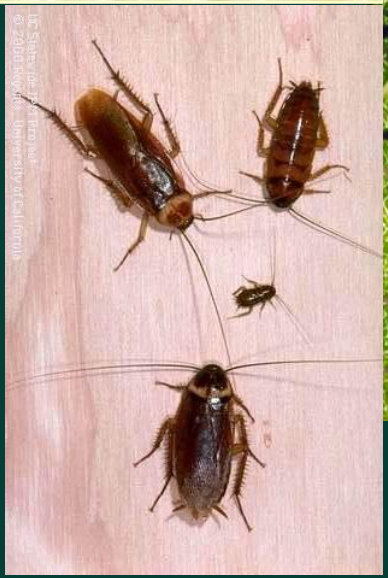
Section 1937 requires that a field representative complete training and education in Integrated Pest Management (IPM) as part of his or her pre-licensing requirements.

Section 1950 requires that all branch 2 and/or 3 licensees that renew **on or after June 30, 2010**, complete two hours of IPM education as part of the renewal requirements.

Field representatives and operators licensed in branch 2 and or 3, will be required to complete 8 hours of rules and regulations, 4 technical hours in each licensed branch, 2 hours of IPM, and 2 general hours.

Central tenets of IPM

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



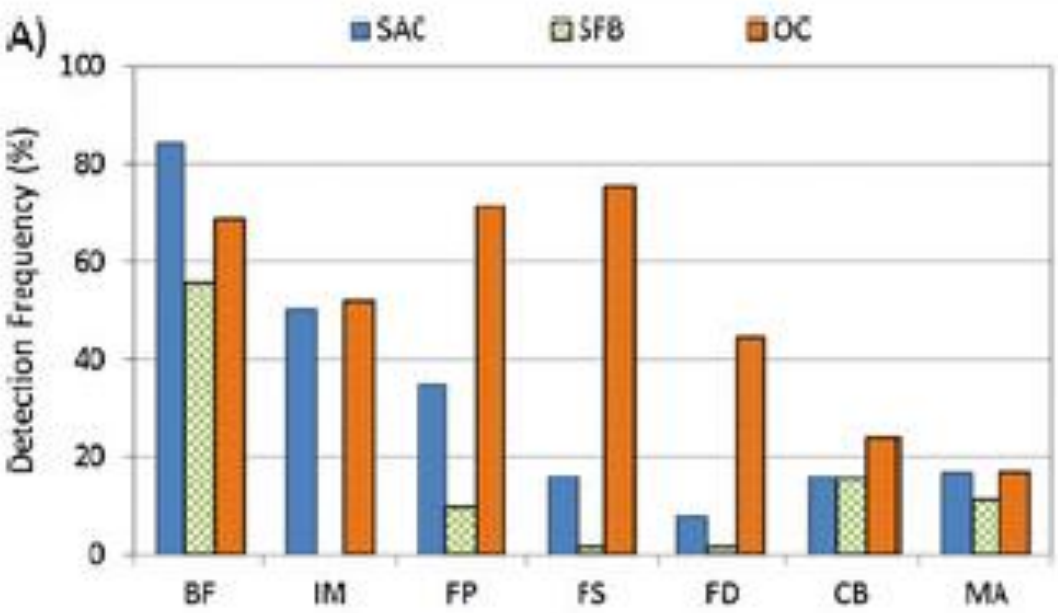
Why Urban IPM?

- 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)

Environ Monit Assess
DOI 10.1007/s10661-012-2821-8

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



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!

Information for pest management professionals and pesticide applicators

UC IPM

Green Bulletin

University of California
Agriculture and Natural Resources

Vol. 3 • No. 1 • November 2012

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 6, Sections 6000, 6970, and 6972: http://www.cdpr.ca.gov/docs/legbills/calcode/chapter_.htm). The United States Environmental Protection

toxic to indicator species representing the small arthropods that make up the base of the aquatic food web. The new regulations address applications of 17 different active ingredients (Table 1; see Page 3) during rain, to standing water, to areas in close proximity to surface waters, and to horizontal and vertical impervious surfaces.

CDPR: New Regulations

- Introduced July 2012
- Enforced January 2013
- California Code of Regulations, Title 3, Division 6, Sections 6000, 6970, and 6972
- http://www.cdpr.ca.gov/docs/legbills/calcode/chapter_.htm

Table 1. New Regulations Affecting Applications of Pyrethroid Insecticides.*

Active ingredient	Some common trade names**
beta-cyfluthrin	some Bayer Advanced products
bifenthrin	Talstar, Allectus, Wisdom, Bisect
bioallethrin	various Wasp and Hornet Killer products
cyfluthrin	Tempo, some Bayer Advanced products
cypermethrin	Demon, Cynoff
deltamethrin	Deltagard, some Enforcer products, Ultratec
esfenvalerate	some Ortho Bug-B-Gone products
fenpropathrin	Tame
gamma-cyhalothrin	some Spectracide products, Optimate
lambda-cyhalothrin	Cyonara, Demand, Scimitar
permethrin	some Enforcer products, Permanone, Astro
phenothrin	Ace, Raid House and Garden Bug Killer
prallethrin	Black Flag Wasps Hornets Yellowjackets Scorpions
resmethrin	Orthonex, Prentox, Rosepride Systemic
S-bioallethrin	Ultratec
tau-fluvalinate	Mavrik, some Bayer Advanced products
tetramethrin	Ortho Hornet & Wasp Killer

* Subject to EPA's Nonagricultural Outdoor Labeling Notification of 2009 and DPR's July 19 regulations regarding nonagricultural applications.

** Containing these active ingredients and registered for landscape or structural use in California.

UC IPM

‘Traditional Perimeter Sprays’

- Allowable under new regulations:
  - Vertical surfaces
    - Up to two feet above grade
  - Horizontal surfaces
    - Only if pervious
      - Soil, mulch, gravel, etc

Exempt Applications under New Regulations

- Injection: soil or structural materials: bricks, concrete, or wood
- Post-construction rod or trench termiticide application methods
- Applications to below-ground insect nests or nests made of mud or paper combs
- Applications of baits in weather-proof stations or gel baits
- Pesticide applications to receiving waters for which a permit has been issued under the Statewide General National Pollutant Discharge Elimination System (NPDES) for Pesticide Discharges to Waters of the U.S. from Spray Applications, and Vector Control Applications
- Applications to the underside of eaves
- Foggers or aerosol applications

Alternative Approaches

- IPM Approaches
- Crack-and-crevice or pin-stream only (always allowed)
- Alternative materials

IPM example: urban ants

- Indoor pest problem
  - Seal cracks, crevices; eliminate leaks
  - Proper sanitation and food storage
  - Liquid / gel bait stations

STANFORD

NEWS SERVICE

NEWS RELEASE

4/25/01

Mark Shwartz, News Service (650) 723-9296;
e-mail: mshwartz@stanford.edu

Household ant invasions are determined by weather, not pesticide use, new study finds

Using bug spray, bait and other household pesticides to prevent ant invasions is futile, according to a new study by Stanford researchers to be published in the journal *American Midland Naturalist*.

"People spend a lot of money on year-round pesticides," says Deborah M. Gordon, associate professor of biological sciences and lead author of the study, "but it's not the pesticide that keeps ants out of your home, it's the weather."

Gordon, who received a Guggenheim Fellowship earlier this month in recognition of her research on ant behavior, is author of the book *Ants at Work: How Insect Society Is Organized*.

She and her colleagues based their pesticide study on an 18-month survey of homes and apartments in the greater San Francisco Bay Area, a region plagued by the Argentine ant (*Linepithema humile*) -- an invasive South American species introduced into California nearly a century ago.

Lacking natural enemies, Argentine ants have taken over large areas of the state, wiping out native ant species and routinely invading human households. The aggressive insect also has become a major pest in other parts of the world with mild winters-- including Hawaii, South Africa, Australia and the French Riviera.

http://news.stanford.edu/pr/01/ants45.html

UC IPM

IPM example: urban ants

- Outdoor pest problem
  - Manage honeydew-producing pests
  - Exclude ants from honeydew
    - Sticky barriers
  - Liquid bait stations
  - Last resort: granular application

Cost Analysis: Traditional vs. Baiting

Treatment	Callbacks	30 days	31-90 days	91-180 days	181-270 days	Total Cost
Traditional: Termidor Talstar G CyKick	0	$123	$94	$94	$94	$404
Liquid bait: Vitis	3	$243	$164	$125	$142	$674

John Klotz, UC Riverside, Lloyd Pest Control, 2009

Remember when cockroach baits were the new alternative?

- Abamectin, boric acid, fipronil, hydramethylnon, indoxacarb, imidacloprid…
- Principle chemical control tactic today
- More effective, more efficient
- Recent shift from liquid applications (~1995)
- The future of household ant IPM?

Integrated Pest Management Alliance Grant
Urban Pest Ant Management (DPR Grant No. 07-PML-G001)

FINAL REPORT

8 January 2008 to 20 May 2010

Dr. Michael K. Rust, PI
Department of Entomology
University of California, Riverside 92521

Table 11. Western Exterminator Company post season telephone customer surveys to three questions from 2008 and 2009.

Year	Route	Question	Yes	No
2008	Conventional	Were you satisfied with your ant control service in 2008 compared with 2007?	40	0
	IPM		40	0
2009	Conventional		57	1
	IPM		60	2

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Outdoors?	23	15	2	0
	IPM		20	18	2	0
2009	Conventional		47	7	4	0
	IPM		44	13	5	0

Year		Question	None	Light	moderate	heavy
2008	Conventional	How would you rate your 2008 summer ant problem Indoors?	35	5	0	0
	IPM		30	8	0	2
2009	Conventional		51	5	2	0
	IPM		55	6	1	0

IPM for structural nuisance pests

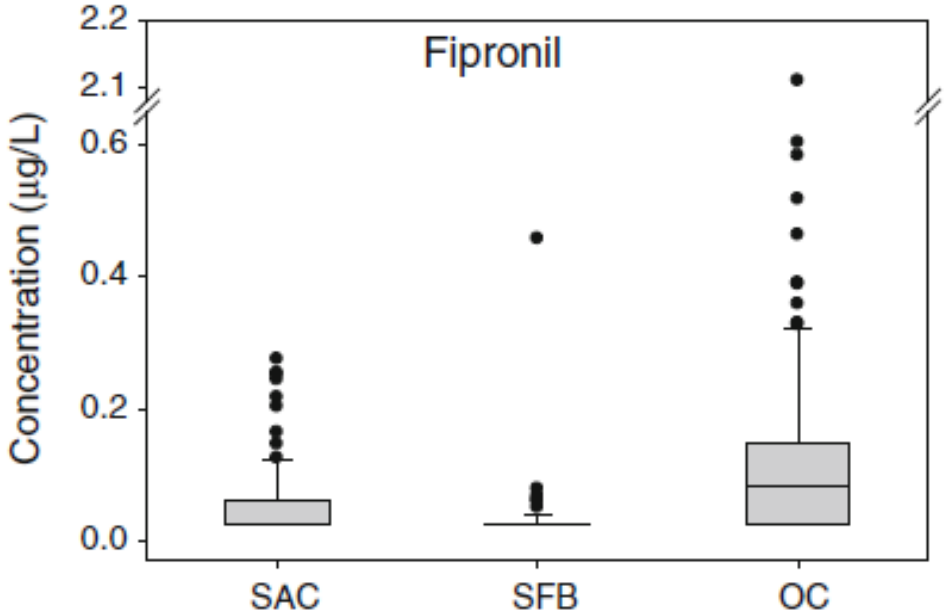
- Traditional perimeter protection (pyrethroids) restricted or no longer available
- Other repellents?
- Exclusion: door sweeps, caulk, repairs…
- Removal of host plants from landscape
- Vacuum (ensure HEPA filter in place)

Alternative materials

- BEWARE THE PESTICIDE TREADMILL!
- Fipronil
  - Very effective material
  - Professional use only
  - Nonrepellent
  - Slow-acting

Alternative materials

- BEWARE THE PESTICIDE TREADMILL!
- Fipronil
  - Very effective material
  - Professional use only
  - Nonrepellent
  - Slow-acting
  - Very toxic to aquatic invertebrates
  - Increasingly recovered at toxic levels in urban surface waters



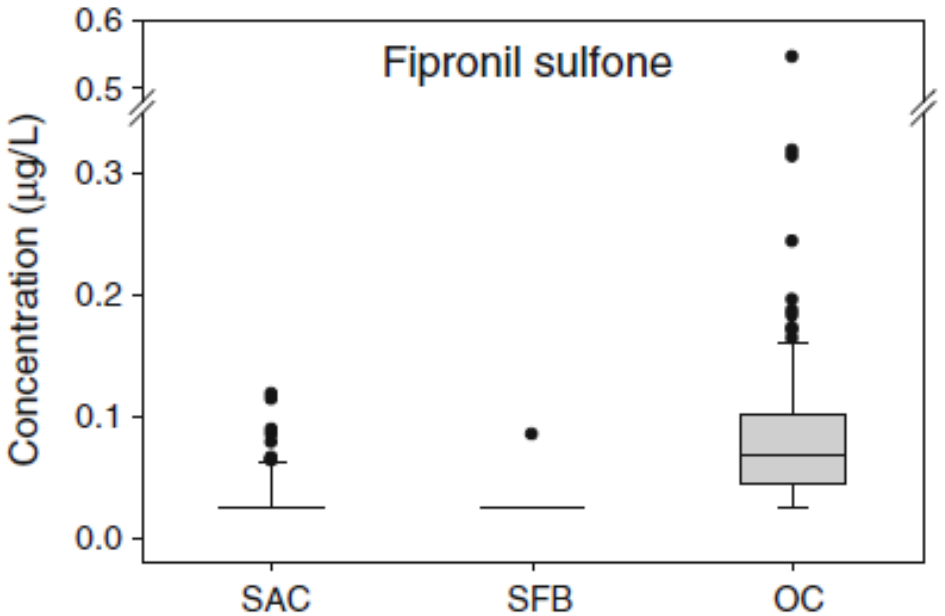


Table 2 Frequency of detected pesticides greater than the minimum aquatic benchmark (BM) listed by the U.S. EPA within three areas of California (units, μL^{-1})

Analyte	RL[a]	Min BM[b]	Area	N	#>RL	Max Result	#>BM (%)
Fipronil	0.05	0.011	SAC	94	32	0.28	32 (34)
			SFB	64	6	0.46	6 (9)
			OC	106	75	2.11	75 (71)
Fipronil sulfone	0.05	0.037	SAC	94	14	0.12	14 (15)
			SFB	64	1	0.09	1 (2)
			OC	106	80	0.55	80 (75)

Canine Detection

Canine Detection

- Classical conditioning
- Potential for very high accuracy (> 90%)
- Potential for false positive detection
- Canine team requires constant training, re-conditioning
- 3rd party certification
- Should always be confirmed with visual / manual inspection by trained PCO

Canine Detection Accuracy

DETECTION TOOLS AND TECHNIQUES

By Changlu Wang and Richard Cooper

since 2008. More alarmingly, bed bugs are beginning to appear in offices, schools, theatres, stores and other public places on a more frequent basis.

The challenges in bed bug control are multifold. Perhaps the greatest challenge is to detect the presence of bed bugs when their numbers are small. Bed bugs are difficult to find and are often hiding in inaccessible areas. An effective bed bug monitor is badly needed to save money, provide peace of mind and nip bed bug infestations in the bud.

Many bed bug monitoring tools have been developed since 2008, yet few have been scientifically tested and proven effective. Here we discuss the types of monitoring tools, technique and

and resting areas for blood meal; 3) may need several days or longer to detect the presence of low number of bed bugs; 4) inner well is prone to breaking under weight of furniture when carpet is present; and 5) requires maintenance (cleaning and re-lubrication) on regular basis.

We found the following tips are helpful when using ClimbUp interceptors: 1) eliminate as many bugs as possible on beds and upholstered furniture before installing interceptors because bed bugs already on furniture may not go to the interceptors; 2) eliminate alternate paths for bugs by pulling beds and upholstered furniture away from walls and do not allow linens, dust ruffles, etc., to touch floor; 3) install interceptors for at least seven days to detect low-level infestations; 4) clean and re-apply talc powder every one to two weeks to keep interceptors fully functional; 5)

Pest Control Technology: pctonline.com; August 2011

Canine Detection Accuracy

ns. The companies selected were experienced firms that have been providing canine scent detection services for at least one year. Five of the seven firms had been providing commercial services for three or more years, the other two firms have been in business between one and two years. Each of the firms boasted advertising claims of 90 percent or greater accuracy.

We asked each firm to inspect 24 apartments.

Each apartment was inspected by three or four different canine detection firms. The detection rate (an infested apartment that was correctly alerted during inspection) by dogs ranged from 11-83%, with an average of 43%. The false positive rate (alerted by dogs but no bed bugs were found in the apartments by visual inspection and/or ClimbUp interceptors) ranged from 0-38%. The two companies that charged the most ($1,000) and had been in business for more than three years had very low detection rates (25% and 30%). False alerts were also high for the same two companies. Interestingly, we found the accuracy of the canine detection was not related with the level of bed bug infestations. Three apartments with large number of bed bugs were not alerted by all dog teams which serviced the apartments.

Pest Control Technology: pctonline.com; August 2011

National Entomology Scent Detection Canine Association

NESDCA

Main Menu

- Home
- By-Laws & Rules
- Applications & Forms
- Accredited Teams
- Accredited Facilities
- Board of Directors
- Evaluators
- Contact Us

NESDCA Supports

NESDCA HOME

The Future of Pest Detection is Here...

NESDCA was formed by Pest Control Professionals to ensure the highest standards for Entomology Scent Detection Canines are upheld.

NESDCA is a certifying organization assuring the highest quality standards of Scent Detection Canines.

Donate

CLICK BELOW FOR CERTIFIED TEAMS IN YOUR AREA:

ACCREDITED TEAMS

DOG TRAINING: NESDCA is a certifying organization made up of Pest Control Owners/Operators. You may contact a

Certification important, but…SHOW ME THE BUGS!

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Trending in Bay Area

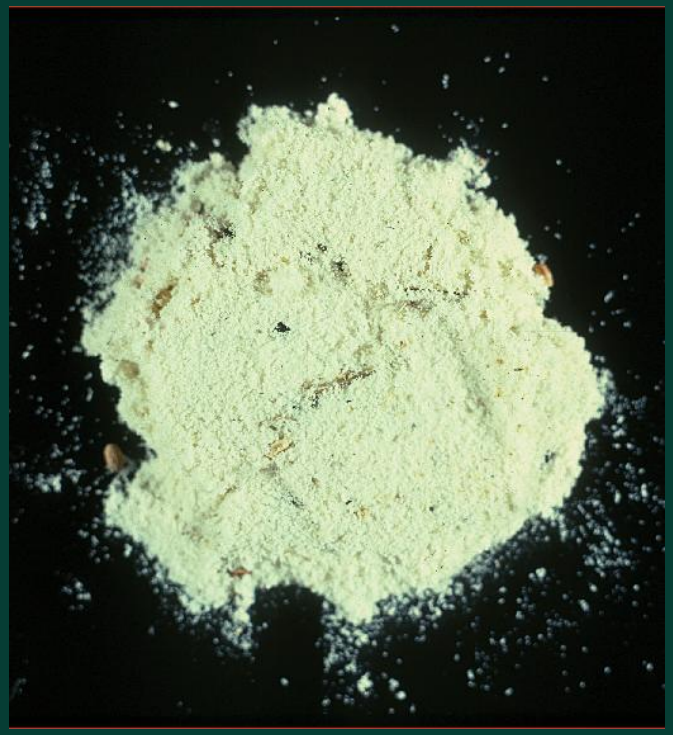
- Wood-boring beetles

Deathwatch beetles

- Anobiidae
- Prefer softwoods and damp wood
- Emergence holes of various sizes

Powderpost beetles

- Lyctidae
- Only in hardwoods, often in new wood
- Emergence holes smaller and same size



Two Methods for Distinguishing Powderpost, Deathwatch, and False Powderpost Beetles.

Group name	Ballpoint pen test[1]	Frass test[2]
powderpost (Lyctinae)	Only the tip of the pen fits into the exit hole.	Feels like talcum powder.
deathwatch (Anobiidae)	The tip and part of the angled face fit into the exit hole.	Feels gritty.
false powderpost (Bostrichidae)	The entire point of the pen usually fits into the exit hole.	It is difficult to dislodge the frass from the hole.

[1] Insert the tip of a click-type, refillable ballpoint pen into the exit hole of the beetle.
[2] To determine the texture of frass, a mixture of feces and food fragments, rub it between your fingers.

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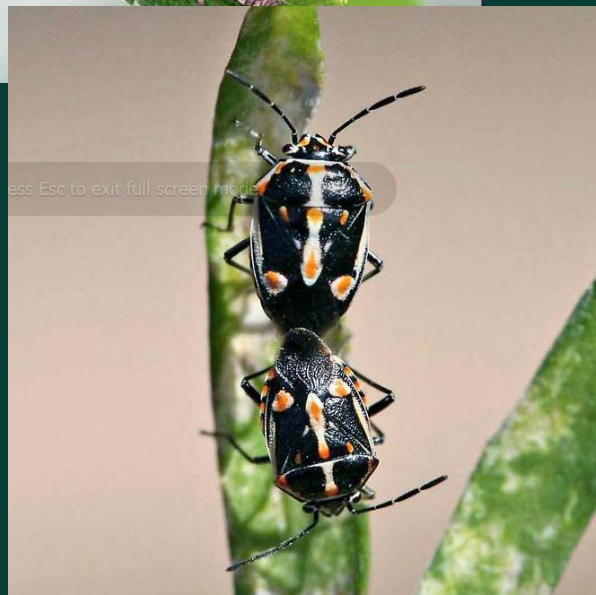
Wood-destroying beetle management

- Prevention during wood storage
- Paint or varnish
- Early detection
- Heat treatments
- Fumigation
  - Remember: no residual activity

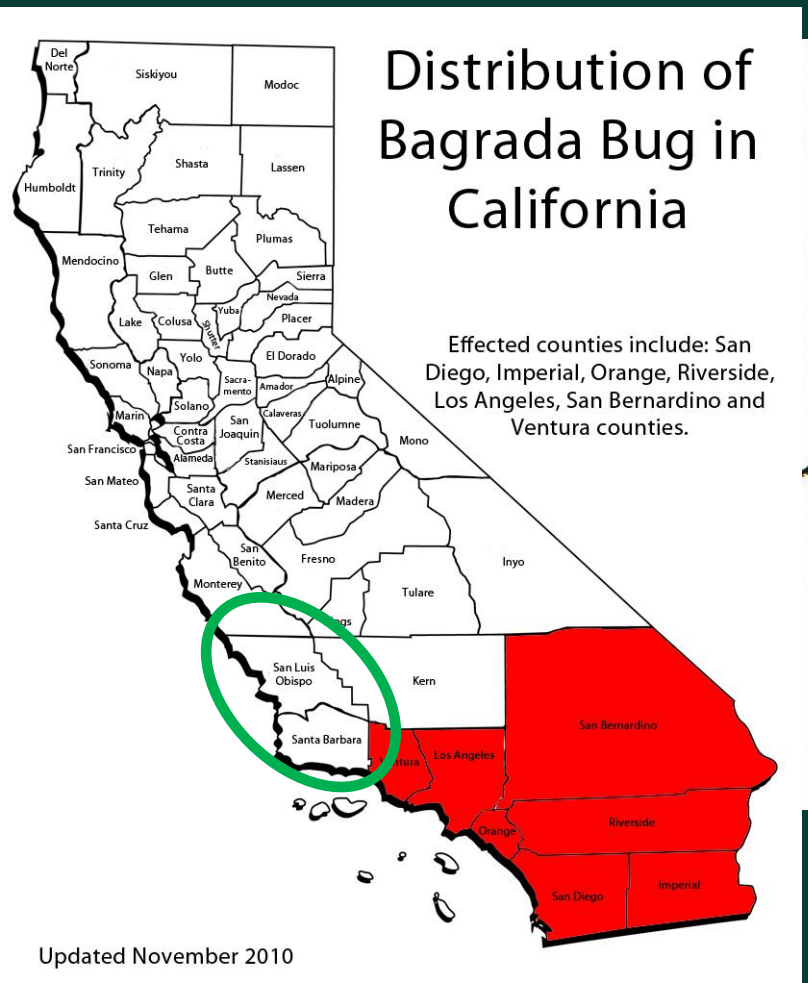
New household nuisance pests!

- 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




2 HOUR
PARKING
8 A.M. 6 P.M.
SUN.
EXCEPT WITH
E PERMIT
13th Street

- bagrada bug; *Bagrada hilaris*



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

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; 2/3 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.

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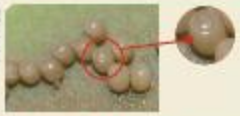
You can help stop a new pest by recognizing and reporting it.

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



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.


BUY IT WHERE YOU BURN IT.
firewood.ca.gov
DONTMOVEFIREWOOD.org

IPM for structural nuisance pests

- Traditional perimeter protection restricted or no longer available
- Other repellents?
- Exclusion: door sweeps, caulk, repairs…
- Removal of host plants from landscape
- Vacuum (ensure HEPA filter in place)

UCCE / UC IPM resources for structural / household 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/Structural___Industrial_IPM/

How to Manage Pests

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

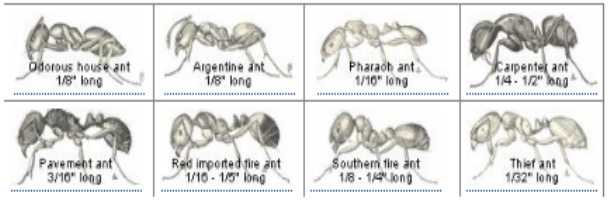
☐ Begin key

- 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.

Information for pest management professionals and pesticide applicators

UC IPM

Green Bulletin

University of California
Agriculture and Natural Resources

Vol. 3 • No. 2 • February 2013

Bed Bug Monitors Enable Early Detection

After decades of relative obscurity, bed bugs (Figure 1) are exhibiting a global resurgence and quickly becoming ubiquitous major household nuisance pests. California has recently experienced a multitude of bed bug reports, with San Francisco now considered one of the Top 10 most infested cities in the country. Suggested factors contributing to this renewed pest status include increased global traffic and commerce, insecticide resistance, and decreases in indoor residual pesticide applications, making it more likely pest management professionals (PMPs) will be called upon to manage infestations.

Bed bug detection can be very difficult and almost always requires special training. One main reason for this difficulty is due to behavior and ecology; when not feeding on blood, bed bugs prefer to hide in dark, inaccessible areas (harborages) near their hosts. Time spent in these harborages may account for 90% of a bed bug's possible harborages in a home, searching for the bugs themselves and signs of infestation such as the characteristic black fecal spotting and cast nymphal skins, although low-density infestations may escape detection.

Types of Monitors

Thankfully, several monitors are available that attract or intercept bed bugs during movement between harborage and host, providing PMPs with a positive identification, an indication of initial population density, and an evaluation of management tactics. Bed bug monitors are quite diverse in size, appearance, and price but generally fall within one of two categories: active monitors or passive monitors.

Active monitors employ attractants—heat, carbon dioxide, host odors (kairomones), pheromones, or a combination of these—to lure bed bugs out of their harborage areas and

D.-H. Choe, UCR

Figure 1. Bed bug adults (bottom and right, darker red) and nymphs. All life stages and both sexes of bed bugs preferentially feed on human blood.

S. Moore, UCB

Figure 2. Five bed bug monitors were evaluated in recent UC research trials, two active, Night

University of California
UrbanAnts

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- Home
- Our Goals
- Definition of IPM (from DPR)
- What conditions lead to ant infestations?
- Learn More About Urban Ant Pests in and Around Your Home
- Resources for Professionals
- Urban Ant Links for Professionals
- Publications
- Links

Welcome! Scroll down for updates




What is Integrated Pest Management?


What conditions lead to ant infestations?


Information for Professionals


Information for Consumers


Our Goals


Who we are

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
Click HERE for links to PDFs of the

University of California

Urban Integrated Pest Management

SKIP TO CONTENT SITE MAP Enter Search Terms

- Home
- Residential IPM
- Commercial Landscape IPM
- Structural / Industrial IPM
- Research Activities
- Selected Publications

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Structural / Industrial IPM

This page serves as a resource for structural pest control operators seeking information regarding IPM. Regular content updates will inform urban pest management professionals and other Structural Pest Control Board licensees of IPM-related educational programs, ongoing research and current events / topics.

UC Berkeley Urban Pests Management Center web site

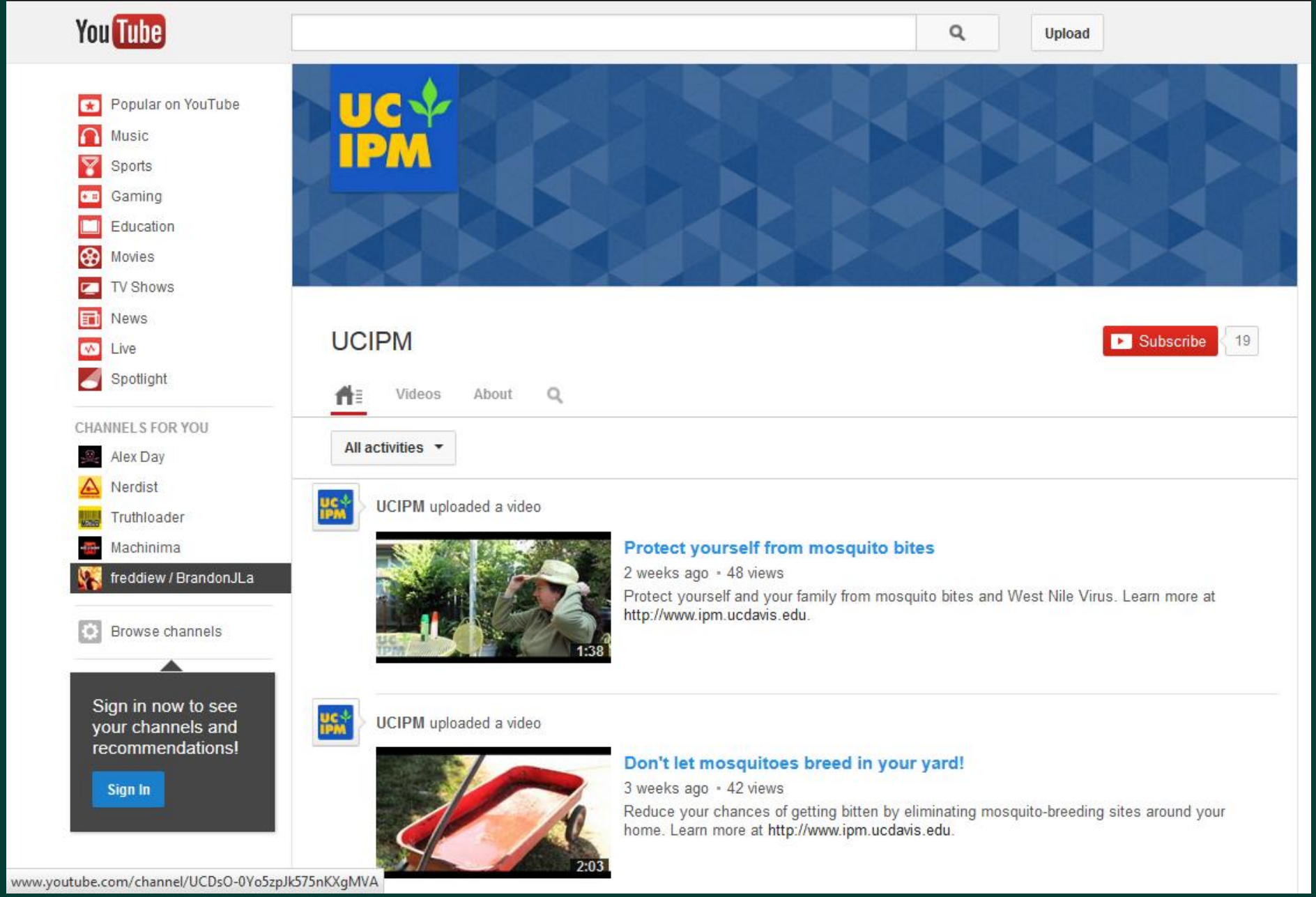
UC Berkeley Structural Fumigation web site

UC Riverside Urban Entomology web site

Great resource for child care clients!

IPM Curriculum for Early Care and Education

UC Urban Ants: Resources for Professionals



http://www.youtube.com/user/UCIPM

http://www.youtube.com/watch?v=H9d_EB6XFUc

Thanks!...Questions?

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