



Green Bulletin

Information for urban pest management professionals

In this issue:

Multi-Unit Housing IPM

p.1

Ask the Expert!

p.4

Formosan Termite Alert

p.5

Volume 13, Issue 2

Spring 2023

Editors: Karey Windbiel-Rojas,
Belinda Messenger-Sikes

Contributors: Lauren Fordyce,
Eric Middleton, Niamh Quinn,
Andrew Sutherland, Siavash
Taravati

E-mail:
ucipm-community@ucanr.edu

Online:
ipm.ucanr.edu

Subscribe to this newsletter at
<https://bit.ly/3G3n8WG>
or use the QR Code:



Connect with us!

   @ucipmurban

 @ucipm

Produced by the Urban and Community IPM Team of the University of California Statewide Integrated Pest Management Program, with partial funding from the USDA NIFA CPPM Extension Implementation Program.

Proactive IPM Programs in Multi-Unit Housing Environments

Multi-unit housing (MUH) environments such as apartment complexes and single-room occupancy (SRO) buildings, also called multi-family housing or multi-dwelling units, can harbor significant infestations of cockroaches, bed bugs, rodents, and other pests. Structural continuity, budgetary constraints, poor maintenance and infrastructure, and cultural and social factors allow pests to infest these environments.

Many of these pests threaten public health and wellbeing of the residents. For instance, German cockroaches (*Blattella germanica*) produce proteins in their feces and exoskeletons that, when dispersed into the air can be inhaled. This causes and worsens asthma in children.

Pest management is often conducted in response to complaints or after discovery of serious problems, rather than proactively, especially in low-income communities. Proactive integrated pest management (IPM) programs that include regular monitoring of pests within every residential unit improve building-wide pest control and prevent significant infestations. These programs are labor-intensive, however, especially at the onset, and so may be considered too expensive by property owners and managers.

To show the efficacy of proactive IPM and to investigate the relationship between cost and pest control, we partnered with affordable housing providers to provide one-year “IPM interventions” at two MUH sites in the San



Figure 1. Accumulations of fecal spots and cast skins (exuviae) from bed bugs harboring behind framed artwork within a single-room occupancy building in Contra Costa County during the initial assessment phase of an IPM intervention.

AM Sutherland, UC IPM



Figure 2. A dead adult German cockroach, *Blattella germanica*, found in a residential hallway of a low-income apartment complex in Santa Clara County during the initial assessment phase of an IPM intervention.

AM Sutherland, UC IPM

continued on page 2

Multi-Unit Housing IPM

continued from p. 1

Francisco Bay Area: a 75-unit SRO building in Contra Costa County and a 59-unit low-income apartment complex in Santa Clara County. This work was led by Regional Asthma Management and Prevention, a program of the Public Health Institute, and sponsored by the California Department of Pesticide Regulation.

IPM Intervention Study Protocols

We worked with the pest control operators already in contract with the housing providers at the two sites and revised existing contracts to include unit-by-unit monitoring. The project included funds used to offset the increased costs associated with these revisions. Operators were asked to design programs that included monitoring for cockroaches and bed bugs in every unit at least once annually. When pests were detected, management tactics would be selected according to the pest densities observed, with the overall goals of eliminating pest populations and reducing pesticide exposure. Typically, baits were used against cockroaches and desiccants, spot treatments, vacuums, and whole-room heat treatments were used against bed bugs.

Independently, our team of researchers assessed pest incidence and density at three points during the one-year interventions: before IPM protocols were in place (baseline), roughly six months afterward

(midpoint), and about one year afterward (final). At each monitoring period, we placed one glue trap behind the refrigerator and one pitfall trap in contact with the bed or sleeping surface for periods of one to two weeks. We also trained management, staff, and tenants on pest awareness, prevention, and reporting. Monthly costs associated with the pest control programs were calculated, including contract values, supplemental or add-on service values, and on-site staff effort hours. These costs were compared to monthly costs before the proactive IPM interventions began. Finally, surveys and interviews were conducted with residents and staff at the study sites to measure their relative satisfaction with the proactive IPM programs. Access to residential units required written notices delivered 24 hours before intended entry and accompaniment by on-site staff.

Study Results

Bed bugs (Figure 1) were the primary pests at the Contra Costa County site while German cockroaches (Figure 2) were the primary pests at the Santa Clara County site. Other pests present at these sites included small flies (of the families Psychodidae, Phoridae, and Drosophilidae), rodents, and stored-product pests like meal moths and grain beetles. Baseline assessments revealed that more than 20% of the units inspected in Santa Clara County were infested

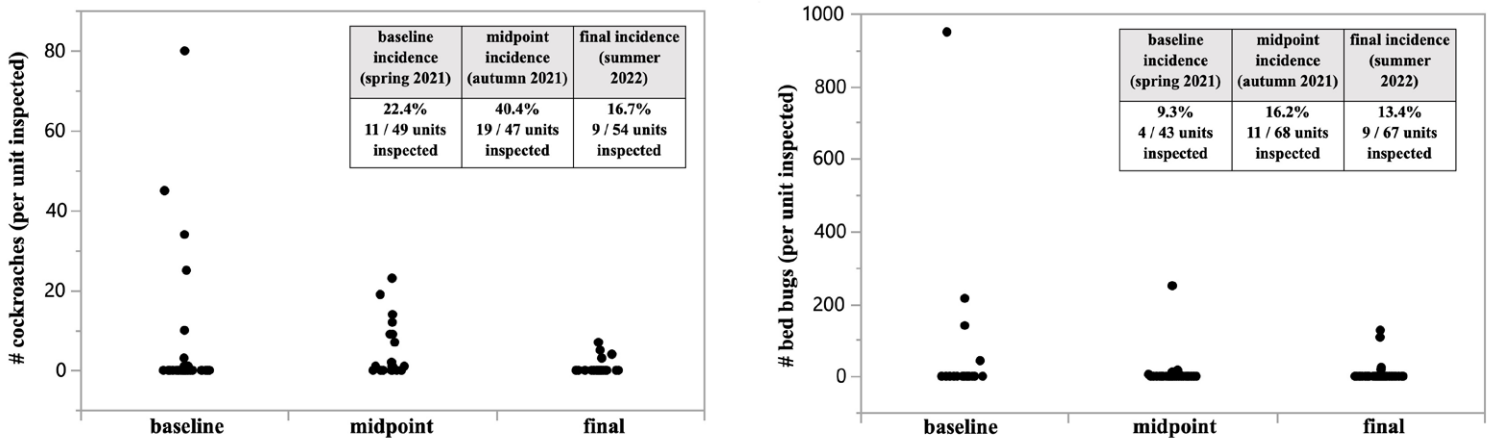


Figure 3. Density of cockroaches at a low-income apartment complex in Santa Clara County (a) and bed bugs (b) at a single-room occupancy building in Contra Costa County decreased significantly during a one-year IPM intervention that utilized unit-by-unit monitoring events. Incidence of both pests remained relatively unchanged (see insets).

continued on page 3

Multi-Unit Housing IPM *continued from p. 2*

with German cockroaches and that about 10% of the units in Contra Costa County were infested with bed bugs.

High-density infestations were addressed first, with heat treatments for bed bugs and high-volume gel bait applications for cockroaches. Several of these high-density infestations were only discovered due to the unit-by-unit proactive monitoring process.

Many residents refused our team’s entry, especially during the baseline assessment in Contra Costa County. Participation and compliance improved markedly after an on-site education program for residents.

By the intervention’s midpoint, pest density at both sites began to decrease (Figure 3), though pest incidence was largely unchanged. Incidence apparently increased since access to several infested units was only achieved several months after the intervention’s onset. In these cases, distrusting residents gradually learned about the project’s goals and about IPM through the resident education programs and

eventually granted the team access to their units. The final pest assessment at the end of the one-year intervention showed continued decreases in pest density but relatively unchanged pest incidence at both sites (Figure 3). This means that the severe infestations (dozens to hundreds of cockroaches or bed bugs per unit) had been significantly decreased or eliminated but that a similar proportion of units were infested as had been at the beginning of the project. This may be very important for building-wide IPM since pests can disperse from high-density units to new units, usually those units next to or otherwise structurally continuous with the severe infestations. Overall, the pest control under the proactive IPM program was considered significantly more effective than the reactive programs previously in place.

Contract base values for the proactive IPM services increased significantly at both sites when compared to the reactive pest control services previously in place (Table 1). However, when considering the supplemental costs associated with add-on services, usually bed bug heat treatments not covered by

Table 1. Monthly pest control expenses at two multi-unit housing sites in the San Francisco Bay Area prior to and during a one-year IPM intervention that utilized proactive monitoring events. Prior to the IPM programs, both sites were managed using reactive programs prominently featuring pesticide spray applications.

| Pest control expenses | Santa Clara County (59 units) | Contra Costa County (75 units) |
|----------------------------------------------------------|------------------------------------------|-------------------------------------------|
| Monthly service costs under reactive program | \$ 350 (\$5.93 per unit) | \$ 240 (\$3.20 per unit) |
| Annual supplementary costs under reactive program | \$ 18,565 (\$315 per unit) | \$ 39,485 (\$526 per unit) |
| Total annual costs under reactive program | \$ 22,765 (\$385 per unit) | \$ 42,365 (\$565 per unit) |
| Monthly service costs under IPM program | \$ 450 (\$7.63 per unit) | \$ 360 (\$4.80 per unit) |
| Annual supplementary costs under IPM program | \$ 16,044 (\$272 per unit) | \$ 26,924 (\$359 per unit) |
| Total annual costs under IPM program | \$ 21,444 (\$363 per unit) | \$ 31,244 (\$417 per unit) |
| Annual savings from IPM program | \$ 1,321 | \$ 11,121 |

continued on page 4

Multi-Unit Housing IPM

continued from p. 3

the base contracts, monthly pest control costs decreased at both sites under the IPM programs. In fact, monthly costs decreased by almost \$1,000 at the Contra Costa County site, where a severe bed bug problem had been ongoing for many years prior to this project.

The majority of surveyed or interviewed residents (96% at the Contra Costa County site and 82% at the Santa Clara County site) reported being either “very satisfied” or “somewhat satisfied” with the pest management services being received, as compared with those in place before the intervention. About 87% of responding residents reported that they had received some educational materials about pests and IPM, and 93% of responding residents said that they would be likely to report pest sightings to management in the future. All staff interviewed reported that the IPM program was more effective, in their opinion, and that the unit-by-unit inspections allowed for more resident engagement surrounding pest control.

Overall, this project showed that proactive IPM programs that use regular unit-by-unit monitoring events can help detect unknown infestations, control severe infestations, reduce monthly costs, and satisfy on-site stakeholders. This result was somewhat unexpected, since IPM programs usually take more than one year to realize savings for MUH environments. In cases where expensive supplementary services, such as bed bug heat treatments, are common, however, savings under IPM programs may be realized very quickly.

—Andrew Sutherland,
SF Bay Area Urban IPM Advisor, UC ANR / UC IPM,
amsutherland@ucanr.edu

—Brandon Kitagawa,
Senior Policy Associate, Regional Asthma
Management and Prevention; Chair, California
Healthy Housing Coalition,
brandon@rampasthma.org

Ask the Expert!

Q: Is management for Formosan subterranean termites the same as management for native subterranean termites?

A: The short answer is “it depends!” Formosan subterranean termites (FST) can form extremely large colonies in the field reaching millions of individuals. When the active nests are primarily in the ground, most colony members will be in the ground except when foraging for food. In this case, in-ground baiting is used against native subterranean termites and it may provide adequate control. However, some FST colonies could be formed above the ground (aerial) with no or limited contact with the soil. In-ground baiting is unlikely to be effective for managing such aerial colonies.

Ideally, an Insecticide Growth Regulator (IGR) in the class of chitin synthesis inhibitors (CSI) should be used for managing FST. CSIs are types of insecticide that disrupt insects’ natural molting process. Since termites are insects, the immature stages must molt several times to be able to grow their size and develop into adult workers, soldiers, and winged termites. When the immature workers are killed by the CSI-containing bait, this will create a large gap in the number of worker termites in the colony. This will reduce the number of workers that could forage, clean the nests, construct tunnels, and tending the immature stages and queens. As a result, the colony will become weaker, inundated with diseases, and eventually it will collapse and die. This normally happens after 2–3 months of baiting.



Formosan subterranean termite soldiers, workers, and swarms.

S. Taravati, UC IPM

Formosan Termite Alert

The Formosan subterranean termite (FST), *Coptotermes formosanus*, is a very destructive pest first reported in California in 1992 in La Mesa, San Diego County. FST has since been found in Canyon Lake, Riverside County, Rancho Santa Fe, San Diego County, and Highland Park, Los Angeles County.

To identify Formosan termites, UC IPM advisor Dr. Siavash Taravati and Dr. Chow-Yang Lee of UC Riverside developed this poster.

Email them at starvati@ucanr.edu or chowyang.lee@ucr.edu if you see any termites resembling those in the poster.



California

Formosan Subterranean Termite Alert



Have you seen these?

Let us know by sending an email to:

Dr. Siavash (Sebastian) Taravati: staravati@ucanr.edu

Dr. Chow-Yang Lee: chowyanglee@ucr.edu

Identification:

Soldiers: Oval head with saber-shaped mandibles, secrete a white defensive chemical when disturbed

Swarmers: Larger than Western subterranean termite, yellowish-brown abdomen

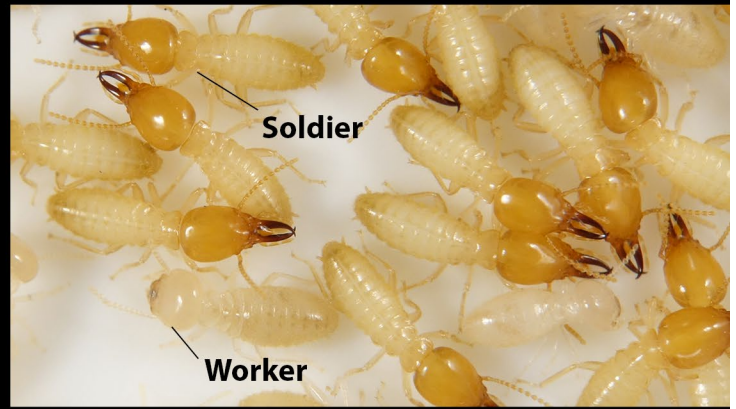
Swarming season: May-July in Southern California

Reproductives



Soldier

Worker



Dead swarmers (winged)



Soldiers, workers, and swarmers



Soldiers secrete a white defensive chemical when disturbed



Soldiers, workers, and swarmers



All pesticide products mentioned have been reviewed by the UC Office of Pesticide Information and Coordination and are current at the time of publication. Always read and carefully follow all precautions and safety instructions provided on the pesticide container label, as well as any other regulations regarding the use of pesticides. Not following label directions, even if they conflict with information provided herein, is a violation of state and federal law. No endorsements of named products are intended, nor is criticism implied of products not mentioned.

Upcoming Meetings and Workshops (CEU opportunities)

Pest Insight Webinar: August 16, 2023

Save the date for UC IPM's next offering of the webinar series *Pest Insight*. On August 16, we'll hold a 2-hour webinar covering bird pests and problematic arthropods around structures. More details and registration information will be available soon at ucanr.edu/sites/pestinsight/



Free Online Courses

UC IPM is happy to offer several of our online courses for free from now until December 2023.

Here's the list of free courses:

■ *Urban Pyrethroid and Fipronil Use:*

◇ *Runoff and Surface Water Protection* **NEW**

campus.extension.org/enrol/index.php?id=2221

◇ *IPM and Alternatives to Pesticides around Structures* **NEW**

campus.extension.org/enrol/index.php?id=2264

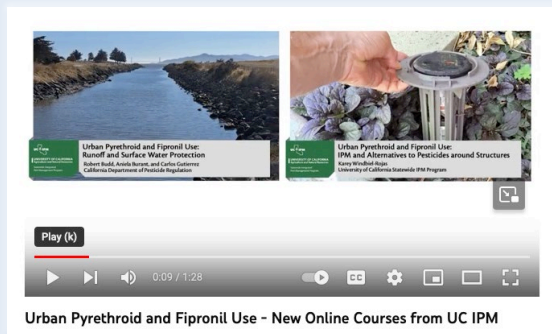
◇ *Calibration of Pesticide Application Equipment and Usage Reporting (Coming soon)*

■ *Providing IPM Services in Schools and Child Care Settings*

campus.extension.org/enrol/index.php?id=1580

Check out this short video about our new courses:

www.youtube.com/watch?v=5ogj2ZLk5XA



All courses must be completed by December 30, 2023 if you need CEUs. Download the Certificate of Completion (PDF file) to receive your CEU credits by December 30th.

All UC IPM's courses can be accessed for free anytime but payment is normally required to receive Continuing Education Units (CEUs) and a certificate of completion. All online courses not listed as free are currently 50% off the regular price. Use code **ipm50** at checkout from now through October 31, 2023.

Visit the UC IPM training website ipm.ucanr.edu/training/ for details.

For more information about managing pests, contact your University of California Cooperative Extension office, or visit the UC IPM website at ipm.ucanr.edu.

ANR NONDISCRIMINATION AND AFFIRMATIVE ACTION POLICY STATEMENT
It is the policy of the University of California (UC) and the UC Division of Agriculture & Natural Resources not to engage in discrimination against or harassment of any person in any of its programs or activities. (Complete nondiscrimination policy statement can be found at ucanr.edu/sites/anrstaff/files/215244.pdf.) Inquiries regarding ANR's nondiscrimination policies may be directed to UCANR, Affirmative Action Compliance Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1343.