



ANNUAL REPORT



2009 HIGHLIGHTS

University of California Statewide Integrated Pest Management Program



*Making
ecosystem-based
integrated
pest management
THE way
Californians
manage pests.*

UC Statewide IPM Program

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From the director

Poised to meet future needs

As part of its 2025 Strategic Vision, UC ANR plans to pursue a new, multidisciplinary, integrated initiative related to managing endemic and invasive pests and diseases. UC IPM is poised to support the effort, designed to ensure a high quality of life, a healthy environment, and economic success for Californians.



In the meantime, however, we are a part of a changing UC, one faced with the challenges—and opportunities—that come from an unprecedented state budget shortfall. UC ANR has assessed UC IPM a significant budget cut, and we are in the process of determining how to reduce our expenses by 20% while continuing to meet the most critical needs of

agricultural, natural resource, and urban pest managers and while positioning our program for the future.

We plan to do this through internal deliberations and discussions with UC ANR colleagues and leaders, stakeholders, and external partners. We are identifying our core activities in order to continue the most essential services. We want to remain flexible to integrate exotic and invasive pests into our core activities and to handle changing pest management needs. Meanwhile, we are looking for opportunities to increase efficiency while providing effective, practical, science-based solutions to Californians.

These are challenging times, but with thoughtful planning we can continue many of the outstanding projects and products we have highlighted in this report. I encourage you to contact me at jfstrand@ucdavis.edu if you have comments you would like us to consider in making our decisions.

Before signing off, I want to express my appreciation to Pete Goodell for his outstanding dedication, service, and leadership during the past two and a half years as UC IPM interim director. In July, Pete stepped down after shouldering the responsibility for implementing UC IPM's 2006 Strategic Plan, including a very significant restructuring for the program. All of us, as well as ANR colleagues, recognize his important contribution in leading us forward.

—Joyce F. Strand, Interim Director

Kassim Al-Khatib named UC IPM director

After a nationwide search, UC ANR and UC Davis have appointed Kassim Al-Khatib as the new UC IPM director and professor in the Department of Plant Sciences.

Al-Khatib comes to UC from Kansas State University where he was a professor and weed scientist specializing in integrated weed management, vegetation management, and pesticide drift. He also has held appointments at Washington State University. He received his doctorate from Kansas State and his master's and bachelor's degrees from University of Baghdad.

"I'm both honored and delighted to serve the UC system as the IPM director," Al-Khatib said. "The exceptional quality of the UC IPM faculty, dedication of the staff, and UC leadership's support of the IPM Program makes UC IPM a gold standard to all IPM programs worldwide and an asset for the people of California."

➔ [Continued online at www.ipm.ucdavis.edu/highlights](http://www.ipm.ucdavis.edu/highlights)

50th anniversary of a great idea *by Jeannette Warnert, public information representative*

Fifty years ago in October, four pioneering University of California scientists outlined a new way of thinking about pest control, establishing a pest management framework that changed the way the world farms.

The scientists recognized—way ahead of their time—that imposing a harsh chemical on a natural system threw it off kilter, causing many more problems in the long run. They believed that combining an array of pest control methods would be more effective, safer for farmworkers, and kinder to the environment.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Environmental guardians honored

Four UC IPM leaders—advisors Peter Goodell and Carolyn Pickel, associate director and entomologist Mary Louise Flint, and associate director Joyce Strand—were recognized at the Sixth International IPM Symposium in Portland, Ore., in March for their contributions to the Grower Incentives for IPM Team Project.

Working across institutions, agencies, and agricultural and environmental communities, the team launched educational activities to support Natural Resources Conservation Service (NRCS) field staff and growers interested in implementing IPM practices. In California, UC IPM's Pest Management Guidelines for more than 40 crops, many of which also include year-round programs, were central to the effort.



Pete Goodell (left), Mary Lou Flint, Carolyn Pickel, and Joyce Strand join members of several other organizations to accept the International Award of Recognition at the Sixth International IPM Symposium. (Courtesy.)



Barat Bisabri, Melissa Siebert, Bradley Vinson, Walt Bentley, Carolyn Pickel, and Mario Viveros accept the Integrated Pest Management Team Award. (Courtesy.)

has resulted in substantial reductions of organophosphate use through a combination of biological, cultural, and reduced-risk insecticide alternatives.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Partnership helps reduce chemical use in almonds

The Entomological Foundation presented its Integrated Pest Management Team Award to the California Almond Pest Management Alliance Team at the Entomological Society of America meeting, held shortly after the 2008 UC IPM annual report went to press.

The team developed an insect pest management program that

Entomological society honors UC IPM advisor

UC IPM Advisor Walt Bentley received an award from Entomological Society of America (ESA) President Marlin Rice for serving as president of the Pacific branch of the national society from 2008 to 2009. While president, Bentley coordinated the Ninety-third Annual Meeting of the Pacific Branch of the ESA, held in April in San Diego. The theme of the meeting, which more than 200 members attended, was “50 years of the integrated control concept,” marking the 50th anniversary of the October 1959 *Hilgardia* paper by Vernon M. Stern, Ray F. Smith, Robert van den Bosch, and Kenneth S. Hagen that introduced the integrated control concept and formed the basis of what we, today, call IPM.

What is IPM?

Integrated Pest Management is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, and modification of cultural practices. Pesticides are used only after monitoring indicates they are needed, and pest control materials are selected and applied in a manner that minimizes risks to humans, nontarget organisms, and the environment.

UC IPM in Action

Gopher traps could provide fast, economical control method

Gophers cause millions of dollars in damage statewide to crops, golf courses, school grounds, and residential yards, but UC IPM Vertebrate Pest Management Advisor Roger Baldwin says trapping could become an important part of an integrated approach for controlling this pest throughout California.

Setting a Macabee gopher trap.
Photo by W. Paul Gorenzel.



Baldwin and five other researchers have been testing two traps, the Gophinator and the Macabee, studying the capture success rate in covered versus uncovered burrow openings and main versus lateral tunnels. They've also studied the influence of factors including the gopher's age, gender, weight, and species.

"Trapping in uncovered laterals is much quicker and requires fewer traps than trapping in covered main tunnels," Baldwin said. "If trapping in uncovered laterals is found to be effective, this would greatly reduce the time and cost of (pesticide) application." So far, the Gophinator is outperforming the Macabee, Baldwin added.

Trapping has been a control method for small populations of gophers for more than a century in California. It is a relatively safe procedure for the person using it compared to applying poison baits and fumigants and is one of the only methods available for controlling gophers in organic crops. Trapping requires little training and provides the added bonus of knowing whether you killed the invading pest.

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Study identifies least-toxic insecticide for controlling vine mealybugs in grapes

UC researchers have conducted studies on six insecticides to determine which provide the most effective control against vine mealybug in grapes while causing the least harm to beneficial insects. In addition to studying the insecticides' compatibility with a biological control program against this pest, the research team also investigated vine mealybug resistance to these pesticides.

Damage by vine mealybug impacts wine, table, and raisin grapes, which combined represent a \$2.3 billion crop grown on more than 790,000 acres throughout California. A black, sooty mold often grows on the honeydew this pest secretes, making the grapes unfit for consumption.

"The insect infests plant roots and feeds beneath the bark, making them difficult to detect," said Walt Bentley, UC IPM advisor and project co-leader. "They're also difficult targets for foliar insecticides and in many cases are protected from natural enemies by remaining in inaccessible locations on the grapevine."

Scientists tested the insecticides' toxicity to one parasitoid, *Anagyrus pseudococci*, and two species of predators, *Cryptoleamus montrouzieri* and *Hippodamia convergens*.

Spirotetramat (Movento), a new insecticide, was the least toxic to all three species of beneficial insects while chlorpyrifos (Lorsban) was the most toxic against all stages of vine mealybug. Spirotetramat also was effective against all immature stages of the vine mealybug although less so against adult females. Toxicity to natural enemies was intermediate for the four remaining insecticides—imidacloprid (Admire), buprofezin (Applaud), dimethoate, and methomyl (Lannate).

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Vine mealybug adult female with eggs.
Photo by Jack Kelly Clark.

Alliance promotes integrated pest management for ants

Ants are among the most difficult pests to manage in urban settings, but pesticides that control them are major contributors to water quality problems in California. Providing professionals and homeowners with better information for effectively managing ants without harming the environment is one of the highest priorities of UC IPM's Urban and Community IPM Program, and several projects are helping to meet this goal. One of them is the Urban Ant Pest Management Alliance (PMA).

Cheryl Wilen, South Coast UC IPM advisor, has been working with the PMA to develop and communicate comprehensive, environmentally sound IPM programs that are designed to reduce, by 50 percent, the amount of pyrethroid insecticides applied to control ants around residential structures. Funding for this project comes from the California Department of Pesticide Regulation.

An urban stormwater runoff drain discharges into a riparian area. Photo by Jack Kelly Clark.



“Pyrethroid insecticides can be toxic to aquatic organisms even at very low concentrations,” Wilen said. “The alliance’s work has shown that the amount of pyrethroid insecticides used can be substantially reduced with no reduction in consumer satisfaction. This is a major step in getting pest management professionals (PMPs) to adopt IPM-based strategies for urban ant control.”

Wilen, who also is responsible for coordinating PMA outreach and extension, maintains the alliance’s Web site, <http://groups.ucanr.org/UrbanAnt/>. Alliance members held two training programs for PMPs in Southern and Northern California in 2009, and Wilen presented a report regarding the group’s progress at the Sixth International IPM Symposium held in Portland, Ore., in March.

➤ *Continued online at www.ipm.ucdavis.edu/highlights*

Portable pest identification tool available through ANR catalog

UC IPM has created a set of pocket-sized, laminated cards to help landscape maintenance professionals and home gardeners identify and manage common pest problems found in the landscape.

Succinct text and more than 200 photos provide details about 80 common insects and mites, 40 diseases, 20 beneficial insects, and a variety of other invertebrate pests and disorders.

Each card includes a description of the pest and close-up, color photographs of important symptoms and life stages. The set also includes suggestions for least toxic management options for each pest.

Landscape Pest Identification Cards, ANR Publ. 3513, is an excellent companion to the UC IPM books *Pests of Landscape Trees and Shrubs*, ANR Publ. 3359; *Lawn and Residential Landscape Pest Control*, ANR Publ. 3510; and *Landscape Maintenance Pest Control*, ANR Publ. 3493. The cards and books are available at <http://anrcatalog.ucdavis.edu>; many county UC Cooperative Extension offices also stock these publications.

The cards are modeled after the very successful *Tree Fruit Pest Identification and Monitoring Cards*, ANR Publ. 3426, which help readers identify and monitor major insect and mite pests and several important diseases in California deciduous tree fruits and nuts.



UC IPM mobilizes to mitigate two new pest threats

When important, new pest issues arise, UC IPM is positioned to coordinate a rapid response among UC research and extension staff, agency personnel, and industry. Late in 2009, the program took action on two pests that threaten California environments.

On Oct. 8, European grapevine moth (EGVM), *Lobesia botrana*, was confirmed in Napa County vineyards—the first detection in the United States. EGVM is the primary pest of grapevines in Europe and can be expected to cause significant economic harm to California's diverse grape industries if it becomes established. Larvae feed on berries and cause extensive damage to the bunch.

Larva of European grapevine moth, *Lobesia botrana*.
Photo by Jack Kelly Clark.



By the end of October, UC IPM had posted an article on its Web site that described the pest, how to monitor for it, and what to do if it were found. The article also included photos to help growers identify all life stages of the pest. Authors plan to update the page, as more is known, to alert farm advisors and industry personnel to the changing situation.

UC IPM Advisor Lucia Varela researched the scientific literature, most of it foreign, and drafted the article in collaboration with UC Davis entomologist Frank Zalom and UC Cooperative Extension viticulture advisor Monica Cooper.

Another recent introduction to California and the Pacific Northwest is spotted wing drosophila (SWD), *Drosophila suzukii*. SWD infests ripening fruit in cherries, caneberries, and strawberries in both agricultural and urban settings. The impact on California crops could be great if the pest moves to grapes or stone fruits, as it has in the Pacific Northwest.

In November, UC IPM convened a meeting of more than two dozen experts from California, Oregon, and Washington universities and two agencies—USDA and the California Department of Food and Agriculture—to coordinate the response to this new threat. The scientists shared their knowledge of the fly's identification and history, and UC geneticists discussed what their *Drosophila* genomics projects can contribute to the effort. The meeting resulted in several multistate research collaborations to begin research to thoroughly understand the pest and what it will take to thwart it.

IPM advisor travels Down Under to help stop new California pest

In 2007 light brown apple moth (LBAM), *Epiphyas postvittana*, was first reported in California. In an effort to learn more about this new pest, North Coast IPM Advisor Lucia Varela took sabbatical leave this year and studied this insect in its native Australia and in New Zealand, where it is an introduced pest.



Larva of light brown apple moth, *Epiphyas postvittana*, in a feeding shelter.
Photo by Jack Kelley Clark.

Varela found that in Australia, LBAM becomes a significant pest of grapes only in cool regions with high humidity; growers keep it in check with timely applications of selective insecticides. In New Zealand, where it is primarily a pest of apples, growers now use an IPM program that combines biological control with reduced-risk pesticides, eliminating the use of broad-spectrum insecticides while significantly reducing damage.

“With a strategic commitment to biological control used as part of an IPM program, California may ultimately achieve the same levels of LBAM control as growers obtain in New Zealand,” Varela said.

LBAM was first reported in New Zealand 1881 where it became a pest of fruit crops, primarily in apples and berries but also a minor pest of grapes, stone fruits, and kiwifruit. Larvae usually feed inside rolled up leaves, but if they web the leaves onto the fruit, they also will feed on the fruit's surface.

➔ Continued online at www.ipm.ucdavis.edu/highlights

UC forges partnerships to increase IPM opportunities

For the fifth year in a row, UC IPM has worked closely with USDA's Natural Resources Conservation Service (NRCS) to help growers make pest management decisions that help mitigate air and water quality problems. UC IPM supported NRCS training, helped revise the NRCS Pest Management 595 Practice Standards, and provided comprehensive, year-round IPM programs as templates for growers to use in preparing their NRCS conservation plans.

In 2007 and 2008, an estimated 117,000 acres of California farmland were under NRCS pest management standard contracts, and growers of about 18,000 acres implemented year-round IPM programs.

In recognition of the successful partnership, UC IPM and NRCS were among recipients of the International Award of Recognition at the Sixth International IPM Symposium. (See the related article on Page 3.)

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Scientists track blue orchard bees as promising pollinators for almonds

Blue orchard bees could supplement honey bees as pollinators in California's almond orchards, reducing the risk of depending on a single pollinator species for the crop, according to research by UCCE personnel and scientists with the USDA-ARS Bee Biology and Systematics Laboratory in Logan, Utah.

Traditionally, commercial almond growers have used hived honey bees, but concern about the availability of enough affordable, healthy hives has increased.

"When almond growers were paying up to \$200 per hive for honey bees, they began looking for alternatives, and we've shown that blue orchard bees are a good possibility," said project member Carolyn Pickel, UC IPM advisor in the Sacramento Valley.

"Blue orchard bees contribute to a more sustainable system too," Pickel added. "Growers don't need to rely on a single pollinator, and they pollinate at cooler temperatures, which could improve pollination in the Sacramento Valley during cool springs."

After studying blue orchard bees from three climatic regions of the Western United States, researchers determined those that are native to the foothills of California are better suited for the state's hot climate, which would make commercial-scale handling less complex and less expensive than handling bees from Utah or Washington.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Sara Goldman Smith, staff research associate, UCCE Sutter/Yuba counties, checks a blue orchard bee shelter with nesting blocks in an almond orchard in Durham as almond bloom begins in February. This is one of six Butte County release sites in a UCCE-USDA study. Photo by Theresa Pitts-Singer.



M. Beroza suggests mating disruption technique.

1960

Zoecon starts selling codling moth traps that use codlemone lure.

1973

Pacific Biokontrol registers Isomate C, a hand-applied codling moth pheromone, for pears and walnuts.

1991

1959

A. Butenandt identifies first sex pheromone.

1971

W. Roelofs discovers codlemone codling moth pheromone.



Combined research and demonstration using puffers to distribute codlemone in pears was initiated. (R. Elkins, H. Shorey [UC])

1996

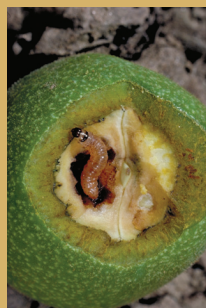
1996-2009

UC farm advisors extend puffer technology to growers.



THE SITUATION IN PEARS

In the 1990s, California pears became infested with Guthion-resistant codling moths, and growers needed a new technique for codling moth control.



THE SITUATION IN WALNUTS

Walnut growers were slow to adopt PMD, because there was no way to economically distribute a pheromone in the large canopies of walnut trees.

1998

Pear Ester (DA Lure) is developed.

2001

DA Lure is commercially available.

2002-2004

S. Welter shows that, in walnuts, one puffer per two acres is effective, making the program economically feasible for growers.

1998-2008

Pear Ester tested as lure to monitor effectiveness for mating disruption in walnuts, leading to Combo Lure of codlemone + DA Lure. (D. Light [USDA]; S. Welter and C. Pickel [UC]; UC IPM Walnut Pest Management Alliance)



Research and Extension Partnership Leads to Successful Pheromone Mating Disruption for Codling Moth

Close collaboration between research and extension has been key to the success of IPM programs. As one example, UC IPM sponsored many of the research, application, and demonstration projects that have led to successful codling moth control by pheromone mating disruption (PMD) in California pears and walnuts. In doing the work, scientists often partnered with commodity boards and the USDA. The following timeline shows key events, occurring over four decades, that eventually led to adoption of new IPM methods.



IMPACT—95% of pears in California are under pheromone mating disruption.

2009

The current puffer PMD program in pears has eliminated the need for codling moth sprays, except when the pest flies in from trees that haven't been cared for. The program monitors PMD effectiveness, using one puffer per acre to account for the lower threshold for damage in pears. Growers can eliminate supplemental codling moth sprays whenever monitoring shows no infestations. Spraying then is necessary only for secondary pests.

The original program was designed to minimize risk to growers by implementing PMD along with a full spray program to reduce codling moth populations. Continuing the full spray program reduced risk to growers, so they were willing to try PMD.

2009

IMPACT—puffers are in use in 10,000 acres of walnuts, or 10% of susceptible varieties.



Growers using the puffer PMD program have eliminated codling moth sprays after only two to three years, but they have to be more attentive to walnut husk fly and aphid monitoring, since codling moth sprays helped keep populations of these pests low.

Growers became interested in using the puffer PMD program in walnuts when demonstrations showed the overall cost of the program was the same as a spray program. Growers initially had been concerned about the logistical issues associated with installing puffers in the large canopies of walnut trees, but demonstrations show the additional cost is very low.



2004–2008

Walnut field demonstration and research using puffers and Combo Lure were initiated. (C. Pickel, J. Grant, S. Welter [UC])

Authors: Carolyn Pickel^{1,2}, Joyce Strand¹, Rachel Elkins², Joe Grant², and Steve Welter³.

¹University of California Statewide IPM Program

²UC Cooperative Extension

³UC Berkeley

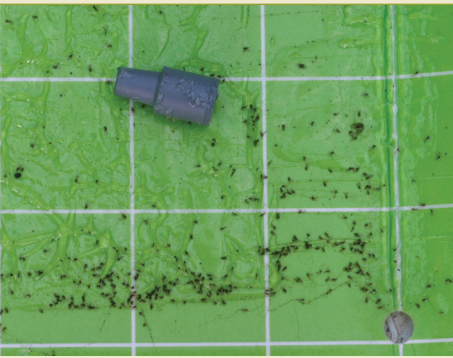
Grants Programs Update

After funding 451 research grants since 1980, the UC IPM Research Grants Program is being redirected to support the new UC ANR initiative on endemic and invasive pests and diseases. The program sponsored projects that developed practical solutions to agricultural and urban pest problems.

USDA funding for the UC Exotic/Invasive Pests and Diseases Research Program ended in August. Since 2001, the program sponsored 101 projects targeting exotic and invasive species that threaten managed and natural ecosystems in California. Although the program has ended, ANR leaders are optimistic about the possibility of additional funding to support further work in this critical area.

The second year of the UC Extension IPM Demonstration Grants Program, which UC IPM also administers, funded six projects in 2009, bringing the total to 15. The program is designed to bridge the gap in the research-extension continuum by taking results from research sites on UC campuses, at research centers, and in counties then demonstrating them in new locations and situations.

➔ Find out more about these programs and the projects they sponsored at www.ipm.ucdavis.edu/grants



Gray rubber septum lure for mealybugs in a sticky trap surrounded by captured male mealybugs. Photo by Steve McElfresh.

Combination lure for mealybugs cuts costs

UC researchers have found the same generic lure can attract three species of mealybugs, which would cut costs for growers by allowing them to use a single pheromone trap.

Without careful, regular sampling, mealybugs can reach economically damaging levels before growers realize infestation has occurred. However, the only scouting tool nurseries currently use for citrus, longtailed, and obscure mealybugs is a labor-intensive, visual inspection of crops. With the synthetic pheromone lures, which are deployed in sticky traps, it is easier to capture and count the males.

Researchers also are assessing the reproductive biology of the three species to determine if pheromone-based control measures such as mating disruption are likely to be successful.

➔ Continued online at www.ipm.ucdavis.edu/highlights

UC Extension IPM Demonstration Grants Program 2008–2009: Funded Projects

On-site disposal of invasive plant materials

- Carl Bell, UCCE, San Diego County
- James Stapleton, UC IPM/UCCE, Central Valley

Homeowner integrated management of bark beetle and mistletoe in Merced and Mariposa counties

- Maxwell Norton, UCCE, Mariposa County
- David Doll, UCCE, Merced County

Bilingual urban IPM training for childcare providers and parents in Contra Costa County

- Shelley Murdock, UCCE, Contra Costa County

Determining and demonstrating effective trapping strategies for gophers to promote trapping as part of an IPM approach

- Roger A. Baldwin, UC IPM/UCCE, Central Valley

Sustainable practices to manage root knot nematodes in tomato

- Antoon Ploeg, UC Riverside

New residential IPM approaches to manage codling moth

- Daniel B. Marcum, UCCE, Shasta and Lassen counties
- Carolyn Pickel, UC IPM/UCCE, Sutter-Yuba counties
- Alan Knight, USDA-ARS

Entomologists use 'love potions' to control cerambycid beetles

UC and University of Illinois scientists have tripled the number of known pheromones that attract several species of pest cerambycid, or longhorned, beetles. Traps containing cheap, generic blends of these chemicals, which insects emit to attract mates, help growers monitor and control populations that are low or difficult to survey.



Adult eucalyptus longhorned borer on a red blossom of eucalyptus. Photo by Jack Kelly Clark.

Wood-boring beetles from this family include many species that attack and kill fruit trees, ornamental trees and shrubs, and timber; they also damage wood in buildings.

Longhorned beetle larvae emerge from eggs laid in protected places on bark, feed on the inner bark, then bore into the sapwood or heartwood, killing branches or entire trees. These beetles also can transmit nematodes, fungi, and other pathogens that can kill host trees.

One nematode, *Bursaphelenchus xylophilu*, which pinesawyer beetles vector, causes pine wilt disease, which has devastated pine forests in Japan and China; the disease also occurs throughout most of the United States.

Cerambycids also are likely to transmit pitch canker and other fungal diseases by contaminating feeding and oviposition wounds with fungal spores.

UC Riverside entomologist Jocelyn Millar and University of Illinois entomologist Larry Hanks have successfully identified pheromone blends for more than 30 species, including several invasive pests. They also have shown that adult beetles of another 10 species apparently don't use pheromones but are attracted by volatile chemicals the host trees release.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Passive solar heating knocks out invasive plants on the spot

UC IPM plant pathologist and advisor Jim Stapleton and a team of researchers have developed a method for removing invasive plants from California's riparian areas and other sensitive habitats that will avoid on-site burning and reduce the spread of seeds and other propagative tissues.

When used during summer months, high-temperature, passive-solar tents quickly and effectively destroy invasive plant debris on-site, Stapleton said, preventing the need to haul material to an access point for pickup and disposal and avoiding the possibility of leaving detached plant parts behind.

Project researchers are working with small groups of volunteers, who are trying to remove invasive plants in a variety of areas in Southern California, to test and demonstrate the solar tents at several sites; almost 30 people attended the demonstration held at Lakeside River Park Conservancy in San Diego County. The scientists will be following up with surveys.

The team plans to conduct additional tests, especially in cooler areas and during cooler seasons, to determine other regions and times solarization could be an effective method to destroy invasive weeds.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*



Graduate student Kris Weathers (left), CE specialist and plant physiologist Milt McGiffin, and principal investigator Carl Bell examine a small mock-up of a solar tent at the experimental field area at UC Riverside. Photo by Jim Stapleton.

Training

UC Master Gardeners enhance IPM outreach

UC IPM and Statewide Master Gardener Program personnel teamed up in 2009 to offer four one-day, regional advanced IPM workshops to UC Master Gardener volunteers throughout the state. Each session featured hands-on activities and covered topics including pest identification, Argentine ant management, sustainable gardening practices, and how to use UC IPM's Web site to solve pest problems.



Master Gardeners learn how to identify pests during the Advanced IPM workshop in Cupertino.
Photo by Cheryl Reynolds.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Partnership provides required training for maintenance gardeners

Maintenance gardeners often apply pesticides in urban landscapes, but the majority of them aren't certified as required by the California Department of Pesticide Regulation (CDPR). As a result, they often aren't aware of safe pesticide use practices and IPM.

UC IPM teamed up with CDPR, county agricultural commissioners, and practitioners to create a new outreach, education, and applicator certification program to prepare maintenance gardeners to qualify as pesticide applicators (category Q) while providing training on IPM and pesticide alternatives.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

UC IPM adds second course to free, online pesticide training for retail employees

UC IPM has released a second course in its free, online pesticide training series for retail employees at www.ipm.ucdavis.edu/training/. These courses were created to increase consumer awareness about pesticides and alternative options for managing pests in homes and gardens. The second course, *Moving Beyond Pesticides*, includes an overview of IPM and information about how to diagnose and manage pest problems. The course features low-toxicity tools and products sold in most garden centers.

➔ *Continued online at www.ipm.ucdavis.edu/highlights*

Resource Roundup

New resources and updates from UC IPM in the past year are:

- *Landscape Pest Identification Cards* (print)
- New subscription notification service (RSS)
- *Pest Management Guidelines*—updated 42 crops and five crop/year-round programs (online)
- *Pest Notes*—revised 23 titles and added four (*Bats, Black Widow and Other Widow Spiders, Brooms, and Palm Diseases in the Landscape*) (online)
- *2009 Efficacy and Timing of Fungicides, Bactericides, and Biologicals for Deciduous Tree Fruit, Nut, Strawberry, and Vine Crops* (PDF and online)
- *Pests in Gardens and Landscapes: Ornamental Trees and Shrubs*—added 110 plant species (online)
- *Quick Tips*—added seven titles (*Bark Beetles, Bed Bugs, Landscape Design & Water Quality, Landscape Plants: Fertilizing & Watering, Lawn Fertilizing, Lawn Watering, and Mistletoe*) and translated 10 into Spanish (print and online)
- *Training course—Moving Beyond Pesticides: Environmentally Safe Tools for Use in an IPM Program for Retail Employees* (online)
- Updated guidelines for *Spotted Wing Drosophila* (online)
- *Training materials—Lawn and Residential Landscape Pest Control: A Guide for Maintenance Gardeners* study guide, workbook, and presentations in English and Spanish (print and online)
- *Field Fumigation*, volume nine in the *Pesticide Application Compendium* (print)

About the UC IPM Program

The University of California Statewide IPM Program was established in 1979 to develop and promote the use of integrated, ecologically sound pest management programs in California. It sponsors activities throughout California.

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