



ANNUAL REPORT



2010 HIGHLIGHTS

University of California Statewide Integrated Pest Management Program



University of California
Agriculture and Natural Resources

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

UC Statewide IPM Program

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From the director

Continuing traditions of excellence

It is a great privilege and honor to serve California and the IPM community as UC IPM's director. During the past 30 years, UC has built a program that is today considered the gold standard for all IPM programs. The success is due to the commitment of UC leadership and the exceptional quality and dedication of UC IPM employees. I am looking forward to continuing the tradition of excellence at UC IPM.



In this report, you'll read about many of the program's accomplishments for 2010. UC IPM has been quite productive, although we received a significant state-budget cut. By making choices and attracting new external funds, the program maintained capacity to serve California's IPM community effectively through research, extension, and preparation of online and print resources to support audiences in agriculture, communities, and natural resources.

UC IPM continued to address important problems in agriculture, including managing new, high-profile invasive pests that have invaded to harm crops and disrupt ongoing IPM programs. Quick action against pests such as European grapevine moth and spotted wing drosophila gives growers a chance to prevent significant damage to California crops.

Meanwhile, our urban and community IPM program has expanded to develop new tools and products that help new audiences manage important urban pests or give sound IPM advice. We are proud of our efforts to develop effective and safe IPM practices for the urban community.

I expect 2011 to bring new opportunities. We're looking forward to contributing to UC ANR's new research and outreach initiatives that address important issues facing California, including sustainable food systems, endemic and invasive pests and diseases, sustainable natural ecosystems, and healthy family and communities.

A new program advisory committee will begin to help strengthen UC IPM and increase its connectivity and services to Californians. The committee will provide feedback and help to set priorities, evaluate UC IPM's ability to meet its goals, and create closer ties with external stakeholders. We are fortunate that 10 prominent IPM leaders agreed to serve on the committee.

Finally, I want to express my appreciation to **Joyce Strand** and **Pete Goodell** for their outstanding dedication, contributions, and service during the past three years as UC IPM interim directors. The leadership and wisdom that both provided during a challenging budget time is recognized and highly appreciated by ANR and the UC IPM program.

—Kassim Al-Khatib, Director

Staff retirements



Principal Editor **Barbara Ohlendorf** retired June 29 after 28 years with UC IPM. Many know Ohlendorf from her role as coordinator of the UC IPM Pest Management Guidelines publication series. Working with many UC ANR authors, she coordinated revisions for 44 crop guidelines.



After serving nearly 29 years with UC IPM, Programmer **Ed Morgan** retired June 29. Morgan joined the program to help develop the original online IPM computer system. IMPACT was the first to give ANR employees access to plant and pest models, weather data, calculators, mail and news, plus other programming tools.



Adult glassy-winged sharpshooter, a vector of the Pierce's disease pathogen, on an orange stem. Photo by J. K. Clark.

UC IPM manages Pierce's disease research grants program

The UC Pierce's Disease Research Grants Program issued a request for proposals in November for 2011–2014 project funding. This request and the proposal review process are being conducted jointly with the California Department of Food and Agriculture's Pierce's Disease Control Program. UC IPM Director **Kassim Al-Khatib** began managing this UC program Dec. 1.

Funded by the USDA National Institute for Food and Agriculture, the program sponsors projects aimed at controlling Pierce's disease, a potentially devastating disease of grapevines, and glassy winged sharpshooter, the insect that carries it. Total research funding for the UC program varies from about \$1 to \$2 million annually.



Zalom wins ESA's IPM award

UC Davis professor and former UC IPM director **Frank Zalom** won the Entomological Society of America 2010 Award for Excellence in Integrated Pest Management.

The nomination noted Zalom's influence related to IPM policy and practices in the United States and the world. He has developed IPM strategies and tactics that include monitoring procedures, thresholds, pest development and population models, biological controls, and use of less toxic pesticides, which have become standard in practice and part of the UC IPM Pest Management Guidelines. Zalom joined UC IPM in 1980, serving as director from 1988 through 2001.

Urban ant alliance wins award

The Entomological Foundation has awarded UC IPM Advisor **Cheryl Wilen** and other members of the Urban Ant Pest Management Alliance the 2010 Integrated Pest Management Team award. The group received the award Dec. 13 at the foundation's awards dinner held in San Diego.

The alliance, funded by the California Department of Pesticide Regulation, was nominated for developing methods to reduce pesticide applications in urban environments, leading to potential reduction of pesticides in urban waterways.

The program worked with pest management professionals to develop IPM strategies that would reduce the amount of pyrethroid insecticides applied to control ants by 50%.

The Urban Ant Pest Management Alliance team consisted of members from UC, regulatory agencies, and the pest management industry. Wilen's UC colleagues were **Michael Rust**, **John Klotz**, **Les Greenberg**, and **Donald Reiersen**, all of UC Riverside's Entomology Department, and UC Cooperative Extension advisors **Darren Haver** and **John Kabashima**. **Thomas Babb** and **Mark Robertson** of the Department of Pesticide Regulation and **Brian Cabrera** of the Santa Barbara County Agricultural Commissioner's Office formed the regulatory team. Industry leaders were from Lloyd Pest Control, Orkin Inc., and Western Exterminator Co.

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

Cling peach growers use new methods



Workshop participants learn how to hang oriental fruit moth mating confusion dispensers at the **Scott and Sid Long** orchard. Photo by A. Molinar.

IN BRIEF

- Mating disruption and parasite establishments reduced toxic pesticide use in canning peaches.
- Reduced-risk approach to managing insects performed as well as conventional methods.
- Released parasites established in sites where sunflowers were planted.

A two-year demonstration project showed canning peach growers that using reduced-risk pest management methods against oriental fruit moth, peach twig borer, and obliquebanded leafroller can achieve the control they need while reducing impact on the environment.

Project leaders recruited San Joaquin Valley growers who were willing to use newer, more environmentally friendly ways to manage important pests in their cling peach orchards. IPM methods—including mating disruption and reduced-risk insecticides as needed plus augmentation of oriental fruit moth parasites—successfully prevented these three pests from causing damage in the demonstration orchards.

The reduced-risk methods were compared to growers' commonly used program where they sprayed pyrethroid insecticides for the same pests. Regulators have targeted organophosphate and pyrethroid insecticides for elimination or severe reduction because of their harmful effects on water quality and nontarget organisms.

The project also demonstrated a way to augment biological control of peach pests to further reduce pesticide use. Researchers released the parasitoid *Macrocentrus ancylivorus* and planted commercial sunflowers in or near

the orchards to help breed sunflower moths that can provide a bridge for parasitoid survival from one season to the next. *Macrocentrus* parasitized sunflower moth at rates ranging from 4 to 10%, supporting long-term establishment of *Macrocentrus* in the orchards.

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

Advisors tackle European grapevine moth

UC Cooperative Extension viticulture and IPM advisors are engaged in an all-out effort to combat the European grapevine moth (EGVM), first trapped in Napa County in September 2009 and since trapped in eight other California counties.

The insect had never before been caught in the United States, but it is the primary pest on grapevines in Europe and can be expected to cause significant economic harm to California's diverse grape industries if it becomes established.

The UCCE advisors' work contributed to a dramatic reduction in 2010 of EGVM populations in Napa Valley from about 100,000 moths caught in the first generation to about only 1,000 moths in the second. Napa County was by far the hardest hit; by comparison, the number of moths caught in counties that surround Napa and in the Central Valley was very low for all three generations in 2010.

By applying reduced-risk chemicals for this new pest, growers in quarantined areas preserved their ongoing vineyard IPM programs and protected important natural enemies that keep several other grapevine pests under control.

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



Adult European grapevine moth. Photo by J. K. Clark.

IN BRIEF

- This recent invader threatens grapes in nine California counties.
- Sprays and mating disruption provided good control in 2010, but the situation for 2011 is not known.
- UCCE advisors educate growers, consultants, and field workers about how to find and control this new pest.
- Research addresses spray timing, pesticide effectiveness, and larva survival.



Lectures such as this one were part of a comprehensive almond IPM training meeting. Photo by CAFF staff.

Training helps managers navigate almond tools

In training workshops, UC Cooperative Extension advisors and specialists helped more than 280 pest control advisors pull together the wide range of IPM tools and methods for managing almond pests. Almost all of those who attended intended to use the methods they learned during the following growing season.

Workshop organizers arranged the agenda by season, following the almond year-round IPM program UC developed. For the dormant, bloom, fruit development, and harvest periods, experts presented the latest about monitoring procedures and tools, degree-day pest models, pesticide selection and timing, biological control, and new technologies such as puffers for dispensing pheromones.

IN BRIEF

- All-day training focused on wide array of IPM tools and methods to manage almond pests.
- Evaluation showed 90% of attendees intend to use the information.

Speakers also presented information about economic and environmental risks associated with pest control practices. This included how to meet pest and pesticide residue requirements that foreign markets place on growers who export this important U.S. crop. During the breaks, meeting goers could participate in hands-on demonstrations of almond pests and their natural enemies.

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

Lettuce growers weigh options in face of tight VOC regulation

Clean produce is the goal for California lettuce growers, and they carefully monitor and manage pests to meet high quality standards. Now, UC Cooperative Extension scientists are advising growers on ways to cut use of air pollution-causing chemicals while getting the same or even better control of lettuce insect pests, but the prospect is less promising when it comes to managing problem weeds.

To achieve federal air-quality standards, the California Department of Pesticide Regulation is proposing to strengthen its regulation of pesticides that produce volatile organic compounds, or VOCs. VOCs readily evaporate and interact with other compounds in the air and, in the presence of sunlight, form ozone or smog. To reduce smog, growers can use alternative chemicals or formulations that form fewer VOCs.

Scientists analyzed the alternatives and found that, unfortunately, lettuce growers on the Central Coast have few options when it comes to reducing VOCs while managing tough weeds. Alternative, low-VOC herbicides either aren't registered for all lettuces or don't control all the problem weeds, or they have restrictions that interfere with important management practices.

UCCE Specialist **Nick Toscano**, Entomology Advisor and UC IPM Affiliate Advisor **Jianlong Bi**, and UCCE Specialist **Steve Fennimore** recently analyzed options for lettuce growers who need to move away from pesticides that cause air pollution.

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

IN BRIEF

- DPR is placing restrictions on the most air-polluting pesticides.
- Researchers' analysis shows lettuce growers have effective alternatives for controlling most insect pests.
- Loss of the herbicide bensulide could cost growers \$300 per acre for hand weeding.



Common purslane infestation in lettuce. Photo by J. K. Clark.

Spotted wing drosophila targets soft-flesh fruits



Spotted wing drosophila damaged these cherries. Photo by L. L. Strand.

UC scientists are helping growers identify and manage spotted wing drosophila, a new pest in California. This fruit fly was identified in 2009 and recently has been found in many California counties infesting soft-flesh fruits, particularly ripening cherries and caneberries.

This new pest has been found in the San Francisco Bay Area, in the Sacramento Valley, in some sites in the San Joaquin Valley and the Sierras, and along the Southern California coast.

Damage occurred to both backyard and commercial cherries, causing fruit to soften and turn brown. Spotted wing drosophila has the potential to become an important pest, because it attacks ripe, undamaged fruit as well as damaged or rotting fruit—unlike other *Drosophila* species that it resembles.

Soon after the pest was found, UC IPM organized a meeting so scientists from California, Washington, and Oregon could



Spotted wing drosophila adult male. Photo by L. L. Strand.

discuss what needed to be done. Strong research collaborations grew out of the fall 2009 meeting including a \$5.7 million grant from USDA's Specialty Crops Research Initiative (SCRI). UC researchers **Frank Zalom, Mark Bolda, Bob Van Steenwyk, Bill Coates, Janet Caprile, and David Haviland** are studying the insect's biology and how best to monitor and manage it.

IN BRIEF

- Spotted wing drosophila damaged backyard and commercial cherries in California.
- Western scientists collaborate to study gaps in the knowledge about this pest.

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

Puffer use increases

Central Valley walnut growers continue to use pheromone mating disruption to reduce their reliance on broad-spectrum pesticides to manage codling moth. Building on that success, researchers are applying the technique to navel orangeworm management in walnut and almond orchards.

One of the more economical techniques for delivering pheromone into orchards is aerosol puffers. These are easily put in an orchard in a grid pattern of one for every 2 acres, hung in the upper part of tree canopies. UC IPM Advisor **Carolyn Pickel** said using the puffers along with monitoring the codling moth combo lure has several advantages over traditional pesticides.

"It lowers the codling moth population over several years, reducing the risk of codling moth damage," Pickel said. "It also minimizes the use of broad-spectrum pesticides that cause secondary pest outbreaks."

Since 2008, Pickel and project colleague UC Cooperative Extension Advisor **Joe Grant** have seen codling moth puffer use grow to 15,000 acres in walnuts with less than half a percent damage. However, researchers still are learning how well the technique works with navel orangeworm. Outcomes from their 2010 research trials, funded by an areawide USDA program, are promising. In large research sites where puffers dispensed navel orangeworm pheromone, traps for live females stopped catching moths. Similarly, after puffers were put up, eggs no longer were found in egg traps for several weeks. These trap "shut downs" indicate that the pheromone is successfully interfering with mating.

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

IN BRIEF

- Mating disruption for codling moth is effective and reduces the use of broad-spectrum pesticides.
- Mating disruption using puffers for codling moth in walnuts grew to 15,000 acres by 2010.
- Research on puffers for navel orangeworm control in almonds and walnuts is promising.

Puffer pheromone dispenser in a walnut tree. Photo by S. Goldman Smith.



A new threat to California oaks: Goldspotted oak borer

There are few plants as emblematic of the California natural landscape as the native oak. Unfortunately, these majestic trees are threatened again, this time by an invasive beetle.

The goldspotted oak borer (GSOB), *Agrilus coxalis*, already has killed 20,000 native oaks in San Diego County and is likely to spread northward. Almost 90% of susceptible oaks in some areas are infested and dead or dying.

UC IPM Extension Entomologist **Mary Louise Flint** has joined U.S. Forest Service entomologists **Steve Seybold** and **Tom Coleman** in a cooperative effort to study the biology and ecology of the pest and develop an integrated strategy to contain it.

The research program includes developing better traps and lures to detect the pest and map its spread and providing tools for timing management programs in the future. Although related to the emerald ash borer that has invaded the Eastern United States, GSOB does not respond to the commercial lures available for that pest.

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



Goldspotted oak borer larvae. Their damage can be seen in the photo on the upper left of the report's front cover. Photo by T. W. Coleman.

IN BRIEF

- Impact started in San Diego County and is moving northward.
- UC and U.S. Forest Service researchers are developing traps and lures to detect the pest and map its spread.
- Preliminary results show chipping can treat infested wood and prevent spread through movement to new areas.
- Potential for biological control is being studied.

UC IPM focuses on slow-moving problem

UC IPM Advisor **Cheryl Wilen** is moving in fast on slow-moving snails. Wilen is testing new, lower toxicity products to expand the range of alternatives available for controlling snails and slugs in commercial nurseries.

The brown garden snail is a major pest that rapidly consumes transplants or seedlings, damages citrus fruit, and impacts landscape quality. In California, the pest traditionally is controlled by one of three pesticides—metaldehyde, iron phosphate, or methiocarb. Unfortunately, metaldehyde and methiocarb are quite toxic, and iron phosphate is slow acting.

During the past year, Wilen carried out blind tests on four new products under consideration for registration for use against snails. She found that several products killed snails when used at considerably lower application rates than traditional snail pesticides, but because the test was blind, she couldn't conclusively state whether the positive outcomes were from better bait attractants or properties of the active ingredient.

Now she has a chance to find out.

"I have a new project that builds on this work, and we can expand the trials to look at other lower toxicity materials," Wilen said. "Because nurseries cannot ship product with snails or slugs on the plants or in the soil, we not only can help reduce the direct costs of the snails feeding on the plants, we can help growers reduce indirect costs by cutting down on the number of rejected shipments."

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



Specially designed arenas control research snail environments. Photo by C. A. Wilen.

IN BRIEF

- Blind tests of new snail baits show products are effective at much reduced rates.
- Expanded trials hold promise for alternatives in commercial nurseries.
- Nursery trial outcomes likely apply to landscapes.

Retail nurseries, garden centers seek IPM information

During the next two years, UC IPM will be working closely with retailers and their employees to better inform shoppers about IPM options.



Retail employees frequently advise customers about how to manage pests. Photo by K. Windbiel-Rojas.

IN BRIEF

- Consumers often ask retail and garden center employees for pest control advice.
- Garden center managers are willing to invest in employee training about IPM and pest identification.
- UC IPM provides online and hands-on training for employees.
- A new industry committee is advising the UC IPM Urban Program on priorities for retail outreach.

Employees who sell pesticides and garden supplies in retail stores are a key source of pest information for many California consumers. They are in an ideal situation to educate the public about IPM and environmentally sound pest management solutions.

To prepare for this project, UC IPM staff surveyed retail garden centers and nurseries to assess their information and training needs. Seventy-one store managers or owners participated in the survey, representing 77% of retailers in Contra Costa, Marin, and Sacramento counties. Despite reduced staff and a poor economy, managers were very enthusiastic about a UC training program.

- More than 91% of the managers said they would send an employee to a 4- to 6-hour training session to learn about IPM tools and pest identification.
- They were especially interested in learning about alternatives to pesticides as well as organic products and less toxic pesticides.
- Only 52% of the stores currently offer formal or scheduled training on pests or pesticides for employees.
- Currently, pesticide companies or distributors conduct most of the training.

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

Pilot training program features UC IPM material

San Luis Obispo County used UC IPM materials in their successful pilot of a pesticide safety training program for maintenance gardeners.

Maintenance gardeners must be certified or supervised if they apply pesticides. After determining 82% of the maintenance gardeners in the county lacked required certification, the San Luis Obispo Department of Agriculture pursued a major outreach and educational program to correct the problem. Use of pesticides by noncertified maintenance gardeners creates risks for public safety and the environment in residential areas.

Led by Deputy Agricultural Commissioner **Janice Campbell**, the program employed a private trainer and used UC IPM-developed curriculum including a PowerPoint presentation, illustrated workbooks, and study guides. The trainer led eight workshops, almost half of which were in Spanish, which 137 maintenance gardeners attended. When 131 of those participants took the category Q pesticide certification exam administered by the California Department of Pesticide Regulation, nearly 90% passed.

UC IPM has made the training materials available to all of California's county agricultural commissioners. The materials and a free, narrated online course that includes the complete curriculum are available on the UC IPM Web site at www.ipm.ucdavis.edu/categoryQ/.

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

IN BRIEF

- Eight workshops in Spanish and English led to 90% pass rate on certification exam.
- Additional training will be held in Stanislaus and San Luis Obispo counties.
- A narrated, online version of the program is available on the UC IPM Web site.

Photo by J. K. Clark.



Marin County strengthens IPM policy

During the past few decades, Marin County has been at the forefront of a movement that emphasizes environmentally responsible pest management in urban settings. In recent years Marin County government departments have reduced their pesticide use by more than 75%, and pesticides still in use generally are less toxic than those used before.

IN BRIEF

■ IPM methods give good pest control while reducing pesticide use by 75%.

■ Marin County's updated IPM policy represents a commitment stretching back to the 1980s.

Playgrounds are one area positively affected by Marin County's reduction in pesticide use. Photo by J. K. Clark.



Recently, UC IPM Affiliate Advisor **Steven Swain** served as part of a team that refined the county's ongoing IPM program to achieve even more effective, yet realistic, pesticide reduction targets while maintaining acceptable levels of pest control.

New aspects include focusing public attention on the program; designating county turf areas, playgrounds, and picnic areas as pesticide-free zones; evaluating potential pesticide reductions for specific sites; and having more stringent public notices. In addition, many more pesticides will require an official exemption in order to be used.

To attain the dramatic reduction in pesticide use, Marin's IPM policy includes vertebrate, arthropod, and weed management guidelines. For example, to control rodents the county is using traps instead of poison baits and establishing barn owl boxes on county-maintained properties. Insect control practices include maintaining strict sanitation policies in buildings the county operates and introducing predators and other natural controls.

To control weeds, county personnel are hand pulling or flaming where possible. When herbicides must be used, the county uses straight glyphosate with soy-based sticker-spreaders instead of commercially available, read-to-use herbicides such as Roundup or Ronstar G.

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

UC IPM releases new disease risk tool

A new Web tool is making it easier for growers and pest control consultants to assess the risk of fire blight to apples and pears, an important disease in California. The online program presents the potential for fire blight infection using two science-based models and weather data stored in the UC IPM database.

The degree-hour model helps growers know whether they need to treat, and if so, how to effectively time fungicide sprays. The model assesses whether recent temperature and rainfall conditions are right for growth and infection by the *Erwinia amylovora* bacteria, which causes the disease.

The mean air temperature model uses daily air temperatures to predict colonization of blossoms by the bacterium. It also gives information about whether—and when—to treat, based on biology of the bacteria and weather data.

Broc Zoller of The Pear Doctor Inc. developed the degree-hour model, and Zoller and UC Cooperative Extension Advisor **Rachel Elkins** worked with UC IPM Programmer **Buz Dreyer** to create the online version of the fire blight tool.

To access the fire blight models, look under Interactive Tools and Models on the UC IPM Web site.



Fire blight canker. Photo by J. K. Clark.

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Project offers advice on mitigating pesticides in runoff

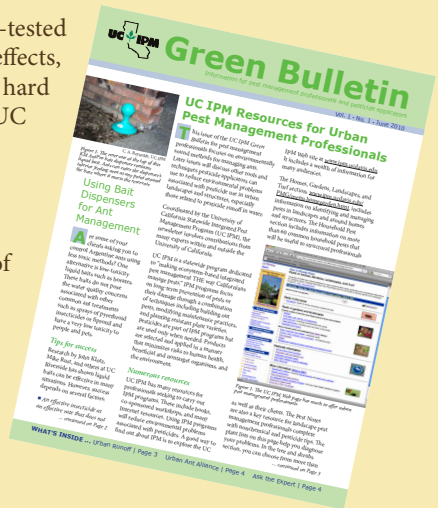
UC IPM Green Bulletin is giving professional landscape and structural pesticide applicators research-based, practical methods to reduce pesticide runoff in urban environments.

The first five issues of the newsletter featured university-tested information that can be applied to reduce runoff or its effects, such as new pesticide application techniques for use on hard surfaces and use of impervious surfaces to filter water. UC experts contribute the articles for each issue.

Green Bulletin is one part of a larger project aimed at creating educational materials and using them to show residents and professionals how to keep pesticides out of California waterways. Other products being developed by UC IPM include online training modules, Quick Tip-style cards, and a pesticide impacts database. Videos and additional training modules and cards will be published before the project, funded by the Department of Pesticide Regulation, ends in March.


“We’re pleased to continue working with the University of California to raise awareness about the effects of pesticides on water quality in urban areas,” said DPR Director **Mary-Ann Warmerdam**. “Educating landscapers, pest control professionals, retail garden store staff, and the public about integrated pest management and the proper application of pesticides is crucial to reducing contaminated runoff—that could be toxic to some small aquatic organisms—from entering urban waterways.”

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



Capítulo 5

Cómo proteger a las personas y al medio ambiente y cómo proceder en caso de emergencias



Maintenance Gardener Exam Prep UC IPM

Spanish maintenance gardener presentation.

UC IPM produces products for Spanish readers

UC IPM is building its collection of new products for Spanish speakers to improve their understanding of IPM techniques and encourage the use of IPM and less toxic methods.

Products include quick answers for residents who have questions about common pests in and around their homes, a full suite of study materials for maintenance gardeners, and training materials to support vineyard workers searching for damaging pests.

TOP 10 SPANISH QUICK TIP CARDS

1. Manejo integrado de plagas y control biológico (Integrated Pest Management and Biological Control)
2. Caracoles y babosas (Snails and Slugs)
3. Tijerillas (Earwigs)
4. Tuzas (Gophers)
5. Ratas (Rats)
6. Chinche de cama (Bed Bugs)
7. Ácaros (Spider Mites)
8. Piojo del cabello (Head Lice)
9. Cucarachas (Cockroaches)
10. Termitas (Termites)

More than 40 titles in the popular Quick Tip pest management series for residents have now been translated into Spanish. These publications quickly get to the point about how to identify and manage a variety of pests in the garden and around the home. They also address subjects such as:

- Beneficial insects in the garden;
- Less toxic pesticides;
- Pesticide safety and how pesticides affect water quality; and
- How to manage lawns to reduce problems.

UC IPM posts all titles online, but many also are available in print through UC Master Gardeners.

Other bilingual resources include kiosks, pesticide applicator certification training material, videos, and pest identification cards.

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

150th Pest Note released

UC IPM released *Pest Notes: Birds on Tree Fruits and Vines* in September, making it the 150th title in the Pest Notes series. UC Staff Research Associate **Denise Stetson** and UC IPM Advisor **Roger Baldwin** co-authored the publication.

Pest Notes form the core content of the home and garden section of the UC IPM Web site, with at least 10 titles each receiving more than 40,000 views annually.

UC IPM Pest Notes are written and peer reviewed by UC scientists for home gardeners, landscape professionals, and the general public. Pest Notes give Californians the most comprehensive and reliable database of home, garden, and landscape IPM publications of any state in the country.

UC Master Gardeners and others in county UC Cooperative Extension offices see Pest Notes as essential for answering questions from the general public.

“We literally could not do our job at the information desk without Pest Notes,” said Sonoma County Master Gardener **Alison Ogden**. “From sending copies to clients, to researching questions, to improving our own knowledge, UC IPM Pest Notes are the most clearly written and concise major resource of scientific-based IPM information for the public and for Master Gardeners. Hooray for Pest Notes!”

UC IPM posts Pest Notes online, but the documents also are available in PDF format for easy printing. Since 2009, PDFs of new Pest Notes have been designed with color photographs.

Other new Pest Notes released in 2010 were *Sudden Oak Death*, *False Chinch Bug*, *Catchweed Bedstraw*, and *Asian Citrus Psyllid*, and UC ANR authors revised 19 existing Pest Notes.



TOP 10 PEST NOTES

1. **Rats**
2. **Aphids**
3. **Carpet Beetles**
4. **Ants**
5. **Mushrooms and Other Nuisance Fungi in Lawns**
6. **Snails and Slugs**
7. **Cockroaches**
8. **Pocket Gophers**
9. **Voles (Meadow Mice)**
10. **Brown Recluse and Other Recluse Spiders**

New tools promote beneficial insects to home gardeners

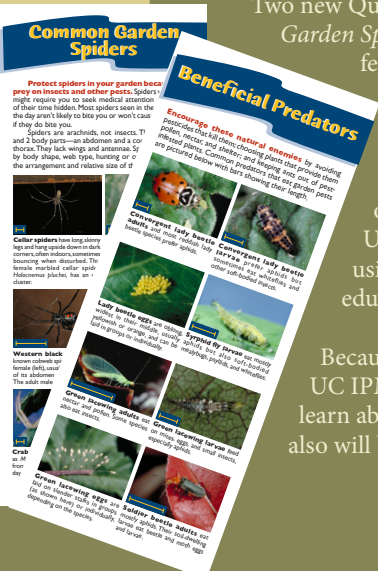
UC IPM has created new print and electronic materials to help gardeners become more familiar with natural enemies in their landscapes.

Two new Quick Tip cards, *Common Garden Spiders* and *Beneficial Predators*, feature more than a dozen

color photos each along with identification tips.

Readers can find them on the home and garden section of the UC IPM Web site, and UC Master Gardeners will be using the printed cards in their educational programs.

Because UC Master Gardeners extend IPM information to home gardeners, UC IPM developed a PowerPoint presentation they can either use to help them learn about biological control or incorporate into their own talks. These tools also will be used in future training programs for Master Gardeners.



NEW QUICK TIPS FOR 2010

English

- **Beneficial Predators;**
- **Common Garden Spiders;**
- **Less Toxic Insecticides;** and
- **Weed Control Using Herbicides.**

Spanish

- **Bark Beetles (Escarabajo descortezador);** and
- **Mistletoe (Muérdago).**

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

Pest management information and tools

- Pest Management Guidelines—updated 16 crops and added *Eggplant* (online)
- Exotic pest provisional guidelines—added three (*Asian Citrus Psyllid*, *Spotted Wing Drosophila*, and *Thousand Cankers Disease of Walnuts*) (online)
- Pest Notes—revised 19 titles and added five (*Asian Citrus Psyllid*, *Birds on Tree Fruits and Vines*, *Catchweed Bedstraw*, *False Chinch Bug*, and *Sudden Oak Death*) (online)
- Quick Tips in English—revised eight titles and added four (*Beneficial Predators*, *Common Garden Spiders*, *Less Toxic Insecticides*, and *Weed Control Using Herbicides*) (print and online)
- Quick Tips in Spanish—revised four titles and added two (*Escarabajo descortezador [Bark Beetles]* and *Muérdago [Mistletoe]*) (print and online)
- *2010 Efficacy and Timing of Fungicides, Bactericides, and Biologicals for Deciduous Tree Fruit, Nut, Strawberry, and Vine Crops* (online)
- Natural Enemies Gallery—added *Spiders* (online)
- Spotted wing drosophila identification key (online)
- Tomato spotted wilt virus brochure (print and online)
- Fire blight risk assessment tool (online)

Training materials

- *UC IPM Green Bulletin* newsletter for applicators—five issues (online)
- Maintenance Gardener Pest Control Exam Preparation kit (online)
- Training modules for pest management professionals (online)

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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Cover photos, clockwise from upper left: Oak trees by T. W. Coleman; snails by C. A. Wilen; raised garden by J. K. Clark; lettuce field by J. K. Clark; peaches by courtesy; and almond training by B. Holtz.

Weed Gallery gets makeover

UC IPM has redesigned its Weed Gallery to make it as easy for readers to find an unknown weed as one they know the name of. The gallery guides readers through several main plant divisions—such as broadleaves or grasses and leaf or plant shape—to quickly narrow the search. From the results, readers can choose among photos of specific weeds.

In addition, individual weed descriptions have a new look with more photos and more information. Each page links to the Calflora Web site to show where the weed grows in California.

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

Plant forms



Mature leaf characteristics



The weed gallery at www.ipm.ucdavis.edu/PMG/weeds_intro.html makes it easy to identify a plant by matching it to a leaf shape.

New IPM guidelines, year-round programs finalized

UC ANR authors added eggplants to the 43 crops that already are a part of the UC IPM Pest Management Guidelines series. These online publications give California growers and pest control advisors the best information available to manage agricultural pests.



Specialty eggplant, ready for packing. Courtesy.

The eggplant guidelines describe in detail how to manage nematodes, 17 insects and diseases, and weeds in both conventional and organic production.

While eggplant is the first new crop added since bermudagrass seed in 2002, new guidelines for pomegranates and blueberries are scheduled for release in 2011. In addition, authors update guidelines for all crops annually or as new information becomes available.

Early in the year, UC IPM added new year-round IPM programs to the cherry and lettuce guidelines.

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