INSECT HOT TOPICS: continued from page 12

survey for this pest and would love to see any photos of suspected day ily leafminer. Email your photos to Gaye.Williams@maryland.gov.

James Bethke is Farm Advisor for Nurseries and Floriculture, UC Cooperative Extension, San Diego and Riverside Counties.

Fig. 2. Daylily leafminer pupa, which has pupated in the mine in the leaf. *Photo*: Gaye Williams.

Web pages of interest with lots of interesting photos:

http://bugguide.net/node/view/655288

http://freshfromflorida.s3.amazonaws.com/ophiomyia-kwansonis.pdf

http://entnemdept.ifas.ufl.edu/hodges/ProtectUs/presentations/Exotic_Pests_Ornamental_Plants.pdf

http://www.daylilies.org/ahs_dictionary/leafminer.html

http://www.amerinursery.com/article-7705.aspx

http://citybugs.tamu.edu/2013/05/22/new-pest-of-lilies-in-texas/

http://entnemdept.ufl.edu/hodges/september_2011.pdf

http://citybugs.tamu.edu/tag/ophiomyia-kwansonis/

http://ecoipm.com/research/daylily-leafminers/

http://blogs.mcall.com/master_gardeners/2013/05/watch-out-for-daylily-leafminer.html

http://mypestprevention.com/2013/05/daylily-leafminer/

http://www.ldaf.state.la.us/wp-content/uploads/2014/08/Daylily-Leafminer-Profile.pdf

https://www.eppo.int/QUARANTINE/Alert_List/insects/ophiomyia_kwansonis.htm

http://www.fera.defra.gov.uk/plants/plantHealth/pestsDiseases/documents/ophiomyia.pdf

REGIONAL REPORT — UC Cooperative Extension

Effect of insecticides on light brown apple moth larvae of different ages

***by* Steve Tjosvold**

The light brown apple moth (LBAM) is an important quarantine pest of nursery crops and other agricultural commodities in California. Because LBAM has a large host range, the nursery crops trade can be a high-risk pathway for moving the pest to new locations. The overall goal of this research was to evaluate the efficacy of various insecticides on LBAM larvae on a typical nursery crop under field conditions. Since older larvae are more robust and are usually sheltered in leaf rolls, we evaluated insecticides with various capabilities of plant systemic activity that might help control these larvae.

Established Pacific wax myrtle in 1-gallon pots were infested with five LBAM egg masses and covered in an insect-rearing sleeve to contain all life stages on each plant. LBAM development was monitored by making weekly field observations and periodically larvae were sampled and the head-capsule size was measured to establish their age. (First instars are those larvae that have just emerged from eggs; fifth or sixth instars are the oldest larval stages and can develop into pupae.) All infested plants were divided into three sets of plants and each set was treated with insecticides when it contained larvae of a given age: (1) first and second instars, (2) third and fourth instars and (3) fifth and sixth instars.

Table 1. Insecticides and rates used.

Active ingredient	Trade name	Manufacturer	Rate / 100 G	Rate / A
cyantraniliprole	Mainspring	Syngenta	8 fl. oz	16 fl. oz
emmactectin benzoate	Enfold	Syngenta	2.4 oz	4.8 oz
spirotetramat	Kontos	OHP	2.5 fl. oz.	5.0 fl. oz
dinotefuran	Safari	Valent	8 oz	16 oz
acephate	Orthene	AMVAC	8 oz	16 oz
methoxyfenozide	Intrepid	Dow Agro Sciences	8 fl. oz.	16 fl. oz
Chromobacterium subtsugae strain PRAA4-1	Grandevo	Marrone Bio Innovations, Inc	1.5 lb	3.6 lb

Field Observations

Phytophthora tentaculata

First identified in North America at a Monterey County nursery in 2012, *Phytophthora tentaculata* has since been found on nursery stock in Alameda, Butte, Placer, and Santa Cruz counties and on outplanted stock in restoration sites in Alameda County. Affected plants in California include *Mimulus aurantiacus* (sticky monkey flower), *Frangula californica* (California coffeeberry), *Heteromeles arbutifolia* (toyon) and *Salvia* sp. In 1993, the pathogen was first detected in Germany on *Chrysanthemum* sp., *Delphinium* sp. and *Verbena* sp. Since the first detection, the host list has increased to include *Gerbera jamesonii, Origanum vulgare*, *Santolina chamaecyparissus*, *Lavendula angustifolia*, *Chichorium intybus*, *Auklandia lappa* and *Calendula arvensis.*

Phytophthora tentaculata causes similar symptoms to those caused by other soil-or-water inhabiting *Phytophthora* species. *Mimulus aurantiacus* symptoms include root and stem rot, with the roots and stem collars developing necrotic, sunken lesions and few feeder roots. In Europe and China, the pathogen is reported to cause crown, root and stalk rot of nurse-

REGIONAL REPORT: Santa Cruz/Monterey Counties

continued from page 14

Plants were laid out in a split-plot experimental design in screened field cages. The three sets were grouped as main plots and insecticide treatments were sub-plots with five plant replications. Applications were made in year 1 on 18 July, 6 Aug, and 16 Aug 2013 and the entire experiment was repeated in year 2 on 25 Nov 2013, 11 Feb and 4 Mar 2014. All treated plants were observed weekly. When mostly adults were present, the plants were harvested and all surviving larvae, pupae, and moths were separated and counted.

Insecticide treatments consisted of the highest labeled rate (for registered products) and included a surfactant (Dyn-Amic, 3 pints/100 G) in insecticide treatments and untreated check treatment. Year 2 included a new treatment (Grandevo). All products were registered for ornamental use in California except for Enfold and Mainspring (see table 1 for rates). All spray applications were made by hand with a carbon dioxide sprayer at constant pressure with a single TeeJet 8002 flat-fan nozzle to groups of plants spaced as they would be in a commercial nursery. The spray was directed at upper-and-lower leaf surfaces and provided thorough leaf coverage at a rate of 200 gallons per acre.

Results are given in table 2 as percent control relative to the untreated check. (The total number of surviving life forms counted on each treated plant was used as the determinant of the percentage control; 100% indicated no life forms survived the treatment). In general, Orthene, Enfold, Intrepid and Mainspring were the most effective on all larval stages. Safari and Kontos provided some, but inconsistent, control on all larval stages. Grandevo, a new bacterial toxin and organically registered, provided moderate control of young larvae, although this was tested in only one of the two years.

Two products (Orthene and Mainspring) were highly effective because they have activity against the target pest and are highly systemic, moving readily in the plant to contact all larval stages. Orthene, a broad-spectrum organphosphate insecticide and long-standing product in the ornamental market, was highly effective on all larval stages, including the larger larvae that were sheltered in leaf rolls. Mainspring, a new diamide insecticide that is primarily active on moth larvae, was also highly effective on all larval stages.

Two products (Kontos and Safari), although highly systemic, are not known for activity on moth larvae. Therefore the inconsistent low-to-moderate control was not so surprising.

Field Observations: continued

ry plants. Subsequently, aboveground symptoms include stunting, leaf russeting and yellowing to browning (chlorosis), defoliation and dieback of twigs, brown to black lesions girdling the basal stem, and eventually plant death.

These detections raise concern for our forest and wildland health. The infested California nurseries specialize in producing native plants for restoration purposes. Unfortunately plants move directly from these infested nurseries to wildlands, so risk of pathogen introduction to forests is very high. The USDA Forest Service, Pacific Southwest Research Station; Forest Health Protection, Washington Office; California Department of Food and Agriculture; and Phytosphere Research are cooperating on a survey to check restoration sites to determine the extent of introduced infestations. A few conservation nurseries will also be surveyed.

REGIONAL REPORT: Santa Cruz/Monterey Counties

continued from page 15

Two products (Enfold and Intrepid) have activity against the target pest but are only locally systemic (moving within the leaves). However, these products were highly effective. Enfold is an avermectin (similar to the long-standing Avid) and is currently being considered for registration in ornamental crops. Intrepid is an insect growth regulator targeting moth larvae. Previous research showed that Intrepid has very good efficacy and long residual activity (3 to 4 weeks) when applied before or after eggs are deposited by LBAM moths. This research demonstrates additional activity on all larval stages. Because of its inherent selectivity and safety to beneficial insects (and the fact that it is currently registered), Intrepid could have a good fit into an integrated pest management strategy in nurseries.

Table 2. The Effect of Insecticides on Light Brown Apple Moth Larvae of Different Ages

First and Second Instars (small)

Year 1		Year 2	
Treatment	Percent Control	Treatment	Percent Control
Orthene	100 a	Orthene	100 a
Enfold	100 a	Enfold	100 a
Intrepid	100 a	Intrepid	100 a
Mainspring	98.2 ab	Mainspring	100 a
Kontos	82.8 bc	Grandevo	70.8 b
Safari	49 cd	Safari	0 c
Untreated	0 d	Kontos	0 c
		Untreated	0 c

Third and Fourth Instars (medium)

Year 1		Year 2	
Treatment	Percent Control	Treatment	Percent Control
Orthene	100 a	Orthene	100 a
Enfold	100 a	Intrepid	100 a
Mainspring	100 a	Enfold	99.6 ab
Intrepid	99.7 a	Mainspring	98.2 ab
Safari	5.5 b	Kontos	77.6 b
Kontos	2.8 b	Safari	29.5 c
Untreated	0 b	Grandevo	25.9 c
		Untreated	0 d

Fifth and Sixth Instars (large)

Year 1		Year 2	
Treatment	Percent Control	Treatment	Percent Control
Orthene	100 a	Enfold	94.5 a
Enfold	99 ab	Intrepid	94.5 a
Intrepid	99 ab	Orthene	87 ab
Mainspring	97.7 ab	Mainspring	84.2 ab
Safari	74.8 bc	Safari	41.8 c
Kontos	8.9 cd	Kontos	40.4 c
Untreated	0 d	Grandevo	4.8 d
		Untreated	0 d

Treatments are ranked from highest to lowest control within each experimental group. Statistical differences between treatments are indicated by the letters in the column next to the percentage control. Treatments having no statistical difference are followed by the same letter.

Steven A. Tjosvold
Farm Advisor, Environmental Horticulture
UC Cooperative Extension Santa Cruz County
1432 Freedom Boulevard
Watsonville, CA 95076-2796
(831) 763-8013 phone
(831) 763-8006 fax
satjosvold@ucdavis.edu
http://cesantacruz.ucdavis.edu

REGIONAL REPORT — UC Cooperative Extension Ventura County

Cool weather diseases of nursery crops

***by* Jim Downer**

The days are getting shorter, a chill is in the air but the drought is still holding. Environmental conditions are often predisposers of disease and while typically dry conditions suggest less fungal disease, this is not always the case in nurseries. Cooling weather is a time to be watchful for diseases caused by *Botrytis. Botrytis cinerea*, the asexual stage of *Botryotinia fuckeliana,* is a necrotrophic fungus that uses enzymes to dissolve host tissues and then absorb the remains. This fungus thrives in cold and wet conditions and will rapidly invade wounded or frost-injured plants. Herbaceous plants or flowers of woody plants (Rose) are particularly susceptible to Botrytis rots. These are quickly diagnosed because the mycelium is easily seen growing on affected plants as "gray mold" which gives it the same common name (fig. 1). Actually the gray part is comprised of spores (conidia) that occur in bunch-like clusters. (Botrytis is Neo-Latin and originated from the Greek *botrus* for "bunch of grapes.") Botrytis rot affects over 200 crop hosts and likely more plants that have not been studied. While various classes of fungicides are available for control, the pathogen is genetically pliable and easily resists typical fungicide regimes. Since the pathogen reproduces rapidly by asexual spores (conidia) it is important to rogue affected plants or trim and dispose of affected parts. Increased spacing to prevent plant-to- plant contact will also slow spread of gray mold. For more information on gray mold see: http://www.ipm.ucdavis.edu/PMG/r280100511.html.

Fig. 1. Gray mold on New Guinea impatiens, *Impatiens wallerana*. *Photo*: Jack Kelly Clark.

REGIONAL REPORT: Ventura County

continued from page 17

Another cool weather disease is pink rot of palms. Also a fungal disease, it is caused by the pathogen *Nalanthamala vermoesenii.* Many remember the old name *Penicillium,* which was later changed to *Gliocladium* and finally revised to *Nalanthamala* in 2005. Pink rot gets its name from the masses of salmon-colored spores that occur on rotted palm tissues. Pink rot disease has a modest host range within the palm family. It primarily affects king palm (*Archontophoenix cunninghamiana*) but also causes disease in *Chamaedorea, Syagrus, Trachycarpus* and *Washingtonia filifera*. The disease is either a bud rot or a trunk rot. The bud rot affects the terminal bud which leads to distorted growth, stunting or death of that stem. The trunk rot is a canker-like lesion that occurs mostly on the king palm (fig.2). While typically associated with trunk rots of queen palm, the pathogen has never been proven to cause this disease. Pink rot is only able to grow in cool weather less than 70° F. It is also associated with wounds, especially in its trunk-rot phase. It is imperative that clasping leaf bases (crownshafts) of king palm not be torn from the trunks of nursery palms. Palms injured by frost often become infected with the pink rot pathogen during the same cool period. Pink rot is well controlled by EBI (ergosterol biosynthesis inhibiting) fungicides such as thiophanate-methyl and other newer materials. Avoiding wounds and providing frost protection usually prevents most disease. Fungicides applied in advance of sporulation may help slow progress of the disease and lessen rot symtoms.

Fig. 2. Pink rot disease on a king palm trunk. *Photo*: Jim Downer.

Jim Downer
Environmental Horticulture Advisor
UC Cooperative Extension Ventura County
669 County Square Drive, #100
Ventura, CA 93003-5401
(805) 645-1458 phone
(805) 645-1474 fax
ajdowner@ucanr.edu
http://ceventura.ucdavis.edu

REGIONAL REPORT — UC Cooperative Extension

San Diego/Riverside Counties

Light brown apple moth update

***by* James A. Bethke**

The light brown apple moth (LBAM) needs no introduction because UC Cooperative Extension has been providing research and education about this pest since its introduction in California in 2007. In San Diego County, it has been detected a number of times over the last few years and most of the infestations have been eradicated. However, a lingering infestation occurs in the Oceanside area (fig. 1). In March 2014, 10 separate detections of the LBAM were observed in Rancho Santa Fe and, due to the level of detection, it is assumed that a breeding population exists in the area (fig. 2). This means that the infestation will need an eradication effort and special mitigation due to environmentally sensitive areas within the eradication zone.

The ornamental plant production industry has not been seriously impacted by the Oceanside infestation, but the new infestation in Rancho Santa Fe threatens numerous growers. San Diego growers have been prepped for the required regulatory actions by San Diego County Department of Agricultural Weights and Measures and by the California Department of Food and Agriculture, but it is now likely that the industry needs to get serious about their preparations. In the references below are links to the most pertinent information available. In short, all nurseries should begin to follow the best management practices against LBAM. All the required information specifically for San Diego County growers can be located at the San Diego County Department of Agriculture Weights and Measures' web page.

Shipping requirements are different depending on whether the plant producer is located inside the state interior quarantine area (within 1.5 miles of a detection) or outside. If they are inside the state interior quarantine, growers are required to have inspections every 30 days and the grower must have a certificate of quarantine compliance (CQC), which needs to accompany any intrastate shipments. However, a federal shield can be used in lieu of a CQC. If the plant producer is located outside the state interior quarantine, a single inspection is required. A federal shield must accompany all interstate shipments. All growers must be trapping at a rate of one trap per five acres or at least one trap if less than five acres. There are other requirements for harvested commodities, so see the links on the County's web page.

Field Observations

The Neonicotinoids

The most pressing issue the industry is facing at the moment is the reaction that the big box stores and other customers of ornamental plants have to the neonicotinoid issue. One of the most common calls I have been receiving is from growers who want alternatives to the neonicotinoids because their customers are demanding it. This is in deference to the conclusions of many of the scientists studying the issue and the reviews of the scientific literature by many U.S., U.K. and Australian scientific committees. Regardless, we are having to respond to the needs of the ornamental plant producers in our area.

There is much science that still needs to be done. Nevertheless, even though the jury is still out on this issue, there is considerable public complaint from those who believe that the neonicotinoids are the cause of bee decline or colony collapse disorder.

For one scientist, Dr. Lu of Harvard University, the cause cannot be anything but the neonicotinoids, "… Lu had a hunch that pesticides, above all, were to blame for the vanishing bees. He wasn't the first to see a connec-

REGIONAL REPORT: San Diego and Riverside Counties

continued from page 19

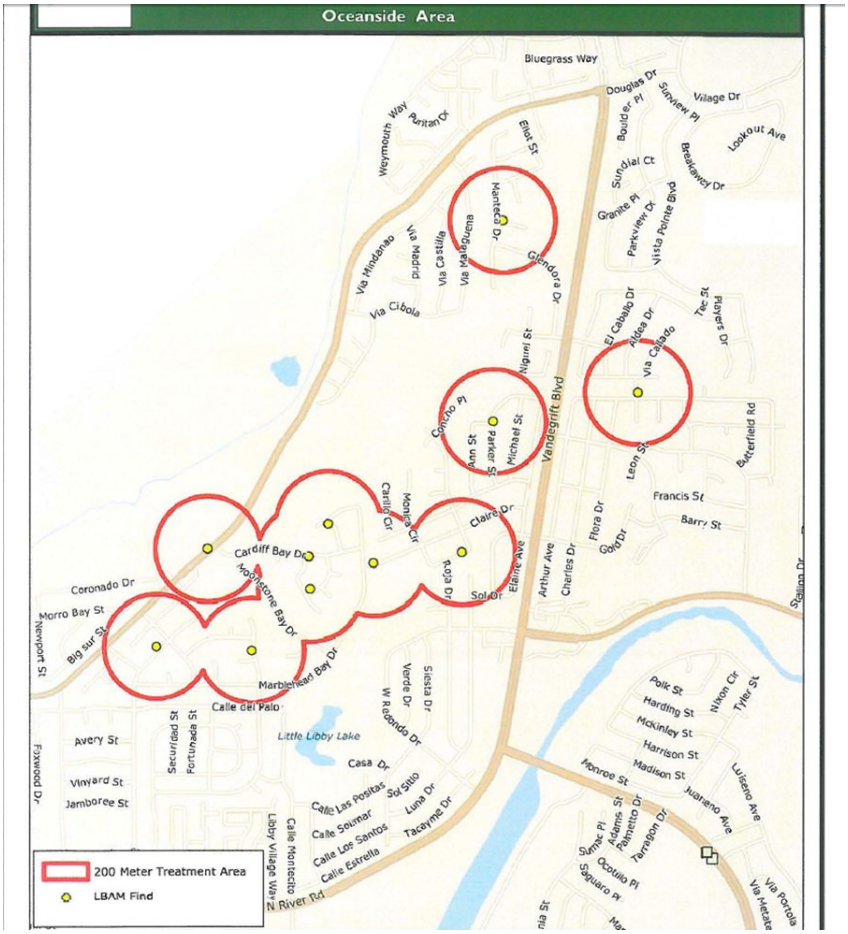

Fig. 1. Lingering LBAM infestation in Oceanside, CA. *Source*: CDFA.

References

[CDFA] California Department of Food and Agriculture. Light brown apple moth (LBAM). http://www.cdfa.ca.gov/plant/lbam/index.html. (Includes all relevant information, maps and nursery regulations.)

San Diego County Department of Agriculture Weights and Measures. Light brown apple moth quarantine. http://www.sandiegocounty.gov/awm/LBAM.html.

[CANGC] California Association of Nurseries and Garden Centers. 2009. Light brown apple moth (LBAM) Nursery Industry Best Management Practices. http://www.cdfa.ca.gov/plant/lbam/rpts/LBAM_BMP-Rev_3.pdf.

Tsjosvold SA, Murray NB, Epstein M, Sage O, Gilligan T. Field Identification Guide for Light Brown Apple Moth in California Nurseries.
(Guide and training video are available under "Emerging Pests" at: http://www.ipm.ucdavis.edu/PMG/selectnewpest.floriculture.html.)

Field Observations: continued

tion, but he was determined to prove one" (http://www.bostonglobe.com/magazine/2013/06/22/the-harvard-scientist-linking-pesticides-honeybee-colony-collapse-disorder/nXvIA5I6IcxFRxEOc8tpFI/story.html). The basis for this statement is a precursor to very poor science.

The bottom line is that bee decline and colony collapse disorder was occurring long before the neonicotinoids were widely used on the market. However, it is a fashionable thing to be anti-pesticide, especially if your customers are easily swayed in that direction.

James A. Bethke
Farm Advisor, Nurseries and Floriculture
UC Cooperative Extension San Diego, North County Office
151 E. Carmel St., San Marcos, CA 92078
(760) 752-4715 phone
760) 752-4725 fax
jabethke@ucdavis.edu
http://cesandiego.ucdavis.edu/

REGIONAL REPORT: San Diego and Riverside Counties

continued from page 20

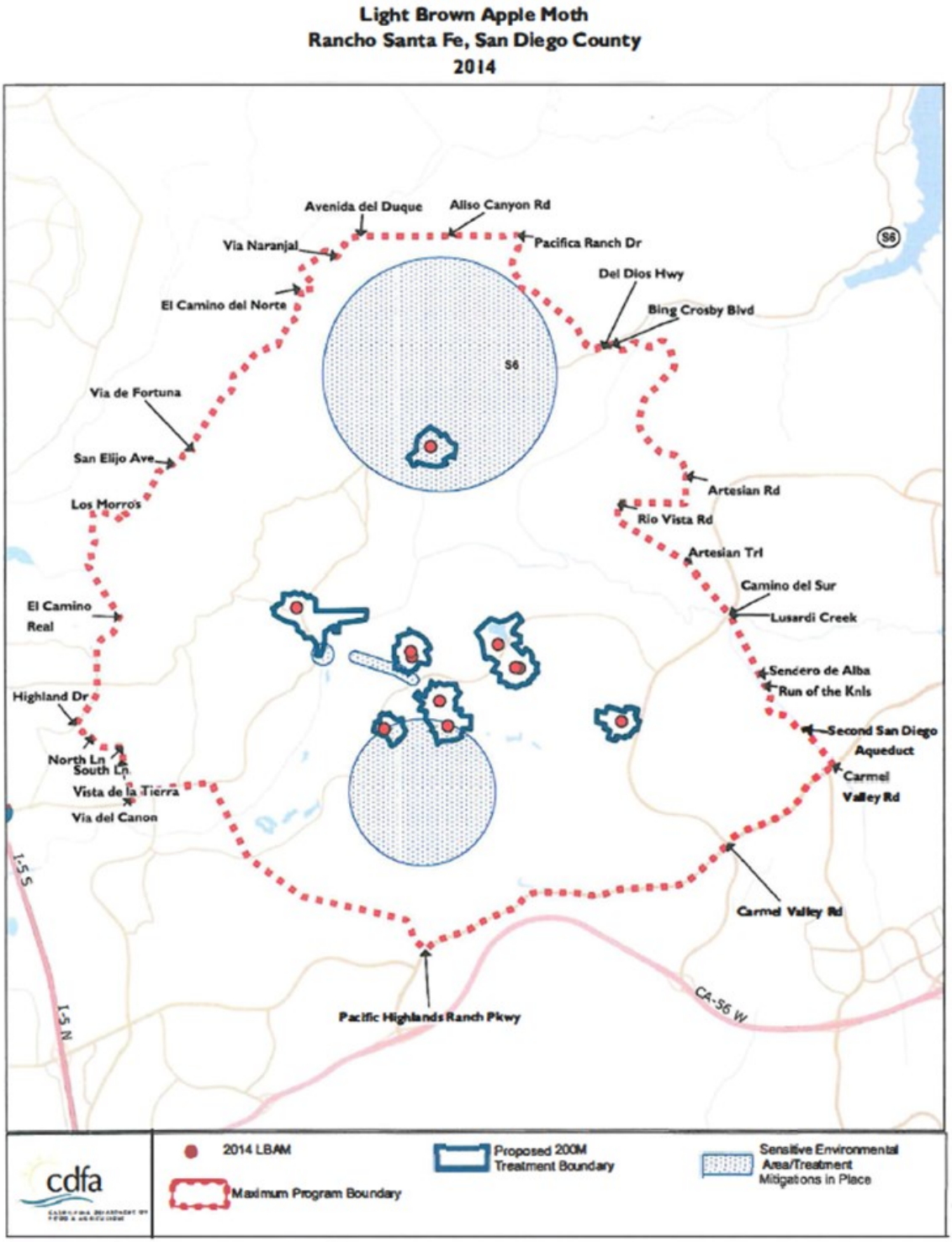

Fig. 2. New LBAM quarantine in the Rancho Santa Fe area. Much of the area is ecologically sensitive and requires special mitigation. *Source*: CDFA.

CAMPUS NEWS

submitted by **Don Merhaut and Matt Daugherty**

New weed specialist at UC Riverside

Dr. Travis Bean joined the Department of Botany and Plant Sciences at UC Riverside as Cooperative Extension Assistant Weed Science Specialist on September 1, 2014. His work focuses on (1) improving treatment efficacy and reducing unintended consequences of invasive and weedy plant control efforts, particularly from herbicides; (2) determining predictors of different phenological stages to identify opportunities for the management of weeds; and (3) creating and adapting novel technologies to improve weed monitoring efficiency and track population growth.

Dr. Travis Bean

Bean earned his B.S. in plant sciences, an M.S. in range management and a Ph.D. in natural resources from the University of Arizona. Prior to joining UC Cooperative Extension, Bean worked as a research specialist at the University of Arizona, where he coordinated regional management of the invasive buffelgrass (*Cenchrus ciliaris*) among several agencies and jurisdictions, and performed research aimed at improving chemical control. He has also designed, implemented and monitored two large-scale revegetation efforts to restore native plant communities on former agricultural lands in arid southwestern Arizona.

-Don Merhaut

Asian citrus psyllid online course

The Asian citrus psyllid and the bacterial disease that it spreads, huanglongbing, are among the most significant threats to citrus production in California. An important element of mitigating the impact of this insect and disease is minimizing human-assisted spread, which has occurred in other regions via the transportation of infested nursery plants.

Asian citrus psyllid nymphs and waxy tubules on lemon. *Photo*: Mike Lewis, UC Riverside.

UC Cooperative Extension researchers have developed an online course to provide information to retail nursery and garden center personnel that may help limit psyllid infestations in these environments and minimize their role in psyllid and disease spread. The approximately 1-hour course discusses the biology of the insect and disease, how to look for each of them, existing control strategies, and best management practices in a nursery setting. To access the course go to http://class.ucanr.edu/, click on the "Asian Citrus Psyllid & Huanglongbing for Retail Nurseries" link at the bottom of the page, and sign up for an ANR Online Learning account.

-Matt Daugherty

New Publications from Agriculture and Natural Resources

compiled by **Steve Tjosvold**

Guide and Video for Field Identification of Light Brown Apple Moth in California Nurseries

A new publication and video from UC IPM is geared to assist field inspectors and nursery scouts who need to identify suspect light brown apple moth larvae in the field. The field guide can be downloaded as a pdf document on the UC IPM website. A narrated 13-minute video can be streamed from UC IPM for training purposes. This project, involving author contributions from UC Cooperative Extension, California Department of Food and Agriculture (CDFA) and Colorado State University, was supported in part by a CDFA Specialty Crop Block Grant.

Authors: S. A. Tjosvold, N. B. Murray, M. Epstein, O. Sage, T. Gilligan
PDF and video: (under "Emerging Pests in California" and "Light Brown Apple Moth")
http://www.ipm.ucdavis.edu/PMG/selectnewpest.floriculture.html
Printed guides: contact Steve Tjosvold at satjosvold@ucdavis.edu for availability

Lace Bugs: Pest Notes for Home and Landscape

This updated Pest Note describes identification, damage symptoms, biology and management of lacebugs. Over a dozen species of lace bugs (family Tingidae) occur in California. Many of the plant hosts — including alder, ash, avocado, azalea, coyote bush, birch, ceanothus, fruit trees, photinia, poplar, sycamore, toyon, walnut and willow — are produced in nurseries.

Author: S. H. Dreistadt, E. J. Perry
Publication Number: 7428
http://www.ipm.ucdavis.edu/PDF/PESTNOTES/pnlacebugs.pdf

UCNFA PARTNERS

UCNFA News is published by the University of California Nursery and Floriculture Alliance, a statewide partnership of researchers and educators, growers, floriculture associations and allied industry.
UCNFA Directors:
Loren Oki, UC Cooperative Extension Specialist for Landscape Horticulture, UC Davis
David Fujino, Executive Director, California Center for Urban Horticulture (CCUH)
Website - http://ucanr.edu/sites/UCNFA

Managing Editor: **Steve Tjosvold**, UC Cooperative Extension Monterey & Santa Cruz counties
Co-Editor: **Julie Newman**, UC Cooperative Extension Ventura and Santa Barbara counties

Layout and Design:
Linda Dodge, Plant Sciences Dept., UC Davis
Cris Johnson, UC Cooperative Extension Ventura County

Editorial Committee:
James Bethke, UC Cooperative Extension San Diego County
Maria de la Fuente, UC Cooperative Extension Santa Clara & San Benito counties
Don Merhaut, UC Cooperative Extension Specialist for Nursery and Floriculture Crops, UC Riverside
Deborah Mathews, UC Cooperative Extension Specialist for Plant Pathology, UC Riverside
A. James Downer, UC Cooperative Extension Ventura County

To simplify information, trade names of products may have been used in this publication. No endorsement of named or illustrated products is intended, nor is criticism implied of similar products that are not mentioned or illustrated.

Banner photo on cover by Don Pace® (*Source*: UC Irvine, School of Biological Sciences, "Natural History of Orange County, California").

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 http://ucanr.edu/sites/anrstaff/files/187680.pdf.) Inquiries regarding ANR's nondiscrimination policies may be directed to Linda Marie Manton, Affirmative Action Contact, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1318. (July 2013)

Follow UCNFA on Facebook!

http://www.facebook.com/pages/University-of-California-Nursery-and-Floriculture-Alliance/172471082771255?v=wall

Get updates on events presented by the University of California Nursery and Floriculture Alliance (UCNFA).

Get timely information on news and other events of interest to the California ornamental horticulture industry.

Find links to Facebook pages for nursery and floriculture businesses, organizations and people in the industry.