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Making a Difference for California

UCNFA News

University of California Nursery and Floriculture Alliance

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Editor's note

This is the first issue provided exclusively in electronic format. We no longer can afford to provide a free printed and mailed copy. We surveyed the readership and found that most of you find electronic newsletter formats acceptable, and for those that still want the printed version, a PDF file can be downloaded from this website. The electronic format has certain advantages in that it will provide active electronic linkages to related subject matter and many more images than in the printed version.

This is also the first issue with the new UCNFA newsletter logo. We are no longer using the CORF name although it still is the same group of people that deliver educational programs and this newsletter. We are changing names to reflect the movement of the educational program to UC Davis.

This issue focuses on Integrated Pest Management. Based on our survey, we heard that the basic framework of the newsletter is sound and appreciated, so that is reflected in this newsletter. We have lead articles that provide emphasis on the theme of the newsletter. Inside are Regional Reports from the farm advisors, Science to the Grower, New Publications, and Campus News. Expect the next issue in October, 2010.

Steve Tjosvold
Managing Editor

Implementation of IPM in California bedding and container color plant production

by Christine Casey and Michael Parrella

Within the environmental horticulture industry, bedding and container color plant producers provide much of the plant material used in and around homes and offices. These plants are produced and purchased year round for their aesthetic value, with an emphasis on flower color and shape, and clean, green foliage. Given that several key pests can be expected to occur regularly on most plants in each crop, this can be a challenge (Figure 1). In addition, production of these plants in an 8 to 10-week crop cycle is typical, and most growers make their profits from quick turnovers of large numbers of plants. This leads to a low tolerance for pest injury and a perception that pesticide applications based on scouting or biological control are not appropriate. It is not unusual for there to be one to three pesticide applications made weekly during the entire crop cycle, which represents significant costs in time, labor and pesticides. Although this industry is using increasing amounts of reduced-risk pesticides, there is still considerable use of "older" materials such as diazinon, chlorpyrifos, acephate, and malathion. Reducing the use of these materials, along with preserving water quality, is a focus of state and county regulatory agencies. All of these factors suggest it may be in growers' interest to reconsider the use of integrated pest management (IPM) in bedding and color plant

Figure 1. Challenges for a bedding and container color plant IPM program include the large number of key pests, rapid plant turnover and limited tolerance for plant damage.

In This Issue:

Figure 2. Banker plants, shown here in kalanchoe, host a grass aphid that does not harm bedding plants but does serve as a food source for aphid natural enemies. This enhances aphid biological control and makes it feasible in short-term crops.

production.

To promote the adoption of IPM by this industry, under the direction of Dr. Parrella, we have formed a team of researchers, growers, extension staff and industry representatives to develop and implement bedding plant IPM demonstrations at collaborating growers' operations. Major funding for this work is from the Pest Management Alliance program of the California Department of Pesticide Regulation. Rather than a "one size fits all program," we will work with individual collaborators to design a program tailored to each operation. Success of our demonstration projects will serve as a model that other growers can adapt to their operations. Key elements of the IPM plan include pest monitoring to prioritize control measures, use of fast-acting biological control agents coupled with compatible pesticides, increased use of appropriate cultural controls and improved water management to reduce disease pressure. Our goal for the three-year project is to reduce overall pesticide use in the production of bedding and container color plants by 30%, and to reduce organophosphate, carbamate, and pyrethroid use to fewer than 15% of total insecticide applications.

Ornamental plant crops are intensively managed, which includes daily worker activity for tasks such as weeding, watering and pruning. While most employees are instructed to look for anything unusual, few are specifically trained in the details of pest monitoring. This leads to pest outbreaks or preventative applications made to greenhouses where pests do not occur. These employees are an untapped resource that growers should be taking advantage of to improve their pest management programs. We will train designated greenhouse staff members to effectively recognize and monitor for arthropod pests and the conditions that contribute to outbreaks (e.g. weeds, open doors, dripping faucets). Pocket monitoring guides, greenhouse posters, web-based IPM manuals and instructional materials will be developed and disseminated to assist with this. Funding for these materials has been provided by the Western IPM Center.

While there has been successful implementation of IPM in other ornamental crops (rose, gerbera, and poinsettias) these dealt with longer-term crops with only a few key pests. There is a perception among bedding and container color plant producers that IPM will not work because of the short crop cycle and multiple key pests. We feel that we can successfully implement IPM in this crop so long as we recognize these limitations. Previous ornamental crop IPM projects all demonstrated the effectiveness of pest monitoring and some level of reduction in pesticide use; most also incorporated biological controls (Figure 2). From this work we know that IPM can be successful in ornamentals, and many of the tactics used in these programs will be adapted for this IPM program. For example, in roses pesticide reductions for thrips control were achieved by regular removal of spent flowers and weed hosts coupled with yellow sticky card monitoring to time thrips sprays. Acaricide use was nearly eliminated by monitoring and predator release. These are approaches that can be used in bedding plants.

Despite the challenges of a large number of key pests, rapid plant turnover, and limited tolerance for plant damage, many of the tools for IPM adoption by this industry exist. The job of this Alliance will be to show growers how to put together what is already there, along with a few novel tools, into an effective IPM program.

Christine Casey is Entomologist and and Michael Parrella is Professor and Chair, Department of Entomology, UC Davis.

UC Statewide IPM Program update: Resources for ornamental growers

by Cheryl Wilen

Established in 1979, the University of California Statewide Integrated Pest Management Program (UC IPM) develops and promotes the use of integrated, ecologically sound pest management programs in California to serve agriculture, urban and community, and natural resources audiences.

The mission of the UC IPM Program is multi-faceted. We strive to increase utilization of ecologically based integrated pest management programs and provide leadership in IPM including building coalitions and partnerships that link with communities and public agencies. In addition, we seek to increase the predictability and effectiveness of pest management techniques and develop science-based pest management programs that are economically and environmentally sustainable, and socially appropriate.

We also aim to protect human health and the environment by reducing risks caused by pests and pest management practices. UC IPM is a part of the UC Division of Agriculture and Natural Resources (ANR). More than 30 employees develop and deliver programs in agricultural, urban and community, and natural resources IPM.

The UC Statewide IPM Program is often recognized for the pest management publications we coordinate based on contributions from numerous authors and technical reviewers. Integrated Pest Management for Floriculture and Nurseries (UC ANR Publication 3402) is an example of one IPM manual written specifically for the ornamental industry. These IPM manuals are only updated about every 7 to 10 years.

However, we make more frequent major updates to the online companion to the IPM manuals, the Pest Management Guidelines (PMGs), by reviewing and editing these online pages about every five years or sooner if there are new chemicals, pests or other information that may need to be added.

The most recent major update to the PMG

for floriculture and nursery growers was posted in March 2009 (http://www.ipm.ucdavis.edu/PMG/selectnewpest.floriculture.html). Nevertheless, I could see when I took a quick look at the list of herbicides that we need to update it already as a new herbicide, FreeHand (dimethenamid-P and pendimethalin), didn't make it into the list by the time it was in for final review. But that's the beauty of the way the IPM manuals and the PMGs work together.

The IPM manuals provide help in identification, prevention and monitoring while the PMGs can provide information about the rapidly changing chemical controls as well as updated IPM information. In fact, I just contacted the main office to let them know about the herbicide omission. To keep on top of changes and updates on the UC IPM website, you can sign up for a subscription notification service (RSS) at http://www.ipm.ucdavis.edu/GENERAL/rssfeeds.html.

Another thing to keep your eye out for in 2010 is an updated version of the weed gallery that will help growers better identify their weed problems and improve access to the PMGs via web-enabled phones. Also, within my own program, I often post my PowerPoint presentations when people request it and some other interesting items like an herbicide activity chart for container nurseries (see "Campus News- IPM websites available" on page 10).

Finally, the Statewide IPM Program has been without a permanent director since 2006. I am happy to announce that after an extensive search, a new director has been selected and started his job in January 2010. Dr. Kassim 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. Prior to working in Kansas, he was a professor in Washington, where he conducted research and extension in weed science for growers in the western part of the state. We are looking forward to working with him as IPM continues to be the way Californians manage pests.

Cheryl Wilen is Area IPM Advisor, UC Statewide IPM Program and UC Cooperative Extension in Southern California.

Foliar nematodes: Worms under your plant's skin

by J. Ole Becker, Antoon T. Ploeg, and Jennifer Smith Becker

Plant parasitic nematodes are small roundworms that cause tremendous economic damage in agriculture and horticulture. As their bodies are typically microscopic in size and transparent, they are difficult to detect and to identify. Most of these plant pathogens occur in soil or in subterranean plant parts. They feed on living plant tissues, influence the plant's physiology and may cause below and above ground symptoms such as root galling, lesions, stunting, wilting or chlorosis. Most of these symptoms are non-specific and can be attributed to a number of abiotic and biotic problems.

Foliar nematodes, also named bud and leaf nematodes, occur mainly within the leaves and crowns of many herbaceous perennials. Typical symptoms include localized chlorotic or purplish angular lesions that are delineated by leaf veins. The infestation usually starts at the base of the lower leaves, where humidity is highest, and spreads upward. The lesion eventually turns blackish-brown and affected parts may shrivel. If buds or young leaves are infested, they may not develop properly and may become deformed. Flower development may also be affected.

In dahlia, the necrotic lesions often disintegrate (Figure 1). Lesions on African violets appear as sunken areas between veins on the lower leaf surface that eventually extend

Figure 1. Dahlia leaf with lesions caused by foliar nematodes.

Figure 2. Foliar nematode symptoms on anemone. Note angular chlorotic and necrotic patterns. Image by Steve Tjosvold.

through the tissues to the upper epidermis. Under moist conditions, the number of leaf spots or the size of the affected area will increase; eventually the leaves will desiccate but usually will remain on the plant. It is thought that the recent increase in foliar nematode-damage occurrence may be attributed to an increase in vegetative propagation and to marketing venues such as supermarkets that lack the expertise of specialized nurseries.

Two species of foliar nematodes (*Aphelenchoides ritzemabosi* and *A. fragariae*) are mainly responsible for the described disease on ornamentals. Nematodes in the genus Aphelenchoides occur commonly throughout the world. *Aphelenchoides ritzemabosi* and *A. fragariae* prefer cool, moist conditions and are therefore more of a problem in temperate regions. In California, they occur primarily in coastal regions and in glasshouse production systems, in particular during winter and early spring. They have been reported on more than 250 plant species in nearly 50 families that include both herbaceous and woody plants. Examples of common hosts include abelia, African violet, ageratum, anemone (Figure 2), aster, astilbe, bergenia, begonia, calceolaria, chrysanthemum, coral bells, cyclamen, dahlia, delphinium, fig, foxglove, geranium, goldenrod, groundsel, hellebore, hosta, hydrangea, iris, leopard's bane, lily (Figure 3), marigolds, narcissus, peony, peperomia, phlox, pincushion flower, primrose, ranunculus, rhododendron, rudbeckia, saxifrage, snapdragon, sneezeweed, speedwell, statice, stonecrop, verbena,

Figure 3. Lily with distorted growth and chlorotic lesions due to foliar nematodes.

wallflower and zinnia. Numerous ferns are also susceptible to *A. fragariae* (Figure 4).

Adult foliar nematodes are about 0.04 inches (1 millimeter) long. Sexual reproduction is required for fertile offspring, but fertilized females can store sperm in a specialized organ to allow continued reproduction for months without additional fertilization. The females deposit 25 to 30 eggs in a compact group, and within 3 to 4 days, after the first molt inside the egg, the second stage juveniles hatch. Leaf nematode problems are usually restricted to high-humidity environments because the nematodes need a thin water-film to be present on the plant surface in order to move. The nematodes penetrate the leaf through the stomata, the pore openings in the leaf surface through which gas and water vapor exchange occurs, and move between the mesophyll cells. They feed by inserting their hypodermic syringe-like mouth stylet into cells to withdraw the contents, causing the cells to die and discolor. Large veins limit the migration within the leaf resulting in the frequently observed angular leaf spots. The nematodes mature through a series of molts to become adults. Reproduction is prolific, and they complete their life cycle under optimal conditions in 12 to 14 days. Numerous generations may occur, and leaf infestation can reach very high levels, with up to 64,000 nematodes having been found in a single infected leaf.

Soil-free propagation techniques and hygiene have greatly reduced the occurrence of foliar nematodes. Outbreaks are typically traced back to infested but asymptomatic vegetative propagation material such as rooted cuttings or seedlings. Field soil or poorly composted organic material should never be used in planting mixes unless it is treated appropriately to eliminate nematodes and other soilborne pathogens.

Although there are a few pesticides that may reduce nematode populations, we do not suggest or condone the use of these materials for control of nematodes in nursery production. The efficacy is typically very poor and the consumer is left with an infested plant that will eventually be the source for further nematode dissemination. In production nurseries there should be zero tolerance to foliar nematodes and any

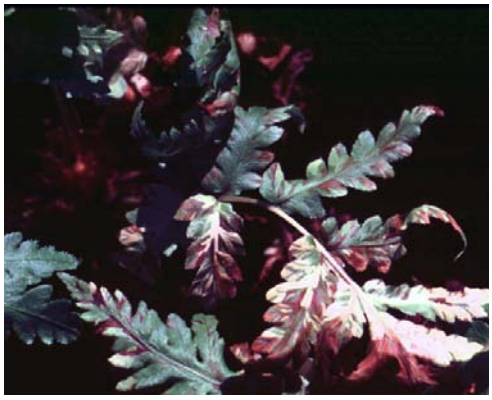

Figure 4. Fern leaves with chlorotic and necrotic lesions caused by foliar nematodes.

nematode occurrence needs to be thoroughly cleaned and disinfested. Diseased plants and old foliage should be destroyed. In slowly-drying leaf tissues, foliar nematodes are able to survive by undergoing major physiological changes. This state of so-called anhydrobiosis is characterized by a lack of detectable metabolic activity. However, the nematode is still alive and even after years of immobility can regain activity when allowed to rehydrate. Dried nematodes can easily be spread when working in a crop.

Consumers who discover diseased leaves on their house or garden plants should remove those as well as any plant debris. Crowding of plants, overhead watering or high humidity should be avoided to mitigate the risk of nematode dissemination via water films on plant surfaces.

J. Ole Becker and Antoon T. Ploeg are UC Cooperative Extension Specialists and Nematologists and Jennifer Smith Becker is Assistant Specialist, Department of Nematology, UC Riverside.

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The farm business and market place

by Laura Tourte

UC Cooperative Extension would like to announce a new website resource for agricultural operations along the Central Coast. The Farm Business and Market Place was specially designed to provide a 'one stop place' where owners and managers of small to mid-scale farms can access a wide variety of research-based information to assist with business and marketing decisions and success. Please visit the website at:

http://ucce.ucdavis.edu/farmbusinessandmarketplace

The website features information from UC, as well as links to downloadable materials from universities across the country. All of the materials were selected with Central Coast farmers, crops, and conditions in mind. Two major categories, 'Planning and Management' and 'Marketing' have a number of subcategories that contain information on, for example, business and marketing plans, budgeting, marketing channels and strategies, and conducting market research.

The website also has easy-to-access links to government agencies and offices. For example, if you want to find the Agricultural Commissioner's contact information, it is located under the main category 'Government Programs', then 'County'. If you want to find other University of California programs and services, it is located on 'Government Programs', then 'California'. There you will first see a listing of California's regulatory agencies, and, after scrolling down the page, a number of UC website links. There are a substantial number of national websites listed under the 'United States'.

We will be adding more resources to the website in the future, including online presentations for various topics under the planning and management and marketing headings. That way, you can choose to download and read any number of publications or, if you prefer, view educational programs online, at your convenience. Also planned for the future are Spanish language publications and online presentations. So please visit the website from time to time to see what is new! We welcome comments you might have about the website's content and also any suggestions for improvement. We hope you will find the website a valuable resource, as well as the 'one stop place' for your farm business and marketing needs.

Laura Tourte is Farm Advisor UC Cooperative Extension Santa Cruz, Monterey and San Benito counties. She is also the County Director for UC Cooperative Extension in Santa Cruz County.

New publications from Agriculture and Natural Resources (ANR)

-compiled by Steve Tjosvold

Field Fumigation

By Susan Cohen, Tunyalee Martin and Mary Lou Flint
Volume 9 in the Pesticide Application Compendium. This is the official study guide for the field fumigation Qualified Applicator License (QAL) and Qualified Applicator Certificate (QAC) exams conducted by the California Department of Pesticide Regulation. This publication is available for purchase as a download only, and requires Adobe® Acrobat® Reader. Publication # 9005 $5.00
http://anrcatalog.ucdavis.edu/Items/9005.aspx

Safe Application of Reclaimed Water Reuse in the Southwestern United States

by Laosheng Wu, UC Cooperative Extension Specialist for Water Management at UC Riverside, and Weiping Chen, Christine French and Andrew Chang of the UC Center for Water Resources. This free booklet covers regulatory issues, water quality and management practices, treatment strategies, applications for agriculture and case histories of systems that have been implemented in various locations. Available from the UC Division of Agriculture and Natural Resources: https://ucanr.org/freepubs/docs/8357.pdf .

New publications recently posted to the online catalog

8397 Invasive Plants and Wildfires in Southern California
http://anrcatalog.ucdavis.edu/Items/8397.aspx

8386 Recovering from Wildfire: A Guide for California's Forest Landowners
http://anrcatalog.ucdavis.edu/Items/8386.aspx

New Pest Notes

74147 Brooms http://anrcatalog.ucdavis.edu/Items/74147.aspx

74148 Palm Diseases in the Landscape
http://anrcatalog.ucdavis.edu/Items/74148.aspx

74150 Bats http://anrcatalog.ucdavis.edu/Items/74150.aspx

74149 Black Widow and Other Widow Spiders
http://anrcatalog.ucdavis.edu/Items/74149.aspx

Recently updated Pest Notes

7427 Snails and Slugs
http://anrcatalog.ucdavis.edu/InsectMiteMolluscPests/7427.aspx

7416 Carpenter Ants http://anrcatalog.ucdavis.edu/Items/7416.aspx

7425 Eucalyptus Longhorned Borers
http://anrcatalog.ucdavis.edu/Items/7425.aspx

7451 Mosquitoes http://anrcatalog.ucdavis.edu/Items/7451.aspx

7433 Gophers (Pocket Gophers)
http://anrcatalog.ucdavis.edu/Items/7433.aspx

7431 Poison Oak http://anrcatalog.ucdavis.edu/Items/7431.aspx

7445 Spotted Spurge and Other Spurges
http://anrcatalog.ucdavis.edu/Items/7445.aspx ♦

REGIONAL REPORT- UC Cooperative Extension Santa Cruz and Monterey counties

Light brown apple moth: Now what happens to integrated pest management?

by Steve Tjosvold

Light brown apple moth (LBAM) is a new invasive moth species that has been detected in 16 counties in California and is widely distributed in the landscape and wild areas in the Monterey Bay Area. It has been found on many ornamentals and on some fruit hosts. LBAM is a quarantined pest and must be destroyed if found in a commercial nursery. Usually broad- spectrum chemicals are applied over the entire infested nursery to eradicate LBAM. So, what happens to the IPM programs in these infested nurseries?

Scouting is the foundation that supports a strong IPM program. It helps find, identify and quantify disease, pest and weed populations so a grower can make intelligent pest management decisions. Usually a few pests and the minor damage they cause can be tolerated on most crops for short periods; these pests can be left for natural biological control or environmental control mechanisms. With scouting, the manager can decide when populations are heading toward levels that are not tolerable, and control strategies can be implemented. Predators and parasites can be introduced into nursery stock early enough to be effective or more specific, and less toxic insecticides can be applied when most appropriate and effective.

Usually with an invasive pest, however, the pest cannot be tolerated. If a regulatory inspector finds LBAM -- just one specimen -- it often means that all the nursery stock or the entire crop is quarantined and a specified regulatory insecticide treatment is typically applied to plants in the entire nursery. Many growers choose to use sprays that kill eggs and larvae, which usually minimizes the time that sales are placed on hold by officials. These sprays often have a broad spectrum of activity, and can kill natural or introduced parasitoids and predators that a grower is trying to maintain. This sacrifice might make sense if LBAM is actually eradicated, but the control strategy falls short for many Monterey Bay nurseries when they are surrounded by native or landscape hosts with LBAM. In these cases, moths can readily migrate back into the nursery, and the process starts all over again, jeopardizing the natural and introduced parasatoids and predators.

LBAM adult female

LBAM adult male

Growers that have established scouting programs with trained in-house personnel find that the transition to intensive scouting for LBAM becomes much easier. With some refinement of established practices and targeting for LBAM larvae or any look-alike leafrollers, these programs can be effective in finding and killing LBAM.

Regulatory officials are considering allowing a targeted insecticide application to the areas where LBAM life stages have been found. This "localized" application would be made instead of a mandatory insecticide treatment to the entire nursery. This targeted application would be triggered by an official regulatory detection, and would require that the nursery operator have an active and demonstrably successful IPM program, including scouting, in place to control leafrollers (any leafroller). The advantage of this concept is that it uses inspectors and grower- scouts to make smart and targeted treatments to areas most likely to contain LBAM. This would leave large pockets of beneficial insects that could help fight LBAM or other leafrollers if they are re-introduced. The cost to the environment and the grower's eradication costs could be significantly less than blanket pesticide applications. Follow-up regulatory inspections would determine if the treatments were effective before any plants would be shipped or sold.

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Field Observations

Gladiolus Rust

A new disease was recently discovered in Santa Cruz County -- gladiolus rust (GR), a disease that appears as orange pustules on the leaves and stems of its host. This rust mainly infects Gladiolus, but has been known to infect other members of the Iridaceae: Anomatheca, Crocosmia, Melasphaerula, Tritonia and Watsonia. It is found in Mexico and parts of Africa, Australia, Brazil, Europe and Martinique; in the United States, it has been detected in Florida and California (Alameda, Contra Costa, Marin, San Diego, San Francisco, San Mateo and Santa Clara counties).

The fungus that causes the disease, *Uromyces transversalis*, is spread by wind and movement of infected plant material. Spores can contaminate corms, but they do not infect the corms directly. There is some evidence that spores may be produced from cut flowers under favorable field conditions. While rust diseases have the potential to cause significant damage, they can be managed by early detection and timely fungicide applications. Frequent scouting for signs of rust is important for early detection. However, under the current management and eradication plan for GR, all host plants would have to be destroyed if the pathogen were to be detected in a commercial nursery.

Images and more information on this disease can be found in the USDA report, "The Gladiolus Rust (Uromyces transversalis): A National Management Plan for Exclusion and Eradication".

For a discussion on the situation in San Mateo County, see Colleen Warfield's "Regional Report," in the 2009 Winter/Spring issue of CORF News. ♦

Gladiolus rust (photo by Colleen Warfield)

REGIONAL REPORT - UC Cooperative Extension San Diego County

Integrated pest management of the aloe mite

by James Bethke

Some pests are unique and very difficult to manage, and it can be quite a challenge to develop an integrated pest management program for them. The aloe mite, *Eriophyes aloinis* (Keifer), is a good example. There is almost nothing known about this mite because it is one of the smaller Eriophyid mites (rust mites or gall mites). To see these mites it usually takes at least 60x magnification on a stereomicroscope, so studying their biology and behavior is very difficult. In addition, there are few miticides that work well on Eriophyids.

Because aloe is becoming more popular in San Diego County ornamental production facilities, we have begun studying the biology, phenology and control of the aloe mite and the susceptibility of selected aloe varieties in preparation for the development of an integrated pest management program for this pest.

There are about 500 or so varieties of aloes worldwide, and they are in ever-increasing demand due to low maintenance requirements and drought tolerance; there are more attractive varieties being developed for commercial sale all the time. In addition, with the increasing interest in promoting fire-retardant landscapes in San Diego County, aloe is recommended as one of the alternative plants to traditional landscapes. These attributes make aloes very attractive to consumers looking for alternative plants for low maintenance gardens and landscape plantings.

The aloe mite causes tumor-like growths on aloe and is commonly referred to as aloe cancer. The development of this deformed tissue makes aloe plants aesthetically unappealing and unsalable, and unfortunately, the damage is irreversible. The only curative solution is the removal of the infected plant parts, which is also necessary to prevent further spread of the mite.

In commercial aloe plantations where the plant is processed for use in medicines and cosmetics, recommended cultural practices include the removal of the affected part of the plant and the application of miticides. The yield of the plant is not greatly reduced by these practices. However, in the ornamental industry, the damage caused by the mite is

The aloe mite causes tumor-like growths on aloe leaves and the only curative solution is removal of damaged plant parts.

aesthetic and is of great economic importance. Once the plants are affected, they lose commercial value, representing a total loss for the grower.

At present, management practices lead to significant losses and to a wait and see approach to control. The basis for a good management practice against *E. aloinis* is to develop a life history of the pest and determine the actual number of mites that can cause significant damage to the plants. In addition to the alternative methods of control, it is critical to know which miticides are most effective against the pest and whether curative or preventative approaches will be the best practice.

Our goal is to provide important information required for implementing best management practices and integrated pest management strategies. Studies will include seasonal incidence, critical mite levels capable of inducing galls, and the efficacy of several miticides as curative and preventive control methods. In addition, our work will be a critical addition to the current scientific knowledge of *E. aloinis* and its relationship to aloe.

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Field Observations

Diaprepes root weevil update

You may have heard that the Diaprepes root weevil quarantine has been lifted. It is true, and oversight by the regulatory agencies already has changed significantly. Not only do the quarantine areas not exist anymore, but the insect has been downgraded to a B- rated pest, an organism of known economic importance subject to eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.

The Agricultural Commissioner in San Diego County takes B- rated pests very seriously and treats them as if they are quarantine pests. Those conditions pose a conundrum for the nursery industry because funding for eradication treatments has ended, which means that the pest can now spread at will.

However, all of the rules and protocols developed by the CDFA for the Diaprepes root weevil quarantine are still in effect if an insect is found in a nursery. That makes it pretty tough on the nursery industry. Without pesticide applications, which have a significant impact on the spread of this insect, as shown by the Diaprepes Project, we are left with releasing as many beneficial organisms as possible to reduce the threat through population reduction.

Our multistate/multiagency project has obtained funding for three more years with the following goals: (1) begin open field releases and monitoring for at least one species of parasitoid from Florida, (2) continue to study the use of parasitic nematodes in potted nursery stock against weevil larvae, and (3) develop parasite rearing techniques in quarantine at UC Riverside for release in San Diego and Orange county infestations. ♦

Diaprepes root weevil adult on citrus

REGIONAL REPORT - UC Cooperative Extension San Benito and Santa Clara counties- *Introducing Maria de la Fuente, Ph.D: UC Cooperative Extension Farm and Master Gardener Advisor, San Benito and Santa Clara counties*

I started with the University of California Cooperative Extension in 1996 as a farm advisor in Santa Clara County, conducting educational and applied research-based programs on key issues associated with commercial agricultural production. I worked with the agricultural community and other clientele groups, assisting farmers in solving their problems. I concentrated my research and extension services on the county's major agricultural commodities: mushrooms and specialty vegetable crops (Chinese vegetables, specialty mushrooms, chile peppers, garlic, etc.), as well as waste management and recycling systems. My main goal was to enhance environmentally sound crop production and pest management programs that support long-term profitability and sustainability for the environment and the growers. In 2000, nursery crops (bedding plants, indoor decorative plants, and ornamental trees and shrubs) became the number one crop in Santa Clara County. At that time (1999 to 2009) I was also responsible for administrative duties as county director for UC Cooperative Extension (UCCE), so I could not expand my work with the nursery industry.

In 2009, I was reassigned to be a farm advisor in San Benito and Santa Clara counties, serving the ornamental horticulture industry as well as mushroom growers and waste management systems in both counties.

My broad knowledge has permitted me to expand my research programs with UCCE in order to address critical concerns of primarily urban-based clientele and contribute to economic development through the Master Gardener Program that I lead in Santa Clara County. My programs emphasize environmental issues such as integrated pest management; plant, water and soil management; and green waste reduction and utilization through composting processes.

Before joining UC, I worked more than 15 years as a full professor at Monterrey Tech (Instituto Tecnológico y de Estudios Superiores de Monterrey, ITESM) in Mexico, and served as director of the Research, Development and Extension Department, providing assistance to the dean of the Division of Agriculture and Food Technology.

I received a Ph.D. with a major in plant pathology and a minor in soil microbiology from Iowa State University (ISU) in 1990. My studies focused on

UCCE Farm Advisor Dr. Maria de la Fuente serves the ornamental horticulture industry, mushroom growers and recycling and waste management interests. She has offices in Hollister and San Jose. (Photo by Nick Lovejoy, pinnaclenews.com)

biological control of plant pathogens and related courses. My Ph.D. dissertation at ISU was on the interactions of plant pathogens and their hyperparasite and antagonistic populations in natural agricultural and amended soils. I also received a Doctor in Sciences (D.Sc.) degree (1986) from Monterrey Tech with transfer credits from The Pan-American Agricultural School at El Zamorano, Honduras, majoring in plant protection. My D.Sc. dissertation involved the study of tomato plants under arbusco-vesicular endomycorrhyzae influence at laboratory and field levels.

I was awarded fellowships and scholarships from the government of The Netherlands, Monterrey Tech, the American Biotechnology Council and other organizations during my academic career. I also attended short courses abroad in The Netherlands, France, England, the United States and Honduras to expand my cultural and technical horizons.

My teaching experience includes mushroom production, plant anatomy and physiology, plant pathology, nematology, bacteriology, soil microbiology and related courses at undergraduate and graduate levels for more than 15 years. I have participated as lecturer and instructor in numerous seminars, workshops, courses for certification, and update-short courses. I have been a guest speaker at scientific symposia and conferences. As an associate professor first and then as a full professor at Monterrey Tech, I advised 15 undergraduate and 15 graduate students. I also served on 13 other graduate committees. I have published numerous popular, scientific and peer-reviewed publications.

Since joining the UC system, I have shown a vested interest and extensive knowledge in expanding continuing educational opportunities for the Hispanic agricultural workforce since I have formal teaching education and adult education knowledge and experience. I have collaborated with the Northern California Turf and Landscape Council (NCTLC), the University of California Nursery and Floriculture Alliance (UCNFA, formerly known as CORF or the California Ornamental Research Federation) and UCCE advisors in 10 counties to provide Spanish-language workshops on agricultural topics. I have also provided and developed the conceptual frameworks for two different original curricula, the "A-B-Cs of Plant Pathology" and "A-B-Cs of Disease Diagnostics," for delivery as educational workshops to English and Spanish-speaking clientele/audiences.

I have been the principal investigator in projects supported by grants from the Cooperative Research Extension and Education Service (CREES) Specialty Crops, California Department of Food and Agriculture (CDFA), Environmental Protection Agency (EPA), Western Sustainable Agriculture Research and Education (WSARE), UC Sustainable Agriculture Research and Education Program (SAREP), Elvenia Slosson Endowment, Rockwell Collins Green Communities program and many local grant institutions.

To welcome me to my new community, Hollister's newspaper, the Pinnacle, printed an article which can be found at this link: http://pinnaclenews.com/news/contentview.asp?c=260390

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SCIENCE TO THE GROWER:

Mr. Sandman, bring me a dream: Is there a place for silicon in an ornamental IPM program?

by Richard Evans

Silicon, the second-most abundant element on earth (the most abundant is Starbucks), is found in plants but is not usually found on lists of essential plant nutrients. That's because, in controlled environments, plants can be grown to maturity in the absence of silicon. Plants grown in the less-controlled conditions typical of crop production, however, may profit from the presence of silicon. Researchers have shown that increasing the silicon content of some species makes those plants more resistant to attack by insects and pathogens. This discovery has led to suggestions that agricultural products containing silicon should be included in IPM programs.

Many studies have shown benefits of silicon fertilization of cereal crops like wheat and rice, as well as for greenhouse-grown cucumbers. Unfortunately, the research status of silicon's efficacy for ornamental crops is not as clear as glass (which, by the way, is usually about 50% silicon). Some researchers have reported benefits from adding supplemental silicon. Gillman and others (2003) added potassium silicate to the potting mix for nursery-grown landscape roses to see what effect it had on development of black spot (*Diplocarpon rosae*). Daily applications at 100 to 150 parts per million slowed the rate and extent of infection, but the silicon treatment had no effect on defoliation due to black spot, and none of the plants were deemed salable at the end of the experiment. Ranger and others (2009) reported that potted zinnias treated with potassium silicate developed "modest" resistance to green peach aphid — the rate of aphid population growth was about 16% slower in the silicon treatment. These sorts of results aren't convincing, and other research adds to the doubt. Hogendorp and others (2009a; 2009b) found that adding potassium silicate did not affect citrus mealybug on coleus or fiddleleaf fig, and Moyer and others (2008) reported that potassium silicate did not control powdery mildew on gerbera.

Why the poor results on these ornamentals? There are at least a few reasons. First, the genetic makeup of monocots, and especially grasses and sedges, permits them to take up much more silicon than broadleaf plants do. Silicon is what makes many grasses tough enough to lacerate skin when we run through them. Among broadleaf ornamentals, only zinnia has been shown to rival grasses in its ability to accumulate silicon (Frantz et al., 2008). Second, many soils and potting mixes provide all the silicon a plant can use. Sand is a source of silicon, and potting mixes may gain more from "contaminants" in fertilizers, as well as from naturally-occurring silicon in irrigation water. And finally, silicon may not protect plants by making them physically tough, as was originally supposed. There is now evidence that silicon heightens the ability of some plants to initiate chemical warfare when attacked by pests. Silicon's effectiveness probably depends more on the genetic makeup of the plant than on its absolute concentration in the plant, and it doesn't start acting until the pest has attacked (Fauteux et al., 2006).

While it looks like silicon treatments won't help most ornamental crops now, things may change. Plant scientists are learning how plants control silicon uptake and transport, as well as how silicon affects the formation of chemical defenses in plants. This knowledge may enable ornamental plant breeders to develop varieties that take advantage of the benefits offered by silicon. Stay tuned.

Daily applications of potassium silicate at 100 to 150 parts per million to roses slowed the rate and extent of black spot infection, but the silicon treatment had no effect on defoliation due to the disease.

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CAMPUS NEWS AND RESEARCH UPDATES

compiled by Deborah Mathews

CAMPUS NEWS

New genomics building opens on UC Riverside campus

In September 2009, faculty members began to move into the new Genomics building on the UC Riverside campus. The 64,000 square foot building will house research laboratories of faculty from nine different departments that will address basic and applied research in the areas of plants, insects and fungi. The facility will also be the home for the Institute for Integrative Genome Biology and contains a 100-seat state-of-the-art multimedia auditorium.

Grant obtained for water management education programs

Donald Merhaut (UC Riverside) and Julie Newman, Ben Faber and Oleg Daugovish, (UC Cooperative Extension, Ventura County) received a $723,000 grant from the State Water Resources Control Board to host outreach programs to growers of nursery and floriculture crops, row crops and tree fruit crops over a three-year period. These programs, both on-site and in the classroom, will help growers develop management practices to mitigate nutrient and pesticide runoff from production facilities while maintaining a profitable agricultural economy in the Ventura County region and statewide. Donald Merhaut recently hired postdoctoral fellow Lea Corkidi, to assist with these programs.

IPM websites available

Cheryl Wilen, UC Cooperative Extension Area Integrated Pest Management Advisor for Los Angeles, Orange, and San Diego counties, has a website available dealing with general IPM issues (http://cesandiego.ucdavis.edu/Integrated_Pest_Management/) where she posts information about research related to IPM in nursery and landscapes, as well as information from meetings that she has attended, along with a link to a table containing recommendations for herbicides to control weeds (http://cesandiego.ucdavis.edu/files/67580.doc). Dr. Wilen created this table from her own experience and that of colleagues and is interested in your experiences with these and other weed control chemicals. She also maintains a blog with a variety of information from her Southern California IPM program (http://ucanr.org/blogs/South). She can be contacted directly at: cawilen@ucdavis.edu.

Deborah Mathews is UC Cooperative Extension Specialist in Plant Pathology, Department of Plant Pathology and Microbiology, UC Riverside.

UC IPM

www.ipm.ucdavis.edu

RESEARCH UPDATES

Use of capillary mats as a low-cost greenhouse runoff retention system

by Richard Evans, Julie Newman, and Emma Torbert

Even under the best management practices, greenhouse and nursery growers must contend with runoff. In a project funded by the Hansen Trust, we tested the utility of capillary mats as an inexpensive system for capturing leachate to reduce runoff. These mats are normally used for irrigation, but we wanted to use them to catch runoff before it left the production area. In effect, we employed the mats as sponges. For the mats to be effective, they must absorb excess irrigation water, then dry out between irrigations so they can accept more water. We wanted to find out three things: Could mats hold enough runoff to be useful? Would crop quality be affected? Would salinity buildup be a problem if poor quality irrigation water were used?

We grew chrysanthemums and geraniums in 6-inch pots in a greenhouse, with capillary mats beneath the pots on half of the benches, and drip-irrigated using a nutrient solution made with either deionized water or moderately salty water (EC = 1 deciSiemens per meter [dS/m]). The daily rate of evaporation from the mats between irrigations was about 60 gallons per 1000 square feet, and under typical growing conditions the mats held all of the runoff. They could accommodate a leaching fraction of 0.5, which is sufficient for salinity control even when water quality is poor. This use of capillary mats did not affect soil salinity or plant size and quality.

Basic capillary matting is available for about 20 cents per square foot, which makes this a relatively inexpensive measure for reducing runoff. Our experiments were conducted in greenhouses, but the mats should work for outdoor nursery crops as long as there is no direct capillary connection between the mat and the soil below. The lifespan of mats used in this way has not been studied, but we assume that it would be at least as long as the lifespan of capillary mats used for subirrigation of pots.

Richard Evans is a UC Cooperative Extension Specialist for Environmental Horticulture at UC Davis, Julie Newman is a UC Cooperative Extension Farm Advisor for Floriculture and Nursery Crops in Ventura County, and Emma Torbert is a Post-Graduate Fellow at the Agricultural Sustainablility Institute at UC Davis.

UCNFA educational programs for 2010 (http://groups.ucanr.org/UCNFA)

Nursery Risk Management Webinar
Date: August 10, 2010 (Tuesday)
Location: Internet
Presenters: Trent Teegerstrom, Ursula Schuch, Stuart Nakamoto
Program: 10:00 am – 12:00 pm (Pacific Time)
Follow-up to June workshop, demonstrate nursery cost estimator

ABCs of Insect Management Spanish and English
Date: August 24, 2010 (Tuesday)
Location: Ag Building Auditorium, Tulare
Organizers: Michelle LeStrange, Karen Robb, Maria de la Fuente
Program: Morning English- Karen Robb, Afternoon Spanish- Maria de la Fuente

ABCs of Insect Management Spanish and English
Date: August 26, 2010 (Thursday)
Location: CE Auditorium Watsonville CA
Organizers: Karen Robb, Steve Tjosvold, Maria de la Fuente
Program: Morning English- Karen Robb, Afternoon Spanish- Maria de la Fuente

Greenhouse Management Workshop
Date: August 31, 2010
Location: Bowley Center, UC Davis
Presenter: Heiner Lieth
Program: all day, presentations, light/shade supplementary topic, tour of UC greenhouses

Greenhouse Management Workshop
Date: September 2, 2010
Location: CfAHR, Vista
Presenter: Heiner Lieth
Program: all day, presentations, irrigation supplementary topic, tour of local greenhouses

California Nursery and Floriculture Pest and Disease Management Symposium
Date: Oct. 28, 2010 (Thursday)
Location: Elks Lodge Watsonville CA
Organizers: Steve Tjosvold, Deb Mathews
Program: all day, presentations and trade show

ABCs of Fertilizer Management in Spanish and English
Date: TBA November 2010
Location: TBA Ventura County
Organizers: Don Merhaut, Julie Newman
Program: Morning English- Don Merhaut, Afternoon Spanish- Maria de la Fuente

ABCs of Fertilizer Management in Spanish and English
Date: TBA November 2010
Location: CfAHR, Vista
Organizers: Don Merhaut, Julie Newman?
Program: Morning English- Don Merhaut, Afternoon Spanish- Maria de la Fuente

Insect Biocontrol Symposium
Date: Dec. 16, 2010 (Thursday) following ESA Annual Meeting (www.entsoc.org)
Location: TBA San Diego
Organizers: Michael Parrella, Jim Bethke
Program: all day; morning- invited speakers, afternoon- hands on specimen ID

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