

# CORF News

## California Ornamental Research Federation

Vol. 3, Issue 1

Winter 1999

### Field "Quick Tests" for Soil and Plant Nitrogen Analysis in Flower Crops

By Steve Tjosvold, Farm Advisor UCCE, Kurt F. Schulbach, Irrigation Farm Advisor, UCCE and Timothy K. Hartz, Vegetable Crop Specialist, UC Davis

Laboratory analysis of soil and plant tissue has been, and remains, the standard method of determining soil and crop nitrogen status. However, these techniques have significant costs and a time lag between sampling and getting useable results to the grower. On-farm, soil and plant tissue "quick tests" for nitrogen analysis have been developed in the last several years for use with vegetable crops in coastal California.

The tissue quick test involves the measurement of the nitrate content of fresh petiole ("leaf stalk") sap by a portable, commercially available, nitrate-selective

electrode (Cardy® meter). The soil quick test involves the extraction of nitrate through a simple volumetric dilution method, with nitrate concentration measured by colorimetric test papers (EM Quant® nitrate test strip), as you would, for example, measuring acidity with pH paper. A soil quick test takes just a few minutes and the cost is as little as 39 cents a test. A tissue petiole test takes just minutes and the cost is around 26 cents per sample.

In 1998, the suitability of the nitrogen quick tests for monitoring soil and plant-tissue nitrogen status was

*See Quick Soil Tests - Page 9*

### Postharvest Management

#### The Admirable Asters

By Dr. Michael Reid & Linda Dodge  
UC Davis Environmental Horticulture

Asters, members of the daisy family, are diverse in form and color, and have recently increased in their importance in the cut flower trade. The showy asters, particularly the multi-colored china asters, have long been important field flowers, and although they are much less widely grown and used than formerly, they are still an important cut flower crop. Smaller asters and michaelmas daisies are increasingly available for use as dainty fillers in an attractive range of colors.

#### China aster (*Callistephus chinensis*)

The annual China aster is usually field-grown and daylength can be regulated

*See Asters - Page 8*

### Ron Enomoto: Floriculture Hall of Fame Inductee

by Dr. Ann King, Farm Advisor UCCE

Ron Enomoto, of Enomoto Roses, was inducted into the 1998 California Floriculture Hall of Fame in December. The Floriculture Hall of Fame, sponsored by the Kee Kitayama Research Foundation and the California Ornamental Research Federation (CORF), was established in 1986 to recognize outstanding achievement and contributions to the floral industry in California, in the areas of production, transportation, marketing, research, and legislative activity.

Ron received a B.A. degree from UC Davis, then joined his family's rose business which was expanding into Half Moon Bay. Ron has held many leadership roles in the floriculture in-

dustry - he served on the Board of Directors of the California Floral Council for 20 years; the California Flower Market Board for 18 years; and the California Ornamental Education Foundation for three years. He was instrumental in starting the California Cut Flower Commission, and he served as its first chairman.

Ron was also instrumental in forming the Kee Kitayama Research Foundation and he served as its chairman and board member. Ron also served as a University of California Regent, and has been strongly supportive of University of California research and education programs.

Ron and Nancy Enomoto closed their business in 1997 after 50 years as a family business. Ron is currently Interim Director of the U.C. Santa Cruz Arboretum. We hope that Ron and Nancy remain close to the floriculture industry.

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## New Publications

Dr. Ann King, Farm Advisor, UCCE

**Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide, 2nd edition**, by Dr. M.L. Flint. This popular University of California publication has been updated and is a worthy addition to any flower-growing operation. Publ. #3332, 1998, \$35; order from ANR Publications, (800) 994-8849.

**Publications Catalog: Publications, Videos, Slide Sets.** UC's new publication catalog for 1999-2000 is now available. Catalogs are free and are available at your local Cooperative Extension office or from the publications office at (800) 994-8849.

**Growing Flowers for Market**, by Mike Madison. The book covers a wide range of minor crops and would be useful to novice growers. It can be ordered from Yolo Press, 6446 Putah Creek Lane, Winters, CA 95694; cost \$19.95.

## CORF Grower Education Programs

The CORF Program Planning Committee has announced its calendar of education and training programs, grower tours and research demonstrations. Since 1995 University of California personnel, in cooperation with regional and state floricultural associations, have conducted these valuable and unique education programs throughout the state in major floriculture growing regions. The programs have become a way for growers to supplement their in-house training programs as well as become informed about new technology and approaches to meeting the challenges inherent in farming. The 1999 programs reflect a diversity of grower's concerns. CDPR PCA credit will be offered for all appropriate programs.

### Disease Diagnostic IPM Workshops

In response to popular demand, this year's bilingual IPM diagnostic workshops will focus on diseases. Offered in both English and

Spanish, the first part of each workshop is held "classroom style" and participants learn the basics of disease identification, lifecycles and monitoring techniques. The second part of the workshop is hands-on diagnosis of diseased plant material with demonstrations pertaining to general plant pathology, damage monitoring and sampling strategies, record keeping and resources. Participants will receive field reference materials they can use in their own growing operations.

The concluding discussion will be prevention and control measures. Each workshop is 4.0 hours long. English sessions will be conducted in the morning 8am - 12pm, Spanish sessions in the afternoon, 12:30 - 4:30pm.

CARPINTERIA: March 9

WATSONVILLE: March 11

See Programs - Page 10

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## Field Observations

### Aster Yellows in Various Field Flowers

Aster Yellows disease has hit hard at a small field flower nursery in the Watsonville area. Several of their major crops, *Helichrysum* (the annual), *Consolida* (larkspur), *Delphinium*, and *Cosmos* became infected and produced many non-saleable flowers. In general, aster yellows affects plants by causing a general yellowing (chlorosis) and dwarfing of the plant, abnormal production of shoots, sterility of flowers, and malformations. The most striking symptoms occur in some flower crops, such as annual statice. In its most recognizable stage, infected statice has a bizarre proliferation of almost unrecognizable "flowering" shoots; shoots may exhibit mild to extreme yellowing and sterility.

The pathogen that causes aster yellows is a mycoplasma-like organism. The pathogen is larger than a virus and smaller than a bacteria and has a unique life cycle. Infection is similar to some viruses in that it is acquired from an infected host by an insect, in this case leafhoppers, and transmitted to healthy host plants when the leafhopper feeds on them. This pathogen is capable of infecting many vegetables, ornamentals and weeds belonging to at least 40 families. Sometimes infection remains undetected because the host may be a symptomless carrier.

Eradication of perennial or biennial weed hosts from the field, roadways, and fences and avoidance of planting a susceptible crop next to a crop harboring the pathogen, help eliminate a large source of the pathogen. Controlling leafhoppers early in the season helps reduce transmission of the pathogen. There are no practical chemical controls of the pathogen.

## Regional Report

### Santa Cruz & Monterey Counties

#### Reduced-risk and Biorational Fungicides Tested for Powdery Mildew Control on Roses



Presently, the cut rose industry has been operating under the only EPA exemption to allow re-entry within a pesticide re-entry interval. Cut roses are harvested twice a day and many pesticide re-entry intervals would preclude proper harvesting and result in a lost crop. The EPA is allowing this exemption with strict reentry requirements and an industry effort to develop pest management programs that would eliminate or minimize the need for the special exemption.

Fungicides used for powdery mildew may account for a large portion (40% or more) of the pesticide volume applied to rose crops. Reduced risk pesticides, as defined by the EPA, and other biorational pesticides tend to have minimum re-entry intervals (many are 4 hours) and thus are good candidates for use by the rose industry to minimize or eliminate the need for a special exemption.

The objective of the research project I recently completed with Steve Koike, a plant pathologist at UCCE in Salinas, was to evaluate various registered and experimental "reduced-risk" or biorational fungicides for control of powdery mildew, *Sphaerotheca pannosa*, on greenhouse roses. The fungicide products that were tested contained active compounds of many unique chemistries: a compound related to baking soda (Kaligreen), a mineral oil (Sunspray Ultrafine), an oil from the neem tree (Trilogy), fungicidal compounds synthesized from a mushroom (Heritage and Cygnus), a fungus (AQ-10), and plant "disease-resistance stimulators" (Sepro SP5100 and Elexa). All of these compounds are relatively safe to the environment and have low mammalian toxicity so they are categorized officially as reduced risk fungicides or unofficially as "biorational" fungicides.

The tested fungicides use unique modes of action to control powdery mildew. The

oils (Trilogy and Sunspray Ultrafine) and bicarbonate salt (Kaligreen) fungicides primarily work by covering rose leaves with a protective layer that prevent infection by the powdery mildew fungus. The oils can also disrupt the fungal body (mycelium) and may kill the fungus growing on the leaf surfaces. The strobilurine fungicides (Heritage and Cygnus) are chemically similar to a naturally occurring fungicidal chemical that was discovered in a mushroom in the genus *Strobolurus*. AQ-10, is a preparation of the living fungus *Ampelomyces quisqualis*. This fungus naturally infects the powdery mildew fungus-causing a disease of the powdery mildew fungus.

Research on the plant resistance stimulators has been conducted for years, but only now are we seeing the fruits of that research resulting in various compounds soon to be commercialized. Here's how they work: Plants have some level of natural defense mechanisms to "fight off" infection, and there is a group of chemicals that stimulate this resistance mechanism to turn on. This mechanism is commonly referred to as systemic activated resistance. Interestingly, some of these compounds (not necessarily the ones we tested), in addition to promoting resistance to fungal diseases, may also impart resistance to virus diseases or even certain insect feeding.

The research showed that all these novel compounds could be used effectively, to some extent, to control powdery mildew. The details can be found in a written report that can be obtained by contacting me.

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## Regional Report

### San Diego County

#### Red Imported Fire Ants Found in California



Red Imported Fire Ants (RIFA) have recently been found in the San Joaquin Valley, Eastern Riverside County and

most extensively in Southern Orange County. Unless eradication measures are implemented quickly and any new finds reported and treated promptly, this serious pest could become established in all parts of California except the driest deserts and the coldest mountain areas.

This pest is currently established in 11 southeastern states. In Texas alone, RIFA is estimated to cause more than \$300 million annually in damage to crops, animals and people. Texas currently spends approximately \$2.5 million per year in its efforts to manage the RIFA infestations.

RIFA infests residential yards and gardens, agricultural fields and pastures, electrical control boxes and utility housings. They threaten resting wildlife and newborn animals. During hot and dry weather, RIFA invades homes in search of food and moisture. They pose a threat to sleeping and bed-ridden individuals and pets. RIFA has changed the way people live outdoors. For example, no one in RIFA infested areas goes barefoot outdoors.

Nurseries infested with RIFA or in RIFA areas are under quarantine. These nurseries are applying pesticides to every pot on the nursery and every pot must be inspected before it can be shipped. This is a serious economic problem.

The average colony contains 100,000 to 500,000 workers and up to several hundred winged ants and queens. Queen ants can live seven years or more, while worker ants (sterile females) usually only live about five weeks.

RIFA mounds can reach 18 inches in height, depending on soil type. Although almost any soil will suffice, RIFA prefer open, sunny areas such as pastures, parks, lawns, meadows and cultivated fields. Rotting logs, areas around stumps and trees are also frequently utilized. Colonies can

also be found in or under buildings.

The biting and stinging behavior of RIFA is generally a defensive reaction, protecting food, water or nesting sites. When a mound is disturbed, large numbers of worker ants come to the mound surface to defend the colony. A person or animal can rapidly become covered with RIFA.

The ant attaches itself with its jaws, rotates its body and stings the victim repeatedly. Venom is injected with each sting. A single ant typically stings a victim 7-8 times in this circular pattern.

The victim first experiences intense burning and itching at the sting site; this usually subsides within 1 hour. A small blister forms at the sting site within the next 4 hours. A white pustule forms in the next day or so. Treatment is aimed at preventing secondary bacterial infections, which can occur if the pustule is scratched or broken.

Although not usually life-threatening, stings are easily infected and can leave permanent scars. On rare occasions, anaphylactic shock can occur and may be life-threatening. Seek immediate emergency medical assistance if the following symptoms occur: flushing; general hives; swelling of the face, eyes or throat; chest pains; nausea; severe sweating; loss of breath; serious swelling; or slurred speech.

If stung, elevate the extremity and apply ice or a cold compress to reduce swelling and relieve pain. Clean blisters with soap and water to prevent secondary infections. Do not break the blister. Topical steroid ointments or oral antihistamines may relieve the itching.

For more information, see the web site: [www.cdffa.ca.gov](http://www.cdffa.ca.gov)

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## Field Observations

### Chrysanthemum White Rust Alert

There were two additional finds of Chrysanthemum White Rust in December 1999. Since then, CDFA has found white rust on cut mums being sold in the county as well as well as on nursery material. The weather is currently very conducive to chrysanthemum white rust. All mum growers should incorporate preventative measures now, if they haven't already.

### Preventative Treatment:

Myclobutanil (Systhane) is registered for control of this rust as an eradicant. At least 5 weekly applications are required if white rust is present. However, it is not a good idea to continue to apply Systhane weekly indefinitely, as it has been associated with plant growth regulator effects. Dithane and Daconil can be used as preventative treatments.

As long as we are experiencing cool, cloudy weather and rust is in the county:

For all new cuttings: It is a good idea to dip all cuttings in Systhane prior to planting. Follow this with at least two applications of Systhane. If you are growing potted mums, you may want to include two additional applications when the plants are moved out of propagation and mist.

For all established plantings: Treat the crop with 3 weekly applications of Systhane to control any white rust that might be present. For new plantings, this means the 3 treatments of Systhane to the cuttings and newly planted material described above.

After the 3 weekly applications of Systhane, rotate between Dithane, then Daconil, then Systhane for your weekly preventative application until we no longer have conditions conducive to the disease.

If you see any plants showing these symptoms, please report it to the County Agricultural Commissioner's Office so that eradication measures can be initiated.

## Nursery Plants Which Can Cause Dermatitis

Agave  
Alstroemeria  
Anemone  
Anthurium  
Aster  
Bulbs (many, including clivia, crinum, daffodil, galanthus, hymenocallis, hyacinth, iris, leucojum, lily, narcissus, nerine, tulip)  
Calla lily  
Carnation  
Chrysanthemum  
Cineraria  
Cyclamen  
Dahlia  
Daisies  
Dieffenbachia  
Euphorbia spp.  
Ficus (fig) family  
Foxglove  
Gladiolus  
Hyacinth  
Hydrangea  
Ivy (Hedera spp.)  
Oleander  
Orchids  
Philodendron  
Poinsettia  
Poppy  
Primrose family  
Ranunculus  
Schefflera  
Yarrow

## Pesticides Which Can Cause Dermatitis

Chlorothalonil  
Dicofol  
Dithane  
Glyphosate  
Malathion  
Sulfur  
Triazine

# Regional Report

## San Mateo & San Francisco Counties

### Spring Crops Mean Dermatitis



When greenhouse or field workers develop skin rashes, they are often quick to blame pesticides for causing

the problem. Often, though, it is the plants that are causing dermatitis. Workers who handle cut plant material (propagators, flower cutters, packers, etc.) usually encounter the worst problems, but anyone handling plants can develop dermatitis.

There are three primary causes or types of plant-induced dermatitis:

**Primary Irritant Dermatitis** - direct irritation by contact with chemicals in plants. Rashes tend to appear quickly. Bulb crops like tulip, narcissus, and alstroemeria are known for this, as are primroses.

**Allergic Contact Dermatitis** - skin become sensitized to the chemical, and an allergic reaction occurs, such as with poison oak. This type of dermatitis may occur after the first exposure to the plant, or it may take years of handling the plants before an allergy develops.

**Photosensitive Dermatitis** - the plant chemical gets on the skin and the sun then causes irritation to that area (a red, blistering rash). Ficus plants are known for this.

In addition to dermatitis from the plants, workers can get eczema on their hands and arms from frequent washing and drying and weather irritation. Of course, workers can also get skin irritation from pesticides (some fungicides are known to be allergenic). On top of that, workers can get infections from punctures, such as with cacti or rose plants.

**Prevention.** To prevent dermatitis and eczema, workers with sensitive skin should wear gloves and protective long

sleeves. Leather or cotton gloves can give adequate protection, but if you need dexterity (such as propagators), then thin surgical gloves can provide protection. If skin is exposed to the chemicals, it should be washed thoroughly with soap, as soon as possible.

**Train your employees.** Workers who develop dermatitis may always have problems with certain plants. Teach them which plants are notorious for causing dermatitis, and teach them that if they suspect a sensitivity, they should start to wear gloves routinely. Be aware that some people are allergic to some plants, while others in the same business may be allergic to different plants.

Which plants cause dermatitis? The list of plants which can cause dermatitis is too extensive to list here. The most notorious plants in the floriculture industry are listed in the adjacent column. For a more complete list, see the web site <http://envhort.ucdavis.edu/ce/king/>

The book, *Poisonous Plants of California* (T.C. Fuller and E McClintock; University of California Press) also has a good list of dermatitis-causing plants.

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## Regional Report

### Ventura & Santa Barbara Counties



**Freeze Damage**  
Overall losses to the freeze last month were relatively minor for growers of outdoor flower and nursery crops in

Ventura and Santa Barbara Counties. Some nurseries, however, such as Skyline Flowers (with fields in the Santa Rosa Valley and Santa Maria) and Glad-A-Way Gardens (in Santa Maria) suffered substantial damage.

#### Giant Whitefly

Giant Whitefly was reported in Ventura County. Dr. Tom Bellows at UC Riverside collected and reared parasitoids for use in biological control of this pest. He is working with Farm Advisor Jim Downer, in our office, to release the parasitoid *Encarsiella noyesii* in Ventura and Santa Barbara Counties. For details on Giant Whitefly, see CORF News Vol 1 (1) and Vol 2(2).

#### Crop Reports

The Ventura County 1997 Crop Report was recently released, marking an all time County high in gross revenues for agriculture. The ornamental industry was valued at \$138,808,000, up 10.6% from 1996. Santa Barbara County also cited higher 1997 gross revenues last spring. The value of nursery products and flower seed was \$139,468,860, an increase of 12.3% from 1996.

#### Lompoc Scouting Program Results

Projects at scouting demonstration sites in Lompoc were completed, conducted with a grant from the California Department of Pesticide Regulations. Sites included a field of stock and a research greenhouse facility for flower seed production. In this report, I will discuss the stock IPM program. The program in the research greenhouse will be presented in the next issue of CORF News.

In the stock program, a biological control program was used at Jay Fisher Farms. *Trichogramma* parasitic wasps were released for control of diamond back moth and lacewing larvae were released for aphids. A weekly monitoring program was used to determine which beneficial insects to release, their rates and effectiveness. The demonstration took place over 4 months. Data collected in the field was compared with another field, used as the control, over a 2-month period. In the control field, pests were managed with insecticides, based on Jay's routine walks through his fields. Our project demonstrated a pesticide use reduction of 71% per acre per month, as compared to the control field. This resulted in an overall pest management cost reduction of 16%, even with the higher monitoring costs and the cost of weekly releases of beneficial insects. Jay was very happy with the quality of flowers produced. He reported additional economic benefits since the beneficial insects reproduced and spread to adjacent fields.

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## Field Observations

### New Pests & Diseases

**Downy Mildew.** Now is the time to watch for downy mildew (DM), a disease favored by cool temperatures, high humidity, and leaf wetness. Last year field growers reported devastating losses following heavy El Nino rain. Fog and dew also increase disease incidence because the fungal spores require moisture to germinate. The name DM refers to the fuzzy white to purplish-brown fungal growth. This growth, unlike powdery mildew, is typically on leaf undersides, so perhaps the disease would more aptly be named "down mildew." Discolored areas are sometimes visible on upper surfaces, and plant growth may be distorted in systemic infections. DM is particularly troublesome on snapdragons, roses, pansies, alyssum, and salvia. The fungi that cause DM are host specific; i.e. the DM that occurs on roses cannot infect snapdragons, etc. To manage DM, know the susceptible crops and their disease symptoms. Scout frequently to ensure timely treatment. Rogue diseased plants immediately and carefully because spores are airborne. Treatment is warranted before you see DM if you grow a susceptible crop with a disease history, and conditions are wet. Symptoms can be prevented in the greenhouse by heating and reducing humidity. Fungicides such as Dithane T/O, Protect T/O and Aliette are registered and provide disease protection. Dr. Ann Chase, of Chase Research Gardens, reports good to excellent control in California with Phyton 27, Protect T/O, Aliette (she recommends using the low rate to prevent resistance), Subdue MAXX (only labeled as a drench), and Heritage (see S. Tjosvold's Regional Report). New reduced-risk fungicides may be coming soon. Novartis, for example, is evaluating Actigard, a plant resistance stimulator; COMPASS (on turf), a strobilurine fungicide, may be labeled for ornamentals this year.



## Asters

*Continued from Page 1*

with artificial lights to extend the flowering season. Stems are harvested when flowers are partially open and graded into bunches of twelve based on standard quality attributes of stem length, foliage quality and uniformity.

The vase life of untreated asters is usually terminated by leaf wilting and flower neck droop. A short pulse (10 seconds) in 1000 ppm silver nitrate increases the vase life by 5 days. Asters pretreated with silver nitrate can be stored for up to a week at 33-35°F (1°C). There has been no study of longer storage times nor of the possibility of bud storage of these flowers.

**Filler asters.** Small-flowered aster varieties are increasing in popularity as fillers for arrangements and bouquets. Aster ericoides, commonly known as the heath aster or winter frost aster, is available in several cultivars of different colors including 'Blue Wonder' and the white 'Monte Casino'. These varieties produce long, multi-branched stems with many small

daisy-like flowers and lots of needle-like foliage. Another popular filler aster is actually a hybrid between Aster ptarmicoides (the pearly aster) and a unknown species of Solidago (yes, that's goldenrod) and produces many-branched stems of cheerful tiny yellow flowers and slender green leaves. Solidaster, as it is known, is reported to have originated in 1910 at a nursery in Lyon, France.

These asters are available primarily from April through November. The ericoides types are harvested when one-fourth to one-third of the flowers on the stem are open and stem length varies from 12-24 inches. Asters should be put in water immediately after harvest and shipping in water is best when possible as they easily become water-stressed. The biggest postharvest problem is bacterial plugging of the stems: a good vase preservative or 1/8 teaspoon of Clorox per gallon of water should solve this problem. Certainly pretreatment with commercial preserva-

tives can enhance bud opening and retain flower color. We have not yet tested the use of silver nitrate with the filler asters.

**Aster nova-belgii and Hybrids.** The perennial New York aster or Michaelmas daisy is a favorite for summer bouquets. Hybrids and cultivars are numerous and the color range is extensive, from 'White Lady' and 'Blue Gown' to 'Crimson Brocade' and 'Royal Velvet' (purple). Plant height ranges from 3-4 feet and flower diameter from 1-2 inches.

Stems are harvested when flowers begin to open and stem length varies from 12-36 inches. Stems should be placed in water immediately and a biocide should be used to keep bacteria in check. Cold storage is possible at a recommended temperature of 36-41°F but should be for no longer than a few days.

Vase life for the nova-belgii type asters is 7-14 days. The longer vase life is facilitated by use of a biocide such as bleach at 1/8 teaspoon per gallon.

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## Quick Soil Tests

Continued from page 1

ated in field and greenhouse cut flowers. Results indicate that these analytical techniques can be used effectively in many of California's cut flower crops and soil conditions. Examples are given in Figure 1 and 2 that compare the conventional (laboratory) tests and quick tests when used to monitor nitrogen status in greenhouse-grown Gerbera.

laboratory and "quick test" analytical techniques. Soil tests are used to determine levels of nitrogen that would be readily available for uptake by a plant's roots. In commercial vegetable production, nitrate nitrogen levels at 10 ppm or below are insufficient and levels above 20 ppm are sufficient to meet immediate crop needs. It is expected that many cut flower crops would also have similar sufficiency levels.

Figure 2. Demonstrates relationship of measured nitrate-nitrogen in the petiole sap using conventional laboratory and "Cardy quick test" analytical techniques. Note that the nitrate concentration of the lab tissue is approximately 3 to 4 times that of the Cardy meter measured concentration. The lab measurement must be based on dry

weight of the plant tissue and the Cardy meter measurement is based on the liquid tissue sap. Therefore the laboratory analyzed tissue, relatively, has more concentrated nitrate nitrogen. Don't let this confuse the issue. A grower using the Cardy meter would be interested primarily in the rise and fall of the concentration of tissue sap to help determine sufficiency levels. A large decrease in sap nitrate concentration can indicate, before visual symptoms appear, that nitrogen deficiency will soon occur. Currently, sufficiency levels using these tissue sap techniques have not been determined in most ornamental crops. Practical sufficiency levels could be determined for many flower crops by correlating nitrogen concentration data with observations of crop production and quality.

In our survey of ornamental nurseries, we found that the soil nitrogen levels in greenhouse-grown crops were consistently very high. Nitrogen levels in field flower crops were quite variable; most notably, some field flower crops were even found with no readily available soil nitrogen. Flower crops may benefit greatly with nitrogen monitoring, particularly to eliminate nitrogen deficiencies that could adversely affect the crop. It is expected that integrating the soil and tissue test results would be most beneficial to determine the nitrogen needs of the crop. This project will continue in 1999, in part, to de

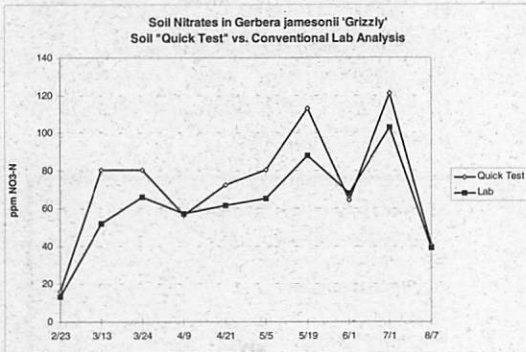


Figure 1. Demonstrates a very close relationship of measured nitrate-nitrogen soil analysis using conventional

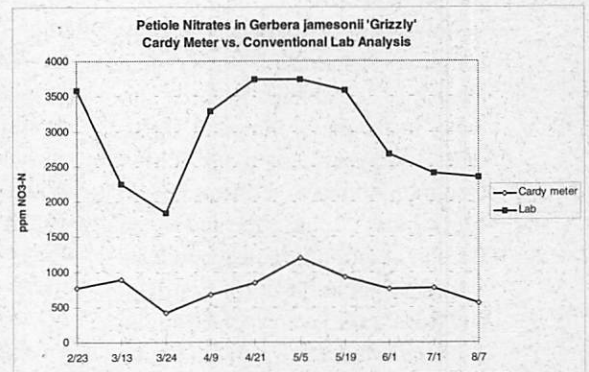


Figure 2. Demonstrates relationship of measured nitrate-nitrogen in the petiole sap using conventional laboratory and "Cardy quick test" analytical techniques. Note that the nitrate concentration of the lab tissue is approximately 3 to 4 times that of the Cardy meter measured concentration. The lab measurement must be based on dry

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See Quick Soil Tests - Page 12

## Campus News

Submitted by Julie Newman, Farm Advisor UCCE

### UC DAVIS

**Scholarships Awarded:** The California Association of Nurserymen awarded scholarships to three students in the Environmental Horticulture Department for 1998/99. Congratulations to Colleen (Bear) McGuinness, Jonas Moe and Loren Oki. In addition, graduate students Carmen Garcia-Navarro, Soo Kim and Rosa Valle each received a John & Terry Kubota Scholarship for the coming school year. This scholarship was established in 1984 by Yoneo John Kubota, a retired staff research associate whose research interests included flower crop production in greenhouses.

**Postharvest Outreach Program:** The Postharvest Outreach Program at UC Davis has provided educational and informational services for 20 years. One of the program's most popular offerings is the annual two-week international short course on

postharvest technology of horticultural crops. The program also offers workshops throughout the state on topics that include postharvest handling of ornamentals. The program's 13 extension specialists provide industry meetings and individual consultations. In addition, a quarterly newsletter—Perishables Handling—reports research in progress and offers reviews on postharvest technology topics. To learn about additional resources, view their website <http://postharvest.ucdavis.edu> or call (530)752-6941.

### A Word of Gratitude . . .

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### Programs

*Continued from page 2*

#### Irrigation Management Training

Designed for growers who are ready to fine-tune their irrigation practices, this workshop will focus on helping the grower evaluate and improve their irrigation system distribution and efficiency, maximize their water utilization and reduce runoff. Included in the discussion will be using tensiometers for monitoring soil moisture. 11am - 4:30pm.

UC SOUTH COAST EXTENSION CENTER, IRVINE: April 27

For information and registration contact the CORF office, 707-462-3435 or fax 707-463-6699.

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## Marigolds Control Root-Knot Nematodes

by Dr. Antoon Ploeg, Dept. of Nematology, UC Riverside

Root-knot nematodes (*Meloidogyne* species) are the most damaging nematodes in ornamental crops. Effected plants are less vigorous, more vulnerable to drought and other stress factors, and exhibit general poor growth. Nematode-resistant cultivars and rootstocks are limited. Soil fumigation is effective, but current restrictions on the use of several nematicides call for other control strategies. We are studying the potential of marigolds to control root-knot nematodes. Ornamental crops with reported success include lilies and roses. In greenhouse experiments we initially screened a range of marigold species and cultivars against four root-knot nematode species. Our study showed that while some marigold varieties were highly effective, others actually increased nematode populations, thus demonstrating the importance of using specific varieties. In a field trial at the South Coast Research & Extension Center, two marigold varieties with demonstrated efficacy were compared with fallow soil and with

soil fumigation. Data collected at harvest of susceptible tomatoes planted over all treatments showed that both marigold varieties gave similar tomato yields to the fumigated plots and increased yields compared to the fallow treatments. One marigold variety also reduced galling and nematode-infestation of the tomatoes, and was not significantly different from the fumigated treatment. The results show that marigolds may have a potential for controlling root-knot nematodes in susceptible crops. We are currently studying the efficacy of marigold use in roses.

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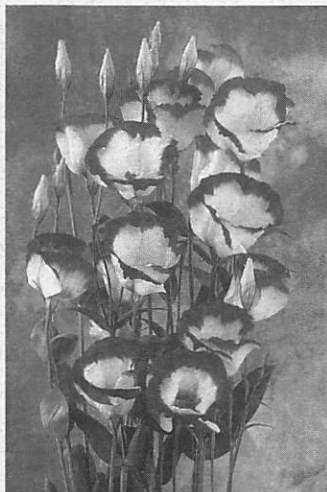
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# CORF



Floriculture education from the Kee Kitayama Research Foundation

*CORF News* is the quarterly publication of CORF, the California Ornamental Research Federation, a statewide partnership of growers, floriculture associations, allied industry and research/educators whose mission is to identify and meet the research and educational needs of the California floriculture industry.

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## Quick Soil Tests

*Continued from Page 9*

evalutermine nitrogen sufficiency levels for field cut flowers.

One potential drawback with the quick tests relates to their specificity to detecting just nitrate nitrogen. If the primary nitrogen form in the tissue sap is not in the nitrate form, then a large portion of the potentially available nitrogen will be undetected. Roses are a notable example of a plant that has little of its total nitrogen transported in the sap in the nitrate form. Most cut flowers tested, so far, have high concentrations of nitrate nitrogen in their tissue sap. If a grower applies primarily ammonium fertilizers, at least at first, there may be some undetected ammonium being used by the plant. However, in warm soils the ammonium nitrogen is, within a few weeks, converted to the nitrate form and will be adequately represented by a nitrate-specific test. Nitrate nitrogen is usually the most abundant form of nitrogen found in the soil

and the most readily available for up-take by plants.

This article has described one analytical tool that can be used to help fine-tune a fertilization program through the regular analysis of nitrogen. It should be recognized, however, that a significant reduction of applied nitrogen could sometimes not be safely achieved unless irrigation water is applied uniformly. Therefore if the objective is to use nitrogen fertilizer effectively, there should be a strong emphasis on the need to improve irrigation system performance.

For guidelines on testing with the quick test techniques, contact Steve Tjosvold.

*The authors wish to thank the California Cut Flower Commission and Kee Kitayama Research Foundation for supporting this research.*

## Upcoming Events

### March

- 1-2..... California State Floral Association's Legislative Action Day, CSFA 916-448-5266
- 9 ..... Disease Diagnostic & IPM Workshop, Carpinteria, CORF 707/462-2425
- 11 ..... Disease Diagnostic & IPM Workshop, Watsonville, CORF 707/462-2425

### May

- 20 ..... "Bugs, Bugs, Bugs" Insect Management Day, Half Moon Bay, CORF 707/462-2425
- 27 ..... "Bugs, Bugs, Bugs" Insect Management Day, San Diego, CORF 707/462-2425



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