

CORF News

California Ornamental Research Federation

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Management Options to be Used in Response to Baykeepers Lawsuits

By Dr. Valerie J. Mellano, Environmental Issues Advisor, UCCE, San Diego County

Water quality has once again become a major issue for San Diego County growers. The San Diego County Chapter of the "Baykeepers", an environmental organization backed by the Natural Resources Defense Council, has filed several lawsuits. (It's sister organization, "Riverkeepers" is active in the inland areas.) These lawsuits have been brought against the County of San Diego, Cal Trans and the cities of San Diego and Encinitas. Others are in process. The lawsuits were brought on the basis that the Federal Clean

Water Act of 1972 has not been upheld, and that pollution of the coastal lagoons and other waters has resulted from this. The cities, county and CalTrans have been parties to the lawsuit, as they have been the local enforcement agencies for Clean Water Act requirements. In all cases, the parties in the lawsuits have entered into a consent decree, meaning that they have agreed to certain terms and a timetable for specific activities, in this

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CORF News Expands in the New Millennium

Steve Tjosvold, UCCE Santa Cruz and Monterey Counties

With this first issue in the new millennium, you will find that *CORF News* has a new expanded format. There are four additional pages, to be exact, with research-backed information for the California floriculture industry. Over 3,000 growers and floriculture industry representatives receive this newsletter. The readership, indeed, represents the entire California industry.

Success has come relatively quickly for the newsletter. Only two years ago we published our first issue, which was sponsored by the California Cut Flower Commission. Now *CORF News* is completely supported by our advertisers. The small profits that are made go back into the budget for CORF grower educational programs or to research that is directed by the non-profit Kee Kitayama Research Foundation. Everyone wins. The members of the University who write in this newsletter carry out their educational mission, and growers and associated industry benefit from timely, research-backed, information.

As always, if there are any comments about the newsletter or suggestions for articles, please do not hesitate to contact us. ❖

Extending the Harvest Season of Specialty Cut Flowers

By Dr. Michael S. Reid and Linda L. Dodge, Environmental Horticulture Department, UC Davis

Over the years, the floriculture industry has devised numerous ways to extend the season of cut flowers so that they are available almost throughout the year. We thought that it would be interesting to briefly review the factors that control the seasonal displays of flowers in the wild or the garden, and then to note how horticulturists have used those very factors to allow them to extend the season for many flowers.

1. Daylength. As the seasons wax and wane, the day length changes; in latitudes where winter days are only 8 hours in length, the midsummer days stretch for a full sixteen hours. Many plants use these dramatic differences in seasonal daylength to trigger their flowering cycle. In general, plants fall into two groups; those that flower in the spring and fall

under short day conditions, and those that flower in summer, requiring long days to bloom. Most floriculturists are very familiar with the manipulation of daylength or of sensitivity to daylength as a tool for manipulating flowering time. Chrysanthemum breeders long ago developed a range of cultivars that differed in their critical daylength, so that growers of outdoor mums could plant and obtain flowers over many months. The use of black-cloth in the greenhouse to artificially shorten daylength is an important tool for ensuring flowering of short day plants (like chrysanthemum and poinsettia) when the natural daylength is still long (or when stray light from street lamps

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Extending the Harvest Season of Specialty Cut Flowers

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might prevent proper flowering). Likewise, field flower growers are familiar with the use of supplementary lighting to stimulate early flowering of long-day plants like China asters and Shasta daisies.

2. Low temperature. The low temperatures of the winter are an important signal to plants for the changing of the seasons. For many plants, this signal is a means to regulate the timing of flowering. In such plants, cold temperatures induce a series of changes that prepare the plant to flower once warmer temperatures return with the onset of spring, a phenomenon that plant physiologists call vernalization. Horticulturists manipulate the flowering of spring bulb crops, like tulips, daffodils, and iris, stimulating them to flower early by exposing the harvested dormant bulbs to appropriate periods of low temperature. Non-dormant plants may also be “vernalized”, and producers who must provide flowers for a particular market window use vernalization to hasten their flowering. A good example of this approach is the cool treatment of static and gypsophila plants that is practiced in Israel to ensure early flowering and high prices in the markets of northern Europe. The effect of cool temperatures are, at least partly, explained by an increase in gibberellin production by the plant. Gibberellin, a plant hormone, is sometimes also used by horticulturists to accelerate flowering. A combined treatment with gibberellin and long days is known, for example, to accelerate the flowering of gypsophila.

3. High temperatures. Some plants use the high temperatures of summer as a “clock” to time their flowering. For example, some spring bulb flowers are induced to flower once they have been exposed to high temperatures for a defined period. This response, too, has been used by horticulturists as a tool for manipulating flowering. Dormant freesia corms are routinely stored at 86F for six weeks at which time the temperature is reduced to 68F. When 80% of the corms show root emergence, they are planted in the greenhouse and emerge within two weeks, thus reducing the dormancy period

by about four weeks.

4. Ethylene. In recent years, horticulturists and postharvest physiologists have devised other tools to extend the season of cut flowers. Perhaps the most interesting has been the use of ethylene to stimulate early flowering. Ethylene, a simple hydrocarbon gas that causes floret shattering and premature senescence of many cut flowers, and blasting (abortion) of bulb-type flowers, is a natural plant growth regulator. Early in this century, Japanese farmers used to burn their iris fields before lifting the bulbs in order to prevent the spread of leaf diseases from one season to the next. They noticed that bulbs from the burned fields flowered sooner, and that flowers were obtained from smaller bulbs than those that came from unburned fields. They reasoned that something in the smoke was causing these desirable effects, and developed the commercial practice of smoking harvested iris, narcissus, and freesia propagules (bulbs or corms) to induce earlier flowering. We now know that the key ingredient in the smoke was ethylene, which is always present in smoke or vehicle exhausts. It has been found that ethylene, applied at the right time, can induce earlier sprouting of a range of bulb-type crops, and flowering of smaller bulbs and corms. Ethylene treatment is now being practiced commercially with Narcissus, Iris, and Tulip.

5. Storage. For a long time, too, growers and researchers have attempted to extend the season of spring bulbs by storing the harvested flowers. In general, flower storage is effective for only brief periods. There have been reports of success in storing daffodils in an atmosphere of pure nitrogen (at 32 F), but apart from this, storage of spring bulb flowers is generally only effective for brief periods, one to two weeks at most under optimal storage conditions (32 F, 95% R.H.). A different approach to storage is to store the flowers in the bud or pre-bud stage, and there have been two interesting applications of this approach developed in recent years. One is the storage of

flowering branches (plum, peach and other species). During the winter, these branches are dormant, although the flowers have already been induced (by vernalization). Growers in some countries harvest the dormant branches, and store them at sub-freezing temperatures (ca. 25 F). Over several months, the branches can be removed from storage, and the flowers “forced” at room temperature in a standard flower preservative.

Another example of this approach has been developed recently by Dutch researchers, who have proposed the so-called “ice tulips”. First reported at the International Flower Bulb Conference in Seattle, the system has now become commercially accepted. Reports at the Flower Bulb Conference in Herzliya, Israel, showed that the vase life of ice tulips was similar to that of tulips forced using normal practices. Tulip bulbs are lifted and stored until the second half of October at 70 F. They are then planted in trays, and after a period of storage (around 4 weeks) at low temperature (40 - 50 F), the bulb trays are wrapped in polyethylene to prevent desiccation and stored at about 28 F for up to 9 months. When the trays are placed back in a cool greenhouse (55 - 60 F is preferred), the plants complete their flowering, and produce flowers comparable in quality and vase life to those obtained from bulbs forced in the normal manner. This technique enables production of flowers from August through November, at which time flowers can be obtained from the new season’s bulbs. Although this scheme is a very attractive one for extending the season, and is now practiced commercially on a large scale in the Netherlands, it requires considerable management expertise, for the required conditions vary depending on the variety, and the desired timing of the crop. Nevertheless, it adds a new tool to the armory of techniques that growers can use to spread the market season of seasonal flowers. ❖

Management Options

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case three years. The Baykeepers also have oversight on all information and data collected. As a result, the case will not go to court.

This is where it gets interesting! While agriculture has not been singled out in these lawsuits, it is a major concern, particularly in the City of Encinitas. The specific problem in Encinitas is storm-drain runoff. Water moving through a storm-water conveyance system is delivered directly to the coastline or other water body without any type of treatment. Based on the Clean Water Act, it is not legal to allow **anything** to flow into the storm drain system other than storm runoff. Therefore, diverting non-stormwater agricultural runoff water into a storm-drain system (accidentally or on purpose) is not allowed.

Several Encinitas growers were "cited" for having excess nitrogen or other pollutants flowing into the storm-drain system. The result is that the growers are going to have to contain any runoff. Karen Robb and Valerie Mellano, UC Cooperative Extension, San Diego

County, and Eric Larsen, San Diego County Farm Bureau, have been working with officials from the City of Encinitas to develop a program that will allow the growers to minimize their impact on the water quality. This program will utilize a Program Assistant that will work individually with the growers, and assist them in a self-inventory or self-assessment for detection of problem areas contributing to water quality concerns. Practices found in the existing "Management Options for Nonpoint Source Pollution for Greenhouse and Container Crops" publication will be utilized to fix any of the problem areas. In addition, a series of tours of various practices and facilities will be scheduled, as well as a series of educational meetings to explain management practices and assist the growers in developing methods to minimize water quality concerns. These programs are funded by the Kee Kitayama Research Foundation and the City of Encinitas. Other funding has been applied for to extend the time of this program.

While there is much speculation about

who will be sued next, it is currently uncertain. In San Diego County, both the cities of Oceanside and Carlsbad have received notices of intent from the Baykeepers that they intend to pursue lawsuits with these municipalities also. The City of Oceanside will be a particularly difficult area, because many types of crops are grown, and the coastal areas are impacted by runoff from the entire watershed of the San Luis Rey River.

It is hoped that the program for the growers in Encinitas will set a precedent for dealing with agricultural aspects of water quality problems as lawsuits appear up and down the state. The information developed in this program will be available to growers statewide. In the meantime, the "Management Options for Nonpoint Source Pollution" booklet is available by mail from our office, or on our website: cesandiego.ucdavis.edu. For more information, contact Karen Robb or Valerie Mellano, 5555 Overland Ave. Bldg.#4, San Diego, CA 92123 ❖

Checklist for Postharvest Handling - The Three C's; Care, Cleanliness & Cooling

By Dr. Michael Reid, Environmental Horticulture Department, UC Davis

The Checklist

CARE:

We care about and are proud of the quality of our product.
We have a system of grades and standards to ensure quality.
It is written down so that everyone understands it.
It is used routinely.
We regularly evaluate shelf life of our product.
Our product is labeled so that our customers can write with compliments or complaints.
We have an in-house training program for our staff.
We take extra care to ensure that the product is not damaged during marketing:
After harvest we _____ to reduce damage en route to the packing shed.
Our staff knows that this is a living product and needs to be handled gently.
Our product is packed gently but firmly so as to minimize damage during transport.

CLEANLINESS:

We run a clean operation.
We use white buckets.
They are cleaned every time they are used.
We clean them with detergent and Clorox.
_____(Name) is responsible for ensuring that the buckets are clean.
Water in field buckets is chlorinated.
Our coolers are cleared and cleaned every _____ weeks.
We wipe all surfaces down with _____ to get rid of fungal spores.

COOLING:

We make sure that our product is cooled quickly and properly.
We know the proper temperature for handling our product.
It is _____degrees.
There is an accurate thermometer in each coolroom.
Each thermometer has been calibrated.
Each thermometer is checked regularly.
_____(Name) is responsible for

checking the thermometer.
He/She writes down the temperatures and I review them.
Our coolrooms are held at _____ degrees.
We cool our product by forced air cooling.
_____(Name) is responsible for ensuring that the precooler is functioning properly.
_____(Name) is responsible for training the packers to pack so that the product can cool.
The temperature of the cooled product is checked before it leaves our dock.
We also check the temperature of trucks that carry our product.
We include a recording thermometer with each load that goes out.
❖

Field Observations

Four nurseries in the Monterey Bay region were discovered this past fall to be infested with the weed, Creeping Field Cress (*Rorippa sylvestris*). This weed is a potentially serious problem because of its rapid growth rate and its ability to spread within the container and nursery industry once it is established. The weed was only officially recognized as being introduced into California in 1998 and now appears to be spreading at an alarming rate. The recent discoveries of these weeds were made at four unique locations: a container ornamental nursery, 2 field-grown cut flower nurseries and a greenhouse cut flower nursery.

Early detection, identification, and eradication of the weed are essential. Creeping field cress has finely divided leaves that resemble a water cress leaf. It has small yellow flowers and flower stalks about 6 to 12 inches in height. It does not produce many seeds, but spreads rapidly from rhizomes that have many buds. It can be propagated easily from pieces of rhizome as small as 1 inch, and therefore cultivation can commonly spread the weed throughout the field. See <http://wric.ucdavis.edu/information/information.html> for photographs.

Presently, the weed is not quarantined but there is some push for a California quarantine and official eradication of this weed. The preemergence herbicides isoxaben (Gallery) at the use rate of 1 lb. ai/A and dichlobenil (Casorron) at 3 lb. ai/A were effective for the control of 3 cm. root segments. Simazine at 2 and 4 lb. ai/A was also highly effective. These herbicides may not be registered or safe to use in many ornamental crops. The most effective post emergence herbicides are MCPA or 2,4-D at 1 to 2 lb. ai/A or triclopyr at 1 to 1.5 lb. ai/A. Glyphosate at 4 lb. ai/A was effective but at 1 to 2 lb. ai/A was not effective.

Regional Report

Santa Cruz & Monterey Counties

Disinfecting Irrigation Pipe



Growers may spend significant time, energy and money to insure that soil fumigation or steaming is effective, but too often they do not take the final, and essential, step of insuring that production beds are not recontaminated. For example, some carnation growers are converting to raised-beds and steam sterilization to control the serious soil-inhabiting pathogen *Fusarium oxysporum* f.sp. *dianthi*. However, piles of diseased plants often may lie just outside production greenhouses and are sources of *Fusarium* spores that blow in and recontaminate sanitized beds. Plastic irrigation pipes are typically lifted up and suspended from the greenhouse superstructure by wires because the irrigation pipes cannot be steamed in the beds or they get in the way of methyl bromide fumigation. But these pipes are often contaminated with soil and plant debris and are potential sources of inoculum for pathogen re-establishment. Hence, we have recommended that pipes be cleaned and disinfected before they are placed back onto the sanitized beds. Unfortunately, there has been no systematic evaluation of disinfectants. One of the goals of recently completed experiments funded by the Kee Kitayama Research Foundation and the California Cut Flower Commission was to test the efficacy of different pipe disinfectants. UC Davis plant pathologist Jim MacDonald, staff research associate Linda Bolkan, and farm advisor Steve Tjosvold conducted these experiments.

Experimental Methods

To compare the efficacy of potential disinfectants under standardized conditions, we spread spores of *Fusarium oxysporum* f.sp. *dianthi* evenly across the surface of agar media in petri dishes. Shortly after seeding the media with spores, we sprayed solutions of (1) water, (2) 70% isopropyl alcohol, (3) 3% hydrogen

peroxide (H₂O₂), (4) trisodium phosphate and (5) a 10% bleach solution. Following treatment, the petri dishes were put into crispers and incubated at 25° C for 5 days, after which the numbers of viable colonies were counted and compared.

In the greenhouse, the irrigation pipe disinfection experiments were carried out on three separate occasions using materials that appeared effective in the laboratory experiments. For each greenhouse trial, we used the same methods. We marked out a series of one-meter-long segments on contaminated pipes in a random block design and included 3 reps for each treatment. The plots were swabbed with wet sterile cheesecloth to pick up inoculum before and then again after treatment with the disinfectants. These swabs were taken to the laboratory for culturing and the inoculum levels were quantified.

Results

In the laboratory experiments, the 3% H₂O₂ and 10% bleach solutions were the most efficacious, resulting in virtually 100% death of spores on the surface of agar media. In greenhouse experiments, our first trial with irrigation pipe cleaners yielded variable results—probably due to errors in handling some cheesecloth swabs. The second and third trials were more uniform. Our results showed that all the cleaning treatments significantly reduced inoculum levels on the irrigation pipes. Even a thorough scrubbing with plain water reduced the amount of inoculum to 0.50-1.75% of initial inoculum levels. Greater reduction (0.18-0.50% of initial inoculum) was achieved with Physan. However the greatest cleaning of the pipes was achieved with 3% H₂O₂ and 10% bleach solutions (0.01-0.03% and 0.02-0.10% of initial levels, respectively).

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Regional Report

San Diego County

Best Management Practices for Compliance with 1987 Clean Water Act Regulations Project Receives Funding



As mentioned in the feature article by Dr. Valerie Mellano, municipalities are now being pressured to enforce the 1987 Clean Water Act. The 1987 Clean Water Act requires municipalities to eliminate the discharge of pollutants into their storm water conveyance systems to the maximum extent practicable through the development of a comprehensive storm water management system. This can be accomplished through structural methods, non-structural methods and by adopting 'Best Management Practices'.

Although growers are not being singled out in these lawsuits, unmitigated agriculture runoff contains applied chemicals and sediment in quantities that exceed federal and state water quality standards. For growers this means that no water other than storm runoff will be allowed to leave the property and enter any gutters or storm drains.

Nursery runoff will have to be captured on-site or eliminated through use of best management practices.

Dr. Valerie Mellano and I have already developed a 'Best Management Options' resource manual for growers. We are now prepared, with funding from the Kee Kitayama Research Foundation and The City of Encinitas, to hire a non-regulatory resource coordinator to work under our supervision to assist growers in adopting appropriate best management practices and technologies in order to come into compliance with this Act. We also plan to serve as liaisons between growers and other agencies to explore novel methods of utilizing water runoff from nurseries. We are continuing to pursue additional funding opportunities to expand this program.

The objectives of this project are as follows. 1) Reduce/eliminate runoff entering storm drains and reduce

contaminants entering impaired water bodies by providing information and resources to growers on 'Best Management Options', 2) Provide a non-regulatory liaison between growers and agencies to explore options for utilizing runoff water in mutually beneficial methods, 3) Document the value of the BMPs utilized by growers to reduce runoff and contaminants within runoff, 4) Highlight the floriculture growers as a model of compliance with 1987 Clean Water Act Regulations and 5) Educate other growers throughout the state of California on methods that can be used to come into compliance with the 1987 Clean Water Act.

The education program will include focussed workshops at sites already using Best Management Options for controlling nonpoint source pollution. Topics include fertilizer and irrigation management, tensiometer-based irrigation management in ground production, tensiometer-based irrigation management for potted plants, tailwater recovery, constructed wetlands and non-production erosion and runoff control (roof runoff, roads management, etc.).

Before any technical changes or remedies are implemented by the growers, the program coordinator will ensure that baseline measurements of runoff are recorded. Following the adoption of technical changes, the coordinator will be responsible for monitoring the results. The anonymity of each grower will be maintained, but the overall efficacy of the program will be measured based on these pooled results .

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Field Observations

Redgum Lerp Psyllid

This pest was discussed in some detail in the last issue of CORF News. However, we have some good news to report regarding the biological control program for control of this new pest. Dr. Dahlsten searched for natural enemies of the redgum lerp psyllid in Australia and sent back seven species of parasites to be tested. Two of these species look very promising and are in the final stages of the safety evaluations required before releasing any introduced natural enemy into California. Therefore, we are planning to start releases of these parasites in early spring of this year – much earlier than we had originally predicted!

What may be even more exciting is that both of these species are in the same genus, *Psyllaephagus*, as the parasite that was, and continues to be, so successful against the Blue Gum Psyllid some years past. We are very hopeful for the success of these parasites. We will be monitoring their impact intensively over the course of the next few years and will keep you informed.

Be Alert for Chrysanthemum White Rust!

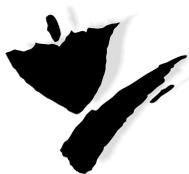
No, there have been no new finds in this county recently. This is the time of year that chrysanthemum growers should increase their scrutiny for chrysanthemum white rust. There have been no finds currently, in large part because growers have self-identified to the county when they do find this rust. However, this is the time to be on the lookout.

As a reminder, infected plants develop light green to yellow spots up to ¼ inch in diameter on the upper leaf surface of infected leaves. Eventually, raised, waxy, pink-colored pustules are formed on the lower surface of infected leaves. As they mature and produce infectious spores, these pustules become whitish.

Regional Report

San Mateo & San Francisco Counties

International Symposium on Postharvest Physiology



In November I attended the *Seventh International Symposium on Postharvest Physiology of Ornamental Plants* in Ft. Lauderdale, Florida.

This is the symposium that brings together academic researchers from around the world to discuss current research on postharvest handling of ornamentals. Dr. Terril Nell at the University of Florida coordinated the excellent program, which included tours of flower importers at the Miami airport, and of three wholesale nurseries in the Homestead area (Kosta Farms, Kosta Color, and Carey's Bromeliads).

Representatives from California included Dr. Michael Reid, Dr. Tony Kofranek, and Dr. Don Hunter from UC Davis; Dr. Ann King from UCCE; and Mr. Lee Murphy from the California Cut Flower Commission (CCFC helped sponsor the Symposium, and had Mr. René van Rems present to showcase California cut flowers). There were attendees from 21 countries, including Israel, the U.K., The Netherlands, Denmark, Germany, and New Zealand.

Here is some of the information presented that is useful to California flower growers:

Production data. California's floriculture production was \$769 million in 1998, according to Dr. Marvin Miller (Ball Horticultural Company). Of course, California is the leading state, followed by Florida, Michigan, Texas, and Ohio. These 5 states produce 51% of the U.S. floriculture crops. California leads the U.S. in cut flower production, while Florida leads in cut green production (California is 2nd in cut green production). California also leads the country in bedding plant production. California's production consists of 36% cut flowers, 15% cut greens & foliage, and 49% bedding/garden plants & potted flowering plants.

Dr. Miller gave an interesting description of how the market channels are changing within the U.S. and internationally. The traditional channel (Breeder- Distributor- Grower- Wholesaler- Retailer- Consumer) has gone topsy-turvy in recent years with the

introduction of mass-market retailers such as Wal-Mart and supermarkets, along with the impact of imported flowers.

Imports. Unfortunately for the California (and U.S.) cut flower industry, 2/3 of the cut flowers sold in the U.S. in 1998 were imported, and this import market was worth \$1 billion. Of the imports coming into the U.S., 56% were from Colombia, 22% from elsewhere in Central & South America, and about 18% from The Netherlands. For California growers who ship to the east coast, Dr. Miller explained that the distance from Los Angeles to New York is 2,400 miles, while the distance from Bogota, Colombia to New York, via Miami, is a comparable 2,600 miles.

My take on Dr. Miller's presentation was that California growers are going to have to continue to be innovative in their product selection (which flowers they grow), their marketing channels, and their postharvest handling practices. In terms of postharvest longevity, the two most important factors seem to be genotype (picking a crop that has a natural long life, e.g., not ethylene-sensitive), and keeping temperatures low after flowers are harvested.

Temperature. Dr. Michael Reid's presentation on temperature management to prolong postharvest life could fill this entire newsletter. He stressed the need to keep temperature low during the **entire** postharvest handling period (during harvest, sorting, packing, storing, and shipping). By low temperature, he meant 32-34 F at all times (except on the few chilling-sensitive crops). Some of the points he stressed were: 1) Coldroom temperatures are typically not kept cold enough; 2) Better pre-cooling and packaging of the product is needed before it leaves the grower's site; and 3) If low temperatures are properly maintained, then it does not matter if the cut flowers are stored dry or wet (for carnations, anyway).

Some temperature problems include: 1) Flowers are often not pre-cooled adequately when they leave the grower; 2) Route trucks are often unrefrigerated, and/or the doors

are left open; 3) Boxed flowers often sit for extended periods on unrefrigerated docks; and 4) Flowers are not kept cool during air transport.

Water temperature for cut flowers. For many years there has been a debate about whether cut flowers (depending on whether the flowers are warm or cold) should be put into cold or warm water (or rehydration solutions) in the buckets. The general feeling among the researchers was that it does not matter if the water or rehydration solution is cold or warm, and that no special effort needs to be made to use **warm** water, which has often been recommended in the past. The most important considerations are that the buckets are clean and that the water is of good quality. Of course, floral preservatives and other postharvest treatments are important on specific cut flower crops.

Ethylene and MCP (EthylBloc). Several researchers gave exciting presentations on MCP (marketed as EthylBloc®), which is used to prevent ethylene damage. Cut flowers and potted flowering plants can be exposed to MCP for as little as 15 minutes (depending on the concentration), and all of the existing flowers and flower buds will be protected from ethylene. However, MCP does not seem to be effective at low temperatures, so growers will not be able to use it in coldrooms during flower storage. Much of the work on MCP on flowers was done by Dr. Michael Reid and Dr. Margrethe Serek at UC Davis.

Several people from FloraLife were also at the Symposium to discuss EthylBloc, which is *still* not available in California, but should be soon (or so they promised). Several of the researchers noted that MCP will not be equivalent to STS in preventing ethylene damage, but when used properly, it will work well on most flowers.

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Regional Report

Ventura & Santa Barbara Counties

Nonpoint Source Pollution Meetings in Santa Barbara



Two meetings will be held in March in the Carpinteria area concerning issues related to nonpoint source pollution.

These meetings are in response to recent lawsuits against the City of Encinitas and other San Diego County entities which include charges that illegal runoff water from agricultural operations is resulting in water pollution. These lawsuits are discussed in this newsletter in more detail by Dr. Valerie Mellano, Environmental Issues Advisor, UC Cooperative Extension, San Diego County.

The first meeting is a tour of the Carpinteria Marsh sponsored by the Santa Barbara Flower Growers Association on March 15 at 1:30 pm. The tour will be hosted by UC Santa Barbara marsh expert, Wayne Ferren. Dr. Ferren has been monitoring the flora and fauna of the Carpinteria Marsh for many years. He will discuss marsh habitats and ecology, and the effects of nursery runoff with participating growers. The tour will start on El Estero Way, on the western end of Carpinteria Ave. near Santa Claus Lane. There is parking on Estero and Carpinteria Avenue, but try to carpool, as parking is limited. The tour will end at Ash Ave., where a restoration project of the Carpinteria Marsh will be observed. Allow 2 to 3 hours for the tour. Call Phil Soderman, Sterling Nursery, 805/684-7244, for further details.

The second meeting is sponsored by CORF and the Santa Barbara Flower Growers Association. It will be held at the Miramar Hotel in Montecito on March 21 from 6 - 9:00 pm. You cannot afford to miss this meeting. Speakers will be Valerie Mellano, Mike Mellano, and Phil Soderman. I will host the meeting along with Brian Caird, Por La Mar Nursery, who is the new president of the Santa Barbara Flower Growers Association. Phil Soderman will summarize what growers saw on Dr. Ferrin's tour, and present a

newsletter that he has developed for Santa Barbara growers on nonpoint source pollution and Best Management Practices. Dr. Valerie Mellano will provide background information concerning existing and pending lawsuits in San Diego County. She will then discuss the current water quality program that Cooperative Extension is spearheading. This program includes a self-inventory of growing operations and potential pollutants, tours and meetings involving Best Management Practices, and resource materials available to flower growers that Valerie Mellano will describe. Mike Mellano (Mellano & Company in San Luis Rey, Chair of CORF and the California Cut Flower Commission Research Committee) will present a grower's perspective on the situation, describing how nurseries in Encinitas may set a precedent for addressing agricultural aspects of water quality problems, as lawsuits appear up and down the state.

While it is uncertain which municipality may be sued next, this meeting will provide you with the information needed so that you can be proactive. Learn why it is important to self-regulate your nursery runoff before government regulates it for you.

There is no cost for the seminar, but there is a charge of \$25 for the dinner, payable at the door. Advanced reservations are required for space and meal planning. For registration details see the insert in this newsletter.

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Field Observations

Aphid Alert. Early spring is a good time to watch for aphids, as they can thrive in cool weather, though optimal temperature for development may be ³75°F. Aphids are small, pear-shaped insects of variable color. They are distinguished from other insects by cornicles, small tubular projections from the hind end. Common species include green peach, melon, chrysanthemum, and foxglove aphid. While sucking plant fluids, aphids excrete honeydew, a substrate for black sooty mold fungus. Many aphid species transmit viruses.

Scouting is important in the pest management of aphids because they can reproduce extremely quickly if undetected, especially in greenhouse situations where females are born pregnant. Since only adults have wings (and not all adults have wings), visual inspection of the crop is necessary, in addition to the use of sticky traps. Scouts must check all plant parts since different aphid species colonize different crop canopy areas. For example, melon aphid is distributed throughout the crop on lower leaf surfaces, whereas green peach aphid is typically found near the plant top on both leaf surfaces. Inspection of new plant material is particularly important. Weed control is essential; other cultural control methods may include screening and managing nitrogen levels. Lacewings, midges (*Aphidoletes aphidimyza*), and parasitic wasps (*Aphidius matricariae*) are available, although commercially acceptable biological control levels may be difficult. Numerous pesticides are registered, but resistance to pyrethroids, organophosphates, and carbamates is common, especially in the green peach aphid. Botanigard and Endeavor can be effective in controlling aphids. See this newsletter for further details concerning these reduced risk pesticides.

Evaluation of Reduced Risk Pesticides

By Julie P. Newman, UCCE, Ventura and Santa Barbara Counties

The Food Quality Protection Act (FQPA) of 1996 resulted in new guidelines for mandated pesticide safety reviews. Organophosphate and carbamate pesticides have been scrutinized, resulting in the loss of Sulfotepp; more pesticides will likely follow. On the bright side, FQPA changes also favored the registration of "reduced risk" pesticides. These are pesticides with low toxicity to non-target organisms that are allowed to pass through the registration process faster than traditional pesticides. Are these reduced risk pesticides as effective as the conventional materials they may be replacing? Many are, but may be slower acting. Some require multiple applications. I am working on a grant sponsored by the Hansen Trust and grants sponsored by the Department of Pesticide Regulation (along with other UC researchers, including Dr. Karen Robb, Steve Tjosvold, and Dr. Michael Parrella) to examine these pesticides and

incorporate successful candidates into IPM programs. Here is a partial list of some of the reduced risk pesticides we are evaluating with cooperating growers.

BotaniGard (*Beauveria bassiana*, Mycotech Corporation). This product, used commercially for a few years, is a biopesticide containing a fungus that attacks insects but does not harm plants or people. Good results have been reported on whiteflies and aphids. Additionally, it was one of the first materials to control western flower thrips and be safely integrated into biological control programs. Multiple applications are recommended. In previous trials, Karen Robb and I had best results in relatively tight greenhouses where there was little pressure from high pest populations outside.

Cinnamite (cinnamaldehyde, Mycotech Corporation). This is an artificial cinnamon oil with a rapid mode of action. It has no known residual activity. This

allows for the safe introduction of beneficial insects and mites, but also makes good coverage an important issue for pest control. It can be used to control spider mites. Thrips and aphids may be controlled at higher rates. Researchers have reported variable results. On crops such as roses that require increased water volume, reduced rates should be used to avoid phytotoxicity.

Conserve (spinosad, Dow Agrosciences). Spinosad is a natural product produced by soil microorganisms with a unique mode of action. Excellent control of western flower thrips, leafminers, and caterpillars has been reported. Its effect on beneficial insects and mites is unclear. Recently the California label was expanded to include greenhouse registration.

Distance (pyriproxyfen, Valent). This insect growth regulator with translaminar activity was recently registered in California. It disrupts egg hatch and

Weidner Inducted into the California Floriculture Hall of Fame

Evelyn Weidner joins a host of industry greats such as Kee Kitayama, Paul Ecke Sr., Dave Pruitt and Horace Anderson as an inductee into the California Floriculture Hall of Fame.

Evelyn Weidner's contributions to the California floral industry are best associated with her family business, Weidner's Gardens, in Encinitas. Over the years, Evelyn and her late husband, Bob, gained the reputation of introducing a new blooming plant each year. This ability to find and promote new plants led to the formation of the marketing group "Proven Winners."

Along with being a much sought after public speaker, Mrs. Weidner is a board member of the CA Floral Council and the Joseph Shinoda Scholarship Foundation. She is a member of the San Diego Co. Farm Bureau, San Diego Co. Flower and Plant Assoc., International Plant propagators Soc., the Garden Writers of America and the Ohio Florist Assoc. along with local Chambers of Commerce.

Reduced Risk

Continued from page 10

development of immature stages to adults. I had excellent control of whiteflies on asters in a recent evaluation. This is consistent with whitefly results reported by other researchers.

Endeavor (pymetrozine, Novartis). This product, recently registered in California, contains a new chemical class. It is a systemic insecticide that results in an inhibition of fluid uptake by sucking insects. It is especially effective on aphids and whiteflies. Since pest death is by starvation, effects may not be immediately apparent.

Floramite (bifenazate, Uniroyal). This product is not yet registered. The carbazates are a new chemistry class that act rapidly with long residual activity. Though less effective as an ovicide, Floramite controls all spider mite stages. It is reportedly safe in biological control programs. ❖

Special Thanks to these Sustaining Sponsors of the 2000 CORF Grower Education Programs...



Is the Internet Going to Hurt You?

By Dr. Heiner Lieth, *Environmental Horticulture, UC Davis*

While many growers have felt the pressure from imports on their profitability, this force is relatively small compared to what growers will face on the Internet. But rather than being spread out over several years, the impact will be over a shorter period of 12 to 18 months. The astonishing rate at which commerce has come to the Internet is perilous to those who are slow to respond. Growers who are not using the Internet to move product, will be left behind. And the penalty could well be bankruptcy.

Basically, whatever product you are producing, someone will be moving it via the Internet. If you don't then you will suffer from the competition. Let's look at an example: let's say that the buyer purchasing product from you has the choice of talking to you or checking on the website of a competitor as to availability of the product. Calling you takes several minutes; the Internet competitor can be checked out in a few seconds. If the buyer is short on time (and who isn't these days), you can guess which will be checked first. If the buyer has the option to buy and arrange delivery directly off the website. Then that

saves yet more time.

Another example; if you are selling through a flower market stand; you have to ask yourself how many times will florists chose to come down to your stand in the middle of the night when they can order from your competitor off a website that lists quality standards and promises satisfaction guaranteed. You might not lose all the sales, but it could be enough to put you out of business.

It is clear that this type of competition is possible and emerging in every market. In some metropolitan areas you can already order groceries for same-day delivery. Doing it with floricultural products is obviously next. It can be done in the retail sector, then it can certainly be done with wholesale.

Why let someone else do this when it could be you? You may need to partner with someone who has the needed skills in Internet commerce (so that you can continue to focus on what you do best), but you should not ignore this force; otherwise the competition could put you out of business. ❖

Campus News & Updates

Submitted by Julie Newman, Farm Advisor UCCE

News

UC RIVERSIDE

Don Merhaut started work February 1, 2000 as Assistant Specialist in Cooperative Extension for Horticulture & Floriculture and Assistant Horticulturist in the Dept. of Botany & Plant Sciences. This is wonderful news for our industry as this position has been vacant since May 31, 1997, when Dr. Ursula Schuch resigned from the University. Dr. Merhaut was most recently employed by Monrovia Nursery as Research Manager. He received his B.S. at Pennsylvania State University in 1986, his M.S. from the University of Georgia in 1988 and his Ph.D. from the University Florida in 1993. All his degrees are in Horticulture and he has an expertise in plant nutrition. Welcome aboard!

Two researchers in the Dept. of Nematology recently received industry grants and awards. The California Association of Nurserymen, Centinela Chapter Research Award was presented to **Ole Becker** for his research on the sting nematode and on alternatives to methyl bromide. The Kee Kitayama Research Foundation awarded \$8,918 to **Antoon Ploeg** to evaluate "soft" pesticides for the control of plant parasitic nematodes in cut roses.

UC DAVIS

Dean Neal Van Algen, College of Agricultural and Environmental Sciences, appointed **James MacDonald** as executive associate dean of the college and **Michael Parrella** as associate dean of the Division of Agricultural Sciences. Dr. MacDonald is a professor in the Dept. of Plant Pathology. His research includes soil microbiology, diseases of ornamental plants, and the role of environmental stress in the development of *Phytophthora* root rots. Dr. Parrella is a professor in the Dept. of Entomology. Current research includes biological control and the evaluation and use of reduced risk pesticides in IPM programs for ornamental crops. Both new associate deans were former department chairs, and hold courtesy appointments in the Dept. of Environmental Horticulture, where

they also teach.

A number of grants were recently awarded for research on ornamental crops. The California Association of Nurserymen presented **Heiner Lieth** with their 1999 Research Award and provided \$15,000 for his research on the effects of salinity on plant growth. The Horticultural Research Institute provided matching funds for his research to optimize fertilization practices under tensiometer-based irrigation. The American Floral Endowment awarded \$45,000 to **Michael Reid**, Dept. of Environmental Horticulture. This is the third year of funding to evaluate postharvest handling practices for cut flowers in collaboration with Terril Nell, University of Florida. The Kee Kitayama Research Foundation awarded \$12,500 to **Clyde Elmore**, Weed Science Program, for research to control weeds in field and greenhouse grown ornamentals. The Slosson Research Endowment Fund provided five grants to researchers in the Dept. of Environmental Horticulture, including \$12,000 to Michael Reid and Ellen Zagory to investigate rootstocks for rhododendrons, azaleas, and grevilleas; and \$2,790 to Richard Evans to survey commercial sources of mycorrhiza inocula for horticultural use.

A number of international scholars and postdocs are working in the Dept. of Environmental Horticulture on research projects for the ornamental production industry. These include Michael Raviv from Israel, working with Heiner Lieth and Dave Burger on water relations on roses; Hak Ki Shin from South Korea,

Juan Hernandez from Spain, and Kiran Menon from India, working with Heiner Lieth on roses; and Don Hunter from New Zealand and Catherine Szlapak from Kenya, working with Michael Reid on postharvest problems.

CAL POLY, SLO

The 4th Annual Environmental Horticulture Integrated Pest Management Conference will be hosted on the campus June 12 and 13, 2000. The conference is designed to provide growers, pest control advisors, pesticide applicators, and landscape and turf maintenance professionals with current information on pest management in the environmental horticulture industry. The conference is one of the few conferences nationwide which concentrates specifically on IPM in the environmental horticulture industry. This year's conference features a detailed seminar on mildew diseases and their control presented by **Dr. Ann Chase** of Chase Research Gardens; an application equipment symposium with the opportunity to try out all the latest application equipment for landscapes, nurseries, and greenhouses; and a turf management symposium featuring **Dr. Joe Vargas** from Michigan State University. The program and enrollment form can be accessed by clicking on the IPM Conference link at the EHS Department home page (www.calpoly.edu/~envhort) or by contacting **Dr. Bob Rice** at rrice@calpoly.edu, phone: 805 756 2830, FAX: 805 756 2869.

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Campus News and Updates

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Research Updates

1-MCP works with daffodils and paperwhites. Don Hunter, Catherine Szlapak, and Michael Reid have shown that Narcissus flowers are sensitive to ethylene. Whether on the plant or off, the flowers have a shorter life if they are exposed to ethylene. The effects of ethylene are overcome by a pre-treatment with 1-MCP (EthylBloc), and even flowers that are held in uncontaminated air last longer if they have first been treated with EthylBloc. These findings show that narcissus flowers are sensitive to ethylene and that ethylene is involved in their natural senescence. Once EthylBloc is registered for use in California, it will provide growers and shippers with a good tool for extending the life of these short-lived flowers.

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Enduring hyperparasites of nematodes. *Pasteuria penetrans* and related bacterial species are known to suppress plant parasitic nematode populations. The interest in their potential as biocontrol agents is supported by their high parasitic efficacy, host-specificity and their endospores' capability to tolerate extended periods of environmental extremes. Our latest study focused on their ability to survive and remain infective after long-term storage. Air dry soil containing spores of *P. penetrans* was stored in a closed can at room temperatures for at least 21 years. When the soil was moistened and infested with juveniles of the root-knot nematode, *Meloidogyne incognita*, numerous spores

of *P. penetrans* attached to the cuticle of the nematodes. The bacteria penetrated the nematode body wall, grew into the animal and eventually formed viable mature endospores.

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Calendar of Industry Events

February

19-21...SAF Insect Management

Conference, San Jose

800/336-4743

24-26...Plant Tour Days - Southern

California, Wholesale/Greenhouse

Open House, 760/431-2572

March

2.....CORF Grower School; Exciting

New Potted Plants, Half Moon

Bay, 707/462-2425

7-8.....CCFC Trade Mission, Orlando,

831/728-7333

8-11.....WF&FSA Annual Convention,

Orlando, 703/242-7000

14.....CSFA Legislative Action Day,

Sacramento, 916/448-5266

15.....CORF Grower School; Waxflower,

Escondido, 707/462-2425

16.....SDCF&PA Spring Meeting, TBA,

760/431-2572

21.....CORF Nonpoint Source Pollution

Seminar, Carpinteria, 707/462-2425

27-28....SAF Congressional Action Days,

Washington DC, 800/336-4743

April

May

17-20...CORF Grower Tour, Israel, 707/462-2425

21-25...International Rose Symposium,

Israel, International Society of

Horticultural Science, contact Steve

Tjosvold, 831/763-8040

21-26...CCFC Tentative Trade Mission,

TBA, 831/728-7333

June

22.....CORF Grower Tour & Research

Demonstrations, Ventura/Oxnard,

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