Department of Environmental Horticulture • University of California, Davis

GROWING Points

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Perennial Plant Association Symposium Comes to California in July 2003

Every once in a while, an opportunity comes along that you just can't afford to miss. In this case it's the Perennial Plant Association's Annual Symposium, which will be held in Sacramento and San Francisco July 27 to August 3, 2003. The symposium is held only once every seven years in the western part of North America, and 2003 marks the first year that the event is in California. This means you'll have easy access to a first-class educational event without spending much time and money on travel.

The PPA will host educational seminars and lectures as well as a trade show in Sacramento at the Hyatt Regency Sacramento from Sunday July 27 through Thursday July 31. Sessions on the latest in perennial research, production, sales and marketing, retail, design and more will be presented by industry experts and professionals. This forum for education and exchange is ideal for growers, retailers and landscape designers in the gardening industry.

The week-long program offers an array of educational sessions and tours so that attendees can pick the events they are most interested in and make the most out of their trip to the PPA symposium. Sunday and Monday, July 27-28, offer an optional, two-day tour to the Lake Tahoe area. Other optional programs for Monday are a nursery and garden center tour, a garden design tour, and "Installing a garden" with Adrian Bloom. More tours are offered on Wednesday with visits to nurseries, garden centers, and private gardens in the Sacramento area.

Tuesday and Thursday are days you won't want to miss. Two full days of lectures offer 25 seminars on topics such as ornamental grasses, heat- and drought tolerant plants, how to build a destination garden center, disease diagnosis, beneficial insects, patenting, marketing, water gardening, and much more. The list of speakers reads like the "who's who" of the perennial industry with names such as John Friel, Adrian Bloom, John Greenlee, Dr. Ann Chase, and Ian Baldwin, to name just a few. A trade show on the same days gives attendees the opportunity to talk with vendors in the perennial industry and learn about their latest innovations.

The PPA Symposium will continue August 1 –3 in San Francisco at the Westin St. Francis Hotel. A number of optional tours combining both tourist and horticultural stops will be available. Some of the visits include one-of-a-kind private gardens, nurseries, garden centers, and botanical gardens in Berkeley and Oakland, the Napa and Sonoma areas, and the Watsonville and Gilroy areas. Visits to tourist sites of botanical and cultural interest will also be offered.

With perennials being a fast-growing segment of our industry, this cutting-edge symposium is perfect for those who want to stay competitive in the horticulture industry. For more information on the program and the trade show, please contact the PPA at: phone (614) 771-8431, e-mail ppa@perennialplant.org, or visit <www.perennialplant.org>. **GP**

Leucanthemum 'Becky' - the Association's Perennial Plant of the Year for 2003.

Open House at Morningsun Herb Farm by Linda Dodge

The rains stopped just in time this year to bring out the crowds for the eighth annual Spring Open House at Morningsun Herb Farm in early May. This specialty retail nursery, run by EH grad Rose Loveall and her husband, Dan Sale, is located in the picturesque Pleasants Valley area between Vacaville and Fairfield in Northern California. The nursery, retail sales area and demonstration gardens occupy several acres in an established English walnut orchard planted by Rose's father and grandfather over 40 years ago. Continually expanding since 1994, Rose has turned her love of herbs and horticultural expertise into a thriving business with the help of Dan's engineering skills and assistance from family, a knowledgeable staff of growers and countless herbal enthusiasts.

Rose and company propagate and grow all the plants sold in the nursery using stock from the demonstration gardens. The chosen varieties are well adapted to the regional climate and Rose has her own formula for the potting mix (no doubt influenced by her major professor, Jack Paul). Dan has overseen the construction of a greenhouse and a number of shade houses occupying several thousand square feet. His latest achievement is the roof covering a major portion of the 3600 square foot retail sales area. The range of plants offered is impressive. From the initial focus on herb species, Rose has diversified to include perennials, ornamental grasses, common and heirloom vegetables, and aquatic plants. Morningsun's selection of scented geraniums is the largest in the region. Rose and her staff are always on the lookout for new and unusual varieties and welcome suggestions from customers.

The annual open house event showcases the nursery and demonstration gardens at the peak of spring bloom. It also celebrates all things herbal, featuring delicious foods and drinks (with recipes) and vendors of herbal products and related services (massage and hypnotherapy). The Solano County Master Gardeners were on hand this year to answer gardening questions. A series of free seminars included information on making herbal vinegars, melaleuca products for health and home,

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Rose Loveall (right), EH graduate and co-owner of Morningsun Herb Farm, welcomes fellow EH alum, Kendra West (left), to the eighth annual Spring Open House at the nursery she runs with her husband, Dan Sale.

Well-built hoop shade houses at Morningsun Herb Farm give propagated herbs, perennials and grasses a fast start in the mild climate of Pleasants Valley near Vacaville in Northern California.

The retail sales area at Morningsun Herb Farm offers customers many choices of plants, garden ornaments, seeds, tools and books. In addition, the Herbal Oasis Gift Shop sells dried herbs and materials for herbal crafts such as candle and soap making.

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repotting orchids and aromatherapy basics. Of course the retail sales area was packed with eager shoppers, selecting their favorite plants from the 600 varieties offered.

The last few years have seen the development of the Herbal Oasis Gift Shop at Morningsun as a source of material for various herbal crafts and a supplier of unique garden ornaments, tools, seeds and books. The shop offers dried herbs, essential oils, jars and bottles for herbal medicines, and supplies for making herbal soaps and candles. Items were flying from the shelves during the open house as shoppers were inspired by the seminars and artful retail displays. Rose and several of her herbal colleagues offer workshops throughout the year on topics such as medicine making, herbal papermaking, dried flower arranging and even henna tattoos. The gift shop keeps customers well supplied for creating their own herbal products and garden displays as seen in the workshops.

Morningsun Herb Farm is an example of a well-run small business for the 21st century. Rose and Dan have found a thriving niche market in herbs and have complimented it with retail items and educational activities that keep customers coming back. They are involved in their community and have donated plants and expertise to several school garden projects. They are active in the local movement to preserve agricultural land in their region. Morningsun has recently ventured into the wholesale arena and now nurseries in the East Bay and Sacramento areas will feature their plants. They have a very entertaining and informative website <morningsunherbfarm.com> and a newsletter, *The Mint Edition*, featuring articles by Rose on herbal topics, herbal recipes and hilarious commentary by Dan on developments at the nursery. In addition to the Spring Open House, they host a tomato tasting event in late summer where customers can compare varieties and enjoy another fun day at the nursery. This year's Tomato Day is on Sunday, September 7th. See you there! **GP**

Morningsun Herb Farm
6137 Pleasants Valley Road
Vacaville, CA 95688
(707) 451-9406

(Editor's note: If you know of other EH alumni success stories, please share them with us. <growing@ucdavis.edu>)

A delicious selection of foods and drinks featuring herbs was offered at Morningsun's Spring Open House. The cheese torta with basil, olives and sundried tomatoes was to die for! The lemon thyme, rose petal and lavender glazed tea cake made an intriguing dessert. Wash it all down with triple lemon tea (equal parts lemon verbena, lemon balm and lemon grass) and you're in heavan!

Venders of herbal products and related services offered their wares to the crowds strolling under the walnut trees in the Garden Market at Morningsun's Spring Open House.

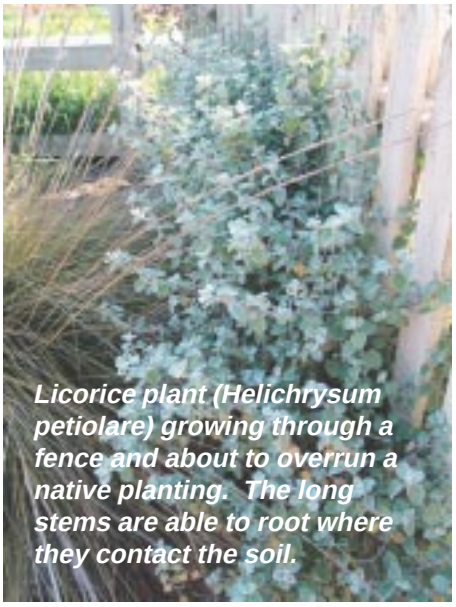
Customers at Morningsun Herb Farm's Spring Open House take time out to enjoy the beautiful demonstration gardens. The day was filled with great food, educational seminars and fascinating people. Of course everyone went home with a trunkful of plants and plans to create their own garden oasis, inspired by the unique vision of owners Rose Loveall and Dan Sale.

Collaborators Seek Alternatives to Invasive Landscape Plants -summary of a report by Alison Stanton, BMP Ecosciences

As every gardener knows, the characteristics that make a plant valuable as an ornamental include ease of propagation, rapid establishment, early maturity, production of abundant flowers, and freedom from insect and disease problems. As every gardener also knows, many weeds have the same characteristics: broad germination requirements, early maturity, fast growth, prolific seed production, and few natural predators. Such traits have enabled many ornamental species to escape the confines of the garden and become established in various wildland areas of California. These "escaped exotics" now threaten the biodiversity and ecosystem processes of wildland areas as seriously as those plant species already designated as noxious weeds. One way to stem the tide of this invasion is to identify and promote alternative ornamental species that serve the same purpose in the garden as invasive species but are less likely to escape and become established in wildland areas.

A project is underway, led by Alison Stanton of BMP Ecosciences in San Francisco, to develop a list, by region of the state, of currently available ornamental plants that invade natural areas and that should not be sold in California's nurseries and garden centers. The list will match an invasive ornamental with non-invasive native and non-native plants that share similar horticultural characteristics. At preliminary meetings held in 2002 at Berkeley's UC Botanical Garden, a group of weed ecologists and horticulturists identified ornamental species that have become invasive in the north-central coast region of California as the first focus of the project. Participants included UC Cooperative Extension, The Nature Conservancy, botanical garden faculty and staff, land managers, the California Exotic Pest Plant Council (CalEPPC), the California Native Plant Society (CNPS), Pt. Reyes National Seashore, Golden Gate National Recreation Area (GGNRA), East Bay Municipal Utilities District, the CSU Monterey Bay War on Weeds project, Suncrest Nursery and Strybing Arboretum. The group selected species that are available in nurseries, have realized or potential impacts in natural areas, and are not already regulated by CDFA. The current draft of the list contains 21 species (Table 1).

Taking a criteria-based approach, the group identified the horticultural attributes of the target invaders- hardiness, growth habit, care requirements, flowering time, flower color, foliage type and design element. They then identified a list of potential alternative plants that matched one or more of these horticultural attributes. Beth Leger, a doctoral student in ecology at UC Davis, developed a fill-in-the blanks form to help focus on different functional aspects of the replacement species. The group is now in the process of using this form to solicit ideas from various stakeholders about suitable alternatives to the target list of invasive plants.



Licorice plant (Helichrysum petiolare) growing through a fence and about to overrun a native planting. The long stems are able to root where they contact the soil.

The final product will be a color brochure depicting the problem ornamental invaders of the north-central coast region of California, along with suitable alternatives that fulfill specific horticultural criteria. This will be the first in a series of brochures focusing on invasive plants on a regional basis. Plans to distribute the brochures through the UC Master Gardener Program, UC Cooperative Extension and county Weed Management Areas are in progress. The project is funded by a grant from Environmental Defense, with additional funding and services provided by the UC Botanical Garden at Berkeley, the California Exotic Pest Plant Council and the Santa Clara County Weed Management Area. For more information, please contact Alison Stanton at <travertine@earthlink.net>. **GP**

Under the right environmental conditions, Chinese tallow tree (Sapium sebiferum) can easily reseed.

Table 1. Draft list of invasive ornamental plants affecting wildlands in the north-central coast region of California.

Scientific Name	Common Name
Groundcovers:	
Carpobrotus edulis	Ice plant, Hottentot fig
Cotoneaster microphyllus	Rockspray cotoneaster
Hedera helix	English ivy
Vinca major	Vinca, Periwinkle
Miscellaneous Flowering Plants:	
Crocosmia x crocosmiiflora	Crocosmia, Montbretia
Helichrysum petiolare	Licorice plant
Large Specimen Plants:	
Cortaderia selloana	Pampas grass
Cotoneaster lacteus	Parney's red clusterberry
Pyracantha sp.	Firethorn
Ornamental Grasses:	
Pennisetum setaceum	Fountain grass
Stipa tenuissima	Mexican feather grass
Flowering Shrubs:	
Cytisis scoparius	Scotch broom
Genista monspessulana	French broom
Spartium junceum	Spanish broom
Trees and Large Shrubs:	
Acacia melanoxylon	Blackwood acacia
Eleagnus angustifolia	Russian olive
Eucalyptus globulus	Blue gum eucalyptus
Myoporum laetum	Mousehole tree
Robinia pseudoacacia	Black locust
Sapium sebiferum	Chinese tallow tree
Schinus molle	California peppertree
Schinus terebinthefolius	Brazilian peppertree
Sesbania pucinea	Scarlet wisteria

Postharvest Research Updates from Michael Reid's Lab

Although Dr. Michael Reid has spent the last several years in the upper echelons of university administration, he has maintained an active and productive research program utilizing traditional methods of plant physiology and new molecular techniques to study the postharvest behavior of many ornamental flower species. He has collaborated with colleagues around the world and contributed useful research-based information to the flower industry on a global scale. Here are some of the latest findings from Dr. Reid's lab.

Genes controlling cell expansion are isolated from flowers of Four O'Clock (Mirabalis jalapa)

Dr. Reid and Post Graduate Researcher, Tim Gookin (who will soon join the Plant Physiology graduate program at Penn State) and Dr. Donald Hunter of the New Zealand Institute for Crop and Food Research found the perfect model system for studying flower opening and senescence in the humble, short-lived Four O'Clock or Marvel of Peru, *Mirabalis jalapa*. The flower buds of this plant expand rapidly in the late afternoon, open early in the evening and collapse the following morning, giving a typical lifespan of fourteen hours. This enabled Dr. Reid's group to easily isolate and identify genes associated with the time course of flower opening and senescence.

Of particular interest were proteins called expansins that are associated with changes in cell wall plasticity making growth of cells and development of plant structures possible. Dr. Reid's group identified several genes that encoded different expansin proteins during the life of a Four O'Clock flower. This was the first such demonstration of expansin genes in flowers and of changes in expression of specific expansin genes during phases of floral development including senescence-specific expansins.

Studies with Hibiscus suggest criteria for developing the ideal indoor flowering plant

Dr. Reid teamed up with Dr. Bernd Wollenweber of the Danish Institute of Agricultural Sciences and Dr. Margrethe Serek of Denmark's Royal Veterinary and Agricultural University to investigate the role of carbohydrates in the display life of potted flowering hibiscus plants in the interior environment. Based on dry weight measurements, they calculated that 200 mg of carbohydrate per day was needed by a hibiscus plant to produce one flower each day. They calculated that under light conditions normally found in an interior home environment, a plant could only synthesize 90 mg of carbohydrate per day, less than half that needed to sustain flower production. The large flowers only lasted one day and abscised before substantial amounts of carbohydrate could be remobilized back to the plant. The result was the end of display life when all carbohydrate reserves were exhausted.

These studies suggest criteria for the selection of potted flowering plants that perform well under interior conditions. First, selection for a photosynthetic rate sufficient for plant maintenance plus allocation of carbon to flowers should be selected. A second criterion would be indeterminate production of long-lived flowers in limited numbers per week. Third, cultivars with moderate-sized flowers and with abscission sufficiently delayed to allow maximum remobilization of carbohydrate resources from the flower should be sought.

Alstroemeria cultivars show differences in leaf yellowing and flower longevity

Alstroemeria has become a staple flower for bouquet arrangements because of its range of colors and long-lived flowers. One frustrating aspect of using *Alstroemeria* is that the leaves often turn yellow many days before flower senescence rendering the stems unsightly or requiring stripping of the leaves. Dr. Reid and EH's professor emeritus, Wes Hackett, combined forces with Dr. Antonio Ferrante of Italy's Scuola Superiore di Studi Universitari e di Perfezionamento and Dr. Donald Hunter to determine the patterns of leaf and flower senescence on cut stems of a large number of *Alstroemeria* cultivars provided by Mellano Wholesale Florists.

They found wide variation in the rate of leaf yellowing and petal fall among the 20 cultivars tested. Leaf yellowing was visible within 5 days for cultivars such as 'Cuba', 'Saba', 'Petra' and 'Tamara'. In contrast, no leaf yellowing was seen in the cultivar 'Rio' until the flowers had been in the vase for 18 days. The time to first petal fall varied from 10 days for 'Cuba', 'Tamara', 'Petra' and 'Rio' to 17 days for 'Tiara' and 'Jubilee'. No relationship was found between the time to leaf yellowing and petal fall for the cultivars tested.

Over half of the *Alstroemeria* cultivars tested showed yellowing of the leaves before the start of floral senescence. Future breeding programs could greatly improve the postharvest performance of these flowers by selecting for both flower and leaf longevity.

TDZ (thidiazuron) prolongs green leaves in Alstroemeria and other ornamentals

Dr. Reid and Dr. Hackett teamed up again with Dr. Ferrante and Dr. Hunter for further study of *Alstroemeria* to determine the effect of various chemical treatments on delaying leaf yellowing in cut stems. It is widely known that treatment with such plant hormones as gibberellins and cytokinins can delay leaf senescence and commercial products containing these compounds are available for use with *Alstroemeria*.

Thidiazuron (TDZ), a registered herbicide and defoliant, has high cytokinin-like activity. Dr. Reid's group showed that a vase solution containing 1µM TDZ delayed leaf yellowing for over 70 days on cut *Alstroemeria* stems but had no effect on flower longevity. More useful in a wholesale setting, the group found that a 24-hour pulse treatment in a solution of 10 µM or greater TDZ also afforded protection from leaf yellowing for as long as 60 days.

Research with TDZ in Dr. Reid's lab on other ornamental crops has shown this compound to be highly effective in preventing premature yellowing of leaves of other cut flowers such as lilies, stock, tulip and iris. Potted flowering plants such as poinsettia and miniature roses also benefited from treatment with TDZ as a foliar spray. Since TDZ is already registered in the US as an agricultural chemical (for defoliation of cotton under the name "Dropp") its extraordinary efficacy at low concentrations makes it a potentially less expensive commercial treatment for delaying leaf senescence in many species. **GP**

Notes From the Chair... by Heiner Lieth

In early May, I convened a general meeting of EH faculty, staff and students to address some issues of these challenging times that might be generating anxiety about the future of the EH Department. I wanted to reassure everyone that our department is strong and vibrant and doing an outstanding job of fulfilling our mission and responding to the needs of the people of California. My "state of EH" presentation focused on the recent progress we, as a department, have made in the areas of teaching, research and outreach. In addition, I wanted to give everyone my perspective on the budget and how we intend to deal with this looming problem.

Our Teaching Mission is Strong

The Environmental Horticulture and Urban Forestry (EHUF) major underwent review last year and received a positive evaluation from the university. I see it as a personal challenge to build on this and be more responsive to the needs of students. One way to accomplish this is to increase the number of offerings of ENH 1, Introduction to Environmental Horticulture and Urban Forestry. This science-based, "general education" course, taught by Prof. Dave Burger, satisfies general curriculum requirements and attracts students to our major.

The Environmental Horticulture Club comprised of undergraduate and graduate students has been very active, putting on plant sales and taking field trips. EH Club members promote the department to other students and the world around us. It is an excellent complement to the formal curriculum and I am committed to helping the EH Club succeed in its activities.

Regarding student recruitment, I am currently focusing on the state's community college system as a valuable source of students for our major. Typically, these students already have a proven track record for success and go on to become productive members of the green industry. I think this group is underrepresented in terms of recruitment for UC Davis as a whole and I am currently working with the Associate Director of Undergraduate Admissions to attract community college students to all programs on campus. I am finding, to my horror, that many potential EH transfers are either not aware of our outstanding EHUF program or have the incorrect perception that we are too selective and don't want them.

Recent improvements to the research capabilities available at EH include a new nitrogen analyzer in Dr. Richard Evans' lab.

Research is Our Foundation

The EH department has an outstanding track record for high-quality research and this is something we absolutely must continue to promote. One of the indicators of our success in this area is the amount of grant funding brought in by faculty; we have done quite well in this area and I encourage faculty to continue to be as active in this area as possible.

Another indicator of success is our publication productivity; we have done an excellent job in this area. This is only possible because of the innovativeness of the faculty and dedicated expertise of staff and students. By all measures of productivity, EH is excellent.

Over the past decade, our ability to do high-quality research has been somewhat impacted by the decreasing number of scientists in the department (due to retirements). Associate Dean Mike Parrella and I have been working with the USDA to establish a presence in Environmental Horticulture at UC Davis. Industry leaders have also emphasized the importance of this to USDA officials. I am currently working with USDA leaders to create a Floriculture position. This position will be stationed in EH and will help us strengthen our research and outreach programs. We hope to be able to announce specifics on this and future growth later this year.

New to our departmental research program is the establishment of an IR4 center for research on agricultural chemicals and biocontrol agents <http://envhort.udavis.edu/ir4>. IR4 (Interregional Research Project #4) is a federal program that facilitates the registration of such materials for use on specialty crops including ornamentals. Participating in this program will bring revenue to the department and provide opportunities for student projects and internships. It also provides a significant service to the ornamentals industry in that we help them bring important and powerful new tools to market. We are currently canvassing the industsry to identify needed projects.

The faculty in Environmental Horticulture is actively involved in leading the campus in various research-related initiatives. We are actively participating in strategic planning in the Plant Sciences to look for synergism between faculty from the various plant science departments. We are also

Teaching happens outside the classroom too. Prof. Jim Harding leads students on a tour of the EH garden as part of a plant identification class.

involved in efforts to improve management of facilities in the college (e.g. greenhouses). Other areas include planning in "Sustainable Agriculture" and "International Horticulture".

Our Outreach Efforts are Expanding

The outreach and extension mission of the EH Department is increasing and changing with the times. Together with the Environmental Design Department, we recently hired Dr. Loren Oki as our Landscape Extension Specialist and he already has a number of important projects in collaboration with faculty and industry. We are currently working on a job description for the statewide Master Gardener Coordinator position which will be based in Environmental Horticulture. This will be an opportunity to increase the visibility of EH to those involved in the Master Gardener program and for us to contribute to this valuable public service.

All of our Cooperative Extension faculty are continuing to work hard to extend research-based information to clientele on a statewide basis. They maintain important collaborations with county-based Cooperative Extension personnel and are devising innovative ways to extend information in the current restricted budgetary environment.

As an addition to our grounds and teaching garden, I am in the process of developing demonstration gardens and field trial areas at the department where plant companies can have us test the performance of their varieties in our Central Valley climate. Several companies that would be interested in participating have approached me. Our superintendent of agriculture, Ron Lane, and his greenhouse staff are studying the feasibility of this project in light of the campus plan to build a hotel and conference center on the south side of our grounds. As part of our commitment to move forward in this area, I have appointed Prof. Jim Harding and Dr. Loren Oki as co-directors of the gardens.

Another exciting outreach project that I have been working on is the establishment of an Urban Horticulture Center for the state of California on the UC Davis campus. We have formed a committee to develop this project consisting of Kathleen Socolofsky, the Director of the Davis Arboretum; Heath Schenker, the Chair of the Landscape Architecture Program; Bob Segar, campus planner and myself. The center will be a focal point for urban horticulture research and outreach, and offer programs with statewide interest. We hope this will be located in a building within the new, high-profile campus entry neighborhood. We are currently developing a planning strategy. This involves fact finding which will take us to various places to see how other organizations have responded to the needs of urban horticulture clients.

Cooperative Extension farm advisors confer with EH faculty during the annual coordinating conference. This meeting fosters collaboration and improves the outreach programs of both groups.

An increasingly important aspect of outreach involves development of extramural funding for programs. I am very much involved in this process and am working with several potential benefactors to do great things for environmental horticulture in California. One example is the establishment of endowed chairs to secure faculty research programs in particular areas of need. To date we have statements of intent to provide substantial funding for an endowed chair in rose breeding and a second endowed chair for arboriculture. We are searching for persons who would be willing to contribute to these. We are also very open to other initiatives for endowed chairs in the area of environmental horticulture.

The Budget- Present and Future

We are doing everything possible to deal with the current bleak budget situation. We are seeking innovative ways to sustain the department, some of which I have already mentioned. We have just been informed of some fairly major budget cuts in Cooperative Extension and because most of extension funds are in salaries, it will be a challenge to find ways to manage these cuts. It is our intention to avoid lay-offs. Our experience with IR4 this year proves that we can avoid lay-offs of experienced, dedicated staff by shifting their efforts to other projects.

A by-product of our recent success in obtaining outside grants is that some of the indirect costs come back to the department. We are committed to using these funds to promote our ability to do research because it is our productivity that benefits us and California in the long run.

Even though next year we may realize some fairly painful budget cuts, I am encouraging everyone in EH to look for opportunities to build, not cut, the department's activities. We should look for ways to expand our teaching programs because this funding will remain strong. The department's recent acquisition of laboratory and office space in the new Plant and Environmental Sciences Building is a positive step and gives us room to grow. The fact that we can accommodate new faculty or USDA researchers will help us in filling these positions.

It should be noted that, while we intend to take good care of our excellent and dedicated faculty and staff and to preserve the investment that California has made in EH, there will be a significant effect on the public. We will no longer be able to provide assistance in problem solving at no cost. We will not be able to travel to meetings unless the costs are covered. We will shift our research to funded projects, abandoning important work that has little or no funding basis. In other words, with the State removing a huge portion of its support for us, we must privatize a part of our operation. **GP**

CORF Presents Water Quality Management Program for Flower Growers at EH on June 18

On June 18, 2003, the California Ornamental Research Federation (CORF) will present a grower education program on water quality management at the EH department on the UC Davis campus. CORF's mission is to identify the research and educational needs of the California floriculture industry and to meet those needs by offering educational programs conducted in partnership with growers, floriculture associations, the allied trade industry and research/educators.

This day-long seminar will provide cut flower and potted plant producers with information about methods and equipment available for managing water quality at nurseries. Topics will include evaluation of water quality, water treatment methods, irrigation management and management of nutrient and sediment runoff. The program will also include a brief tour of Hines Nursery in Vacaville and Four Winds Nursery in Winters. CEU/CCN Pro hours have been requested. The program is also sponsored by Syngenta, Crompton (Uniroyal), Dow AgroSciences, Olympic Horticultural Products, SePro, Source Technologies Biologicals, Target Specialty Products, United Horticultural Products, and Western Farm Service.

CORF Water Quality Management Program • June 18, 2003
Environmental Horticulture Department, UC Davis • Room 146

Presentations

9:00	*Evaluating water quality*	*Richard Evans, UCCE , UC Davis*
9:30	*Sand filtration*	*Larry Schwankl, UCCE , UC Davis*
10:15	*Reverse osmosis and other membrane filtration systems*	*Jatal Mannapperuma, California Institute of Food and Agriculture Research, UC Davis*
10:45	*Control of pathogens in recirculating irrigation systems*	*Jim MacDonald, Executive Associate Dean, UC Davis*
11:15	*Drainage water recirculation*	*Heiner Lieth, UCCE , UC Davis*
12:00	*Lunch and board bus for tour*	

Nursery Tour

1:00	*Hines Nursery, Vacaville*
3:00	*Four Winds Nursery, Winters*

Registration costs $60.00 ($85.00 after June 12th). Call the CORF office (831-724-1130) for more information about this and other grower education programs. Log on to the EH department website <http://envhort.ucdavis.edu> for directions to the event.

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