

Department of Environmental Horticulture • University of California, Davis

GROWING Points

Cooperators for The California Tree Failure Report Program Gather at Filoli Center



<http://envhort.ucdavis.edu>

The picturesque grounds of Filoli were the January setting for the annual meeting of cooperators involved in the California Tree Failure Report Program. Established in 1987, this unique program seeks to compile quantitative information about urban tree failures in a central database. The data will be subsequently used to assess failure potential in standing trees and establish failure patterns for particular tree species. The day-long meeting brought together arborists, foresters, consultants and academics from throughout California to get an update on



A tower and cable system was installed to preserve this specimen live oak in El Dorado County.

the program's progress, share reports of interesting tree failure cases and hear presentations on current urban forest research.

The California Tree Failure Report Program (or CTFRP) was developed by Larry Costello, UC Cooperative Extension Advisor in San Mateo and San Francisco counties, Dr. Alison Berry, professor, and Dr. Richard Harris, professor emeritus, in the Environmental Horticulture Department at UC Davis. The program draws on the help of over 200 tree care professionals around the state to document tree failures as they occur. The information is recorded on standardized forms and sent to Katherine Jones, Horticulture Associate for Cooperative Extension in San Mateo County, who manages the database and extends the information through the CTFRP web site (<http://treefail.ucdavis.edu>) and a semi-annual newsletter, *Breaktime*.

As of the end of 2001, over 3300 failure reports have been submitted, according to Larry Costello in his status report to the group. The most commonly reported genera were *Pinus* (20%), *Quercus* (20%), *Eucalyptus* (14%) and *Cupressus* (12%). The majority of reports have originated in the San Francisco Bay Area counties but efforts are being made to train collaborators in other parts of the state. Nearly two-thirds of the reported tree failures occurred between the months of October and March and half occurred while estimated wind speeds were over 25 miles per hour. The point of failure on individual trees was fairly evenly distrib-

uted among trunk, branch and root system, and in over half of the cases no decay was visible. Two-thirds of reported failures occurred in park or residential settings and only 3% occurred in parking lots. Failure patterns are beginning to emerge for particular species and genera but more data is needed to establish these "failure profiles".

Several CTFRP cooperators presented memorable cases of individual tree failures, including a champion red fir in Yosemite and a palm in the Bay Area that was estimated to weigh 300 pounds per foot. After pruning of lateral branches, a Chinese pistache tree in Chico suffered the "banana split" type of failure where a scaffold branch split in two along its length. After suffering the loss of a major limb, \$20,000 was spent on a tower and cable system to support the remaining branches of a large specimen live oak in El Dorado County (see photos pages 1 and 2).

Another objective of the annual CTFRP meeting is to extend information to tree care professionals concerning current areas of research in urban forestry. Dr. Matteo Garbelotto, Forest Pathology Specialist with UC Cooperative Extension, Berkeley, discussed alternative models of decay development in trees. The widely recognized model of "compartmentalization of decay in trees" (CODIT) contends that barriers to the progress of fungal disease are actively laid down by the host tree. This notion is being challenged by researchers who are finding microenvironmental factors such as oxygen

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A major branch was lost from the right side of this specimen live oak prompting the installation of a tower and cable system to preserve the tree.

level and water status may have more effects on restricting fungal colonization.

William Graham of the University of Pennsylvania's [Morris Arboretum](#) demonstrated his biomechanical model for studying the behavior of cable systems in trees. Using dowels anchored in a base and tied

together in various configurations simulating cable designs, wind or other forces can be applied to the system while filming it to assess the response. Such factors as oscillation of branches, cable slack and torque forces can be studied to better predict the type of cabling best suited to a given situation.

Horticultural consultant (and EH grad), Nelda Methany of HortScience Inc. in Pleasanton, examined several of the current mathematical formulas used to calculate failure



Closeup view of tower and cable system installed to support specimen live oak.

potential in trees. She discussed both the merits and pitfalls of formulas for predicting strength loss due to decay, trunk breakage due to windthrow and failure based on the ratio of height to diameter.

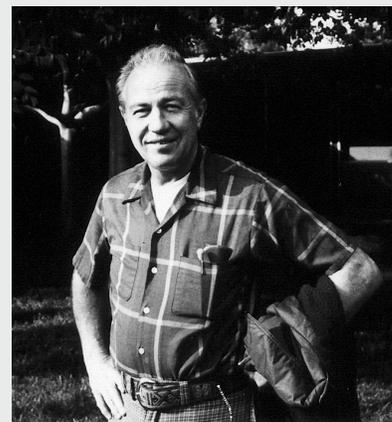
Dr. Ted Swiecki of the horticultural consulting firm, Phytosphere Research in Vacaville, provided an update on the Sudden Oak Death (SOD) situation in California. The latest information shows the SOD pathogen (*Phytophthora ramorum*) is responsible for a bark canker disease of oaks and does not get into the wood. Trees weakened by the disease are more prone to infection by opportunist fungi that can move into the inner wood. Boring beetles can then tunnel more extensively through the decayed wood further weakening infected trees. Dr. Swiecki also presented field diagnostic information on other fungal diseases of oaks so tree care professionals can distinguish these from SOD.

The staff of [Filoli](#) (including EH grads Lucy Tolmach and Jim Salyards) provided a perfect atmosphere for horticultural networking and lunch with a grand view of the grounds. Meeting organizers presented an informative program sure to stimulate future participation in the California Tree Failure Report Program. Visit their web site (treefail.ucdavis.edu) for details on becoming a cooperator. -Linda Dodge

Harry Kohl Memorial Scholarship Seeks Donations

The Harry Kohl Memorial Scholarship Fund was established in July 1999 to honor our colleague and dear friend, Harry C. Kohl, Jr. who died September 23, 1996. Harry, a long-time Davis resident and UC Davis emeritus professor, is well remembered for his early work in the 1950's responding to the needs of California's fledgling floriculture industry. After establishing his career at UCLA, he moved his family to Davis where he was instrumental in making a new department, now known as Environmental Horticulture, a success. He served as chair from 1966-1973. During those years, he assured the department had first-class greenhouses and set our future direction. After "retiring" in 1986, Harry did ongoing research in large-flowered cyclamen hybrids and evaluating the potential market for his short crop seed-propagated Easter lilies. Harry had numerous accomplishments and we fondly remember him for his pleasure in mentoring graduate students, his sense of humor and his friendship.

Thus the department, with the blessing of his wife Martha, established a scholarship to help fund and nurture the development of our graduate students. A minimum of \$10,000 is needed to start providing small scholarships to our deserving students. We are a mere \$3,000 away from our first goal. If you can help, then please drop us a note with a check made out to the UC Davis Foundation and send to Sandra Fielden, Department of Environmental Horticulture, University of California, Davis, CA 95616-8587. -Sandy Fielden



As Harry's "Hi friend" echoes in the corridors of Environmental Horticulture, let's make sure we also hear "Thank you friends. Well done."

EH Department Has Big Plans for Picnic Day: April 20, 2002

Mark your calendars and plan to be in Davis on April 20, 2002! **Picnic Day** is the annual Open House for the University of California, Davis. On this Saturday, folks from all over California come to UC Davis to



Mark Bibbo displays transplanted seedlings that will be ready for your garden on Picnic Day.

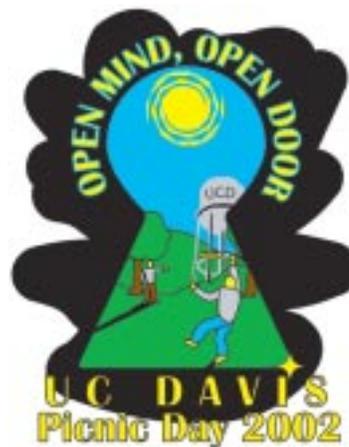
see what's going on in every unit of the campus. According to the Picnic Day Board of Directors, this is the largest student run event in the United States. From the pancake breakfast and parade to the battle of the bands, the day is intended to highlight the richness of campus life, to celebrate the achievements of UCD students, staff and faculty and to provide a day of education,



Julie Lohr, Mark Bibbo and Pam Frickmann of the EH Club transplant plugs to be grown on and given away during Picnic Day.

information and entertainment for all who attend. There will be more than 150 events throughout the Davis campus and expected attendance may exceed 50,000.

EH faculty, staff and students are planning a full day of activities to showcase the department's achievements and extend practical horticultural information to the general public. Because our department's building complex is on the outskirts of campus, we have, for the past few years, brought our message to a more central location through the use of a mini greenhouse. Decorated with plants and flowers and staffed by horticulturists eager to answer questions, this location initially attracted people who were then directed to our department for tours of the greenhouses and grounds. This year we



transferring snapdragons, violas, dianthus, gazanias and petunias from plug trays to six packs. These plants will be given away to those visiting the department on Picnic Day and information on their garden care will be included.

A series of mini seminars on topics of interest to home gardeners and horticulture

Picnic Day Seminars to be held at Environmental Horticulture

<i>TIME</i>	<i>SPEAKER</i>	<i>TOPIC (All talks in EH Room 146)</i>
10-10:30	Michael Reid	<i>The Secret Life of Plants</i>
10:30-11	Truman Young	<i>Opportunities for Involvement in Local Restoration Projects</i>
11-11:30	Heiner Lieth	<i>Commercial Rose Production</i>
11:30-12	Lin Wu	<i>Selecting and Growing Turf in Northern California</i>
12-12:30	Mark Bibbo	<i>California Natives for the Central Valley Garden</i>
1-1:30	Ron Lane	<i>Hydroponics in the Home</i>
1:30-2	Richard Evans	<i>Container Gardens</i>
2-2:30	Rik Smith	<i>Training Young Trees</i>
2:30-3	Kat Anderson	<i>Harvest and Renewal- Native American Gathering Methods that Sustain California Native Plants</i>
3-3:30	Kathren Murrell	<i>Mountain Meadows</i>

plan to focus our efforts on getting people to the department through advertising and enticements such as plant giveaways and a series of mini seminars, as well as tours.

Hundreds of six packs of bedding plants that were recently transplanted from plugs donated by Goldsmith Seeds are now growing in EH greenhouses to be in bloom or garden-ready by Picnic Day. Members of the EH Club spent a Saturday

enthusiasts will run on Picnic Day from 10:00 AM to 3:30 PM in the department's classroom. Each mini seminar will last about 20 minutes and feature faculty and students. See the table above for exact times, presenters and topics.

In addition to these activities, posters outlining recent research projects will be visible in the windows of individual labs in the department. The traditional guided tours of the greenhouses will run most of the day. The EH grounds will be open for wandering and full of spring color plus a few unusual plants as well. In the spirit of this year's Picnic Day theme, bring an "open mind" to the EH Department's "open door". **GP**

Class Field Trip Showcases California Horticulture

Every year during the Winter Quarter “Greenhouse and Nursery Production” course (ENH 125) at UC Davis, students participate in a two-day field trip to view the real world of ornamental horticulture. They have the unique opportunity to visit some of the nation’s finest and largest production and shipping facilities. These cut-flower, potted plant and landscape nursery businesses are located less than 150 miles from Davis in the mild coastal climate of Northern California. Instructor Dr. Heiner Lieth ensures that everyone on the field trip has a great learning experience and a lot of fun as well.

This year’s participants were quite a diverse group, including descendents of established horticultural family businesses as well as a former member of the local



A multitude of flowers are available even in January at the San Francisco Flower Mart.

Superior Court who traded in the judge’s bench for the greenhouse bench. There’s always room on the field trip tour bus for a few extra adventurous souls and this year DANR’s Program Leader for Agricultural Productivity, Dr. Michael Reid, managed to clear his schedule and join the group. He even took a few turns on the bus microphone as tour guide, describing various aspects of California agriculture visible along the route. Melody Meyers, this year’s teaching assistant for the course, enthusiastically carried out the endless headcounts after each stop and demonstrated great herding skills in guiding us through many green-

houses in timely fashion.

Only hazy recollections of the field trip’s beginnings remain, as our departure time from Davis was 5:30 AM on Friday, January 25th. We arrived at our first stop, the San Francisco Flower Mart, around 7:00 AM which is actually near the end of the business day for this large wholesale flower market. One of only five such facilities in the U.S., growers and wholesalers offer every cut and potted flower crop imaginable to over 5000 registered buyers, mainly retail florists in Northern California. The main action takes place in this downtown facility from midnight to 6:00 AM but some businesses open to the public for retail sales after 8:30 AM. Manager Bob Otsuka recounted the market’s history from the associations of Japanese-, Italian- and Chinese-American flower growers in the early 1900s to today’s modern permanent building complex. He then escorted the group through the market pointing out the various types of vendors and products, after which he treated the entire group to a much-appreciated Continental breakfast.

UC Davis alumnus, Tim Oldham, greeted us at our next tour stop, Nurserymen’s Exchange in Half Moon Bay. This facility, overlooking the Pacific Ocean, is one of the nation’s largest producers of potted flowering and foliage plants. Growing a large variety of greenhouse and outdoor crops, you probably see some of their products under the brand name “Bloom-Rite” when you visit the local supermarket. A family-owned business for over 60 years, Nurserymen’s recently expanded to include a cut-flower operation in Watsonville, also under the “Bloom-Rite” label. The high-



Manager Bob Otsuka guides ENH 125 students through the San Francisco Flower Mart.

lights of the tour were the highly automated mini-rose production system and the large variety of traditional flowering potted crops.

Our next stop was Bill Suyeyasu Wholesale Florist in Fremont. This large wholesale distributor ships cut flowers and foliage all over the United States. They also design and assemble bouquets for shipping to supermarkets. Todd Hackney guided us through the facility and students were able to view one of the best operations for pre-cooling packed flower boxes. Suyeyasu’s staff has always been on the cutting edge of postharvest technology and frequently cooperates with UC Davis researchers.

We continued to travel south, stopping next in Morgan Hill to visit Kawahara Nursery, a large wholesale bedding plant grower providing annuals, perennials, herbs, potted flowering crops, and vegetables to Northern California garden centers. Their distinctive pink six packs are a familiar sight. They grow their crops from seed using automation to plant and water in the seed in plug trays. Seedlings are grown on as plugs for a few weeks and then run through a robotic transplanter and transferred to six-pack containers. Crops are either finished as six-pack transplants or potted up to 4-inch or one-gallon pots. Several of their greenhouses were filled with spectacular blooming cyclamen ready for Valentine’s Day sales. Check out their excellent web site at: www.kawaharanursery.com.

Our final destination for the day was Goldsmith Seeds in Gilroy. This company has been providing the industry with seed



Bouquets are made assembly line-style at Bill Suyeyasu Wholesale Florist in Fremont.

varieties of ornamental bedding plants for 40 years and, ten years ago began producing vegetative transplants as well. The Gilroy facility is where most of the breeding and research takes place and Mike Capp guided our group through some of the greenhouses. Students were able to see a multitude of pansies, violas and marigolds in various stages of selection, crossing and production of precious hybrid seed. Germination testing is one of the crucial stages in the development of a variety and Goldsmith's rigorous standard of better than 95% germination eliminates many contenders. Lots of information about their varieties can be found on their web site: www.goldsmithseeds.com.

The second day of our tour began with a visit to Pajaro Valley Greenhouses in Watsonville, led by production manager, Don Howell who is the current president of the International Cut Flower Growers Asso-



Cyclamen crop ready for Valentine's Day at Kawahara Nursery, Morgan Hill.

ciation. Arne Thirup, who founded the company in 1962, also accompanied our group and kept up a lively conversation with Michael Reid about the state of the flower industry. Pajaro Valley currently has three production locations, 1.4 million square feet of greenhouses and 50 acres of field flowers. They grow 40 different types of fresh cut flowers and 40 varieties of roses. Students saw both traditional ground beds and sophisticated hydroponic systems for growing

roses. Don outlined the IPM program they are using to successfully control insect pests in the greenhouses. The Valentine's Day crop was just about ready for harvest at the time of our visit and there were rose buds as far as the eye could see. Students were also able to see the Olimex rose grading machine in action, a computerized system for grading and bunching cut roses that significantly reduces hand labor. This company has an excellent web site which can be found at: www.pvflowers.com.

Our second stop, also in Watsonville, was Aspen Enterprises, a cut rose production facility run by UC Davis alumnus Bill Young. His greenhouses are mostly devoted to growing state-of-the-art hydroponic roses for cut flowers. Bill had many interesting stories to tell about the vagaries of the flower business. He was able to survive last year's energy crisis but a recent hailstorm broke 800 panes of greenhouse glass in five minutes. Then there was the neighbor who called out

the sheriff to stop Bill from applying white-wash to his greenhouses using a helicopter. It took some convincing to make them realize calcium carbonate was not a threat to their health while the helicopter sat on the ground for a few hours with the motor running.

Last but certainly not least, we visited Monterey Bay Nursery in Royal Oaks, wholesale growers of ornamental and color container crops, operated by Luen Miller for over ten years with about 30 acres in production. Our guide, Ann Stocker, summed it up when she called this facility "the ultimate plant geek's paradise". They grow over 150 species and countless cultivars, including California natives, Australian plants, Mediterranean plants, fuchsias, ferns, geraniums, cyclamen, lantana, clematis, *Salvia*



Automatic equipment for rose grading and bunching at Pajaro Valley Greenhouses, Watsonville.

and *Phormium*. They have introduced many plants to the trade and are always looking for new and improved varieties. Ann guided us through the converted chicken houses that served as their first greenhouses to the more modern houses with concrete floors purchased from a nearby nursery. The hilly terrain of the outdoor growing grounds allows drainage of irrigation water into a central recycling pond which is then reused. Monterey Bay's entire catalog is on line with many excellent pictures and is a great resource (www.montereybaynsy.com).

As this year's nursery production field trip came to a close, Dr. Lieth's students no doubt had a clearer picture of the real world of California horticulture. We hope this information will help direct the course of their studies and influence their career choices. -Linda Dodge



Notes From the Chair... by Heiner Lieth

Being department chair is a memorable experience in that one becomes a part of all the successes (and failures) of all of those around you. I am always amazed at how the successes outnumber the failures. Thus it is a pleasure to report to you what's happening in EH.

Our students are, of course, our first priority. Our undergraduate major, Environmental Horticulture and Urban Forestry (EHUF), is doing well with 40 currently enrolled in the program. The curriculum is currently being reviewed by the campus and we anticipate a lot of positive feedback.

I have also involved myself in the **EH Club**-a group of students who love horticulture and want to be involved in it. As mentioned earlier in this newsletter, the group is quite active and is making significant contributions to the EH department as well as the Arboretum.

We continue to have a number of outstanding graduate students. Two students in my group, **Soo Hyung Kim** and **Loren Oki**, completed their Ph.D. theses in recent months. Dr. Kim is now at the USDA ARS facility in Beltsville, Maryland. Several new Ph.D. students have already joined my group to help me with my research program.

Two of **Richard Evans'** students are making progress on their degrees. **Kris Kiehne** has submitted a draft of her Master's thesis and **Lisa Bruni** has finished her mycorrhizal research and has begun writing her Master's thesis.

Rik Smith, Ph.D. Candidate in Ecology, working in **Alison Berry's** Lab, gave a talk at the 2002 California Chapter of the American Society of Agronomy's California Plant and Soil Conference in Fresno on February 6, 2002. The title of Rik's talk was "Leguminous Cover Crop Residues in Orchard Soils: Nitrogen Release and Tree Uptake."

EHUF graduate, **Angela Pratt** (2000), is finding success as a free-lance horticultural writer and photographer. Her article titled "Our Valley Oaks" appeared in the February 2002 issue of **Sacramento Magazine**, inspired by the 150-year old valley oak in her front

yard.

As you probably know, the aging departmental facilities are in need of rejuvenation. So it is a pleasure to be able to announce that the department has secured a substantial amount of space in a brand new building on campus. We have been allotted enough space for three professors and their research teams. This facility is some distance away from the main EH site so that we will soon have two locations. Thus when you visit us in the future, be sure to know whether you should go to EH-south or EH-north.

Alison Berry, **Michael Barbour** and **Truman Young** are set to move into their new offices and labs in the nearly completed Plant and Environmental Sciences Building (better known as EH's "North Facility") in May and June. They are looking forward to collaborating with their new neighbors in the department of Agronomy and Range



Life after being department chair- Dave Burger makes some new friends on a recent trip to Australia.

Science and the department of Land, Air and Water Resources.

Dave Neale, **Tom Ledig** and **Wes Hackett** are all in various stages of becoming adjunct professors in the EH department. This courtesy title will allow them to serve as Principal Investigators on certain granting agency proposals.

NASA's Technology Transfer and Commercialization Office via their Inventions and Contributions Board has just awarded **Don Durzan** and **Frank Ventimiglia** recognition and an award for the invention "Recovery of taxanes and drugs by cell and biosynthetic surface enrichment with anti-drug antibodies" (US Patent 5,981,777). This award will be high-

lighted in *Tech Briefs: Engineering Solutions for Design and Manufacture*.

Greg McPherson won the US Forest Service, Pacific Southwest Research Station's Civil Rights Award. For the past five years he has applied for and received matching funds from the Station's Summer Intern Program to hire up to three college students as part of the Asian-American Pacific Islander Recruitment Initiative at UC Davis. He recruited and then hired as permanent employees two students from historically black universities in support of African American Multicultural Workforce Initiatives. Today, women and minorities account for 7 of the 12 permanent and term employees at the **Center for Urban Forest Research**. In addition, Greg partnered with the **Sacramento Tree Foundation's** NeighborWoods program coordinators to establish a volunteer-based tree inventory and monitoring program in Oak Park, one of Sacramento's most socio-economically challenged and underserved neighborhoods.

As you can see by the photo at left, **Dave Burger** is having too much fun on his sabbatical leave. Currently, he is organizing this year's **OHECC** meeting (Ornamental Horticulture Extension Coordinating Conference) at a resort in Palm Springs. Such is the life of a former department chair.

Principal Superintendent of Agriculture, **Ron Lane**, is approaching his tenth year of service with the University. His efficient management of the department's greenhouses is a model for the campus and several researchers from other departments seek to run experiments there. Ron will be teaching another University Extension course scheduled for May 24, 2002. "Hydroponic Vegetable Production" is an intensive one-day introduction to the commercial production of vegetables using various water culture methods. Find out more information at University Extension's web site (<http://extension.ucdavis.edu/>).

As you see on page 3, we have made some significant plans that include **you**. Please come visit us on Picnic Day. While we certainly had the general public in mind in our planning, we were particularly interested in providing something of interest to you, our friends. **GP**

Faculty Research Updates -Abstracts from recently published papers

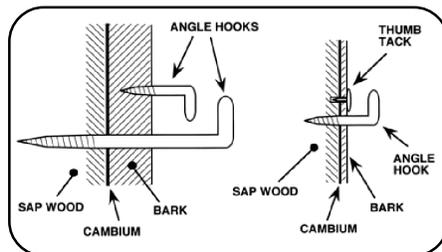
Royce, E.B and Barbour, M.G. 2001. Mediterranean climate effects. I. Conifer water use across a Sierra Nevada ecotone. *American Journal of Botany* 88(5): 911–918.

Xylem water potential of the midelevation conifers *Pinus jeffreyi*, *Pinus lambertiana*, *Abies concolor*, and *Calocedrus decurrens*, the higher elevation *Pinus monticola* and *Abies magnifica*, and co-occurring evergreen angiosperm shrubs, together with soil moisture under these plants, were monitored at three sites on the Kern Plateau in the southernmost Sierra Nevada Range of California. Site locations spanned the ecotone between the mid- and upper montane forests at elevations of 2230–2820 m. Measurements were made through a low-snowfall year and a heavy-snowfall year.

In the Mediterranean climate of the Sierra Nevada, the heavy winter snowpack persists into late spring, after precipitation has effectively stopped. We found the subsequent depletion of soil moisture due to plant water uptake to result in predawn xylem water potentials for conifers more negative by 0.6–1.4 MPa than those for shrubs or inferred soil potentials. Shrubs generally depleted soil moisture more rapidly and ultimately extracted a greater fraction of the available soil moisture than did the conifers. This depletion of soil moisture by shrubs, particularly *Arctostaphylos patula*, may limit conifer growth and regeneration by prematurely terminating growth on the shallow soils studied. The conifers all generally showed similar patterns of soil moisture use, except that *A. magnifica* extracted moisture more rapidly early in the season.

Royce, E.B and Barbour, M.G. 2001. Mediterranean climate effects. II. Conifer growth phenology across a Sierra Nevada ecotone. *American Journal of Botany* 88(5): 919–932.

Growth and xylem water potential of the lower elevation conifers *Pinus jeffreyi* and *Abies concolor* and the higher elevation *Pinus monticola* and *Abies magnifica* were monitored in their montane Mediterranean habitat of the southernmost Sierra Nevada mountains of California. Measurements were made across the ecotone between the midmontane and upper montane forests and



Schematic drawing of dendrometers used by Royce and Barbour for measuring conifer tree growth.

through light and heavy snowfall years.

Radial stem growth, averaging 1.5 mm/yr, started 2 wk after snow melt, providing that maximum air temperatures had reached 21 C, and ended when predawn water potentials fell rapidly at the onset of the summer drought. Leader growth started on or after a fixed date, providing that minimum air temperatures were above 24 C for *Pinus* species or 12.5 C for *Abies* species. The cue for leader growth was inferred to be photoperiodic. Leader growth ended when either a determinate internode length of 1 mm was reached or predawn water potentials fell rapidly. *Abies magnifica* grew more rapidly than the low-elevation species, but had a shorter growth period; its annual leader growth, as a consequence, was only 35 mm/yr vs. 50 mm/yr for the low-elevation species. Needle growth was similarly determinate in the absence of early drought. This growth phenology contributes to determining species distribution across the ecotone.

Sher, R.B., Parrella, M.P. and Kaya, H.K. 2000. Biological control of the leafminer *Liriomyza trifolii* (Burgess): Implications for intraguild predation between *Diglyphus begini* Ashmead and *Steinernema carpocapsae* (Weiser). *Biological Control* 17: 155–163.

Studies were conducted on the combined use of the eulophid parasitoid wasp *Diglyphus begini* Ashmead and the entomopathogenic nematode *Steinernema carpocapsae* (Weiser) for control of the leafminer *Liriomyza trifolii* (Burgess) on chrysanthemums. Several factors indicated that these two agents were suitable for combined use: adult *D. begini* were not susceptible to nematode infection, leafminer larvae parasitized by the wasp were less

susceptible to nematode infection, adult wasps detected and tended to avoid ovipositing on nematode-infected leafminer larvae, nematode-infected larvae served as host-feeding sources for the adult wasps, and nematodes showed equal orientation toward paralyzed/parasitized leafminer larvae and healthy leafminer larvae. However, interspecific interference and intraguild predation (IGP) between the agents were found. Infection of *D. begini* larval stages by nematodes was seen in petri dishes and in intact leaf mines. The presence of nematodes in mines with wasp eggs decreased the chance of wasp survival to adulthood. IGP may be minimized through proper timing of natural enemy releases.

Wu, L.L., Banuelos, G. and Guo, X. 2000. Changes of soil and plant tissue selenium status in an upland grassland contaminated by selenium-rich agricultural drainage sediment after ten years transformed from a wetland habitat. *Ecotoxicology and Environmental Safety* 47: 201–209.

A field survey was conducted in 1989, 1994, and 1999 in order to monitor the soil and vegetation Se concentrations at the Kesterson upland grassland contaminated by Se-rich drainage sediment. The rate of Se dissipation estimated by the change of soil Se concentration, via volatilization, was found to be about 1.1% per year. Soil water-extractable Se increased in 1994, but greatly decreased in 1999. The increase of soil Se concentration in the top 15 cm of soil at the fresh-soil fill sites indicates that the plants were able to effectively take up the soluble soil Se from the lower soil profile and to deposit it on the top of the field. This process may reduce the rate of leaching of soil Se. Overall, the concentration of soil water-soluble Se was relatively low and it is unlikely that problems of transport of Se from the Kesterson soil to the adjacent uncontaminated environment by leaching can occur. Plant tissue Se concentration was found to coincide with the soil water-extractable Se concentration. The average plant tissue Se concentration and soil water-extractable Se detected in 1999 were about 10 µg Se·g⁻¹ and 110 µg Se·kg⁻¹ dry weight, respectively, and the estimated bioaccumulation value of this upland grassland is less than 10% of the previous wetland habitat. Therefore, the existing Kesterson grassland should not be at high risk to the environment. GP

California Master Gardener Handbook Now Available

The long-awaited reference tool for California Master Gardeners is here! This handbook is the first compilation of horticultural training and reference materials designed primarily for Master Gardeners statewide. Designed as a reference tool for use during and after completion of the formal Master Gardener training program, the handbook contains detailed information and important facts not found in other texts written for this audience.

Chapters include background information on disciplines related to the general culture and management of horticultural crops. Topics include soils, fertilizers and plant nutrition, water management, plant propagation, plant physiology, weeds and pests. Chapters also address the specific culture and management of horticultural

crops important in California including woody landscape plants, turf, houseplants, grapes, berries temperate fruits and nuts, citrus and avocados. In addition, information on landscape design, poisonous plants and developing problem-solving skills is included. Nutritional composition data is provided for most of the edible crops covered in the handbook along with information on how to interpret the data. The handbook also contains an appendix of useful conversions for many units of measure encountered in the text or in caring for crops.

The *California Master Gardener Handbook* is an invaluable reference tool for retail nursery staff, horticultural advisors, and all California gardeners. Order it on line from ANR Communications Services (<http://anrcatalog.ucdavis.edu>).



This essential 700-page reference is a bargain at \$30.00 per copy!

Restoration Nursery Conference set for March 21 at UC Davis

This one-day conference is designed to bring together people involved in the production of seed and stock for ecological restoration projects in (northern) California, together with research scientists. One goal of the conference is to inform restoration growers of some of the current research that applies to their industry, and to open lines of communication between growers and the University. In addition, conference organizers hope to provide a forum for restoration growers to interact with each other and discuss issues of common concern.

Presentations planned for the morning session include *Genetics and plant provenance* (Kevin Rice), *Native Seed Network* (Keli Kuykendall), *Wildland seed certification* (Betsy Peterson), *Sudden Oak Death in container-grown native species* (Steve Tjosvold), *Argentine ants in restoration nurseries and planting sites* (Andy Suarez) and *The role of native and non-native soil microbes in restoration*.

Lunch will be provided followed by an afternoon discussion of possible organized relationships among nurseries, and with the University of California. The conference will be held at Putah Creek Lodge on the UC Davis campus and will run from 9am-3pm. There is no cost for this event. To register, e-mail Samantha Smith (samsmith@ucdavis.edu).



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