

# COHORT

A NEWSLETTER FOR TURFGRASS, LANDSCAPE, AND NURSERY ISSUES

## LANDSCAPE LOPPINGS

by Dennis R. Pittenger

### EFFECTIVE NATURAL ENEMY OF NEW EUCALYPTUS PEST UNDER STUDY AT UC RIVERSIDE

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**NOTE:** The following press release was issued July 5, 1996 from UC Riverside. It contains an update of the eucalyptus snout beetle problem and information that may impact County Extension offices.

A new insect pest of one of California's most venerable landscape trees--the eucalyptus--is on the march and threatens to defoliate trees throughout the state, but entomologists at the University of California, Riverside have found a natural enemy of the pest beetle and are preparing for biological battle.

The eucalyptus snout beetle, first detected in Ventura in 1994, was found last month in a Santa Barbara County park and had previously been reported as far south as Topanga Canyon in Los Angeles County.

The rust-colored, 3/8-inch-long beetle chews notches along the edges of young leaves, quickly defoliating eucalyptus trees. The immature larvae of the beetles, too, cause extensive damage; the yellow-and-black striped grubs adhere to leaves with a secreted slime and feed on the leaves. As the grubs crawl and feed, they produce strands of black fecal pellets that fall from the trees.

UCR scientists have imported and tested a pinhead-sized parasitic wasp which they say has performed remarkably

well in field tests. The wasp lays its eggs inside the dark brown, quarter-inch-long egg capsules that the snout beetle deposits on the upper surface of eucalyptus leaves. The wasp eggs hatch and the larvae consume the beetle eggs. (Cont.'d on p. 2)

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The stingless wasp, imported from South Africa, poses no threat to native insects, landscape plants or to commercial agriculture, according to UCR scientists.

"In the places where we have released the wasp, we have seen a parasitism rate of almost 100 percent, so it's very efficient. The beetle larvae disappear and the beetle populations crash. It's quite a dramatic success," said Larry Hanks, an assistant research entomologist at UCR.

The snout beetle is the newest of three major eucalyptus pests that have threatened one of California's most prevalent urban landscape trees. Imported from Australia, eucalyptus trees were first planted more than a century ago for use as windbreaks, telephone poles, lumber and paper pulp. They have since become a popular landscape feature because they grow fast and require little maintenance.

The first insect to attack eucalyptus in California was the eucalyptus longhorned borer. First discovered in 1984 in Orange County, the beetle has spread rapidly throughout the state, in both coastal and valley areas. UCR scientists have imported from Australia and released against the longhorned borer two species of natural enemies, which have become established in areas throughout the state and show promise as an effective biological control. The borer is now becoming a serious pest in the Bay Area and UCR scientists are extending the biological control program there.

The blue gum psyllid, an insect pest that threatened the state's \$30 million decorative foliage eucalyptus industry beginning in 1991, has been successfully managed with the introduction of another tiny wasp parasite by UC Berkeley and UC Cooperative Extension scientists.

Repeated attacks of eucalyptus trees by the recently-arrived snout beetle will eventually kill the trees. The larval, or grub, stage of the insect feeds both on the tender young leaves and the tips of new shoots, while the adult insect chews notches in leaves. The feeding can stop branch growth or kill an entire major branch.

The snout beetle has recently spread from Ventura County northward to Santa Barbara. On May 21, UCR scientists found a significant infestation of the insect in eucalyptus trees in Lookout Park in the community of Summerland, just south of the city of Santa Barbara. It had previously spread to the coastal portions of north Los Angeles County. Scientists anticipate the beetle is capable of spreading throughout the eucalyptus-growing regions of the state. "It

probably already occurs up and down the coast at low densities," said Hanks, who added that he expects to find evidence of the insect spreading this summer, the season when it is most active.

An extensive infestation could also potentially harm the Monarch butterfly, which uses eucalyptus trees from Santa Barbara north to Monterey for shelter during the winter months.

The tiny wasp under study at UCR, which goes by the scientific name *Anaphes nitens*, has been released by University of California scientists at several sites in Ventura County where it has successfully parasitized the beetle.

Uses of biological control, like this one, have become more common in recent years as insects develop resistance to chemical pesticides, as the public grows more concerned about the widespread use of insecticides, and as governmental agencies phase out certain chemicals and adopt tougher regulations for the use of others. Insect biological control works by using one or more natural enemies, such as parasites, against a pest insect to keep the population of that insect at low levels.

UCR scientists are asking the public's help to identify areas where the snout beetle has gained a foothold. "We are very interested to know about any other areas of the state where the beetle has migrated. We expect it to pop up elsewhere," said Jocelyn Millar, UCR associate professor of entomology. "The sooner we know about it, the sooner we can ship the natural enemies to those areas."

Adult snout beetles have a characteristic way of hanging on to small eucalyptus branches by wrapping all six of their legs around a branch. The adults live between three and six months, and each female, can lay between 700 and 800 eggs.

The larval grubs can grow to a length of about half an inch. They can be identified by the two nearly-solid black stripes that run the length of the bright yellow body and the small black spots that run across the body, and by their sticky slime and chains of fecal pellets.

Members of the public and park maintenance personnel who observe either the larval or adult forms of the snout beetle on their properties have been informed to contact their local county University of California Cooperative Extension office, or the county Agricultural Commissioner's office.

## LANDSCAPE PLANTS KNOWN TO BE SUSCEPTIBLE TO OLEANDER LEAF SCORCH

Mike Henry, *Environmental Horticulture Advisor, UC Cooperative Extension, Riverside and Orange Counties.*

With the devastating effects of Oleander Leaf Scorch in the Coachella Valley and parts of Orange County, there is a demand for replacement shrubs and trees that are not susceptible to injury from the suspected, though unconfirmed, causal organism, *Xylella fastidiosa*. There are multiple strains of the suspected causal organism, and it appears that a new strain is now affecting oleanders. Research is just beginning on the susceptibility of oleander cultivars and other landscape plants to this bacterial disease, and it will be years before answers are obtained because it takes over six months for the symptoms to appear in newly infected plants. In the meantime, we can only provide lists of plants to avoid based on studies and observations conducted largely in the Southern U.S. where other strains of *Xylella fastidiosa* are found.

### Woody Shrubs and Trees to Avoid

<u>common name</u>	<u>scientific name</u>
American elder	<i>Sambucus canadensis</i>
Blue elder	<i>Sambucus caerulea</i>
Boston ivy	<i>Parthenocissus tricuspidata</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
Pepper vine	<i>Ampelopsis arborea</i>
Porcelain berry	<i>Ampelopsis brevipedunculata</i>
American beautyberry	<i>Callicarpa americana</i>
Eastern baccharis	<i>Baccharis halimifolia</i>
Coyote brush	<i>Baccharis pilularis</i>
Blackberry	<i>Rubus sp.</i>
Goldenrod	<i>Solidago fistulosa</i>
Oaks	<i>Quercus rubra, Q. coccinea, Q. falcata, Q. palustris, Q. laurifolia, Q. nigra</i>
Red mulberry	<i>Morus rubra</i>
Red maple	<i>Acer rubrum</i>
American sycamore	<i>Platanus occidentalis</i>
London plane tree	<i>Platanus x acerifolia</i>
Oriental plane tree	<i>Platanus orientalis</i>
American elm	<i>Ulmus americana</i>
Scotch elm	<i>Ulmus glabra</i>
Siberian elm	<i>Ulmus pumila</i>

California mugwort	<i>Artemisia vulgaris var. heterophylla</i>
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### Herbaceous Plants (Including Grasses) To Avoid

<u>common name</u>	<u>scientific name</u>
Ladino clover	<i>Trifolium repens var. latum</i>
Bermudagrass <sup>a</sup>	<i>Cynodon dactylon</i>
Hairy crabgrass <sup>a</sup>	<i>Digitaria sanguinalis</i>
Dallis grass	<i>Paspalum dilatatum</i>
Alfalfa	<i>Medicago sativa</i>
Periwinkle <sup>b</sup>	<i>Vinca minor, V. major</i>
Poison hemlock <sup>c</sup>	<i>Conium maculatum</i>
Umbrella sedge <sup>c</sup>	<i>Cyperus eragrostis</i>
Wild strawberry	<i>Fragaria vesca</i>
Miner's lettuce	<i>Montia linearis</i>

### Fruit Crops to Avoid

<u>common name</u>	<u>scientific name</u>
Peach	<i>Prunus persica</i>
Plum (Japanese type)	<i>Prunus salicina</i>
Citrus	<i>Citrus sp.</i>
Almond	<i>Prunus amygdalus</i>
Black cherry	<i>Prunus serotina</i>
Blackberry <sup>a</sup>	<i>Rubus sp.</i>
Grape	<i>Vitis vinifera</i>

<sup>a</sup>Recent tests at UC Berkeley did not show infection by oleander strain of *X. fastidiosa*.

<sup>b</sup>Showed initial infection by oleander strain, but no symptoms as of 7/15/96.

<sup>c</sup>In recent tests at UC Berkeley became infected with Pierce's disease strain (grape infecting strain). Tests with oleander strain have not been done.

### Species Tested in Florida that Did Not Show Signs of Infections in One Study

<u>common name</u>	<u>scientific name</u>
Southern wax myrtle	<i>Myrica cerifera</i>
Cotoneaster	<i>Cotoneaster sp.</i>
Lantana	<i>Lantana camara</i>
Mexican tea	<i>Chenopodium ambrosioides</i>

## THERAPEUTIC BENEFIT OF BEING IN A GARDEN

Research sponsored by the Center for Health Design on the use and therapeutic benefits of hospital gardens finds an overwhelmingly positive response from employees, patients, and their families and friends. Of those who were observed and interviewed while in a garden, 95 percent reported a therapeutic benefit. According to the study, this manifests itself in employees being more productive, patients feeling better and having more tolerance of medical procedures, and family and friends feeling relieved of stress.

The research, which was published in a report entitled "Gardens in Healthcare Facilities: Uses, Therapeutic Benefits, and Design Recommendations," was conducted by Clare Cooper Marcus, a professor of architecture and landscape architecture at the University of California, Berkeley, and Marni Barnes, a clinical social worker, landscape contractor, and principal designer of Deva Landscaping in Palo Alto, California. Beside collecting other data, they observed and interviewed people at 24 hospitals, almost all of them in northern California.

Four case studies (including user responses); typology of health facility outdoor spaces; and a set of design recommendations for location, wayfinding, planting, and maintenance are included in the report. Also included are a literature review and a brief historical overview of hospital gardens since the Middle Ages.

Copies of the published report can be purchased for \$27 U.S. dollars from The Center for Health Design, Inc. (4550 Alhambra Way, Martinez, CA 94553-4406; tel. 510-370-0345). The research study was made possible through contributions by Armstrong World Industries Inc., Interface Flooring Systems Inc., JCM Group, and Jain Malkin.

**FROM:** *People-Plant Council News*. 1995. Vol. 5, No. 4. Diane Relf, Editor.

## STATE LANDSCAPE ARCHITECTS' LICENSE MAY BE HISTORY SOON

The California Department of Consumer Affairs (DCA) and the Wilson Administration have recommended in a recent report that Landscape Architects' Law be repealed by July 1, 1998. This recommendation would, among other

things, abolish the landscape architects' state license. The report comes on the heels of a recommendation earlier this year by the Joint Legislative Sunset Review Committee to eliminate the State Board of Landscape Architects.

Since most observers had expected DCA and the Administration to respond to the Joint Legislative Sunset Review Committee by recommending that DCA replace the Board as the future regulator of the profession, the recent news came as a surprise to many.

The Administration/DCA report points out that the Board of Landscape Architects was established in 1953 "to give value to the profession and provide an opportunity for landscape architects to compete on an equal basis with other design professionals." Consumer protection, it emphasizes, "was not the driving force behind the Board's establishment or [subsequent] expansion of its authority."

The report also notes that the Board's enforcement activity during the past three fiscal years has been "virtually nonexistent."

After asserting that "landscape architects have limited contact with the general public or average consumer," the report maintains that "there is no direct actual or measurable risk regarding health, safety or welfare to the consumers of California, resulting from unqualified landscape architects." It goes on to state that "professional incompetence is presumably checked by the marketplace since a landscape architect's plans are reviewed by local planning officials (cities and counties) and by construction project managers (prime contractors)."

For all of these reasons, the report draws the following conclusion: "The continuance of the board and its regulatory authority only benefits the profession through status of maintaining a 'state' license and limiting competition."

The report makes three specific recommendations:

- ☛ Provide for transition to private sector certification of landscape architecture by extending the current sunset date for the Board of Landscape Architects to July 1, 1998, at which time the sunset would include the repeal of Landscape Architects' Law. (The current sunset date is July 1, 1997.)
- ☛ Encourage landscape architects to self-certify or regulate their profession without the power or protection of state law.

☞ Repeal or prohibit any requirements that only state-licensed landscape architects may perform work normally done by individuals trained in landscape design.

Not to give up without a fight, the Board recently sponsored an amendment to an existing bill in the state Legislature, Assembly Bill 3164 by Robert J. Campbell (D-Martinez). The amendment included the following statement: "The practice of architecture and landscape architecture are professions that may be regulated by one board for the protection of public health, safety and welfare." Last month the Assembly Consumer Protection Committee killed this bill with a 4-2 vote.

**FROM:** *The Cutting Edge*. June 1996. California Landscape Contractors Association.

#### ERRATUM for Co-Hort Volume 2.1

- A. Page 5, column 2, paragraph 2, line 7 should read "...branch and shoot tip dieback..."
- B. Page 6, column 1, line 2 should read "...stinging nettle, crape myrtle, and blackberry."

## NURSERY NUMBERS

by Ursula K. Schuch

### NURSERY STATISTICS

John R. Brooker, *University of Tennessee*  
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Nurseries in 24 states, which represent about 80 percent of the total United States production of landscape plant material, were surveyed to investigate trade flows and marketing

practices. Following are excerpts from the report. The entire publication is accessible on the World Wide Web at <http://funnelweb.utcc.utk.edu/~mgray/agecon.htm>.

The 24 states that participated represented 79 percent of the U.S. total cash receipts for landscape plants. The relative importance of the green industry to each state is revealed in the percent of each state's total farm receipts that is accounted for by greenhouse and nursery products (Table 1). As indicated, in some states that are not "important" to total national output, income from the green industry is very important to the individual state. In the cases of Connecticut, Massachusetts, and New Jersey, almost one-third of agricultural cash receipts in these states is derived from nursery and greenhouse products. Clearly, this industry is very important to these states. Yet, from the national perspective, each had less than three percent of total output.

The survey was conducted during the first half of 1994. Initial mailing of questionnaires was in February. A total of 1,316 usable questionnaires were returned. Among participating states, the method of reaching the relevant population varied (Table 2).

#### Types of Plants Sold

All respondents were asked to distribute total annual sales among major plant categories (Table 3). All horticultural products not specifically covered under the usual landscape plant categories were grouped under the heading "other".

#### Root Media

The regional aspect of the nursery industry was evident from the responses of the nurserymen regarding the distribution of annual sales by root media (Table 4). For the two Northwestern states, Oregon and Washington, 38 and 44 percent, respectively, of sales were categorized as bare root. However, container sales was the dominant form of sales for 17 states, with percentages of annual sales ranging from a low of 42 percent for Michigan growers to a high of 91 percent for California growers.

**FROM:** *Trade Flows and Marketing Practices Within The United States Nursery Industry: 1993*. Southern Cooperative Series Bulletin 384, p. 38.

(FOR TABLES PLEASE SEE PAGES 6 - 9).

Table 1. Grower Cash Receipts for Landscape Plants in 24 States and the U.S., in 1991.

State <sup>a</sup>	1991	Share of Total U.S.	Percent of state's total for all commodities
	\$1,000,000s	-----percent-----	
Alabama	199.5	2.4	6.7
Arkansas	24.0	0.3	0.5
California	1,953.5	23.2	10.9
Connecticut	135.3	1.6	29.2
Delaware	34.0	0.4	5.4
Florida	998.1	11.9	16.2
Georgia	177.3	2.1	4.4
Idaho	48.6	0.6	1.8
Illinois	169.3	2.0	2.2
Kentucky	54.2	0.6	1.7
Louisiana	69.7	0.8	3.8
Maine	17.5	0.2	3.9
Maryland	197.4	2.3	14.8
Massachusetts	143.4	1.7	30.1
Michigan	265.7	3.2	8.6
Mississippi	21.0	0.2	0.8
New Jersey	203.4	2.4	30.8
North Carolina	295.0	3.5	5.9
Ohio	154.5	1.8	3.9
Oklahoma	273.0	3.2	7.1
Oregon	357.9	4.2	14.5
Tennessee	128.6	1.5	6.5
Texas	563.9	6.7	4.6
Washington	157.4	1.9	3.9
United States	8,404.7	--	5.0
24 State Share of U.S.	6,642.2	79.0	--
Total			

<sup>a</sup>States providing survey data for this study.  
Source: Johnson and Johnson.

Table 2. Survey Size and Selection Process Used in Each State.

State	List frame	Sample size	Survey respondents <sup>a</sup>	Number of mailings	Criteria for selecting survey sample
Alabama	383 <sup>b</sup>	131	31	2	100% of nurseries with 5 or more acres
Arkansas	42	42	16	2	100% of nurseries
California	2,663 <sup>b</sup>	450	52	1	100% of CA Nursery Assoc. growers
Connecticut	450	450	61	1	100% of nurseries on mailing list
Delaware	125 <sup>b</sup>	125	20	1	100% of licensed nurseries
Florida	7,496	610	183	2	Random sample of larger growers <sup>c</sup>
Georgia	1,050	325	146	2	100% of licensed growers with more than 1 acre
Idaho	43	43	20	2	100% of ID Nursery Assoc. or Class A nursery license
Illinois	91	91	30	2	100% of nurseries wholesalers
Kentucky	250 <sup>b</sup>	160	48	2	Random sample of licensed nurseries
Louisiana	276 <sup>b</sup>	276	72	2	100% of growers in larger size group <sup>d</sup>
Maine	52	52	25	2	100% of wholesale nurseries
Maryland	80	80	13	1	100% of MD Nursery Assoc. growers
Massachusetts	102	102	29	2	100% of MA Nursery Assoc. growers
Michigan	400	400	31	1	100% of MI Nursery Assoc. growers
Mississippi	125	75	14	1	Random sample of full-time growers
New Jersey	154	154	52	2	100% of NJ Nursery Assoc. growers
North Carolina	1,600 <sup>b</sup>	336	153	3	100% of wholesale nurseries identified as shipping plants out-of-state
Ohio	1,592 <sup>b</sup>	139	30	1	100% of nurseries with 20 or more irrigated acres
Oklahoma	90	90	24	2	100% of wholesale nurseries
Oregon	247	247 <sup>e</sup>	81	1	Large growers that account for more than 80% of sales
Tennessee	1,203	300	107	2	Random sample of certified nurseries
Texas	602	91	42	2	100% of TX Nursery Assoc. members with sales greater than \$200,000
Washington	121	121	36	1	100% of WA Nursery Assoc. growers
Total	19,236	4,890	---		

<sup>a</sup>Total number of survey respondents.

<sup>b</sup>Licensed or registered nurseries.

<sup>c</sup>Selected from FNGA membership list with 8 or more employees and from DPI registry with 100,000 plant units or more in inventory.

<sup>d</sup>List of certified nurseries places growers of landscape plants into two size categories.

<sup>e</sup>Wholesale nursery growers with annual sales of more than \$5 million.

Table 3. Weighted Average Percentage Distribution of Nursery Sales by Plant Category.

State	Respondents <sup>a</sup>	Deciduous Trees		Evergreen Shrubs		Evergreen Trees		Vines & Ground Cover		Herbaceous Perennials		Tree Fruit		Small Fruit		Foliage Plants		Propagating Material		Other	
		93.5	6.6	7.6	47.6	7.0	3.4	6.3	4.1	3.0	2.1	0.8	1.0	4.4	6.1	6.1	2.1	0.8	1.0	6.1	4.4
Alabama	93.5	6.6	7.6	47.6	7.0	3.4	6.3	4.1	3.0	2.1	0.8	1.0	4.4	6.1	6.1	2.1	0.8	1.0	6.1	4.4	
Arkansas	100.0	17.8	6.4	24.8	8.7	2.9	3.1	1.5	2.7	6.3	6.9	2.3	7.6	7.6	7.6	6.3	6.9	2.3	7.6	9.0	
California	100.0	10.0	2.5	12.7	4.8	9.0	2.3	5.9	8.7	2.8	0.1	6.0	2.7	2.7	2.7	2.8	0.1	6.0	2.7	32.6	
Connecticut	96.7	14.7	13.3	18.8	12.0	6.9	3.0	1.8	20.6	2.0	0.3	1.4	1.1	1.1	1.1	2.0	0.3	1.4	1.1	3.9	
Delaware	95.0	6.2	6.9	3.7	5.2	3.6	0.4	1.1	2.1	0.3	1.1	2.2	5.9	5.9	5.9	0.3	1.1	2.2	5.9	61.3	
Florida	96.2	3.4	0.9	10.4	5.0	4.9	3.7	1.9	1.6	1.6	0.1	39.4	3.7	3.7	3.7	1.6	0.1	39.4	3.7	23.3	
Georgia	89.7	11.5	4.8	18.9	8.5	3.8	6.4	1.0	10.7	2.6	0.5	3.2	6.4	6.4	6.4	2.6	0.5	3.2	6.4	21.6	
Idaho	95.0	32.1	1.8	0.1	0.1	56.7	0.1	0.0	0.1	0.3	0.0	0.0	6.1	6.1	6.1	0.3	0.0	0.0	6.1	2.8	
Illinois	96.7	24.6	22.0	3.3	16.2	11.7	2.3	1.5	6.2	1.2	0.2	3.5	0.2	0.2	0.2	1.2	0.2	3.5	0.2	7.1	
Kentucky	87.5	45.0	9.2	9.7	8.3	9.5	2.8	0.9	3.9	0.9	0.3	0.4	5.2	5.2	5.2	0.9	0.3	0.4	5.2	3.9	
Louisiana	88.9	9.8	4.4	17.4	4.8	4.2	2.8	0.9	0.6	0.9	0.2	7.0	2.7	2.7	2.7	0.9	0.2	7.0	2.7	44.3	
Maine	84.0	16.5	11.9	9.6	13.4	13.1	2.0	1.8	7.4	0.8	0.8	0.2	19.2	19.2	19.2	0.8	0.8	0.2	19.2	3.3	
Maryland	92.3	13.5	7.8	45.0	7.1	1.2	2.4	0.1	18.4	0.4	0.1	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	4.0	
Massachusetts	93.1	15.3	10.9	19.2	13.0	12.7	2.4	2.7	7.5	1.4	1.0	4.6	1.9	1.9	1.9	1.4	1.0	4.6	1.9	7.6	
Michigan	100.0	19.9	14.1	5.4	11.7	22.8	2.8	1.0	7.6	1.8	0.4	0.5	7.4	7.4	7.4	1.8	0.4	0.5	7.4	4.5	
Mississippi	100.0	12.0	5.0	37.9	10.6	3.1	3.4	0.9	7.8	0.6	0.7	2.7	3.1	3.1	3.1	0.6	0.7	2.7	3.1	12.3	
New Jersey	94.2	18.9	8.0	30.3	11.1	12.2	2.0	2.8	8.0	0.3	3.2	0.4	1.0	1.0	1.0	0.3	3.2	0.4	1.0	1.8	
North Carolina	96.1	16.7	5.8	20.3	8.1	14.9	4.0	0.3	7.9	0.3	0.7	0.6	1.7	1.7	1.7	0.3	0.7	0.6	1.7	18.6	
Ohio	93.3	19.8	16.3	16.2	31.3	7.4	3.3	0.4	3.3	<0.1	<0.1	0.0	1.4	1.4	<0.1	<0.1	0.0	0.0	1.4	0.5	
Oklahoma	100.0	31.8	12.4	18.5	7.6	12.6	1.7	3.5	1.4	5.5	0.6	0.5	0.7	0.7	0.7	5.5	0.6	0.5	0.7	3.4	
Oregon	98.8	26.0	5.5	12.8	7.8	10.2	1.3	6.8	1.4	1.0	6.3	0.0	3.4	3.4	3.4	1.0	6.3	0.0	3.4	17.6	
Tennessee	93.5	40.8	12.3	11.2	6.8	8.9	1.8	0.3	0.5	10.7	3.0	0.3	2.0	2.0	2.0	10.7	3.0	0.3	2.0	1.3	
Texas	97.6	8.2	4.5	14.5	3.7	1.3	3.7	0.9	1.7	3.0	0.8	11.7	2.6	2.6	2.6	3.0	0.8	11.7	2.6	43.4	
Washington	97.2	9.4	3.0	11.3	2.8	12.6	3.6	0.9	4.1	31.5	0.3	0.9	11.9	11.9	11.9	31.5	0.3	0.9	11.9	7.6	
Average	--	15.1	6.2	15.0	7.8	8.2	3.1	2.4	4.7	3.1	1.4	10.4	3.6	3.6	3.1	1.4	10.4	3.6	3.6	19.2	

<sup>a</sup>Percentage of survey respondents who provided this information.  
Source: Mail survey conducted in 1994.

Table 4. Weighted Average Percentage Distribution of Nursery Sales by Root Packaging

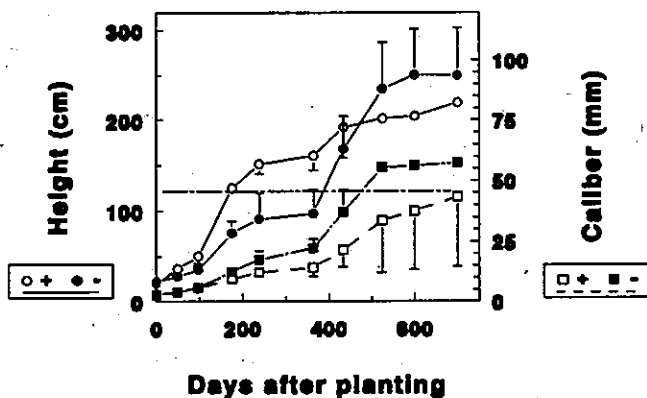
State	Respondents <sup>a</sup>	percent							
		Bare root	Balled & potted	Balled & Burlapped	Processed balled	Container	Field grow bag	In-ground container	Other
Alabama	96.8	2.3	4.9	7.7	<0.1	84.4	0.8	<0.1	0.0
Arkansas	100.0	8.2	6.8	8.5	0.0	75.8	0.7	0.0	0.0
California	100.0	4.6	0.5	0.4	0.3	91.1	0.1	0.6	2.4
Connecticut	91.8	0.9	4.1	28.9	0.9	61.9	0.4	0.0	3.0
Delaware	100.0	3.4	1.7	19.1	0.3	74.7	0.0	<0.1	0.8
Florida	95.1	2.3	0.7	4.5	<0.1	85.1	0.4	1.5	5.6
Georgia	89.0	4.3	1.3	9.2	0.2	71.6	0.2	0.8	12.4
Idaho	95.0	9.4	5.5	73.1	<0.1	9.4	0.0	0.3	2.4
Illinois	96.7	0.3	14.5	55.2	0.0	29.7	0.0	0.1	0.2
Kentucky	87.5	0.9	1.4	65.9	0.7	26.2	0.0	0.0	4.8
Louisiana	87.5	5.8	1.8	17.1	0.1	65.8	0.0	0.2	9.3
Maine	84.0	19.7	0.2	32.8	0.1	43.2	3.6	0.0	0.4
Maryland	92.3	0.3	25.4	14.3	0.0	59.9	<0.1	0.1	0.0
Massachusetts	93.1	2.7	22.1	26.5	0.9	47.1	0.2	<0.1	0.4
Michigan	100.0	14.6	11.3	26.0	2.1	41.9	0.7	0.0	3.4
Mississippi	100.0	0.2	1.3	1.0	0.0	82.5	0.0	0.6	14.4
New Jersey	98.7	5.8	1.1	43.5	0.3	48.5	<0.1	<0.1	0.7
North Carolina	96.7	10.1	0.7	26.8	0.2	55.4	0.1	0.4	6.1
Ohio	93.3	3.5	5.4	52.1	2.2	35.5	0.1	0.3	0.9
Oklahoma	95.8	0.4	0.4	21.5	0.1	76.4	1.0	<0.1	0.1
Oregon	98.8	37.9	6.6	12.9	2.7	30.0	<0.1	0.1	9.9
Tennessee	93.5	19.3	7.7	41.8	1.3	28.9	0.1	0.2	0.8
Texas	95.2	2.8	0.8	4.7	0.0	87.5	0.1	1.2	3.0
Washington	97.2	44.1	3.4	7.9	0.3	32.7	10.7	1.0	<0.1
Average	-	10.2	3.5	18.1	0.6	61.5	0.6	0.6	4.8

<sup>a</sup>Percentage of survey respondents who provided this information.  
Source: Mail survey conducted in 1994.

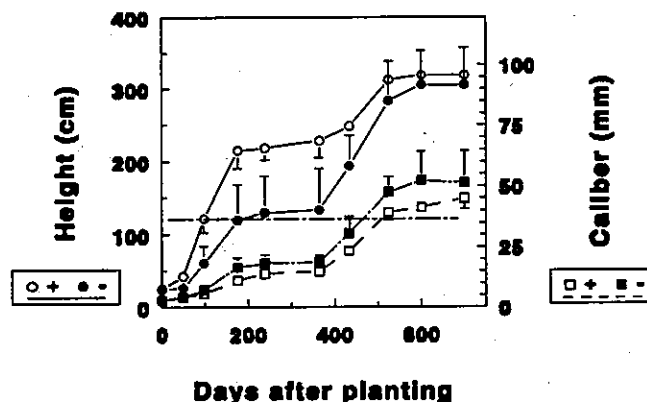
HEIGHT AND CALIBER RESPONSES TO TREESHelters OVER A 2-YEAR PERIOD

David W. Burger, Department of Environmental Horticulture, University of California, Davis

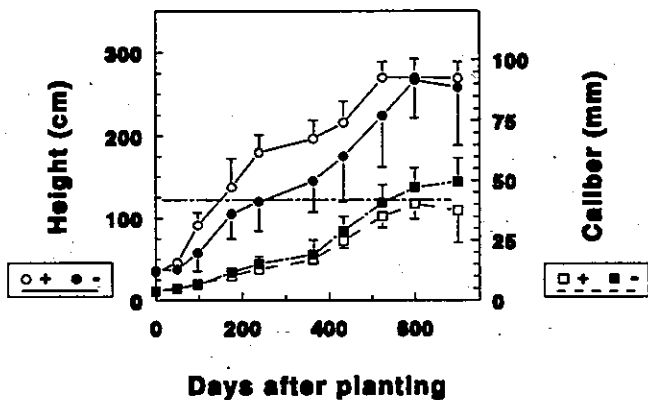
*Sequoia sempervirens*



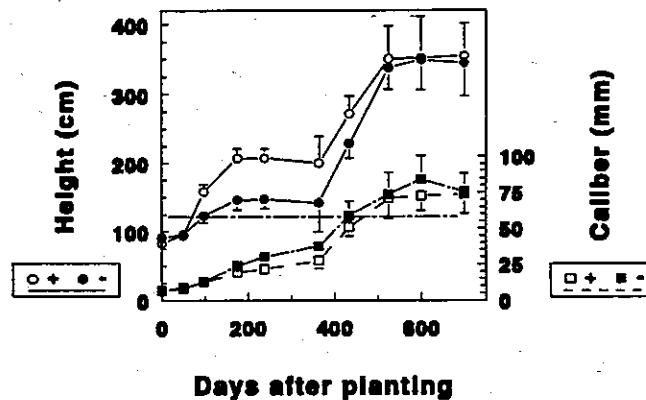
*Quercus lobata*



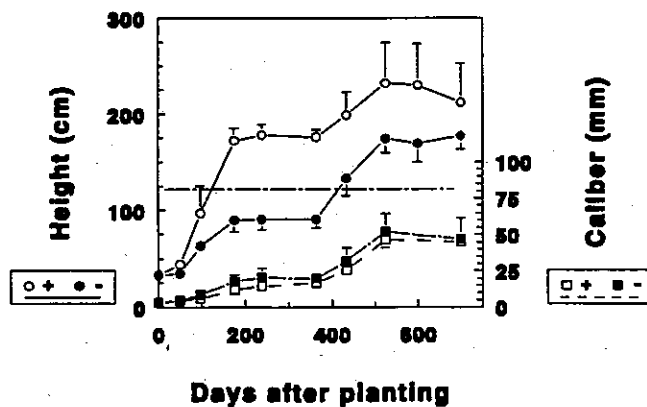
*Quercus agrifolia*



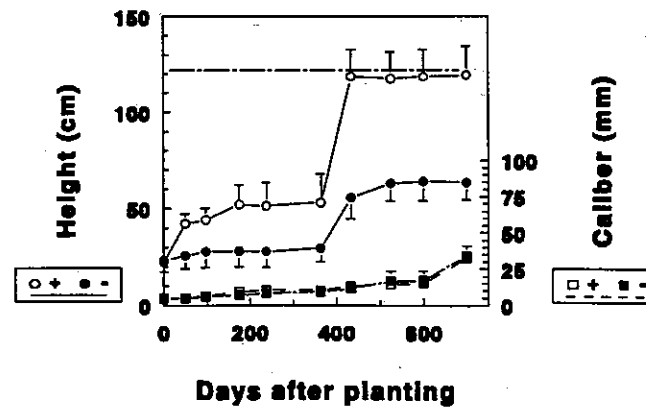
*Alnus rhombifolia*



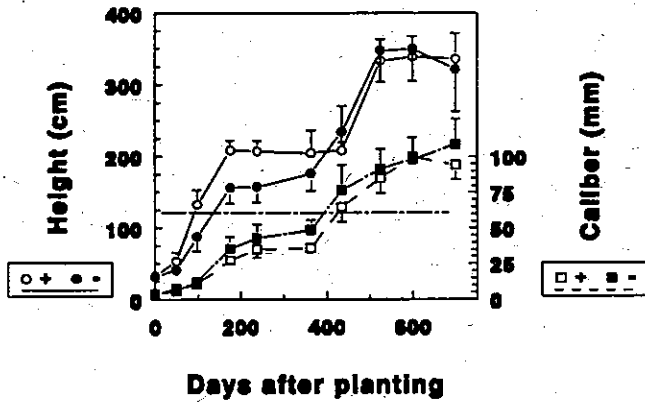
*Lagerstroemia Indica*



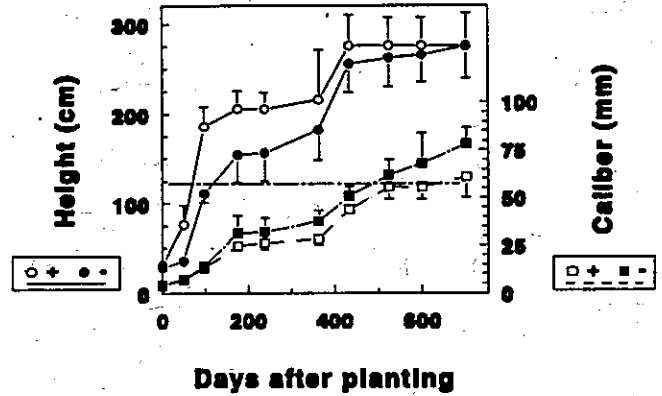
*Ginkgo biloba*



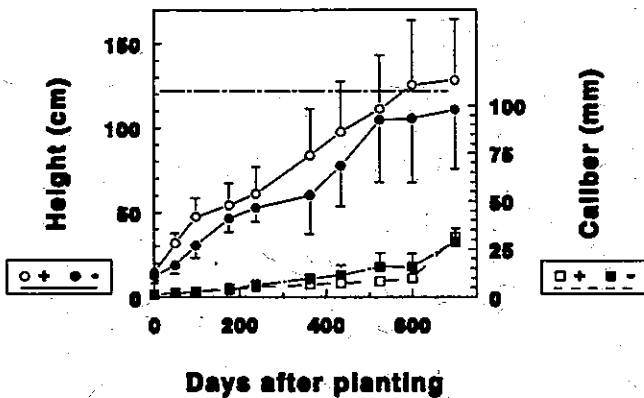
*Platanus racemosa*



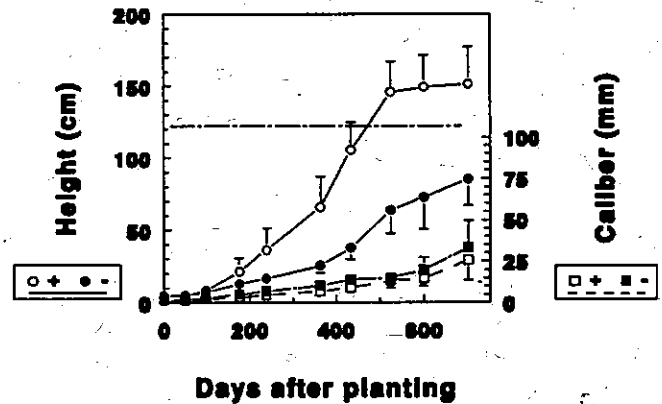
*Fraxinus latifolia*



*Maytenus boaria*



*Pinus canariensis*



**BENEFITS OF TREESHelters:**

- protect trees from:
  - browsing animals
  - protect cultivation
  - herbicide sprays
- allow easy implementation of biological control of insect pests
- enhance height of trees

**LIABILITIES OF TREESHelters:**

- tend to diminish caliber and taper
- reduce top mass
- reduce root mass
- reduce total root length and surface area

**SUMMARY AND RECOMMENDATIONS:**

- Response of trees to shelters is species dependent
- shelters useful during early growth period
- shelter should be removed soon after tree emerges

- be prepared to stake trees grown in shelters
- use short shelters ( $\leq 2$  ft tall) for trees having branches near the ground

**TREESHelters USEFUL FOR:**

- *Quercus lobata*
- *Ginkgo biloba*
- *Pinus canariensis*
- *Platanus racemosa*
- *Fraxinus latifolia*

**TREESHelters (probably) NOT USEFUL FOR:**

- *Sequoia sempervirens*
- *Alnus rhombifolia*
- *Maytenus boaria*
- *Quercus agrifolia*
- *Lagerstroemia indica*

The complete article entitled "Height, Caliper Growth, and Biomass Response of Ten Shade Tree Species to Tree-shelters" by D. W. Burger, G. W. Forister, P. A. Kiehl is published in the Journal of Arboriculture, 1996, Vol. 22(4), p. 161-166.

## EFFECT OF GA<sub>3</sub> AND PBA ON GROWTH AND FLOWERING OF BOUGAINVILLEA

Yintung Wang, Dept. of Horticultural Sci., Texas A&M University Agricultural Research and Extension Center

*Bougainvillea* cuttings propagated in fall and winter often bloom profusely before putting out adequate shoot growth. These large flowers shade the small leaves, resulting in slow growth. In an attempt to solve this problem, rooted 'Juanita Hatten' cuttings were planted in 11.5-cm pots, clipped to 5 cm, and placed under natural short day or a four hour night interruption on 7 Dec. Plants were sprayed on 8 Dec. and again on 2 Jan. with 0, 50, 100, or 200 mg/L<sup>-1</sup> of GA<sub>3</sub> or a combination of 200 mg/L<sup>-1</sup> each of GA<sub>3</sub> and PBA. Data were taken on the uppermost new shoot of each plant. Under long-day conditions, the first inflorescence was produced on the first node of all control plants, whereas plants treated with 100 or 200 mg/L<sup>-1</sup> GA<sub>3</sub> produced the first inflorescences on higher nodes. The number of inflorescences on this shoot was unaffected by any treatment. GA<sub>3</sub> treatment resulted in longer shoots (6.7 to 10.2 cm vs 2.4 cm) and more leaves (13.4 to 16.2 vs 7.5), with greater effects at higher concentrations. These shoots had several inflorescences at the base, followed by many non-flowering nodes and additional flowers near the tip. The GA<sub>3</sub> + PBA treatment had no effect on the position of the first inflorescence. However, shoots had twice as many nodes and fewer inflorescences than the controls and were shorter than those treated with GA<sub>3</sub> alone. Plants under short day responded similarly to respective treatments under the long-day conditions. Tests will be conducted to determine if stock plants need to be treated in early fall and cuttings collected from the new growth to prevent early flowering.

FROM: Proceedings of the 77th Annual Meeting of the Pacific Division, AAAS, Vol. 15, Part 1, p. 56, June 23, 1996.

## TURFGRASS TWISTERS

by Victor A. Gibeault

Jess Evans is a M.S. candidate in the Department of Botany and Plant Sciences at UC Riverside with his primary interest being in turfgrass management. As an assignment for a class this past term, he developed a report on the use of

reclaimed water for turfgrass irrigation. The following are sections from the report that he developed.

### Recycled Water for Turfgrass Irrigation

Jess Evans

The demand for water increases. Potable water is not an unlimited resource and some discretion must be used when considering its use and conservation. One possible means of conserving potable water is the use of effluent or recycled water for irrigating turfgrass.

Golf courses are a prime example of an area in which recycled water can be used successfully. Golf courses require significant amounts of water and because the costs of fresh water is ever increasing, recycled water is a good alternative. Also, golf courses are usually under intense management by a trained professional who closely monitors water quality and irrigation, making it possible to utilize water of lesser quality. Even so, there are still some important factors that must be considered when determining the quality. These include: total salt content, sodicity, toxic ion levels, bicarbonate, and pH (Harivandi, 1994).

#### Salinity

Reclaimed waters have been found to have salt levels higher than that of fresh water. There is a high negative correlation between the salt concentration in the soil solution and turfgrass growth. The salts inhibit the plant's ability to access water in the soil solution. As the plant takes up water, the concentration of salt in the rhizosphere increases. This increase in the salt concentration reduces the osmotic potential in the rhizosphere and, thus, reduces the water potential relative to the roots.

Salinity is measured by electrical conductivity or total dissolved solids. Electrical conductivity (EC) is measured as resistance with an alternating current bridge (Butler, 1985). Electrical conductivity is usually expressed as either millimhos per centimeter or decisiemens per meter (dS/m).

Irrigation water with EC<sub>w</sub> of greater than 0.75 dS/m may cause salinity problems, but real caution must be taken when the EC<sub>w</sub> exceeds 3.0 dS/m. Water with electrical conductivity of greater than 3.0 dS/m is not recommended for irrigation purposes (Harivandi, 1994).

Although the electrical conductivity of the water is an important factor when evaluating water quality, it is the electrical conductivity of the soil solution that has the greatest impact on plant growth. Soil salt levels below 3 dS/m

usually do not inhibit turfgrass growth. However, when the soil salt levels are between 3 and 10 dS/m, the growth of most turfgrasses is inhibited. The ability to tolerate saline conditions varies among species.

Golf course superintendents in the Southwest are fortunate because the most widely used species of turfgrass, bermudagrass, is fairly tolerant to saline conditions. This is due to the presence of salt excreting glands which are characteristic of the *Cynodon* genus. Bermudagrass would not experience the problem of salt build-up in the root rhizosphere because the salts are taken up with the water and then secreted out through the salt glands.

### Sodicity

The sodium (Na) concentrations in recycled water is another important factor that must be considered when using the effluent for turfgrass irrigation. Although Na itself can reach levels that may cause phytotoxicity in plants, it is the indirect effects of Na on soil structure that causes concern (Harivandi, 1994). Hayes et al. (1990) showed that secondary-effluent-irrigated soils contained greater concentrations of potentially hazardous Na and soluble salts when compared to potable-irrigated soils.

The primary effect of Na on soil structure is a reduction in permeability. Sodium causes deflocculation of the soil clay particles. This means that the high sodium concentrations cause an actual physical dispersion of the soil colloids and loss of soil structure. As a result, aeration is reduced, infiltration decreases, and a high degree of mechanical impedance to the root is observed.

The influence of sodium on soil permeability is commonly measured as the sodium adsorption ratio (SAR). SAR is the ratio of the Na ion concentration to that of calcium plus magnesium. Calcium and magnesium help to reduce the negative effect of Na on the soil (Mancino, 1994). Recycled water with SAR values of greater than 9 can cause severe permeability problems when applied to fine textured soils (Harivandi, 1994).

Turfgrass grown in sandy soils can tolerate a higher SAR than turfgrass grown in clay soils. Coarse sandy soils have very low cation exchange capacities. As a result, the Na tends to leach through the soil profile and the soil structure and integrity is maintained. Many modern golf courses construct the putting greens with a sand base, making it possible to irrigate with water of less than optimal Na concentrations. I must point out that most of these sand base greens also have some organic material mixed in with the

soil. This organic material provides additional binding sites for the Na and could potentially become dispersed causing problems in the root zone.

The use of effluent water with high sodium concentrations may make it necessary to apply soil amendments, like gypsum, more frequently in order to prevent possible problems with soil permeability. Frequent aeration is another technique commonly used, especially in clay soils (Hayes et al., 1990).

The adverse effects of Na ions on soil permeability have been shown to be counteracted by the concentration of soluble salts in water (Harivandi, 1994). Therefore, the sodium hazard of irrigation water is evaluated considering both the sodium absorption ratio and the electrical conductivity. Increasing salinity reduces the ability of sodium to deflocculate soil particles (Hayes et al., 1990). This is usually due to the counteracting effects of calcium and magnesium.

Besides sodium, recycled waters contain several other elements that can cause phytotoxicity. These include boron, chloride and many of the heavy metals or trace elements. In some cases the turfgrass itself may not be sensitive to these ions, but many of the trees and shrubs are. Also, because turfgrass is under intense management, and as a result is mowed frequently, many of the symptoms associated with these ion toxicities are not observed (Harivandi, 1994).

Boron is commonly found in effluent water because it is an ingredient in many soaps and detergents. Boron toxicity symptoms include necrosis of the leaf tips. As stated above, these symptoms are seldomly observed on turfgrass that is frequently mowed. However, the trees and surrounding landscape will show these symptoms (Harivandi, 1994).

Effluent water contains many elements, other than the few previously mentioned, that could be toxic to plants. However, in the desert Southwest where soils are primarily alkaline, ions like aluminum and manganese do not pose a threat in terms of phytotoxicity. The solubility of these two ions decreases as pH increases. These same conditions which prevent ions like aluminum and manganese from reaching toxic levels also inhibit the availability of other essential elements like iron.

### Nutrient Benefits

Effluent water contains many, if not all, of the nutrients necessary for plant growth. The concentration of these

nutrients in the water may not fulfill the needs of the plant, but are present nevertheless. Hayes et al. (1990) observed reductions in seedling emergence in areas irrigated with effluent water. They attributed this to high ammonium concentrations and salinity. However, these same areas showed improvement in seedling establishment and growth rate. This was attributed to the increases in nutrient availability with effluent water as compared to potable water (Hayes et al., 1990).

Nitrogen is one of the primary macronutrients essential for plant growth. Nitrogen is also a component of recycled water. These two facts make recycled water an attractive alternative to potable water for irrigation of turfgrass. However, the potential of nitrate leaching through the soil into the ground water causes critics to question its use. Healthy turf has been found to remove 90% of the nitrogen delivered by recycled water, even in cases resulting in a 41% leaching fraction (Mancino and Pepper, 1994).

In addition to nitrogen, effluent irrigated soils have been found to contain significantly higher levels of phosphorus and potassium when compared to soils irrigated with potable water. While the amount of nitrogen in the effluent water may sometimes be less than that required by the plant, the phosphorus levels often exceed the needs of the plant (Hayes et al., 1990).

The nutrients in effluent water are most effective when used in conjunction with a fertilization schedule. Both the water and the soil on which it is being applied must be periodically tested. This allows the superintendent to make adjustment in irrigation and fertilization practices when necessary (Hayes et al., 1990).

Another important factor that must be considered is the potential risks to human health caused by bacteria in the effluent water. Proper treatment and careful monitoring are the key to reducing possible pathogen or viral infection. Effective storage and irrigation are both of primary importance when human contact is an issue.

Treatment of effluent water can affect from 50% to greater than 99% of pathogen removal depending on the treatment process used (Yates, 1994). Effluent water is subjected to two, if not three, treatment processes prior to being released for use as irrigation water (Odendaal, 1991).

Tertiary treatment includes primary sedimentation, trickling filter/activated sludge, disinfection, coagulation, direct filtration, and chlorination (Yates, 1994). Although tertiary treatment does not remove all water born pathogens, the

concentrations are such that risks to human health are low (Yates, 1994).

Exposure to pathogens in effluent water can occur in several ways. The one that poses the greatest risk, in terms of golf course irrigation, is people coming in direct contact with plant material exposed to the pathogen. One way golf superintendents avoid such risks is by irrigating with effluent water at night while no humans are present. Also survival of pathogens decreases with increased temperatures and exposure to UV radiation in sunlight (Badway et al., 1990). A 99% inactivation of turf-applied viruses occurred after 16 to 24 hours under winter conditions and 8 to 10 hours under summer (Badway et al., 1990).

Finally, golf superintendents using reclaimed water must provide areas in which to store the effluent water delivered. Water hazards and lakes are commonly used for storing effluent water. Lakes can be a source of algae, weeds, odors, and health problems if not properly designed and maintained (Terrey, 1994). Lakes should be designed in a way that reduces exposure to sunlight while at the same time maximizing aeration and circulation (Terrey, 1994).

Effluent water is an excellent source of water for turfgrass irrigation. The high shoot and root densities common to turfgrass aid in removing pollutants from the wastewater. Pollutants like nitrates and phosphates are also essential nutrients necessary for plant growth. Therefore, the use of effluent water on turfgrass not only reduces the needs for commercial fertilizer, but also the turf itself provides an excellent filtering mechanism (Mancino and Pepper, 1994).

#### References:

- Badway, A. S., J. B. Rose, and C. P. Gerba. 1990. Comparative survival of enteric viruses and coliphage on sewage treated grass. *Journal of Environmental Science Health* 25:937-952.
- Butler, J. D., P. E. Rieke, and D. D. Minner. 1985. Influence of water quality on turfgrass, p. 71-84. In: V. A. Gibeault and S. T. Cockerham (eds.). *Turfgrass water conservation*. University of California, Div. Agric. Nat. Resour. Publ. 21405.
- Hayes, A. R., C. F. Mancino, and I. L. Pepper. 1990. Irrigation of turfgrass with secondary sewage effluent: I. Soil and leachate water quality. *Agron. J.* 82:939-943.
- Hayes, A. R. C. F. Mancino, W. Y. Forden, D. M. Kopec, and I. L. Pepper. 1990. Irrigation of turfgrass with secondary sewage effluent: II. turf quality. *Agron. J.* 82:943-946.
- Harivandi, A. 1994. Wastewater quality and treatment plants, p. 106-129. In: USGA (eds.). *Wastewater Reuse for Golf Course Irrigation*.
- Mancino, C. F., I. L. Pepper 1994. Irrigation of turfgrass with wastewater, p. 174-191. In: USGA (eds.). *Wastewater Reuse for Golf Course Irrigation*.
- Mancino, C. F. 1996. Personal communication.

Odendaal, P. E. 1991. Wastewater reclamation technologies and monitoring techniques. *Water Science and Technology* 24(9):173-184.

Terry, A. 1994. Design of delivery systems for wastewater irrigation, p. 130-142. In: USGA (eds.). *Wastewater Reuse for Golf Course Irrigation*.

Yates, M. V. 1994. Monitoring concerns and procedures for human health effects, p. 143-172. In USGA (eds.). *Wastewater Reuse for Golf Course Irrigation*.

**Acknowledgment:** I would like to thank Dr. Charles Mancino, Penn. State University, for taking the time to review this article.

## TURFGRASS SELECTION

Many factors are important in determining quality turfgrass. The following are generally thought to be the most important criteria when evaluating the quality of grasses and choosing a grass to establish, according to Kevin Morris, who is the National Program Coordinator for the National Turfgrass Evaluation Program.

**Genetic Color:** Shades range from dark to light green. Americans usually prefer darker green grasses while Europeans prefer lighter green grasses.

**Leaf texture:** This describes the width of the turfgrass leaves. Coarser-textured grasses, like St. Augustinegrass, have a tougher "feel" than the finer leaved grasses like the fine fescues.

**Density:** Density is the number of grass plants in a given area. Higher density grasses give a carpet-like appearance.

**Growth Habit:** Refers to upright vs. low-growing form of growth.

**Uniformity:** A turf area that is uniform in color, texture, density, and growth habit is most desired.

**Pest resistance:** Refers to the ability of the grass to resist or overcome disease and insect attack.

**Drought resistance:** The ability of a turfgrass to survive and/or thrive under drought conditions. For survival, grasses often lose their green color and go dormant.

**Rate of establishment:** The rate the turfgrass produces 100 percent cover.

**Shade Tolerance:** The ability to survive and thrive in shaded sites.

In addition to these criteria, grasses have to be well adapted to the climate and soil of the site, to be able to perform under the expected use the site will receive, and function well with the level of maintenance of culture that will be provided.

## ROOTZONE COMPOSITION

S. W. Baker and C. W. Richards of The Sports Turf Research Institute in Bingley, West Yorkshire, England, reported recently that they measured playing characteristics for 16 golf green rootzone mixes. The 2.5 year-old simulated green had golf type wear applied during the 18-month study. Green speed, measured as distance rolled by the golf ball, generally was not influenced by rootzone type, however, the surface hardness was influenced by the amount and type sand in the mix and soil moisture content. High sand content rootzones gave firmer playing surfaces when rootzones were wet but in dry conditions the findings were reversed. Rootzones that were constructed with finer sands tended to give a softer surface and rootzones constructed from sands with a wider range of particles gave a harder surface than when uniform sands were used.

FROM *Journal of Turfgrass Management*, Vol. 1(3), 1995, p. 53-68.

## C A L E N D A R

MONTH	EVENT AND LOCATION	CONTACT
Sept. 12	Sustainable Nursery & Greenhouse Conference, Encinitas, CA	CSA-Nursery, (916) 756-6967.
Oct. 3-5	International Plant Propagator's Society Western Region, Visalia, CA	Wilbur L. Bluhm (541) 393-2934
Oct. 6-10	American Society for Horticultural Science Annual Meeting, Lexington, KY	ASHS Headquarters (703) 836-4606/e-mail ashsm@ashs.org
Oct. 24-25	Western Ornamental Horticulture Research Conference, Las Vegas, NV	Calif. Assoc. of Nurserymen, Carol Hutchings (800) 748-6214

**ANNOUNCEMENTS****TURFGRASS RES. CONF. & FIELD DAY - LANDSCAPE MANAGEMENT RES. CONF. & FIELD DAY  
SEPTEMBER 17 AND 18, 1996**

Listed below are the programs for the two conferences at UC Riverside that are coordinated by Victor Gibeault, Dennis Pittenger, and Steve Cockerham. Note that the registration fee will be waived for CE Advisors and Specialists along with Faculty that would like to attend. Pre-registration is still required, however, to assist with planning. Please contact Susana Denney at (909) 787-4430 or e-mail [susana@ucr.ac1.ucr.edu](mailto:susana@ucr.ac1.ucr.edu), to register.

**TURFGRASS RESEARCH  
CONFERENCE AND FIELD DAY  
SEPTEMBER 17, 1996**

**MORNING PROGRAM  
University Theatre**

- 8:00 am **Registration**
- 8:50 **Welcome and Announcements**  
Victor Gibeault, Extension Environmental Horticulturist, Dept. of Botany and Plant Sciences, UCR
- 9:00 **Chemical Edging of Bermudagrass**  
David Cudney, Extension Weed Specialist, Dept. of Botany and Plant Sciences, UCR
- 9:20 **Black Turfgrass Aetaneous: A Problem in the Lower Desert of California**  
Ken Kido, Staff Research Associate, Dept. of Entomology, UCR
- 9:40 **Perspective on Turfgrass Diseases in Southern California**  
Marcella Grebus, Extension Plant Pathologist, Dept. of Plant Pathology, UCR
- 10:00 **A Comparison of Actual and Predicted Pesticide Fate**  
Marylynn Yates, Env. Microbiology Ground-Water Quality Specialist, Dept. of Soil and Environmental Sciences, UCR
- 10:20 **BREAK**
- 11:00 **Summer Cultivations on Creeping Bentgrass/Annual Bluegrass Putting Greens**  
Robert Green, Turfgrass Research Agronomist, Dept. of Botany and Plant Sciences, UCR
- 11:20 **Getting Ready to Put Turfgrass in a Retractable-Roof Stadium the First Time**  
Stephen Cockerham, Superintendent of Agr. Operations, UCR
- 11:40 **New Turfgrasses for Southern California and Their Performance**  
Victor Gibeault, Extension Environmental Horticulturist, Dept. of Botany and Plant Sciences, UCR

12 noon **LUNCH**

**AFTERNOON PROGRAM  
Turfgrass Plots-Agricultural Experiment Station**

- 12:45 pm **Tram Ride to Turf Plots or Drive Your Own Car**
- 1:30 **Organizational Comments**
- Stop #1 **Light Restricted Traffic Research**  
Stephen Cockerham and Michael Henry, Env. Hort. Advisor, UCCE Riverside and Orange Counties
- Stop #2 **Tall Fescue Fertilizer Studies**  
Janet Hartin and Grant Klein, Env. Hort. Advisor, UCCE San Bernardino and Los Angeles Counties and Lab. Asst., Dept. of Botany and Plant Sci., UCR, respectively
- Stop #3 **Determining Landscape Water Requirements**  
Dennis Pittenger, Area Environmental Horticulturist, Univ. of Calif. Coop. Ext., Southern Region and UCR
- Stop #4 **Buffalograss Evaluations**  
David Shaw, Environmental Horticulture Advisor, Univ. of Calif. Coop. Ext., San Diego County
- Stop #5 **Zoysiagrass Response to Mowing and Overseeding**  
Victor Gibeault and Rudy Khan, Staff Res. Assoc., Agr. Oper., UCR
- Stop #6 **Fertility and Aerification on Trafficked Sports Turf**  
Steven Ries, Staff Research Associate, Agricultural Operations, UCR

**LANDSCAPE MANAGEMENT RESEARCH  
CONFERENCE AND FIELD DAY  
SEPTEMBER 18, 1996**

**MORNING PROGRAM  
University Theatre**

- 8:00 am **Registration**
- 8:50 **Welcome and Announcements**  
Dennis Pittenger, Area Environmental Horticulturist, Univ. of Calif. Coop. Ext., Southern Region and UCR
- 9:00 **Use of Growth Regulators in the Landscape**  
Ursula K. Schuch, Nursery Crops Specialist, Dept. of Botany and Plant Sciences, UCR
- 9:30 **Landscape Weed Control Update and Alternatives to Herbicides**  
Cheryl Wilen, Area IPM Advisor, Univ. of Calif. Coop. Ext., Southern Region
- 9:50 **Update on Oleander Leaf Scorch—A New Problem**  
Michael Henry, Environmental Horticulture Advisor, Univ. of Calif. Coop. Ext., Riverside and Orange Counties
- 10:10 **BREAK**
- 10:40 **Do Green Plants Contribute to Smog?**  
John Karlik, Environmental Horticulture Advisor, Univ. of Calif. Coop. Ext., Kern County
- 11:00 **Plant Stress Proteins as Indicators for Screening Drought and Cold Tolerances**  
Timothy Close, Assoc. Geneticist, Dept. of Botany and Plant Sciences, UCR
- 11:20 **Studies on the Water Retention Properties of Mulches**  
David Shaw, Environmental Horticulture Advisor, Univ. of Calif. Coop. Ext., San Diego County
- 11:40 **Effects of Size, Shape and Copper Coatings of Nursery Containers on Tree Root Development in the Landscape**  
Dennis Pittenger, Area Environmental Horticulturist, Univ. of Calif. Coop. Ext., Southern Region and UCR

12 noon **LUNCH**

**AFTERNOON PROGRAM  
Agricultural Experiment Station**

- 12:45 pm **Tram Ride to Experiment Station or Drive your Own Car**
- 1:30 pm **Organizational Comments**
- Stop #1 **Tree Root Barrier Study**  
Dennis Pittenger, Area Environmental Horticulturist, Univ. of Calif. Coop. Ext., Southern Region and UCR
- Stop #2 **Symptoms and Diagnosis of Oleander Leaf Scorch Disorder**  
Marcella Grebus, Extension Plant Pathologist, Dept. of Plant Pathology, UCR
- Stop #3 **Development of Dwarf Lilac Cultivars for Southern California**  
Dr. Louis Erickson, Director, Emeritus, UCR Botanic Gardens
- Stop #4 **Determining Landscape Water Requirements**  
William Richie, Staff Research Associate, Dept. of Botany and Plant Sciences, UCR
- Stop #5 **Use of New Herbicide Products**  
Cheryl Wilen, Area IPM Advisor, Univ. of Calif. Coop. Ext., Southern Region
- Stop #6 **Landscape Tree Species Evaluation Under Two Irrigation Regimes**  
Donald Hodel, Environmental Horticulture Advisor, Univ. of Calif. Coop. Ext., Los Angeles County

## LANDSCAPE WORKGROUP NEWS

Greg Vogel, *Environmental Horticulture Advisor, UCCE Contra-Costa County*

**E-mail list server:** The Landscape workgroup has an e-mail list server to facilitate communication between workgroup members. If you would like to subscribe, send a message to Greg Vogel at [gbvogel@ucdavis.edu](mailto:gbvogel@ucdavis.edu), fax (510) 646-6708, phone (510) 646-6540, or send a letter to 1700 Oak Park Blvd., Room A-2, Pleasant Hill, CA 94523. If you have any problems, contact Greg. Each e-mail message will be posted on a bulletin board at the Environmental Horticulture Department at UCD.

**Workgroup meeting:** I would like to set up a fall workgroup meeting. Three possible meeting situations look like they would work. We could meet Thursday, September 19, the day after the UCR Turf and Landscape Field Day. Another possibility is to meet at UCD before or after a speaker from the National Arboretum makes a presentation Tuesday, October 1, at noon. He will talk about the work going on at the National Arboretum in Washington D.C. A third option is to meet in Visalia on Wednesday, October 2, the day before the Western Regional International Plant Propagation Society Meeting in Visalia from October 3 through 5. Do you have a preference or other suggestions?

**Survey:**

Would you attend if there are workgroup travel funds available? Yes \_\_\_ No \_\_\_

Would you attend if we do not have workgroup travel funds? Yes \_\_\_ No \_\_\_

Please send your response to Greg Vogel.

**Reviewing and rewriting UC Publications:** Pam Elam has two publications that need to be reviewed and possibly rewritten. They Are Erosion Control on Bare Slopes Around Your Home, UC ANR 21137 and Landscape Tree Wound and Treatment, UC ANR 7185. If you want to rewrite one of these publications or you plan on writing a new statewide publication, please let Pam know. She is in the UCCE Fresno Office (phone 209/456-7554).

Seasonal landscape publication: Some workgroup members have expressed a strong interest to produce a statewide newsletter for professional landscape clients. I would like to know if there is support to put out a periodical (at least three times a year) to address important industry educational and research concerns. If you support this, please estimate the number of articles you would be willing to submit for inclusion in the seasonal publication.

I suggest including both applied research reports and newsletter style educational articles. Camera-ready copies of the publication would go out to County Offices, and industry organizations. They could duplicate and send out the periodical as they choose.

Please let me know if you support putting out a Landscape workgroup seasonal periodical? Yes \_\_\_ No \_\_\_

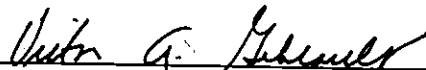
Estimate the number of articles you might submit each year \_\_\_

Would you be willing to review articles? Yes \_\_\_ No \_\_\_

Would you like to edit the periodical? (your name) \_\_\_\_\_

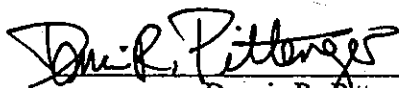
Your comments on the periodical or other landscape workgroup topics are welcomed. \_\_\_\_\_

Please send this information to: Greg Vogel, UCCE Contra Costa County.



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