Hawaii Cooperative Extension Service

HORTICULTURE DIGEST

HITAHR · College of Tropical Agriculture and Human Resources
U. S. Department of Agriculture Cooperating

Department of Horticulture
University of Hawaii at Manoa

In This Issue: FLOWER AND NURSERY INFORMATION
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POINSETTIA HEIGHT CONTROL

At present, most growers have been using chlormequat (Cycocel™) and ancymidol (Arest™) to control poinsettia height. There have also been some recent successes using mixtures of daminozide (B-nine SP™) and chlormequat. Other retardants used successfully on poinsettia have included ethephon, (Florel™), flurprimidol (Cutlass™), and XE-1019 (Sumagic™), but information, registration, and product availability for these have limited their use. Chlormequat remains the most widely used retardant despite its potential for causing some foliar chlorosis. A label has recently been issued for a tank mix of chlormequat and daminozide.

The growth retardant, paclobutrazol (Bonzi™) became available in Hawaii in late 1986, nearly 6 years after the first reports appeared from the manufacturers and mainland university researchers. An inhibitor of gibberellin biosynthesis, paclobutrazol is a very powerful regulator of plant growth, requiring only fractions of a milligram to achieve control of plant height. Thus, it is easy to overdose and mixing directions must be followed closely.

Among the first ornamental crops that paclobutrazol was registered for was the poinsettia. The manufacturers guidelines for poinsettia are quite broad and refinement is needed for individual operations. In brief, these guidelines state that the poinsettia should be treated with foliar sprays of 1:15 to 1:128 dilutions (2 quarts of spray per 100 ft^2) 1 to 4 weeks following the pinch. Drenches are likewise recommended 1 to 4 weeks following the pinch, with rates ranging from 0.12 mg/6" pot to 3.8 mg/6" pot.

One other aspect of the problem has been the diversity in responses among different poinsettia cultivars. In the Eckespoint series, C-1 has been particularly difficult to control with a single drench or spray, and an early season drench followed by foliar sprays at 10 day intervals was most effective when chlormequat was used (Criley, 1973). As C-1 comprises only about 23% of the Hawaii market, it may not be the major concern of our growers, but its use for large flowered specimens could increase if more compact plants could be produced.

The Gutbier series, V-10 (Amy) and V-14 (Glory) comprise 60% and 6% of the Hawaii market respectively. The V-10 cultivar is normally compact, free branching, and fast to produce, but it has small flowers, weak stems, and poorer color under shade than other poinsettia cultivars. It usually is not given retardants except for early crops. The V-14 cultivar is taller and requires longer to produce than V-10 (11 weeks versus 9) but it has stronger bract of foliage color. Like C-1, it is not free-breaking nor easily retarded. The Hegg and Rochford series represent a wide range of colors, finish in 8–9 weeks of short days, and are free-breaking. Both the Hegg and Rochford cultivars are reasonably compact, but respond well to chlormequat, and both require cool nights (low 60's and high 50's) to finish well. They are not widely grown in low elevation sites in Hawaii.

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Table 1. Growth retardant use on poinsettia (Adapted from Tayama, 1987).

Material & Trade Name	Concentration and method of application	Application timing/age & frequency	Remarks
ancymidol (Arest)	33–66 ppm SPRAY	@ 14 days after pinch when new growth is 2 to 2½ inches long. Repeat if needed 1 to 2 weeks later.	Cultivar sensitivity varies. Suggested not to apply after October 23 (in Ohio).
	0.25 to 0.50 mg a.i./6" pot as DRENCH	Same as for spray but second application not needed unless a split application is used.	Same as for spray. It is important that entire soil is uniformly drenched.
chlormequat (Cycocel)	1500 ppm SPRAY	When new growth is 1 to 1½" long. Repeat if necessary at 1 to 2 week intervals.	May cause chlorosis if applied on a warm day. Suggested not to apply after October 23.
	3000 ppm DRENCH	Same as for spray but repeat applications not usually necessary.	As for spray. Suggested not to apply after October 15.
daminozide (B-nine SP)	2500 ppm SPRAY	When new growth is 1½ to 2" long. Repeat at 1 to 2 week intervals if needed.	If combined with chlormequat, do not apply after Sept. 15; make only 1 application with B-nine at 2500 ppm and Cycocel at 1500 ppm.
paclobutrazol (Bonzi)	47 to 100 ppm as a SPRAY	When new growth on shoots is 1½ to 2" long. One.	Thorough and uniform coverage is essential.
	0.125 to 0.25 mg a.i./6" pot	Apply 4 fl. oz. per 6" pot when new growth are 1½ to 2" long.	
chlormequat + daminozide	1500 ppm + 2500 ppm combined as a spray	When new growth is 2" long. Use no more than 2 applications.	Late application may cause stunting and deformed leaves and bracts and delay flowering.

Growth retardants should not be used to correct grower deficiencies in poinsettia culture. Conditions which contribute to excessive height include: starting the crop too early, pinching too early, crowding, low light intensity, excessive irrigation, heat stretch, and combinations of these factors. Fortunately, the use of chemicals can help to , modify what would almost surely be undesirable plants, but the first line of defense is to provide optimum growing conditions.

Table 1 has been adapted from a publication of the Ohio Florists' Association and represents a *guideline* for growth retardant use. We have previously noted that the length of a break 4 weeks after the start of short days is approximately one-half its final length (Criley, 1979); this may provide an indication of whether a late treatment of retardant may be helpful. Still, should warm conditions persist through November and the plants are kept under low light or crowded conditions, they may stretch even after flower initiation is complete.

Literature:

Criley, R. A. 1973. Growth retardants on 'Eckespoint C-1' poinsettia. Horticulture Digest 18:1–2.

Criley, R. A. 1979. Observations on poinsettia flowering 1978. Horticulture Digest 49:2–3.

Tayama, H. K. 1987. Growth regulator chart. Ohio Flor. Assoc. Bull. 687:24–29.

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Horticulturist

HORTICULTURE NOTES

California condo owners making waves

Condominium owners—especially those in California—are bringing actions against landscapers for alleged wrongs with their landscaping contracts.

According to the California Landscape Contractors Association (CLCA), condo homeowner groups are banding together, pooling their resources, and generally ganging up on landscape architects, installation contractors, and maintenance contractors. Roger D. Fiske, CLCA president, is often called upon as an expert witness or consultant in such litigation.

The problem is becoming so difficult that the CLCA recently offered a one-day panel discussion on condo contracting liablility. Besides Fiske, a landscape architect, landscape contractor, and an attorney sat on the panel.

If condo owners in other states follow the trend being set in California, landscape contractors in those states would be well-advised to follow the CLCA's example.

Weeds Trees & Turf
Vo. 25, No. 10. 1986

Favorite outdoor pastime

Gardening remains the favorite outdoor leisure activity for Americans for the third year in a row—and they spent almost 20% more on that activity than in 1985.

According to a Gallup survey released by the National Gardening Association, 44% of American households participate in gardening. Jogging, playing golf, fishing, tennis and bicycling ranked far below gardening in popularity.

The popularity of gardening means good news for the garden industry. Retail sales were up in 1986, totaling more than $14 billion, an 18% increase over the $12 billion spent in 1985.

10 Most Popular Gardening Activities:

1. Lawn care
2. Growing flowers
3. Tending houseplants
4. Vegetable gardening
5. Insect control
6. Shrub care
7. Tree care
8. Landscaping
9. Fruit tree growing
10. Raising transplants

MarketLetter
January 26, 1987

Cacti sharpen interiors

The demand for unusual cacti for interior landscapes has tripled in the past year, according to Thais Aguirre, Silhouettes of the Desert, Vista, CA, as reported in Pacific Coast Nurseryman. Aguirre says cacti and euphorbia are in great demand because they lend themselves to many interior styles. Also, euphobia needs little light or maintenance. Aguirre expects the increase in popularity to continue.

MarketLetter
April 27, 1987

The natives are restless and growing

Native wildflower gardens are sprouting up around homes across the country. Homeowners are taking advantage of a wide range of American wildflower and shrub species with texture, color, size, and shape to match anything from around the world.

"Until recently, nurseries, and garden centers didn't carry many native species; and to landscape architects, using native species was a novel idea," says Leo Collins of the Tennessee Valley Authority (TVA).

This new American revolution is still in its infancy, though. About 80 percent of all nursery and garden material available in the TVA area is still exotic. But, Collins says, wholesalers and retailers are beginning to adjust to consumer changes.

Weeds, Trees and Turf
January, 1987

Easy being green

Bedding plant growers can look forward to a profitable trend, if the observations of the San Lorenzo Nursery Co.'s Bloom Booster hold true.

"People are tired of green," according to the June 1987 issue. "They are going for color by mixing flowering plants with foliage plants."

Along with the desire for green, consumers are demanding larger pots, such as moving from four-inch to the eight-inch pots.

Florists may also be seeing dollar signs this year. Mass marketers are seeing a demand for exotic plants, according to the Booster. The Chicago Tribune lends credence to this trend by naming the heliconia the "hot" bloom of 1987 in its annual "Hip list." "They don't even sound like flowers, and that's what makes Lobster Claw and Sexy Pink heliconias a hot topic

among those who love buds and blossoms," reports the Tribune. In Chicago, one stem goes for about $10.

All retailers can profit from the Booster's prediction of the cash-and-carry market. "Cash-and-carry plants should continue to gain in popularity, or at least remain at the same level," according to the report.

MarketLetter
July 13, 1987

Relative toxicity for pesticides

There has been a great deal of publicity lately regarding the relative danger of pesticides. The relative toxicity for all pesticides is measured by the LD-50 for that particular pesticide. The LD-50 is the abbrevation of the median lethal dose, or stated simply, the LD-50 is the dosage of the pesticide at which one-half of the test animals are killed. The lower the LD-50 value, the higher the toxicity or danger of that particular chemical.

Information on LD-50, as well as other important information, is available for each pesticide on its own "Material Safety Data Sheet" (MSDS). These MSDS should be readily available from your source of pesticides for the asking.

Geiger News
March, 1987

A preserved bombshell?

"The next bombshell could well be the arrival of preserved plants and flowers." That market prediction, made in a recent newsletter by nursery consultant Ian Baldwin, barely preceded the announcement last month by Weyerhaeuser Co. that it was indeed entering the preserved plant and flower business. Marketing will begin this year.

Weyerhaeuser says it is perfecting a patented process developed in Sweden that preserves living plants and flowers indefinitely and in a state that leaves them almost indistinguishable from living plants. Preserved plants will cost an estimated three to four times more than live plants.

Weyerhaeuser's long-term impact on the artificial plant market could be significant. The impact could be particularly severe on the silk plant industry. One of the largest corporations in the U.S., Weyerhaeuser is targeting both the interior landscape and the consumer markets. Retail floral products will be available this year, as well as a line of holiday decorations.

MarketLetter
February, 1987

THE EFFECT OF LIME AND POTTING MIX ON GROWTH AND QUALITY OF SPATHIPHYLLUM AND NEANTHA BELLA PALM

Symptoms of interveinal chlorosis and marginal necrosis were observed on a variety of foliage plants at a local nursery. A nurseryman from Australia along on the tour commented that he had had a similar problem and that it had been diagnosed as being related to the source of perlite being used. Reports from Florida (*1*) indicate that perlite contains concentrations of fluorides that can be toxic to some plants and that this problem can be corrected by liming the potting mix to about 6.5. Since the soil tests on the grower medium was quite variable in pH, it was decided to attempt to induce the observed symptoms by growing two test plants (spathiphyllum and neanthe bella palms) in limed and unlimed samples of the grower's perlite. If in fact the perlite were the problem, plants were also grown in limed and unlimed mixes containing screened black cinder as a perlite substitute.

Uniform spathiphyllum plugs and neantha bella palm seedlings, obtained from a local grower, were potted into 6-inch azalea pots in one of four potting mixes (1:1 or 3:1 perlite: peat and 1:1 or 3:1 cinder:peat). One half of each mix was amended with 340 g dolomite (10 lbs/cu yd). The cinder was from the Island of Hawaii and was screened so that the particle size was between 3/16 and 3/8 inches, comparable to perlite. These potting mixes were further amended with 143 g Osmocote 18-6-12 (8.5 lbs/cu yd), 55.6 g Micromax (1.7 lbs/cu yd) and 33.6 g (1 lb/cu yd) treble superphosphate per cubic foot.

Plant growth data were determined after 6 months using growth index measurements (GI), W+W+H/3, and the dry weight of the plant tops. Observations were made on plant condition. Four replications of each treatment were combined to make two samples for soil testing and tissue analysis.

The plants were grown in the University of Hawaii shade house under 73 percent shade. Daily irrigation was provided by overhead spray stakes and pest control measures were taken as needed. The experiment was a 2 by 4 factorial with 8 single plant replications. The data were analyzed using the General Linear Model (GLM) procedure for analysis of variance from the Statistical Analysis System (SAS) package (SAS Institute, N C).

Table 1. The effect of lime and potting mix on growth of spathiphyllum and neanthe bella palm after 6 months.

	Spathiphyllum		Neanthe bella palm	
	G I[x]	Dry wt, g	G I	Dry wt, g
Lime				
With	26.9 a[y]	3.82 a	18.2 a	0.94 b
Without	26.9 a	4.26 a	18.4 a	1.15 a
Potting Mix				
Perlite/peat (1:1)	26.6 a	3.74 a	18.8 a	1.11 a
Perlite/peat (3:1)	27.7 a	4.11 a	17.1 a	1.00 a
Cinder/peat (1:1)	26.7 a	4.48 a	18.9 a	1.06 a
Cinder/peat (3:1)	26.6 a	3.82 a	18.3 a	1.01 a

[x]G I = Growth index (W+W+H/3)

[y]Mean separation within columns for each treatment group by Duncan's multiple range test, 5% level.

Table 2. The effect of lime and potting mix on pH and salinity of mixes for spathiphyllum and neanthe bella palm, after 6 months.

	Spathiphyllum		Neanthe bella palm	
Treatments	pH	Sol. salts	pH	Sol. salts
Liming				
With	6.1 a[x]	0.65 a	6.5 a	0.46 a
Without	4.6 b	0.42 b	4.3 b	0.38 a
Potting Mix				
Perlite/peat (1:1)	5.1 b	0.41 b	5.3 b	0.34 b
Perlite/peat (3:1)	5.4 ab	0.37 b	5.2 b	0.38 ab
Cinder/peat (1:1)	5.3 ab	0.53 b	5.3 b	0.45 ab
Cinder/peat (3:1)	5.7 a	0.83 a	5.8 a	0.50 a

[x]Mean separation within columns for each treatment group by Duncan's multiple range test, 5% level.

The spathiphyllum plants were all dark green without any of the symptoms observed on the grower plants, even without lime present. Some interveinal chlorosis and terminal necrosis was observed on the neanthe bella palms but this could not be corrleated with treatments.

The various mixes tested had no effect on the growth of either plant species (Table 1). The growth of neanthe bella palms was significantly greater without the lime treatment compared to those receiving a recommended rate of dolomitic lime, as measured by the dry weight of the tops. However, no difference was found for spathiphyllum.

The potting mixes used had a slight effect on medium pH and soluble salts levels at the conclusion of this study (Table 2) and tended to be slightly higher for the 3:1 cinder:peat mix. As expected, the liming treatments raised the average media pH about 2 points, from the mid-4 to the mid-6 range. Also, liming resulted in a slight increase in the media salinity.

This study demonstrated that the source of perlite was not responsible for the observed symptoms. Liming the potting mix to a pH of about 6.5 resulted in significant reduction in growth of neanthe bella palms compared to the unlimed mixes. While not significant, this trend

was also observed for spathiplyllum. Satisfactory plant growth was obtained with all of the potting mix combinations used in this study, suggesting that the choice of the mix components used in this study can be made on availability and cost and that screened black cinders can be substituted for perlite in potting mix with equal results.

Literature cited

Rauch, F. D. 1981. Fluoride plant toxicity. Hort. Digest 59:6–7.

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Horticulture Specialist

AVAILABLE PUBLICATIONS

Several recent publications from the College of Tropical Agriculture and Human Resources (CTAHR) may be of interest.

Catalog of Acari

Research Extension Series 075, a catalog of Acari of the Hawaiian Islands by M. Lee Goff, Entomologist provides information on the various types of mites found in Hawaii. Records are given for 466 species of Acari representing 104 families and five suborder in the Hawaiian Islands. For each taxon, distribution within the Hawaiian Islands, hosts of associations, and literature citations are given.

1987 Laws Affecting Agriculture

This publication, HITAHR 02.09.87, summarizes the major Acts and Resolutions passed by the 1987 Legislature which affect the Hawaii agriculture industry. The summaries are intended to help in understanding the intent of the legislature measures passed and not to provide legal interpretations. This publication, 1987 State Laws & Resolutions Affecting Agriculture in Hawaii, was prepared by Richard L. Bowen in cooperation with the legislature Reference Bureau.

Nursery Cost of Production

This publication by S. T. Nakamoto and P. Leung presents a useful worksheet for estimating the cost of production for nursery products. HITAHR Info. Text Series 028, A Worksheet for Nursery Costs of Production, will enable the manager to estimate the costs of specific plant from a fairly large number of products.

Single copies of these publications are available from your County Extension Office or by contacting the Agricultural Publications Office, CTAHR, University of Hawaii, 3050 Maile Way, Gilmore 119, Honolulu, Hawaii 96822.

PHYTOTOXICITY OF INSECTICIDES ON CERTAIN FOLIAGE PLANTS

Pesticide phytotoxicity are plant injuries resulting from pesticide applications. A limiting factor in using certain insecticides on foliage plants is phytotoxicity.

Tests were conducted with Cygon 400 (dimethoate), Diazinon 50 W, Dursban 4E and 50W (chlorpyrifos), and Vydate L (oxamyl) on Seifrizii palm (*Chamaedorea seifrizii*), Neanthebella palm (*Chamaedorea elegans*), Dwarf Dracaena, (*Dracaena deremensis* 'Compacta'), and Schefflera (*Brassaia actinophylla*). Insecticides were tested at 4X the recommended label rate to ensure margin of safety to plants. Three foliar spray applications were made at one week interval. Sprays were applied to runoff using a compressed air sprayer with a No. 8004 Teejet nozzle at 40 psi.

Table 1 shows that Dursban 4E and 50W, and Diazinon 50W were safest on the plants tested. Cygon 400 was highly phytotoxic to Dwarf Dracaena and Scheffler. Vydate L was highly phytotoxic to Seifrizii palm.

Cygon 400 is NOT REGISTERED for use on any ornamental. Vydate L is a restricted use insecticide and registered for use on only certain species of ornamental. Read and study the PESTICIDE LABEL before using.

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PRECAUTIONARY STATEMENT

Use pesticide safely. FOLLOW THE LABEL. The USER is responsible for proper use and application of pesticides as well as storage and disposal. There are many factors affecting phytotoxicity and under certain conditions pesticides which are ordinarily safe may be phytotoxic. When using unfamiliar pesticides, it is wise to first test the pesticide on a small portion of the crop. Consult Cooperative Extension Service or Hawaii Department of Agriculture personnel for authorized special local need registration or additional information.

Table 1. Phytotoxicity of insecticides applied as a foliar spray on certain foliage plants at 4X the recommended lable rates.

Insecticide	Rate/100 gal[1]	Phytotoxicity Scores[2] and Type of Injury[3]			
		Seifrizii Palm	Dwarf Dracaena	Neanthebella Palm	Schefflera
Cygon 400[4]	4 pt	1CF	3ABDEF	0	3EGI
Diazinon 50W[5]	4 lb	1C	0	0	0
Dursban 4E[5]	4 pt	0	0	0	0
Dursban 50W[5]	4 lb	0	0	1B	0
Vydate L[6]	16 pt	3CF	0	0	1EH

[1] Three spray applications of insecticides at one week interval. Insecticides tested 4X the recommended label rate to ensure margin of safety to plants.

[2] Phytotoxicity Scores: 0 = No injury; 1 = Slight injury (marketability not affected); 2 = Moderate injury (marketability affected); 3 = Severe injury (marketability reduced).

[3] Type of Injury: A = Tip burn; B = Chlorotic spotting; C = Necrotic spotting; D = Marginal chlorosis; E = Marginal necrosis; F = Water-soaked areas; G = Cupping; H = Crinkling; I = Leaf drop.

[4] Cygon 400 is NOT REGISTERED FOR USE ON ANY ORNAMENTAL.

[5] General or Broad Ornamental Label—Does not list or imply specific plants that the insecticide can be used on.

[6] Specific Ornamental Label—Lists specific plants that the insecticide can be used on.

COMING EVENTS

Horticulture Show

The dates for the 1988 Horticulture Show are July 28–30, at the Edith Kanakaole Stadium in Hilo. Displays of anthurium, dendrobium, protea, ikebana, bonsai, palms, tropical cut flowers and potted foliage plants will be featured. For further information contact Dwight Sato at 959-9155.

Farwest Show

The Farwest Trade Show in Portland, Oregon, with over 500 booths, is scheduled for August 26–28, 1988 at the Portland Memorial Coliseum. For information contact: Dan Barnhart, Show Manager, Farwest Show, 2780 S.E. Harrison St., Milwaukee, Oregon 97222 (503) 653-TREE.

Landscape Design Study Course

The National Council of State Garden Clubs in cooperation with ASLA, Hawaii Chapter, LICH and U.H. Cooperative Extension will conduct its second Landscape Design Study Course for the general public on Saturday, September 10, 17, and 24, 1988. This course will be held in Rm 011 of the St. John Plant Science Building on the Manoa Campus. The instructors will consist of ASLA members. For further information contact Fred D. Rauch, 948-7256, Randy Fujimoto 521-5361, or Connie Riccio at 623-9958.

IPPS

The Western Region of the International Plant Propagators will hold their annual conference in Vancouver B. C. at the Hyatt Hotel, September 6–9, 1988.

Landscape Maintenance Workshop

The Landscape Industry Council of Hawaii will hold a Landscape Maintenance Workshop, Back to Basics. This will be held at the Prince Kuhio Hotel in Honolulu on September 23, 1988. Included on the program are pruning, disease and insect pests, irrigation trouble shooting and maintaining interiorscapes. Contact Fred D. Rauch 948-7256.

Turf Conference

The annual Turfgrass Conference is tentatively scheduled for September 29–30, at the Hilton Hawaiian Village in Honolulu. Contact Chuck Murdoch 948-7958 or Karen Bento 841-3305 for further information.

HAN Conference

Plans are underway to hold the 28th Hawaii Association of Nurserymen's Annual Conference and Trade Show, October 24 to 26 at the Pacific Beach Hotel in Honolulu. One of the featured speakers is Todd Bachman, Bachman's Inc., the world's largest retail greenhouse grower, with 71 stores in the Minneapolis area. Mr. Bachman will share some of his innovative marketing techniques. Contact: HAN, 833-3369.

NOTE: The use of trade names is for the convenience of readers only and does not constitute an endorsement of these products by the University of Hawaii, the College of Tropical Agriculture and Human Resources, the Hawaii Cooperative Extension Service, and their employees.

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