



HORTICULTURE DIGEST

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ORNAMENTALS—A GROWTH INDUSTRY IN HAWAII

An examination of the Statistics of Hawaiian Agriculture prepared by the Hawaii Crop and Livestock Reporting Service of the Hawaii Department of Agriculture reveals that the ornamental industry in the state made a significant contribution to the economy of Hawaii. The 5 year growth of the ornamental industry from 1969 to 1973 shows a significant growth rate which has accelerated in recent years (Table 1).

Table 1. Flowers, Ornamentals, and Nursery

Year	Wholesale value \$	% Increase	
		Total	Annual
1969	3,910,000	—	—
1970	4,225,000	8.1	8.1
1971	4,484,000	14.7	6.1
1972	5,144,000	31.6	14.7
1973	6,341,000	62.2	23.3

Flower and Nursery production in 1973, the most currently available figures from the State Department of Agriculture, had an estimated wholesale value of \$6.3 million. This is a 23.3

percent increase over 1972 and 62 percent higher wholesale value than 5 years ago. This represents an average annual growth rate of 12.4 percent for the 5-year period 1969–1973 for the ornamental industry in the State of Hawaii. If the trend continues at this rate, the wholesale value of the ornamental industry, excluding turf, will reach \$10 million by 1977.

A breakdown of some major commodities grown reveal also some interesting trends (Tables 2–5).

Table 2. Anthuriums

Year	Wholesale value \$	% Increase	
		Total	Annual
1969	847,000	—	—
1970	943,000	11.3	11.3
1971	1,032,000	21.8	9.4
1972	1,150,000	35.8	11.4
1973	1,500,000	77.1	30.4

Anthurium production reached a new high of \$1.5 million in 1973, a 30 percent jump over 1972. This represents an average annual growth rate of 16 percent for the 5 year period of 1969–1973.

Table 3. Orchids

Year	Wholesale value \$	% Increase	
		Total	Annual
1969	1,075,000	—	—
1970	1,107,000	3.0	3.0
1971	1,073,000	-0.2	-3.1
1972	995,000	-7.4	-7.3
1973	1,178,000	9.6	18.4

Orchid production during the 5 year period, 1969–1973, has remained relatively stable in Hawaii with an average annual increase of 2 percent. Cymbidium and Dendrobium orchid sprays

show a significant upward trend with an average annual increase of 120 and 33 percent, respectively. This upward trend for dendrobium orchids should accelerate during the next 5 years with 2 large orchid farms having been recently established and several existing growers greatly expanding their plantings.

Table 4. Flowers and Cut Foliages

Year	Wholesale value \$	% Increase	
		Total	Annual
1969	1,318,000	—	—
1970	1,467,000	11.3	11.3
1971	1,552,000	17.8	5.8
1972	1,754,000	33.1	13.0
1973	1,991,000	51.1	13.5

Production of cut flowers and foliages in Hawaii show a steady increase with an average annual growth rate of 10 percent. However, this does not reflect the recent interest in the production of protea flowers for export with an estimated 12,000 plants in the ground on 20 acres. Significant increases were reported for cut roses, pompom chrysanthemums, lei carnations and tuberose, and other cut foliages (mostly crotons and lycopodiums) with average annual increases of 92, 61, 35, 320 and 176 percent respectively for the 5 year period 1969–1973.

Table 5. Nursery and Potted Foliages

Year	Wholesale value \$	% Increase	
		Total	Annual
1969	671,000	—	—
1970	708,000	5.5	5.5
1971	827,000	23.2	16.8
1972	1,245,000	85.5	50.5
1973	1,672,000	149.2	34.3

The most rapidly expanding segment of the ornamentals industry in Hawaii, 1969–1973, was production of nursery plants for landscaping and potted foliage plants for homes and offices with an average annual increase of 30 percent. This represents a wholesale value of \$1.7 million for 1973. Production of landscape plants may level off somewhat during the next 5 year period with slow down in construction industry but should be more than offset with production of foliage plants for mainland markets.

Fred D. Rauch
Assoc. Specialist in Horticulture

COMING EVENTS

FTD Convention

The Florist's Transworld Delivery Association will hold their annual convention in Honolulu this year at the Hilton Hawaiian Village on August 2–9, 1975.

Florist Association of Hawaii

The 1975 Floral Design and Management Short Course sponsored by the Florist Association of Hawaii is scheduled for August 11–14, 1975, following the FTD Convention.

State Anthurium Flower Show

The fifth annual Hawaii State Anthurium Flower Show will be August 7–10, 1975, at the Shipman Street Armory, Hilo, Hawaii. The show is sponsored by the Hawaii State Anthurium Show Committee in cooperation with Anthurium Associations of Hawaii, Big Island Association of Nurserymen, Hilo Florist and Flower Shippers Association, Hawaii Department of Agriculture, County of Hawaii, and the University of Hawaii College of Tropical Agriculture.

Prizes will be awarded to the best display of: Reds, Red Obakes, Oranges, Orange Obakes, Whites, White Obakes, Pink-Corals, Pink-Coral Obakes, Splash-Blushes, and Novelties. Second and third place awards also will be made in selecting winners.

Included in the anthurium displays will be non-competition anthurium flower arrangements and an educational display which will feature exhibits of dwarf anthurium, unusual anthurium species, new university-bred anthurium hybrids, insect and disease control, and anthurium nutrition.

In addition to the anthurium displays the show will feature other flowers and potted foliage plants which contribute to Hawaii's horticultural diversity. Among the exhibits will be hanging baskets which are becoming increasingly popular in Hawaii, new foliage plants which may become important to local growers as an export crop, and proteas which are being successfully grown in the Kamuela area.

Turf Conference

Hawaii Turfgrass Association will hold its annual conference at Ala Moana Hotel in Honolulu, August 28–29, 1975. Keynote speaker is Dr. Wallace Mitchell, Acting Dean, College of Tropical Agriculture, University of Hawaii. Other speakers will cover a wide range of topics including turf pesticides, nutrition, cultivation and irrigation. Slide presentations of turf management

in Japan and England will be given by Tosh Fuchikami of O.M. Scotts and Ray McMicken of B. Hayman Co., respectively.

Farwest Show

Farwest Nursery, Garden, and Supply Show will be September 8-10, 1975, at the Memorial Coliseum in Portland, Oregon. For information contact: Farwest Nursery Show, Suite GA-7, 222 S.W. Harrison, Protland, OR. 97201.

ASHS

The 72d annual meeting of ASHS (American Society for Horticultural Science) will be held in Honolulu, September 8 to 13, 1975, at the Sheraton-Waikiki Hotel. Meeting concurrently with ASHS will be the American Horticulture Society. The University of Hawaii will host the meeting with Dr. Richard Bullock, general chairman. Dr. Henry Nakasone will serve as assistant general chairman, Dr. Phil Parvin as local arrangements chairman, and Dr. Richard Criley as program chairman. Neighbor island tours will be conducted following the meetings.

Meetings will be open to the public and Hawaii Nursery and Flower Growers are urged to attend to hear and visit leading Horticulture authorities from throughout the world. Of special interest to Island growers is the symposium scheduled for Saturday morning on tissue culture. Also on Saturday, Dr. Charles A. Conover, Director of the Agricultural Research Center, Apopka, Florida will present a paper on *Handling Rooted and Unrooted Cuttings of Tropical Ornamentals*. The completed program is available by contacting the University of Hawaii, Horticulture Department.

Pacific Horticultural Trade Show

The San Diego Convention and Performing Arts Center will house Pacific Horticultural Trade Show September 13-15, 1975. For information contact: Pacific Hort Show, Box 1100, Garden Grove, CA. 92642.

CAN

The annual convention of the California Association of Nurserymen will be held September 16-18, 1975, at the Town and Country Hotel, San Diego, Ca. 92101.

PHYTOTOXICITY OF SELECTED INSECTICIDES AND ACARACIDES TO FOLIAGE PLANTS

Trials were conducted at the University of Hawaii on two foliage plants, Dwarf Brassia

(*Brassia arboricola*) and Dwarf Ti (*Cordyline terminalis* 'Madameandré') to determine their phytotoxicity to selected insecticides and acaracides. Plants, growing in 6-inch pots, were treated by submerging the aerial portions of the plant in water suspensions of 7 pesticides for 15seconds. Granular formulations of 2 pesticides were applied to the soil surface. Materials, at 2X standard rates, were as follows:

Material and formulation	Amount formulation per:	
	1-gallon water	6-inch pot
chlorobenzilate 4E	2t	—
dicofol (Kelthane) 35WP	2T	—
Pentac 50WP	2T	—
carbaryl (Sevin) 50WP	2T	—
diazinon AG500 (48% EC)	2t	—
dimethoate (Cygon) 2E	2t	—
Volck Oil Supreme	2T	—
aldicarb (Temik) 10G	—	1.5t
disulfoton (Di-Syston) 15G	—	1.5t
untreated controls	—	—

T = tablespoon

t = teaspoon

Pots receiving granules also received 180 ml water in the case of Dwarf Brassia and 250 ml in the case of Dwarf Ti for more rapid systemic action. Thereafter, all the plants were maintained (watering and fertilizing) by the greenhouse crew according to their standard practice. There were 4 Dwarf Brassia plants and 3 Dwarf Ti plants per treatment.

Plants were examined 1 and 2 days following treatment, at half week intervals until 3 weeks and at weekly intervals until 8 weeks when observations were terminated.

Dwarf Brassia. Within a week all aldicarb treated plants showed leaf spots with older leaves dropping some or all their leaflets. Within 2 weeks there was extensive killing of older leaves and 2.5 weeks all 4 plants had deteriorated to the extent that recovery was impossible and all were considered dead by the end of 3 weeks.

After 2 weeks Volck oil produced chlorosis of several leaflets of basal leaves starting at the midrib. By 3 weeks these leaflets fell from the plants with no further progress of phytotoxicity.

Diazinon produced only minor chlorosis on 1 plant after 3 weeks. Disulfoton produced yellow spots on 2 plants after 7 weeks.

Dwarf Ti. None of the ti plants showed any discernable reaction to any of the treatments during the entire observational period.

Volck oil produced shiny leaf surfaces to both species of plants and enhanced their appearance for about 2 weeks.

Conclusions. With the exception of aldicarb it appears that all these materials can be safely used at standard rates for control of mites or insects. However, slight reactions of Dwarf Brassica to Volck oil, diazinon and disulfoton may be expected, but complete recovery of plants can also be expected.

W. C. Mitchell
Professor of Entomology
H. Tashiro
Visiting Professor

CAUSE OF PALM DISEASE IS FOUND

Florida agricultural scientists announce they found the probable cause of lethal yellowing disease decimating south Florida's coconut palm population. Researchers believe the disease is incurable and "will be in Florida from now on," although they are confident it can be controlled. Experiments with Terramycin indicate that the culprit is a strange microorganism, mycoplasma, a living cell that is neither a virus nor a bacteria.

Results of the latest study showed a 100% success rate in controlling blight with antibiotic Terramycin. A closely-related chemical, achromycin, was only 60% effective. The study, done on 50 trees in Coral Gables, was being double-checked by another study involving 10,000 trees around Dade County.

Three grams of Terramycin are being injected into trees through a hollow screw about one-quarter of an inch in diameter. The antibiotic, diluted with a small amount of water, is forced into the trunk by 100 pounds of air pressure per square inch.

Western Landscape News
February, 1974

NURSERY NOTES

Hypobaric Storage

Hypobaric storage—storage under a continuous, partial vacuum—greatly extends cut flower life. The storage trials at Michigan State University were very successful.

Carnations stored for 10 weeks under hypobaric conditions and then placed in room temperature had a longer vase life than fresh cut flowers.

Sleepiness, or failure of bud stage carnations to open properly, was completely prevented in carnations stored for 9 weeks.

HYSFI Bulletin
No. 55, Feb. 1975

Methyl Bromide for Carnations

In 1972 a report from California has shown that methyl bromide (Dowfume MC2) is the most effective chemical method of soil fumigation at one pound per 100 sq. ft. for many organisms. It is much better than the Thomas method of steam pasteurization for the control of Fusarium wilt of carnation, etc., grown in ground beds. There is now further evidence as reported in California Agriculture for September, 1973, but the soil must be leached afterward to remove the bromide residue. Where Fusarium infection is severe, as in the test, the MC2 should be used after every crop. MC2 also gave excellent control of germinating weed seeds, insects, and nematodes when directions are followed. There is a report of one grower who had disastrous results with MC2 for carnations because his soil was such that he could not leach it.

Geiger News
Feb. 1974

Aphid Alarm System

When "bugged," aphid alarm goes off. Until recently it was not understood how aphids (plant lice) were able to warn their co-feeders of an attacking insect. With refined instrumentation for observing tiny insects and equipment for measuring minute quantities of chemical compounds, it is now reported that when an aphid is attacked by a predator, small drops of an "alarm reagent" called a pheromone are released from the tiny tube-like projections on the aphids posterior. The pheromone vapor is then detected by other aphids through sensors on their antennae causing them to retreat. Discoveries such as this are useful to scientists as they probe for basic information that can be used to develop new insecticides and repellent systems and better understand plant mechanisms of insect resistance, or lack of it.

Florida Foliage Grower
Vol. 10, No. 7 July, 1973

Weed Competition Reduces Growth of Plants in Containers

In Georgia studies it was found that weeds growing in container nursery plants caused serious reduction in plant growth. One redroot

pigweed (*Amaranthus* spp) growing in a one-gallon container with convexleaf Japanese holly resulted in a 42 percent reduction in plant growth while 32 weeds per container resulted in 60 percent loss. Large crabgrass plants reduced holly growth by 59 percent with one weed per container while 32 crabgrass plants resulted in a growth reduction of 76 percent.

These results indicate that for nursery stock production in containers competition from weed growth cannot be tolerated without significant losses in salable plant size.

American Nurseryman
September 15, 1973

Hot Water for Plastic Pots

Steam cannot be used to sterilize most plastic materials because temperatures of 80°C or higher will cause distortion. However, California has shown that two types of clean (prewashed) plastic pots can be dipped for 3 minutes in water at 70°C (158°F) with good kill of organisms present and causes no distortion.

Flower and Nursery Report
September 1973

TWO NOVEL "TULIP-TYPE" ANTHURIUM CULTIVARS

In July of 1968, Drs. Sagawa and Kamemoto participated in the 17th Annual Meeting of Tropical Region of American Society for Horticultural Science in Trinidad, West Indies. While there, they visited Mr. J. D. Rapsey's 45 acre anthurium plantation. Two unusual "tulip-type" anthurium clones were observed in the collection. Mr. Rapsey graciously donated a plant of each to the University of Hawaii.

The plants were air-shipped back to Honolulu and placed under post entry quarantine for a year. They were then evaluated at both Manoa and Hilo. When their merits became known, plants were increased through cuttings. Since they were obtained from Trinidad, they were named 'Calypso' and 'Trinidad' respectively and are being released for trial by commercial growers.

'Calypso'

This attractive cultivar has an upright cupped spathe, 4 1/4 inches long and 3 inches wide, carried on long straight and sturdy flower stem, 24 inches long and 1/4 inch thick. Inner surface of the spathe is dark pink to light red (RHS Color Chart 46C), while the outer surface is light pink (RHS Color Chart 51C). Red-purple (RHS Color Chart 75C) spadix is straight and upright, about

4 1/8 inches long, and susceptible to anthracnose. Shelf life of the flower is about 17 days. Average yield is 6.5 flowers per plant per year. Plant habit is sturdy and upright with relatively long internodes. It produces suckers sparingly. The foliage tends to be rather large, measuring 14 to 17 inches long and 9 1/2 inches wide.

Major attributes of 'Calypso' are the attractive novel tulip-type flowers, long and sturdy flower stems, the ease of packing flowers for shipping and relatively good yield of 6.5 flowers per plant per year. Weaknesses are relatively long internodes, large foliage which takes up considerable growing space, relatively poor shelf life compared to 'Kaumana' and 'Nitta,' poor sucker production and susceptibility to anthracnose.

'Trinidad'

General characteristics of this cultivar are similar to those of 'Calypso.' The spathe is white with a flush of red-purple (RHS Color Chart 70C), and tends to be smaller and less cupped than in 'Calypso.' The spadix is slightly darker than the spathe (RHS Color Chart 70B). The leaf size, yield, keeping quality and susceptibility to anthracnose are about equal to those of 'Calypso,' but sucker production appears to be higher.

H. Kamemoto, Chairman
Horticulture Department

T. Higaki
County Chairman, CES, Hilo

J. Kunisaki
Assistant Horticulturist

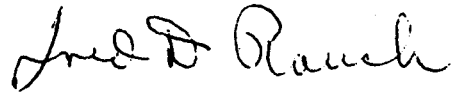
M. Aragaki
Professor of Plant Pathology

NEMATODE CONTROL ON COMMERCIAL FOLIAGE CROPS

The February, 1975, issue of the Florida Foliage Grower contains an excellent review of control measures of nematodes in commercial foliage plants by R. A. Hamlen, D. W. Dickson and R. W. Henley. This is one of the primary pests of concern to Hawaii plant producers interested in shipments to the mainland, especially California. Those interested in the export of plant materials can obtain a copy of this article by contacting Dr. Richard W. Henley, Associate Ornamental Horticulturist, Agricultural Research Center, Apopka, FL 32703. You can also request that your name be added to the mailing list to receive the Florida Foliage Grower on a regular basis.

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, the Hawaii Cooperative Extension Service, and their employees.



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Associate Specialist in Horticulture