FLORIDA AGRICULTURAL EXTENSION SERVICE
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES, UNIVERSITY OF FLORIDA, GAINESVILLE

Florida Flower Grower

Vol. 6, No. 8
August 1969

COMMERCIAL PRODUCTION OF POT POINSETTIAS IN FLORIDA

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Potted poinsettias for the Christmas market account for approximately 10 percent of all finished potted plants sold in the United States. Attempts by Florida growers to produce for this lucrative market in the past have generally met with failure because high light intensity, temperature and relatively long photoperiods in the state during propagation and growth periods make height control difficult and flower timing uncertain. Schedules recommended for more northern states do not work under Florida's conditions and thus considerable research has been necessary to produce quality plants.

Florida production of potted poinsettias for Christmas sales has increased considerably in recent years, with an estimated 100,000 pots produced for the 1965 Christmas season and over 500,000 for the 1968 season. Production in northern and central sections of the state is under glass or plastic, while in southern areas it is usually outdoors in full sun or under light shade.

Production potential seems tremendous for Florida growers to economically compete with northern growers in production of potted poinsettias. Added transportation costs can be offset by considerably cheaper production costs in the state and scheduling for earlier shipment is possible with new varieties which can withstand long distance shipping and have better keeping quality characteristics. Research at the University clearly shows that poinsettias of top market quality can be produced and accurately timed.

- STOCK PLANTS -

Two types of stock plants are available in the trade, dormant stock plants, and vegetative stock from rooted cuttings or 2¼ inch potted plants. Both produce satisfactory cuttings, but recent research shows that cutting cost from young vegetative stock is about 30 percent less when initial cost of plants, space required and labor is considered. In addition, pot grown stock plants can be pruned and used for specimen flowering plants, or as a source of cut flowers.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS, STATE OF FLORIDA
COLLEGE OF AGRICULTURE, UNIVERSITY OF FLORIDA, UNITED STATES DEPARTMENT OF AGRICULTURE, AND BOARDS OF COUNTY COMMISSIONERS, COOPERATING

Best cutting production is obtained in Florida when stock plants are grown outside in full sun, in containers or directly in the ground. Stock plants grown in full sun produce heavier cuttings with shorter internodes than shade grown plants. Production under 20% saran shade is satisfactory also if the fertilization program is reduced to 3/4 of that recommended for open field production.

Containers used should be large enough to hold sufficient soil for adequate root growth. Five gallon containers are most satisfactory, but 3 gallon ones may be used although some reduction in cutting production will occur. Regardless of container size or type, adequate drainage must be supplied.

Soil mixtures for container-grown stock plants should provide good aeration, high water-holding capacity and fertilizer retention. A mixture of 1/2 peat moss and 1/2 sand by volume has proved satisfactory. When stock is to be field-grown, native sands should be amended with peat moss at a rate of 1 bale per 200 square feet and rototilled to a depth of 6 to 8 inches. Soil for container or field-grown stock must be sterilized, preferably with steam (180 degrees for 30 minutes), or methyl bromide at a rate of 1½ pounds per 100 square feet. Soil pH should be adjusted to 5.5 to 6.0.

Field and container-grown plants should be spaced so approximately 6 inches is maintained between outer leaves when plants are producing cuttings (generally field-grown plants are spaced 2½ feet and container-grown 2 feet on center). Plants allowed adequate space will receive sufficient sunlight for best cutting production.

Dormant stock received from producers any time after the 15th of April, can be planted outside without danger of frost. Growth may be slow at first in northern Florida, but will increase as temperatures rise. Vegetative stock planted after April 15 will not have to be lighted, but stock planted earlier must receive 5 to 10 foot candles of light at plant height for 2 to 3 hours in the middle of each night until April 15.

Stock plants should be fertilized weekly or biweekly to maintain a high fertility level and obtain maximum cutting production. They should be fertilized weekly with 25-10-10 or 20-20-20 at a rate of 1/3 ounce per 2 gallons of water and apply to 8 square feet or use 1½ pounds per 100 gallons of water and apply to 400 square feet. When fertilizing biweekly instead of weekly use double the weekly rate (2/3 ounce per 2 gallons of water or 3 pounds per 100 gallons). This program applies to either container or field-grown stock.

Sufficient water should be applied to thoroughly moisten soil and also allow for some drainage from container or past the root zone. This practice will help prevent a build-up of excess soluble salts.

Research in Florida has shown that the best finished poinsettias come from cuttings taken in late August, September, or early October. Under Florida conditions the cost of producing finished plants from cuttings taken in June and July is greater than cost of additional stock plants to supply desired number of cuttings in two lots at the times indicated. Stock must be soft pinched throughout the growing period before cuttings are harvested so a maximum number of cuttings will be obtained from each plant. Therefore, soft pinching should be

practiced from the time stock plants start producing cutting sized material until five weeks before first cuttings are desired. This practice will build up stock plants so a maximum number of cuttings will be obtained.

SUGGESTED LAST PINCH DATE AND CUTTING DATES IN FLORIDA:

1. Last soft pinch should be made between July 10-15.
2. Take first group of cuttings between August 20 to September 1.
3. Take second group of cuttings between October 1-8 (Stock plants should be lighted at night after September 5 to produce long day effects and prevent early initiation of flowering buds).

When lighting stock plants a minimum of 5 to 10 foot candles of light at plant height should be applied from two to three hours during the middle of the night.

- POTTED PLANTS -

Propagation

Terminal cuttings four inches long should be taken between August 20 to September 1 and again between October 1 to 8. 'Mikkelson' varieties generally should be taken at the beginning of the suggested periods while 'Ecke' varieties should be taken at the end of the periods. Stock plants should be lighted for photoperiod control from September 5 until last cuttings are taken. At least two leaves should be left from the first cuttings to provide sufficient leaf surface to produce the next lot of cuttings, but this is not necessary when taking the last lot. Cuttings can be taken any time during the day, but they should not be allowed to wilt. Poinsettia cuttings do not need to be cut at a node, as they will root at or between nodes.

Intermittent mist propagation should be used with misting interval set to utilize a minimum of water, only enough to maintain a thin film of water on leaf surfaces at all times. Shade is not necessary during rooting and may increase time to root, however, propagating beds in greenhouses might require some light shade to reduce temperatures.

A well-drained rooting medium is essential to successful poinsettia propagation under mist. A mixture of 50% imported peat moss and 50% perlite by volume has proved best in research. Transplanting is more successful if cuttings are rooted in peat or plastic pots containing the above medium, or one containing 1/3 peat moss, 1/3 perlite and 1/3 soil by volume.

Poinsettias will root in 14 to 21 days depending on variety, light and temperature. Plants must then be hardened to survive transition from mist bed to pots by reducing mist intervals during the last week of rooting. Plants should not be allowed to wilt during hardening, or after potting since this may cause scorching of foliage or excessive leaf drop.

Considerable leaching of nutrients from foliage occurs when rooting poinsettias under mist. A good practice, therefore, is to apply fertilizer three times two days apart during the last week of rooting. Use one ounce of 25-10-10 or 20-20-20 per six gallons of water and apply to 25 square feet of bench area in late afternoon 15 to 30 minutes before mist is turned off.

Soils

A soil mixture similar to the one recommended for stock plant production is recommended for potting of cuttings (1/2 peat moss and 1/2 sand by volume). Such a mixture will be retentive of water and fertilizer, but will be sufficiently aerated to not hold excess water that might cause root-rot problems. Five to 7 pounds of dolomite and 2½ to 3 pounds of superphosphate should be added per cubic yard during mixing to obtain correct calcium, magnesium and phosphorus levels and adjust pH.

Soil must be sterilized to prevent contamination with disease organisms. Sterilize with steam (180 degrees for 30 minutes), or methyl bromide at a rate of 1 to 1½ pounds per 2 cubic yards.

Early Growth

Plants from the first cutting date should be potted in 2½ or 3 inch pots and exposed to full light intensity as soon as possible without causing injury, usually 6 to 8 days after potting. Adequate spacing must be provided to prevent stretching and spindly growth (check growth regulator section). These plants should be graded by selecting plants of similar height and planting 3 per 6-inch pan about the 15th to the 20th of October. Plants from the second cutting date can be panned directly when removed from the propagation bench. Some growers may prefer to pot these cuttings in 3-inch pots and transfer to pans between November 10-15 to produce more uniform pans, since directly panned poinsettias are less uniform than those grown in pots and then panned.

Fertilization

Fertilizer recommendations for poinsettia production are numerous and varied. Generally, those from northern states are for high levels of fertilizer and daily to twice daily watering frequencies with considerable leaching with each watering. Certainly irrigation and fertilizer levels and frequencies cannot be considered separately. Results from many experiments at the University of Florida under greenhouse conditions and using a potting media of peat and sand, 1:1 by volume indicate that a fertilizer solution containing 2 pounds of 20-20-20 formula plus 2/3 pound of ammonium nitrate per 100 gallons of water and applied to 1000 6-inch pans every other week produces excellent plants with good keeping qualities. Plants on this fertilizer program should be watered daily with sufficient water to allow a slight amount of leaching and heavily leached once a month to remove excess salts.

Additional fertilizer or more frequent watering has invariably reduced quality of plants produced in several experiments. Growers who cannot resist watering more frequently should add slightly more fertilizer or fertilize a little

more frequently to compensate for heavier leaching resulting from excess watering.

Growers producing small quantities of plants or producing in small pots, such as 2¼, 2½ or 3-inch ones, can obtain similar fertilizer levels with a solution of 2/3 to 1 ounce of 20-20-20 or 25-10-10 per 2 gallons of water and applying this to 8 square feet of surface area every other week. Fertilization should continue on this schedule until plants are moved to market.

Watering

Correct watering is important in production of high quality poinsettias. Plants must not be allowed to dry out or growth will be checked and quality lost, but neither should a grower indiscriminately water, because keeping plants too wet encourages root-rots. Plants should be watered whenever soil begins to dry out, but before plants start to wilt and sufficient water should be applied each time to allow for slight drainage to occur. Automatic pot watering systems are gaining acceptance and provide an excellent method of removing guess-work in watering of poinsettias and reducing labor costs.

Use of Growth Regulators

Growth regulators must be used to reduce height of the first lot of cuttings, but are unnecessary for cuttings taken during October. Cycocel (CCC) has given the most reliable results under Florida conditions. Solutions should be mixed at the rate of 8½ ounces of 11.5% cycocel per 3 quarts of water, and 7 ounces of this mixture applied per 6-inch pan as a soil drench. One application a week after plants are panned is sufficient. Growers desiring to treat plants while in 3-inch pots should apply 2 ounces of the cycocel and water mixture per pot 1 to 2 weeks before panning. Spray applications of cycocel are less satisfactory than drenches under Florida conditions. Research indicates than a 2500 to 3000 ppm solution sprayed on foliage is satisfactory. However, at least two and sometimes three spray applications of cycocel about two weeks apart are necessary to provide the same growth retardation that one drench application will provide. Damage from cycocel sprays has been reported frequently and appears as a chlorosis of foliage soon after application. Provided the 3000 ppm rate is not exceeded plants should grow out of the chlorosis and appear normal before they reach maturity.

Flowering Control by Daylength Manipulation

Poinsettias are short day plants, with flower and bract initiation occurring when daily dark periods exceed 11 to 11½ hours or daylengths drop below 12½ to 13 hours. This varies with variety and temperature, but in Florida the critical period comes about September 5. Many varieties will be in full bract development by Thanksgiving unless artificial lighting is supplied from September 5 until October 5 to delay flowering and bract development for the Christmas market. A minimum of 5 to 10 foot candles of light at plant height for 2 to 3 hours during the middle of each night is necessary to prevent early flowering. This can be obtained on 4-foot beds by placing 100 watt bulbs 6 to 8 feet apart and 3 to 4 feet above plants.

'Mikkelson' and many new 'Ecke' varieties are outsanding and exhibit excellent keeping quality characteristics under home conditions, but have not been satisfactorily produced in Florida, having poor bract size and color and late bract development. Recent research at the University indicates that these varieties have longer daily dark requirements than occurs in the state even during the shortest days of the year. Such varieties require approximately 15 hours of continuous darkness for maximum bract development. Even older varieties that would develop in Florida without supplemental shading to simulate long nights will produce larger bracts and exhibit better keeping characteristics when given supplemental dark periods. Black shade cloth should be used to cover the plants from 5 p.m. until 8 a.m. beginning October 5 when artificial lighting is stopped to obtain excellent plants in time for Christmas sales.

Supplemental shading results in more and larger bracts developing more uniformly and bracts with more intense color and better keeping quality. Shading can be discontinued after 4 to 5 weeks since flower and bract development is sufficiently stimulated to continue without it. Most varieties will be in full flower and bract 75 days after beginning short days with night temperatures in the range of 60 to 70 degrees F. Lower night temperatures will delay flowering and night temperatures above 80 degrees F. reduce bract size and quality.

Finishing

Best quality poinsettias are grown in full light. Reduction in light levels at any time but particularly when plants are initiating and developing flowering bracts will result in quality reduction.

Spacing is important, since this directly affects light levels and stem length. Space plants so that leaves barely touch, for crowding reduces light levels and causes stem stretching and leaf drop.

Poinsettias are sensitive to rapid temperature changes which causes leaf drop. Night temperatures must be closely monitored to bring plants into bloom at the proper time. However, temperature is less critical when black cloth is used.

If one or more plants in a pan is too tall the grower may resort to folding or bending of stems, but this should not be necessary. Folding should be done in late November while stems are still reasonably soft and will bend without breaking. Stems are squeezed together between thumb and forefinger until flattened for a distance double that wanted in height reduction. Stems are then folded back on themselves and tied to hold the 3 stem sections together. Some experience is needed to determine the best place to flatten a stem so plants will look normal after the procedure is completed.

Insects and Their Control*

Insect control is very important in poinsettia production since quality of foliage and bracts is directly correlated with selling price. All insects

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* Materials and rates are given as suggestions only, as research information on poinsettias is incomplete in Florida.

should be controlled before bracts appear on plants to avoid spotting or discoloration from chemical use.

Whiteflies - Dimethoate (Cygon) and diazinon will control whitefly. Dimethoate (Cygon) should be used at the rate of one pint of 2 EC per 50 gallons of water. This rate will also control mites, mealybugs and aphids. Diazinon should be used at the rate of one pound of 50% WP or one quart of 25% EC per 100 gallons of water.

Mealybugs - Control is similar to that of whitefly.

Spider Mites - Mites are usually not a problem on poinsettias, but if they are, they can be controlled with Tedion, dimethoate (Cygon), or Kelthane. Use Tedion at the rate of one pound of 25% WP per 100 gallons of water, Kelthane at the rate of two pounds of 18.5% WP or one quart of 18.5% EC per 100 gallons of water and use dimethoate (Cygon) as listed under whitefly control.

Aphids - Control is similar to that of whitefly.

Poinsettia Hornworm - Control of this insect can be obtained with carbaryl (Sevin) at the rate of two pounds of 50% WP per 100 gallons of water or endosulfan (Thiodan) at the rate of one quart of 25% EC or one pound of 50% WP per 100 gallons of water.

Diseases and Their Control*

Disease control is important since poinsettias can be wiped out in a relatively short time by some diseases. Sanitation should be carefully monitored to reduce disease problems. All soil, peat, benches, containers, etc. should be sterilized to prevent contamination with disease organisms.

Stem Rot (Rhizoctonia) - This disease can be serious in poinsettia production and is best controlled by sanitation, sterilization and use of clean cuttings. The disease attacks stems and roots at or slightly below soil level and produces dark brown lesion on stems. Lower leaves turn yellow and drop and roots may be discolored and reduced in size or unaffected. The specific control for this disease is Terraclor (PCNB), and one application during the life of the crop is sufficient. The suggested rate is 8 ounces of 75% WP per 100 gallons applied one quart per square foot. For potted plants use 4 ounces per 100 gallons and apply 8 fluid ounces of this mixture per 6-inch pot.

Root Rot (Pythium) - Pythium attacks roots, causing a reduction in the root system and stunting of plants. Sometimes this rot may extend part way up the stem. Leaves yellow, roots rot and plants are often killed. Conditions most conductive to this disease are now soil temperatures and high soil moisture. Plants should be drenched at 7 to 10 days intervals with dexon 70% WP at 1 to 2 ounces per 100 gallons water for root-rot control.

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Root Rot (Thielaviopsis) - This disease is usually not a problem in Florida, but can be controlled by keeping soil pH in the range of 4.5 to 5.0 and growing temperatures above 60°F. There are presently no fungicides available that will give satisfactory control of this organism other than soil sterilization and sanitation.

Soft Rot of Cuttings (Erwinia) - This is most prevalent in cutting beds during propagation. Sterilization of the propagating medium and strict sanitation are the best methods of combatting this disease. Propagation medium must be sterilized prior to sticking cuttings.

Gray Mold (Botrytis) - Sometimes attacks poinsettias and appears as a mass of gray-brownish spores. This disease can be controlled with captan or zineb at rates listed on the container. Better aeration of plants will retard the disease.

Bacterial Leaf Spot - This disease was first reported in Florida in 1960. New infections are dull gray to brown and slightly watery, but spots later become chocolate brown to rust colored, measure 1 to 2 millimeters in diameter and are visible on both leaf surfaces. Lesions vary in shape from circular to angular and on some varieties may be surrounded by a pale green-yellow halo. The lesions are often more numerous along the veins and midribs although not confined to these areas. As disease severity increases, the leaves of some varieties turn yellow and drop prematurely. Highly susceptible varieties may be almost devoid of leaves at time of flowering. The best control is to spray foliage with basic copper sulfate at 4 pounds per 100 gallons of water.

Poinsettia Scab - Rarely are poinsettias affected with scab when grown in greenhouses, but they may be severely affected outdoors. Scab appears as conspicuous, raised lesions or cankers on the stem or cane. The lesions are usually circular but in advanced stages they combine to form large, irregular areas. In severe cases the plant will lose its leaves when the stem is girdled by cankers. Cankers may appear also as spots on the leaf petioles. Control may be obtained with maneb, zineb or basic copper sulfate.