

Producing Poinsettias For Profit

A Commercial Grower's Guide

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Poinsettias are the second largest potted flowering crop grown by Michigan Greenhouse producers. In 1978, over 1.4 million plants, with a wholesale value of \$3.5 million, were produced. The technology has changed dramatically within the last few years. This outline is a guide and reference for poinsettia growing.

I. INTRODUCTION

- A. Poinsettias (*Euphorbia pulcherrima* Willd) were first introduced to the United States in 1825 by Joel Robert Poinsett, the first U.S. ambassador to Mexico.
- B. The plant is native to southern Mexico and Northern Guatemala.
- C. The poinsettia is the most important Christmas pot plant in the United States.

II. CULTIVARS

- A. In 1923, a seedling variety called "Oak Leaf" was introduced. Most cultivars grown from 1923 to the early 1960's were sports of this cultivar. Most were selected and developed by Paul Ecke.
- B. In 1964, a red seedling called "Paul Mikkelsen" from Mikkelsen's Inc., having stiff stems and the ability to retain leaves and bracts under home conditions, was introduced. This cultivar and its sports were the most important cultivars grown by 1967.
- C. In 1968, Paul Ecke, Inc. introduced a red cultivar, "Eckespoint C-1", which had strong stems and large bracts. It and its sports became important cultivars by 1970.
- D. In 1967, a cultivar was introduced in Norway called "Annette Hegg." This cultivar and its many sports have become the most popular cultivars for pinched, multiflowered plants in the 1970's.
- E. Following is a listing of important cultivars over the past 50 years.
 - 1920's—True Red, Early Red, Red Sport, St. Louis, Hollywood, Oak Leaf, Henriette Ecke, Mrs. Paul Ecke.
 - 1930's—Ruth Ecke, Indianapolis Red, Albert Ecke.
 - 1940's—Improved Albert Ecke, Henriette Ecke Supreme, Ecke White, Barbara Ecke Supreme.
 - 1950's—Improved Indianapolis Red, Ecke's Flaming Sphere, Dark Indianapolis Red, New Improved Ecke White.
 - 1960's—Elisabeth Ecke, Paul Mikkelsen, P. M. Pink, P. M. bi-color, P. M. White, Eckespoint C-1, C-1 Pink, C-1 Marble, C-1 White, Eckespoint D-7, Annette Hegg, White Hegg, Pink Hegg, Marble Hegg, Dark Red Hegg.
 - 1970's—Annette Hegg Maxi, A. H. Diva, A. H. Lady, A. H. Top Star, A. H. Supreme, A. H. Dark Red, A. H. Super Star, A. H. White, A. H. Marble, Eckespoint Reddy Light H-15, Smalls Winter Flame, Rudolph, Red Baron, New Eckespoint C-1 Pink, New A. H. Pink, Eckespoint Prof. Laurie Pink, Mikkelpoint, Jingle Bells, New Ecke White, Super Rochford, Triumph, Wonder Star, Gutbier V-10 Amy, Gutbier V-14 Glory.

III. FLOWER INDUCTION REQUIREMENTS

- A. Poinsettias are short day (long night) plants.
- B. Flowers are initiated whenever the dark span is 12 hours or longer.
- C. Temperatures of 70°F or higher delay flower initiation.
- D. The optimum temperature for flower initiation is 60°-62°F.
- E. Floral initiation may begin under conditions of an 11 hour night. However, continued development requires a longer night.
- F. If unfavorable conditions (high temperatures, long photoperiods) follow initial flower initiation, 3 side branches may develop and return to the vegetative state or undergo abnormal elongation resulting in a flower with "split heads".
- G. At least 5 weeks of long nights are required for proper floral initiation.
- H. Plants are extremely sensitive to light during the dark span. One to two ft-C of light from an incandescent light can delay or prevent flower initiation and development.
- I. Floral initiation naturally occurs from Sept. 20 to Oct. 1. The date varies somewhat with weather conditions. Clear skies will cause later initiation. Early morning or late evening cloud cover encourages earlier initiation.

- J. Lighting for 3 hours during the middle of the night until the desired day of initiation and then the use of black cloth will produce the desired short day conditions and uniform flower initiation.

IV. ENVIRONMENTAL REQUIREMENTS

A. Light

1. Poinsettias require **high** light levels for best growth. No greenhouse shading is necessary unless temperatures cannot be controlled.

B. Temperature

1. Under **high** light conditions, stock plants can be grown at temperatures of 70-90°F.
2. Temperatures should be lowered to less than 70°F under **lower** light conditions.
3. During floral initiation, temperatures should be 60-62°F nights and no higher than 80°F days.
4. After floral initiation, temperatures should be approximately 65°F nights and 70-75°F days.
5. Lower temperatures (56-60°F night) during the final 2-3 weeks of forcing enhances bract color.
6. Plants become very susceptible to root rot at very low temperatures (50-52°F).

C. Nutrition

1. Poinsettias have a high nitrogen requirement with a more modest phosphorus and potassium requirement.
2. Several methods of applying adequate nutrients have been used and are acceptable.
 - a. *Constant liquid feeding (CLF) of poinsettias supplies 263-30-135 ppm N-P-K plus 0.1 ppm Mo. The nutrients required are described below.*

Quantity per 1,000 gal. water	Compound
3 lbs.	Ammonium Nitrate
5 lbs.	Calcium Nitrate
3 lbs.	Potassium Nitrate
10 fl. oz.	75% food grade Phosphoric Acid
1.5 fl. oz.	Molybdenum stock solution*

*Dissolve 1 pound sodium or ammonium molybdate in 5 gallons water.

- (1) One could also use:
 - (a) 13 lbs. 16-4-12 per 1000 gallons (250-27-158 ppm N-P-K)
 - (b) 8.5 lbs 25-10-10 per 1000 gallons (250-44-85 ppm N-P-K)

- (2) Other micro elements like iron, zinc, copper and boron may be included as required.
 - b. Apply liquid fertilizer at weekly intervals by using constant liquid feed formula at double strength.
 - c. Dry feed can be used. Osmocote (19-6-12) can be incorporated into the soil mix at a rate of 7 to 10 lbs. per cubic yard (use in place of CLF). Do not steam sterilize soil after incorporation.
 - d. As a top dressing, apply one level tablespoon of Osmocote per 6" pot.
 - e. A combination of Osmocote (14-14-14) at 1 teaspoon per 6" pot and 185 ppm nitrogen from a 25-10-10 has been used successfully.
3. The $\text{NH}_4\text{-N}$ fertilizers should be used during early forcing while $\text{NO}_3\text{-N}$ should be used during the later part of forcing and finishing. Poinsettias grow better with a high $\text{NO}_3\text{-N}$ to $\text{NH}_4\text{-N}$ ratio.
 4. A soluble trace element should be added once when cuttings are potted in final containers.

D. Water

1. Poinsettias require large amounts of water and should not be allowed to totally wilt between waterings. Excessive wilting can result in leaf drop.
2. During very hot weather, water plants in the morning. Cold water applied during the hot afternoon can cool the roots, reduce water uptake, and cause severe plant wilting.
3. Overwatering should be avoided on newly planted cuttings as root loss can occur.

V. CULTIVATION

A. Propagation

1. Poinsettias are vegetatively propagated by cuttings.
2. There are two basic options for plants:
 - a. The grower can buy rooted (or unrooted) cuttings from a propagator.
 - b. The grower can grow stock plants and root his/her own cuttings.
3. Stock plant production:
 - a. Cuttings for stock plants can arrive from March to June. Plants should be potted in the following sized containers.

Month Planted	Container Size	Spacing	Expected Cutting Production/Plant
March	12"	18"×18"	72
April	10"	15"×15"	36
May	8"	12"×12"	18
June	6"	8"×8"	9

- b. Monthly fungicide drenches should be used.
- c. High nutrition should be maintained.
- d. Temperatures should be 65-70°F night and 80-85°F day.
- e. Soft pinch when liners are established and every 4 week thereafter through June 22-27.
- f. Provide night interruption lighting through May 15 to prevent flower initiation.
- g. Harvest cuttings beginning July 15.
- h. Stock plants can be sprayed with Cycocel at 1:60 (1850 ppm) 3 to 4 weeks before the first cuttings are taken to reduce elongation.
- i. Cuttings should be 3-4" long early in the season and 4½ to 5" long later in the season.

4. Rooting of cuttings

- a. A sterile, well-drained medium should be used. Peat, perlite, or vermiculite mixes and foam materials work well.
- b. Cuttings should be maintained under sterile conditions at all times.
- c. Cuttings should not be allowed to dry out. Initially under high light conditions, a 5 second mist every 5 minutes is adequate.
- d. Reduce this rate under cloudy conditions and as the cuttings root (approximately 12-14 days).
- e. Cuttings do not require a rooting hormone for rooting but application of one speeds rooting and improves uniformity. Apply hormone as a quick dip of cutting stems in IBA at 2500 ppm or as a talc formulation.
- f. Be sure that leaves from adjacent cuttings do not cover the cutting shoot tip. This shading will increase rooting time.
- g. The rooting medium temperature should be at least 70°F.

B. Medium and planting

- 1. A medium with high porosity is desired, especially if plants are grown in plastic pots.
- 2. An excellent medium has been a 1:1:1 (soil: peat:perlite). Peat vermiculite mixes are also acceptable.
- 3. The pH should be adjusted to 6.0-6.2.
- 4. The addition of superphosphate and trace elements in the mixes eliminates the need to add these elements in subsequent feedings.
- 5. Several methods of planting have been used.
 - a. Rooted cuttings can be transplanted from a propagation bench to the finishing pot.
 - b. Cuttings can be rooted in 2½" or 3" pots and then transplanted into finishing pot.
 - c. Cuttings can be direct rooted in the finishing pot. For 6" pots, stick cuttings on Aug. 20 and pinch no later than Sept. 15. If plants are

grown single stem, stick on Sept. 1. Also, for single stem plants, cuttings and propagation techniques must be uniform so a uniform final pot will result.

- C. The following dates should be considered as a guide for cutting, propagation and pinching dates.

Pot Size	No. Plants Per Pot	Direct P or SS*	2 ¼" Rooting	Pot Rooting	Planting Date	Latest Pinch Date
4"	1	P	9/7	9/1	9/22	9/28
4"	1	SS	9/22	9/15	10/6	
5"	Same as 6"					
6"	1-2	P	8/20	8/13	9/3	9/15
6"	3-5	SS	9/1	8/25	9/15	
7"	1-3	P	8/17	8/10	8/31	9/7
7"	5-7	SS	9/1	8/25	9/15	

*P: pinched or SS: single stem

Adapted from *The Poinsettia Manual* by Paul Ecke Jr., and O. A. Matkin.

D. Pinching

- 1. Plants can be soft pinched or precision pinched. With precision pinching, the plant is pinched so the number of nodes left on the plant equals the number of desired flowering stems.
- 2. When producing branched plants, the plant should be pinched early enough so that sufficient growing time is allowed to produce the length of stem required for the pot size.
- 3. In Michigan, cuttings should not be pinched any later than Sept. 15 and preferably by Sept. 10 for 6" pots.

E. Growth Regulators

- 1. Both Cycocel and A-Rest are effective in controlling height. Cycocel is generally used.
 - a. The following are suggested application rates for Cycocel.

Application Method	Time		
	August	Sept. or early Oct.	Late Oct.
Cycocel drench*	3000-6000 ppm	3000 ppm	1500 ppm
Cycocel spray	3000 ppm	3000 ppm	1500 ppm

*180 ml (6 oz.) per 6" pot

- b. Apply the Cycocel about 2 weeks after pinching when the shoots are 1½ to 2" in length. Cycocel may cause blotchy yellowing of leaves. A half application and balance 4-7 days later helps prevent injury.
- c. Late application of Cycocel may reduce bract size, crinkle bracts or delay flowering.

- d. A-Rest is also effective as a drench (0.5 mg/6" pot). Apply A-Rest 3 weeks after the pinch when breaks are 4-6" long or 8-12 weeks before crop finishes.

VI. PROBLEMS

A. Diseases

1. *Rhizoctonia solani* causes stem and root rot. Symptoms include brown rot of stem at the soil line and roots with brown lesions.
2. *Pythium ultimum* is water-mold root rot. Symptoms include rotting of the root tips and cortex. It may advance up stem causing lower leaves to yellow and rot.
3. *Thielaviopsis basicola* causes a black root rot. Roots develop black rooted areas. Plants show lack of vigor, leaf yellowing, leaf drop and sometimes sudden collapse, particularly after temperatures have been lowered below 60°F.
4. *Botrytis cinerea* or gray mold is sometimes a problem. Symptoms include rotting of tissue, frequently starting on young leaf edges or other immature tissue. Botrytis causes red varieties to develop purplish color on infected bracts. Control Botrytis by maintaining air circulation at night, using night heat to lower humidity and keeping night temperature above 60°F.

B. Insects

1. The main insect pests include aphids, white fly, and spider mites.
2. Control these insects with standard chemicals.

C. Physiological

1. "Leaf drop" is a disorder caused by excessive drying, fertilizer injury to the roots, or exposure to cold air drafts. Older varieties were much more prone to this disorder.
2. "Leaf crippling, distortion, puckering" was originally thought to be a virus, but is now known to be caused by environmental factors. The factors necessary for expression are a rapid rise in temperature and a rapid drop in humidity occurring simultaneously. Control by maintaining low humidity at night.
3. "Latex eruption" or Crud is a disorder caused by the bursting of cells resulting

from high turgor pressure. Latex spills over the tissue and, upon drying, creates a growth-restricting layer. It occurs mainly under conditions of low temperature, high humidity and high soil moisture. It is controlled by avoiding these factors.

4. "Split bracts" is a disorder caused by flower initiation followed by a vegetative period. A flower bud initiates but fails to develop. Subtending lateral shoots begin growth. If the laterals then initiate and develop, split bracts occur.

VII. HARVESTING, HANDLING, MARKETING

- A. Plants are sold when the bracts are in full color.
- B. Modern cultivars have a long keeping life in the home. They should last at least 6-8 weeks if properly grown and shipped out of the greenhouse with a good root system.
- C. All plants should be "sleeved" prior to shipping to protect the bracts and leaves.

VIII. SCHEDULE

FORCING SCHEDULE FOR 5½ or 6" NATURAL DAY LENGTH POINSETTIAS*

Week Number	Dates	Cultural Practice	Temperature
0	8/10-8/15	Stick unrooted cuttings	70°F Soil Temp.
3	8/31	Cuttings rooted, transplant	65°F Night
4-5	9/8-9/15	Pinch	65°F Night
6-9	9/23-10/10	Flower initiation	60-62°F Night (dark span greater than 12 hours)
6-9	9/23-10/10	Growth retardant (apply CCC when shoots are 1½ to 2" in length)	
9-12	10/10-10/31	Forcing	65°F Night
12-13	10/31-11/7	First color	65°F Night
13-15	11/7-11/21	Development	62°F Night
15 to sale	11/21	Full bract color	56-60° Night

*9 Week Cultivar

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Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8, and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Gordon E. Guyer, Director, Cooperative Extension Service, Michigan State University, E. Lansing, MI 48824.

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2P-5M-2:82-KMF-UP. Price 25 cents. Single copy free to Michigan residents.

Michigan State University Printing

FILE: 26.22