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Poinsettias: Hot or Cold

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Summary

1. Most Annette Hegg and Mikkelsen poinsettia cultivars can be grown and acceptable quality obtained in greenhouses heated to 54° or 60°F and cooled to 70°F during sunny weather.
2. Quality miniplants of several Hegg and Mikkelsen cultivars can be obtained by pinching no later than September 28.
3. Malformed bracts and "crud" occurred on some varieties in the 1973 trials but not in 1974.
4. Cooler growing temperatures should be used only when an abundance of light is available and good cultural practices utilized.

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Greenhouse temperature requirements for the growth of today's poinsettia cultivars have been in a state of flux, especially with the energy crisis facing growers. It is not uncommon to see recommendations of a minimum of 60°F N for most Hegg and Mikkelsen cultivars and 70°F N for the C-1 types (2). Research (3) even indicates that fluctuation of temperatures during the growing period improves the keeping quality of some cultivars. Widmer (4) recommended that Annette Hegg be finished around 60°F which is lower than the finishing temperatures of the C-1. To

further complicate the growers thoughts, Conover (1) found that the phytotoxicity of Cyocel applications on Annette Hegg, Paul Mikkelsen and C-1 cultivars occurs at 80° and 90°F day temperatures and not at 70°F day temperatures. He also noted that decreased light intensity at lower temperatures reduced further the chlorosis of the foliage.

To evaluate some of the factors related to temperature and the production of poinsettias for the Christmas season, space within the floriculture

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research greenhouse was obtained and several evaluations undertaken.

1973 Evaluations

The effects of reduced temperatures on the development of 31 cultivars of Ecke, Hegg and Mikkelsen poinsettias were evaluated using two night temperature treatments, 52-54°F, commonly considered "carnation temperatures", and 60-62°F. The day temperature for each treatment ranged from 60-70°F, depending on the amount of solar energy available.

All varieties were potted on September 15 and placed in the two temperature regimes starting September 20. Some of the plants in each treatment were pinched on September 20 and 28.

The nutritional program was maintained at a low level in order to observe natural foliage characteristics and plant development on pinched and unpinched plants. Carbon dioxide was injected during daylight hours. No fungicides were used, and Temik was applied once for insect control.

During the first week of December, 1973, the plants in both temperature treatments were evaluated for foliage color, rate of bract development and growth habits due to pinching. Comments on the most desirable cultivars are as follows:

Annette Hegg Lady performed well in both temperature treatments. The foliage was dark green, but the bracts developed a little slower at the lower temperature. A small amount of "crud" appeared in both temperature treatments. It was the best "pinched" Hegg variety evaluated. The tallest pinched plants were produced in the cooler temperature.

Annette Hegg Diva was the best in the higher temperature. The foliage was lighter in color than "Lady", and a small amount of "crud" appeared. The tallest pinched plants were grown in the warmer temperature.

Mikkelsen Improved Rochford was comparable to AH Diva in foliage color and rate of bract development. The pinched plants developed well in both temperature treatments but were slower in the cooler treatment.

Mikkelsen 72-6901, 6903, and 6720 grew well in both temperature treatments and all pinched plants were well developed. Cultivar 6903 had the greenest and most desirable foliage. It was somewhat slower in the cooler temperature treatment.

Discussion of 1973 evaluations:

The C-1 cultivars were grown only in the 60°F treatment, and it was very evident that a higher temperature and more concentrated feeding programs were needed. The H-2 and H-15 varieties did not perform well in either temperature. Nutrient deficiency was possibly the contributing factor. Growers using the cultivars described in this evaluation can probably produce relatively green foliage with lower feeding levels, but bract development may be impaired. More desirable pinched plants appeared to be obtained with the combination of lower growing temperatures and the earlier pinching date. The pinched plants were considered as minipots. Larger plants could only be obtained by pinching earlier or using different cultivars. During this evaluation no "crud" appeared on the Mikkelsen cultivars, but small amounts were found on some of the Hegg varieties.

There is no doubt that some poinsettia cultivars can be grown at constant 60-62°F and/or 52-54°F night temperatures and provide quality plants.

1974 Evaluations

Three rooted poinsettia cuttings were potted on September 2, 1974 in 6" azalea pots using a 1:1:1 by volume mixture of sand, Canadian peat and soil. Half of the plants of each cultivar were placed in each temperature treatment and replicated twice on each bench. Some plants of each variety were also planted in 4" geranium pots in both temperature treatments and pinched on September 25, 1974.

Table 1. Temperatures used during the 1974 poinsettia evaluations.

	Heat to	Cool at
Treatment 1	60°-62°F N; 60°-62° F D	70°F D
Treatment 2	52°-54°F N; 60°-62°F D	65°F D

The feeding program consisted of a single top dressing of Osmocote 18-9-9 and a constant liquid feed. CO₂ was injected during daylight hours creating a concentration ranging from 1000 ppm to 1500 ppm.

All plants were treated with Temik twice, and no fungicides were applied. The plants were observed every two weeks and data collected. Final observations were made on December 18, 97 days following potting.

Table 2. Coding of plants used in the 1974 evaluations.

Number	Cultivar	Number	Cultivar
1	Dk red Annette Hegg	10	Mikkel Dawn
2	Annette Hegg Lady	11	Mikkel White Rochford
3	Annette Hegg DIVA	12	Mikkel #6903
4	Annette Hegg White	13	Mikkel #6720
5	Annette Hegg Pink	14	Mikkel Imp Rochford
6	Ann Hegg Red Supreme	15	Mikkel Pink Rochford
7	Paul Mikkelsen	16	Mikkel #6809
8	Mikkel Fantastic	17	Mikkel #6150-2
9	Mikkel #6373	18	Mikkel Cardinal

Days to color in three bracts:

Plant development during the first 4 weeks of growth was about equal in both temperature treatments. The average number of days for the "Heggs" to reach the stage of color in three bracts in the warmer temperature was 65.2 and the Mikkelsen varieties 62.3. In the cooler temperature treatment the Hegg cultivars required 76.3 days and the Mikkelsen, 69.3. In most instances the buds were relatively well developed before the bracts were in full color. The Dark Red Annette Hegg and Annette Hegg Red Supreme were extremely slow in the cooler temperature. Annette Hegg White was the slowest of all cultivars in the 61°F treatment. Mikkel Cardinal had good bract coloration 55 days from planting in the 61°F treatment, but the poorest foliage of any cultivar evaluated.

Bract size:

There were no significant differences in bract size of Mikkelsen varieties due to temperatures (Fig. 1). The bracts of the Hegg varieties were significantly larger in the warmer temperatures. The bract size of Lady Hegg, grown in the cooler temperature, was not significantly different than the Mikkelsen cultivars.

Plant height:

Some varieties responded differently to temperature in relation to plant height than others. Annette Hegg White, Mikkel 6150-2, and Mikkel 6720 were significantly taller in the cool treatment, while Dark

Red Annette Hegg, Mikkel Improved Rochford and Mikkel 6809 were taller in the warmer treatments (Fig. 2). There were no significant differences between treatments in relation to the remaining varieties.

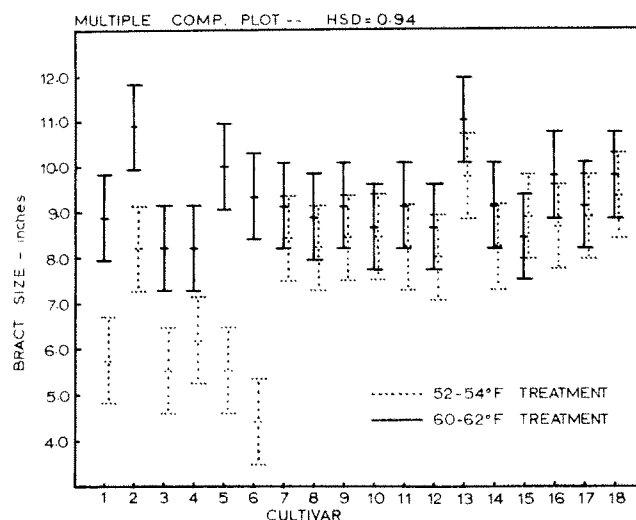


Figure 1. Bract sizes of non-pinched poinsettia cultivars (Table 2) grown in two temperature treatments and observed on December 16, 1974, 95 days after planting.

Days to cup formation:

The number of days from planting to the initial development of the nectar cups was also considered (Fig. 3). All of the Hegg varieties developed slower than the Mikkelsen cultivars. (Reasons will be discussed later). In the warm temperature treatment, Annette Hegg Lady had 3 bracts in color 57 days after pinching while the other Hegg varieties averaged 62 days. The Mikkelsen varieties ranged from 57 to 62 days also, but the cultivar 6809 had good color 52 days

following the pinch (Fig. 4). The foliage of the pinched Hegg plants, in general, was darker than any other pinched or non-pinched plants.

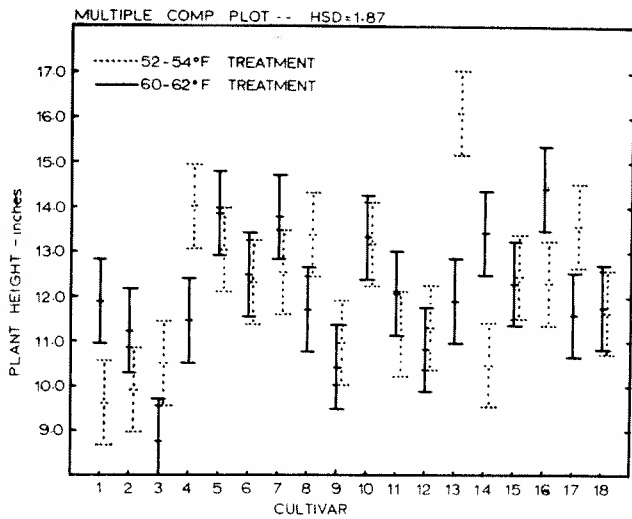


Figure 2. Height of non-pinched poinsettia cultivars (Table 2) from the soil to the base of the cyathium as measured on December 16, 1974 in two temperature treatments.

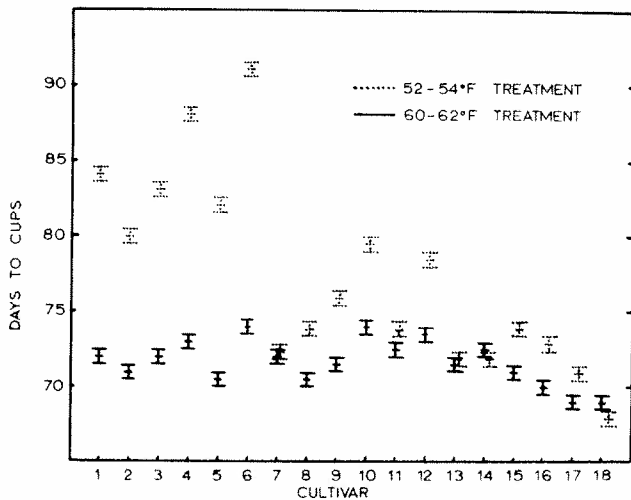


Figure 3. The number of days before the nectar cups were starting to be clearly visible on poinsettia cultivars (Table 2) planted September 12, 1974 and grown in two temperature treatments. November 23 = 72 days, December 8 = 82 days.

Discussion of 1974 results:

There is no doubt that most Hegg and Mikkelsen cultivars can be grown at 53° or 60°F night temperatures with day temperatures from 7° to 10°

higher, provided there is good light and proper nutritional and watering programs are maintained.

Hegg cultivars in the cool treatment were grown at a slight disadvantage due to periodic shading in late November by a bench of carnations (Fig. 5). Previous years' evaluations, however, indicate that quality plants can be grown in the lower temperature. Performance of the Lady Hegg cultivar, under restricted light conditions and lower temperatures, may prove advantageous in many parts of the country (Fig. 6).



Figure 4. Pinched and non-pinched plants of Mikkelsen's cultivar 6809 planted on September 12, 1974 and pinched September 25, 1974 and grown in the warm temperature treatment.



Figure 5. Pinched plants of Hegg Diva and Supreme. The center plants were grown in the cool treatment in a "shaded" area and the outside plants in the warm unshaded treatment.

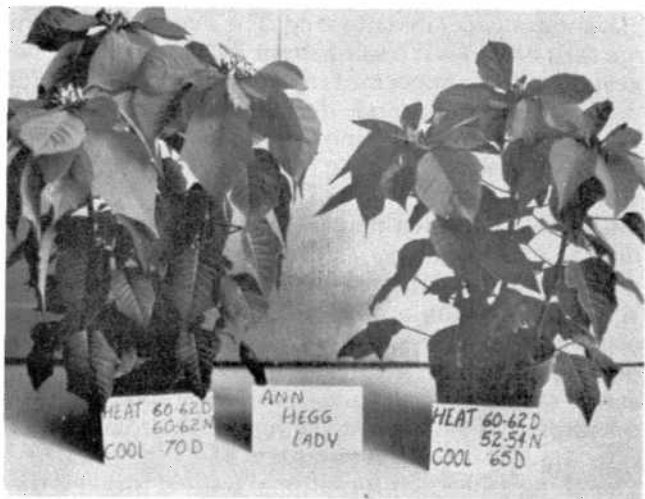


Figure 6. Annette Hegg Lady planted on September 12, 1974 and grown in two temperature treatments. The cool treatment was in a "shaded" area. Photo December 12, 1974:

Another factor that was very apparent in the evaluations was the formation of the nectar and pollen before the bracts were fully developed. The presence of pollen has always been an indicator of age, and in some instances this could be detrimental to the sale of the new cultivars. Perhaps breeding and selecting can overcome this potential marketing problem.

In the 1974 evaluations, there was a total absence of any "crud" or malformed bracts on any variety. There is no apparent reason why these problems exist in one season and not another.

Growers planning to grow poinsettias at lower temperatures must consider the potential problems involving botrytis and root rot. Watering should be accomplished early in the day, thus allowing adequate time for the evaporation and use of excess moisture.

The poinsettia evaluations will be continued this season at Colorado State University and involve the effects of two temperatures and two light levels on the growth of pinched cultivars.

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