PRODUCTION

POINSETTIAS

Finishing Poinsettias Cooler

Practical experiences help guide the way for finishing this seasonal crop at a lower temperature.

'Prestige Early Red' grown at cold (left) versus normal (right) temperatures on November 1. These plants are in 8-inch pots with three plants per pot. The cold crop was planted a week earlier than the normal crop. The cold crop finished by Nov. 24. The normal crop was grown at 68˚F to 72˚F.

by ***JAMES E. FAUST*** *and* ***ROGER KEHOE***

HIGH fuel costs have our industry searching for opportunities to lower the thermostat, and poinsettias provide a unique opportunity for reducing greenhouse fuel inputs. Initially, the options may appear to be limited since poinsettias have historically not grown well at cooler temperatures. However, poinsettia has several attractive features. First, the scheduling and marketing calendar is identical from year to year. This makes it easier to compare data from previous years to determine how a current crop is progressing. Second, cooler temperatures can be compensated for by adding time to the front of the schedule. This is not usually a problem since greenhouse space is often available during the summer. Third, several new cultivars are extremely early to flower and thus a one- or two-week delay in flowering may be ideal for hitting the peak market dates.

In 2006, experimental trials were conducted at four greenhouses situated in different parts of the country to validate the effects of reduced greenhouse temperatures on poinsettia production under different environmental conditions, particularly the different light levels. The four greenhouses included: Kube-Pak (New Jersey), Smith Gardens (Washington), Post Gardens (Michigan) and Van Wingerden International (North Carolina). Van Wingerden International (VWI) conducted the trial at two separate sites (Mills River and Jeffress Road).

The cultivars selected for the trial included: 'Advent Red,' 'Autumn Red,' 'Enduring Red,' 'Freedom Early Red,' 'Freedom Red' and 'Prestige Early Red.' The normal market dates for each cultivar is as follows: 'Advent Red' (Nov. 1), 'Freedom Early Red' (Nov. 5), 'Autumn Red' (Nov. 10), 'Freedom Red' (Nov. 15), 'Prestige Early Red' (Nov. 18) and 'Enduring Red' (Nov. 20). At least 300 plants were grown per cultivar at each location.

The greenhouses followed a few basic guidelines. The crop was to be

✓ Tips For Reducing Greenhouse Temperatures

If you are considering reducing greenhouse temperatures on some of your poinsettias this season, following is a checklist of important items to keep in mind:

✓ Choose cultivars that are relatively early, so that a one- to three-week delay in flowering is useful. Keep these cultivars in separate greenhouses from later flowering poinsettias in order to avoid delaying the cultivars grown under the normal temperature regime.

✓ Choose cultivars that have a relatively high vigor and plant them one to two weeks earlier than normal to compensate for a reduction in plant vigor when the greenhouse temperatures are reduced. Smaller pot sizes and warmer locations will need less additional time compared to larger pot sizes and cooler locations.

✓ For natural daylength crops, use normal temperatures until October 1, then the cold temperature regime can be started.

✓ Be careful with excessive use of early season plant growth regulators since vigor is necessary to achieve the proper plant sizes. The large positive DIF delivered during the cold trials did not compensate for the lower average daily temperatures. It is likely that Cycocel alone is a sufficient growth regulator for cold poinsettia production.

✓ Allow the greenhouse to warm up to between 75˚F and 85˚F during sunny days to offset the cooler night temperatures. On cloudy days, the temperatures should still reach the mid 70˚Fs to maintain bract development.

✓ Average daily temperatures should be maintained between 62˚F and 65˚F. Lower temperatures will likely delay flowering more than desired.

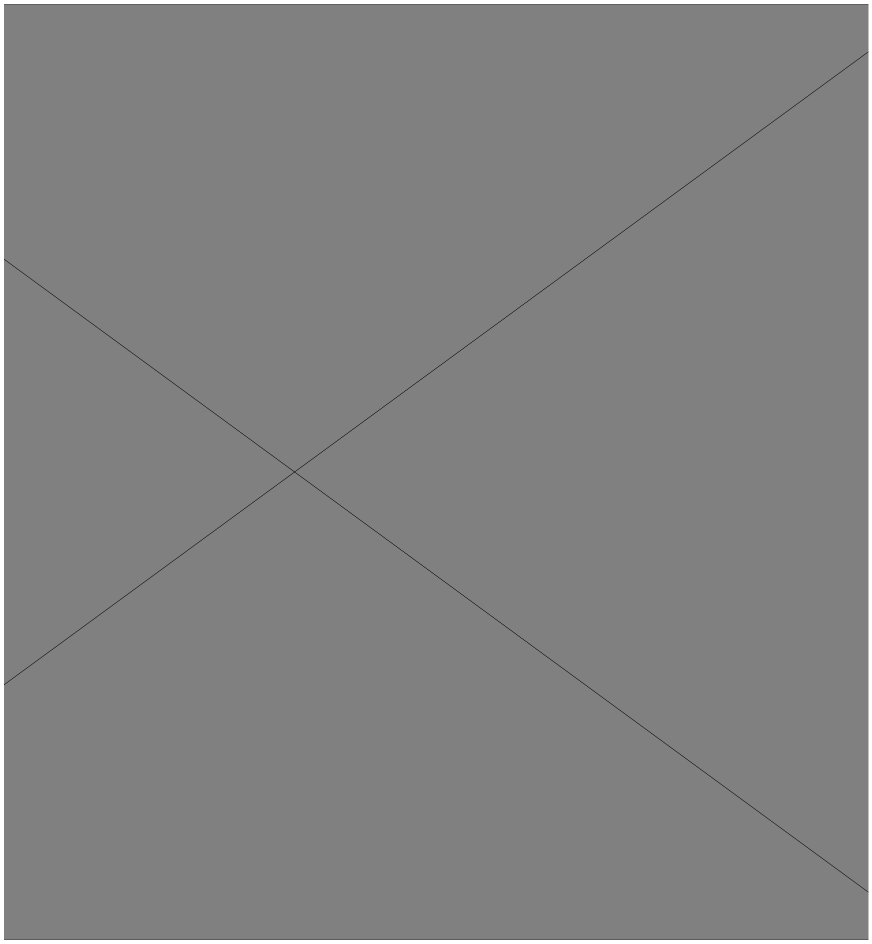
✓ The minimum night temperature should not fall below 55˚F. Flower development will not progress at 50˚F.

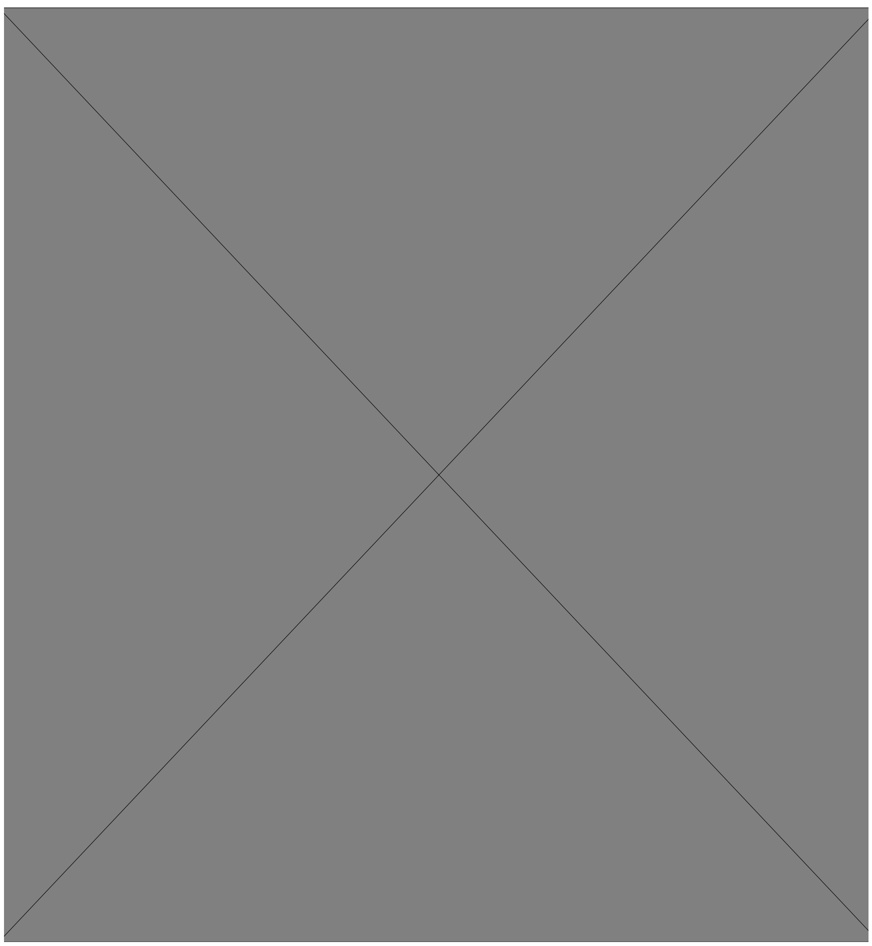
✓ Monitor root growth throughout the crop. Poor root growth may indicate that a crop or a cultivar is not doing well with the cold regime.

✓ Provide adequate air circulation and ventilation to reduce the humidity in the crop canopy and the greenhouse. Cold nights can cause excessive condensation in the humid plant canopy, which can lead to botrytis problems.

✓ Maintain temperature and humidity sensors at the canopy height to provide an accurate picture of the crop environment.

✓ Document your crops with a digital camera. Take weekly pictures and place a card with the cultivar name and date in the picture. This is an invaluable tool for evaluating the crop and making adaptations to future crops.





grown with 60˚F night temperatures and 70˚F to 75˚F day temperatures when possible. Temperature and light data were recorded with a datalogger placed at the height of the canopy. Cycocel was the only plant growth regulator to be used, so bract size or timing was not influenced. Each site received cuttings one to two weeks before their regular crop schedule to compensate for any reduced vigor that might be observed under cool nights. Digital pictures were taken during flowering to evaluate bract development.

The average daily temperatures in the five greenhouse locations typically ranged from 60˚F to 75˚F during October and 55˚F to 65˚F in November. The temperatures were the warmest at the VWI Jeffress Road location while Smith Gardens remained cool throughout the season. In most locations, the average low temperature from mid-October through November was near 55˚F. The high temperatures varied considerably between locations, ranging from the high 60s to the mid 80s.

Figure 1 displays the temperatures averaged weekly for each greenhouse. The average weekly temperatures at Post Garden were the coldest at 60˚F to 63˚F throughout October and November, while the Jeffress Road site dropped from 72˚F to 63˚F from early October to the end of November. In general, the average weekly temperatures during bract development were 60˚F to 65˚F.

Figure 2 displays DLI for each greenhouse. DLI is a light measurement that adds up all the individual measurements during the day. It represents the total light delivered to the crop during the day. For poinsettia, 10

Fig. 1. Weekly Mean Temp

Average temperatures recorded daily at five greenhouses from Sept. 22 to Dec. 1, 2006.

Date	Kube-Pak	Post Gardens	Smith Gardens	VWI Jeffress Road	VWI Mills River
Oct 3	68.9	62.1	65.9	71.7	67.3
Oct 10	70.1	62.7	65.1	71.7	68.0
Oct 17	65.6	61.0	62.9	67.7	62.4
Oct 24	65.4	59.7	60.9	67.4	62.6
Oct 31	62.9	62.1	60.6	64.3	63.0
Nov 7	62.7	62.6	59.7	63.3	57.9
Nov 14	65.1	62.4	59.6	64.9	63.4
Nov 21	62.9	62.3	61.4	62.4	60.9
Nov 28	58.0	62.8		64.5	64.5
Dec 5	58.3				

moles/day is desirable during the vegetative phase (August and September), while 5 to 10 moles/day is acceptable for adequate bract development in October and November. Growing crops cooler actually improves plant quality when the ambient light levels are low (< 5 moles/day). The greenhouses in this study were near 10 moles/day in early October and then steadily dropped down to 5 moles/day in late November. Smith Gardens in Washington had the lowest light levels with as little as 2 moles/day throughout November.

First color in the cold greenhouses was, in general, less than one week different from the normal greenhouse crops. This indicates that the temperatures until first color were not greatly different from the normal growing regime, and perhaps it also suggests that flower initiation is primarily affected by photoperiod. At Kube-Pak, the cold crop was planted a week earlier ,so that helped to compensate for the slightly lower vigor. Also, it is interesting to note that the cold crop had a larger positive DIF, but this did not contribute to any excessive stem elongation

Fig. 2. Weekly Mean DLI

The daily light integral (DLI) delivered to the poinsettia crop at each of five trial sites. To reduce day-to-day variability, the DLI was averaged over the course of each week.

Date	Kube-Pak	Post Gardens	Smith Gardens	VWI Jeffress Road	VWI Mills River
10/3/06	12.2	8.0	11.5	10.6	12.1
10/10/6	11.3	9.4	10.3	9.2	10.0
10/17/06	9.7	6.1	6.4	7.3	8.7
10/24/06	7.6	4.8	5.7	7.8	9.4
10/31/06	7.6	5.1	4.9	5.9	7.5
11/7/06	8.5	4.6	2.1	5.1	7.0
11/14/06	4.8	3.4	2.2	5.6	9.3
11/21/06	5.4	3.0	2.6	4.0	6.4
11/28/06	5.1	4.4		4.8	7.5
12/5/06	5.3				

In general, bract development of each of the cultivars was slower in the cold greenhouses. At Kube-Pak Greenhouses, 'Advent Red' was marketable in early November. 'Freedom Early Red' was marketable in mid-November, 'Autumn Red' was marketable in mid to late November and 'Prestige Early Red' and 'Freedom Red' were marketable in late November. As you can see, bract development in the cold greenhouses was approximately one to two weeks slower than the normal flowering schedule for these cultivars. In some cases the timing difference and bract size difference was not as great as expected, which was attributed to the normal crop requiring more growth regulator than the cold crop, and the growth regulator caused a reduction in bract size and a slight delay in flowering. 'Enduring Red' did not perform uniformly at all locations. The magnitude of change in flower timing appears to be influenced not only by temperature but by variety as well; therefore, further trials will be conducted to better understand the interactions between temperature and bract development.

The results of this series of trials were considered to be a success, i.e., the crops were marketable and the participating growers have indicated that they will continue similar trials with additional cultivars this season. Additionally, controlled environment studies will be undertaken at Clemson University this season. The experimental studies will be conducted to gain a deeper understanding of the factors that influence bract development and to develop tools to assist growers in making low-temperature management decisions.

We anticipate growers will continue to incorporate cooler greenhouse temperatures into their poinsettia production planning. The Ecke Ranch will continue to develop techniques that will give growers more confidence in their ability to manage the poinsettia crop while reducing fuel inputs.

In summary, these trials conducted at commercial sites underscore the potential for reducing fuel costs on poinsettias while maintaining plant quality by following appropriate temperature reduction guidelines. We expect that this technique will become commonly used for growing poinsettias in the coming years. **GG**

Kube-Pak photographed the weekly progression of bract development of five cultivars grown in cold greenhouses. Find the photos at www.greenhousegrower.com.

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More Online
www.greenhousegrower.com
To see a photographic progression of bract development at Kube-Pak Greenhouses' trials, see our Web Site.