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SHORT and EARLY POINSETTIAS IN 1988: A POSSIBLE EXPLANATION

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Since 1957, when Bob Langhans and I studied poinsettia pinching dates at Cornell University, I have advocated September 15th as the best time to pinch most of the plants. These would be single plants in 6" or 6 1/2" pots. Year after year that pinching date has been satisfactory. Ever since the early 60's when Joe Love and I conducted trials with Cycocel at several commercial ranges in North Carolina we have recommended that the first and often only application of growth regulators be about 2 weeks after the pinch. Year after year that schedule has worked . We suggested these practices when growers would inquire, and we observed them ourselves. Our recommendations were based on repeated experiments, our own and those of people at other institutions. We assumed the poinsettia season would have weather closely approaching the long-time average, and flower bud initiation and development would proceed at normal rates. For almost 3 decades our assumptions were accurate and safe. Then we ran into the poinsettia season of 1988.

In 1988 we pinched the plants on our favorite date and applied growth regulators at our preferred time. Nothing seemed to be unusual weather-wise and the plants were doing very well in the potting medium and with the fertilizers they were getting. Plants were under natural day lengths, as we hadn't been lighting our poinsettias since plant breeders had provided us with long-lasting varieties.

I always stroll through the greenhouse before I go up to my office each morning. One morning I was startled to see that most of the plants had visible flower buds (the primary cyathium), and it seemed to be at least 2 weeks too soon. How would I be able to explain to students, growers and to my colleagues that in my 34th poinsettia season I was going to have plants over-mature in mid-November?

When I despondently got to my office I already had had a call from a local grower. He had just been out in his greenhouse and he thought his plants already had flower buds showing, and he wondered how that had

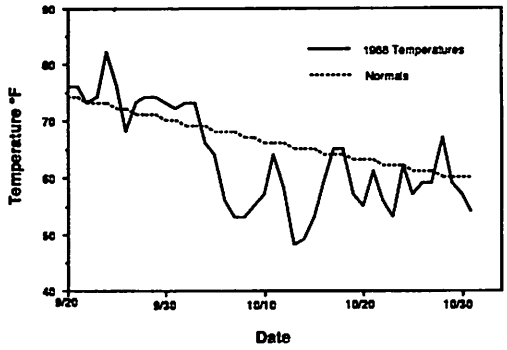
happened. Later that afternoon a couple more telephone calls convinced me that growers throughout the state might be in trouble, and then some inquiries from other states told me the trouble was wide spread. The plants had initiated flower buds with very few leaves on the lateral shoots, the plants would be too short, and too early. Questions arose, such as "How can we overcome the growth regulator effects?" "How can we slow down the flowering without getting root rot and small bracts which can be troublesome at cool temperatures?"

Why did early flower bud initiation occur in 1989?

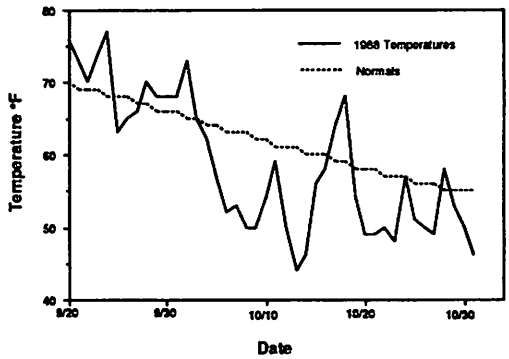
I would wager Joe Love's Ford pick-up that unusually cool weather in early to mid-October got us into trouble with early initiation in 1988. Growers throughout the area who grew their crops under natural day lengths and with night temperatures of about 65 encountered the problem. I obtained weather records from Debbie Dutcher in the State Climatology Office across from mine in Kilgore Hall, and Bill Fonteno plotted the data for me with his computer. The 1988 average temperature curves are compared with the 30-year averages (normal) for Wilmington, Raleigh, Charlotte, and Asheville, from September 20 to October 31.

A glance at these curves reveals that temperatures much cooler than normal occurred for at least the first 2 weeks in October. Day temperatures were cooler, and growers could actually provide night temperatures which were optimum for initiation. Usually high temperatures delay initiation under natural day lengths, and we have to be concerned about temperatures which are too high, rather than with temperatures which are too cool.

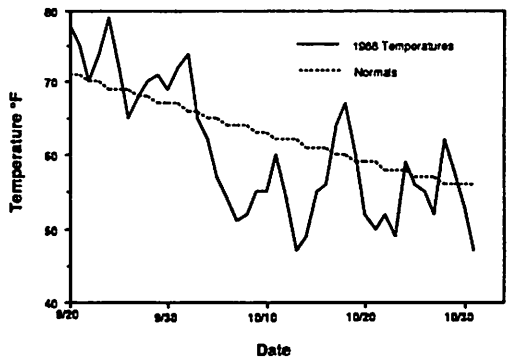
Wilmington, NC



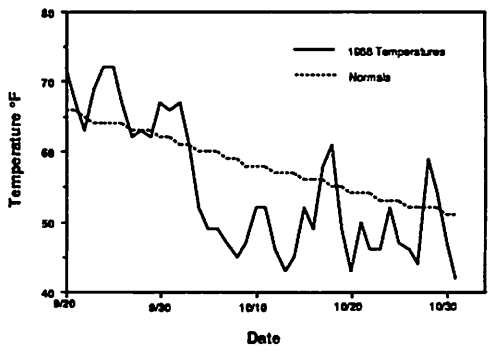
Raleigh, NC



Charlotte, NC



Asheville, NC



What temperature is most favorable for poinsettia flower initiation?

Over the years many studies have been conducted on this subject and it might be helpful if we followed the historical development of temperature and photoperiod recommendations for flower bud initiation. Undoubtedly some excellent work has not been cited in this survey and I make no claim that the list is complete. Some key references not mentioned in the chronology are in the list of references. (I have all of the references listed and I could send you a copy of an article if you particularly wish to read it but do not have access to it).

The chronology of literature in the development of recommendations for flower bud initiation in poinsettias.

1937 Kenneth Post (22) reported that October 10-20 was the usual time of flower bud formation at Ithaca, NY (42 N latitude). He did not state the temperature.

1938 Roberts and Struckmeyer (23) showed a relationship between temperature and photoperiod in flower initiation.

1950 Parker, Borthwiek and Rappleye (21) suggested supplementary lighting from September 20 to October 10 to delay flower bud initiation and better time the poinsettias for Christmas sales.

1954 Gartner and McIntyre (4) in North Carolina advocated a night temperature over 60°F., and lighting from September 15 to October 12 to delay flowering. Varieties used were not known for their long-lasting ability. They began lighting September 15, as they believed initiation occurred between September 15 and September 25. Their plants were <u>not</u> pinched.

1954 Kofranek and Sciaroni (11) reported that "Indianapolis Red" plants grown under high light intensities in East Palo Alto, CA initiated flower buds from September 25 to 30, while "Barbara Ecke Supreme" plants in the same location initiated flowers from September 30 to October 5. "Indianapolis Red" plants under medium light intensities in San Francisco had flower initiation from September 30 to October 5. "Barbara Ecke Supreme" plants in Colma initiated flowers between September 30 and October 8 under a medium light intensity and from October 5 to October 12 under a low intensity

1958 Langhans and Larson (13) at Ithaca, NY experienced delayed flowering at temperatures below 60 or above 70 with the varieties "Barbara Ecke Supreme" and "Indianapolis Red".

1960 Langhans and Larson (14) found night temperatures to be most important in controlling flowering for the variety "Barbara Ecke Supreme".

1960 Struckmeyer and Beck (24) in Wisconsin observed microscopic flower buds after less than 15 short days. In some instances only 8 days or even less were needed to induce the formation of the primary

cyathium.

1961 George Goddard (5) at the University of Massachusetts reported initiation in 15 to 18 days at a night temperature of 62 F. under natural day lengths.

1961 Robert Miller (19) in Ohio used illustrations in his article to show flower bud development. He advocated lighting to delay flowering.

1963 Miller (20) showed the interaction of temperature and photoperiod on flower bud initiation, but reported that later development was affected only by temperature. "Barbara Ecke Supreme" plants initiated buds faster at 60 and a 12 hour day length than they did at 65 or 70 .

1963 Larson and Langhans (17,18) reported accelerated flower bud initiation at night temperatures of 60 and 65 for "Barbara Ecke Supreme". They determined the interaction of temperature and critical day length to be:

Night temp.F	Critical photoperiod(hrs)	Date at 42 N.
70	12 1/2 - 12 3/4	Oct. 1-5
65	12 1/2 - 12 1/4	Oct. 1-5
60	Over 13	Sept. 23

1969 Trygve Kristoffersen (12) in Norway reported that the critical day length for flower bud initiation occurs during the first week of October at 64 to 70 F.

1970 Roy Larson (15) showed hastened flowering of "Eckespoint C-1 Red" at 72 day, 64F night. The experiment was conducted in the Phytotron with excellent temperature control.

1972 Gollan, Tayama and Kiplinger (6) stated that flower bud initiation occurs about September 27 at a 60 F night temperature. Initiation was delayed at higher temperatures. They concluded that the warmer the temperature the shorter the day length had to be, so initiation is delayed until that day length is reached.

1973 Adams, Payne and Richardson (1) in Oklahoma considered September 30 to October 7 to be the range of initiation dates for "Eckespoint C-1 Red". Plants propagated August 16 initiated flower buds more readily than those propagated on September 7. By October 1 all plants had initiated buds under natural day lengths.

1975 Ole V. Christensen (2) in Denmark reported that 15 short days were needed so all plants would be reproductive. He also stated that by the time all plants have initiated the primary cyathium, then 40 to 90% also have initiated the second order cyathia.

1981 Hagen and Moe (9) in Norway felt that 72 to 76F was best for lateral shoot development. Number and growth of shoots were reduced at 60.

1985 Grueber (7) and Grueber and Wilkins (8) used single-stemmed plants of "Annette Hegg Diva" and "Gutbier V-14 Glory" in their experiments. According to them floral development determines the time of flowering more than does flower bud initiation. That is logical, as the percentage of the growing season devoted to flower bud initiation might be less than 20, while flower development takes the remaining 80%. They concluded that flower bud initiation occurs between September 23-27 in St. Paul, MN (45°N). Plants were shortest at 60 , compared to 65, 70 and 75, and had the fewest leaves.

1985 Royal Heins (10) compared the results of experiments conducted from the 1960's to the mid 80's. The changes in varieties might be the primary reason for response differences.

1988 Larson, Hartley and Thorne (16) showed the pronounced delays caused by higher than desired temperatures.

The unusual results obtained in 1988 perhaps can be best summarized by showing the data we have obtained in our height control studies in the last four years with Gutbier V-14 Glory.

Table 1. Comparisons of the effectiveness of growth regulators on height control of Gutbier V-14 Glory from 1985-88 at N.C. State University.

Treatment	Plant height (cm) (a)			
	1985	1986	1987	1988
Control	36	35	25	20
CCC drench	28	29	21	17
CCC spray	29	26	18	17
Bonzi spray	24	31	21	15
Sumagic spray	(b)	30	(b)	16

(a) 2.5 cm = 1 inch. (b) no data

What do we recommend for 1989?

I would suggest you follow practices which were satisfactory for so many years. September 15 is still a good date for pinching most of the crop. Some growth regulator treatment,applied about 2 weeks later, most likely would be advisable.

Growers might put a portion of their crop under long days from mid-September to about October 1, to make certain an adequate number of long days is provided. Mum lighting is satisfactory. This should not be done on plants intended for early sales.

In 1989 we will expand our research with gibberellic acid, to give us better information on how to get out of an "excessively short plants" predicament, should it occur again.

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