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'After Lighting' of Chrysanthemums

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Photoperiodic control of chrysanthemums for precise flowering is commonly accepted by the floricultural industry. Today not very many people even remember when mums were just a "fall crop". The basic concept of photoperiod control consists of using long days (natural or with the addition of incandescent light) to maintain the plant in a vegetative condition and short days (natural or covering with black cloth) to cause the plant to flower.

The biochemical processes that occur when the chrysanthemum is changed from a long to a short day are very complex and most of what occurs is still not known. From a practical viewpoint, however, we do know a great deal. A few days after the start of short days a microscopic examination of the growing point will show the start of the flowering process. At this time many changes have begun to occur and can be observed. No more leaves form, instead the end of the stem or the apical meristem begins to enlarge and flatten out (start of the receptacle) and florets (petals) begin to initiate. Under continuous short days, floret initiation continues until around the 25th day.

Most photoperiodic studies with the chrysanthemums have been concerned with the early stages of flower formation. The early stages are most important for a disruption of the photoperiod, or poor environmental conditions may cause major flowering problems.

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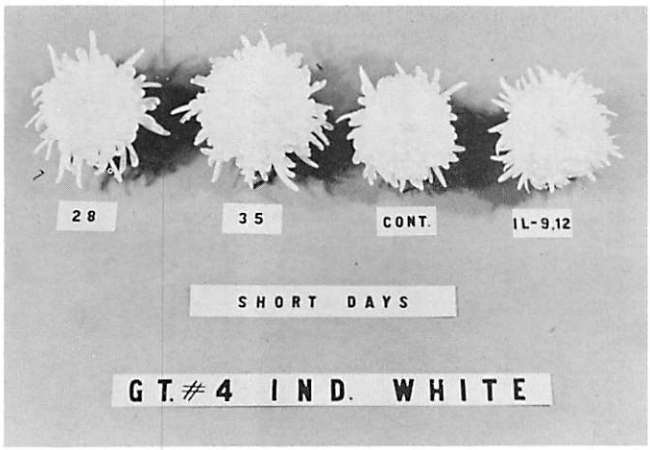


Figure 1. 'After Lighting' of Giant #4 Indianapolis White to increase the diameter of the flower. (Left to right) 28 short days—long days to flower, 35 short days—long days to flower, continuous short days, and interrupted lighting 9 short days—12 long days—short days to flower.

Reorganization of N. Y. S. Flower Growers, Inc.

John Brookins—Orchard Park *and*
T. Paul Newman—Olean

PART III

Looking to the future, the Board of Directors recognizes the necessity of greater and more thorough application of technological advances and research results in order to improve the welfare of the flower industry in New York State. As we all realize, keeping up with the rate of change in today's civilized world is getting more and more difficult.

It is becoming increasingly important that current problems of our industry are properly identified and that all available information be accumulated and utilized rapidly and effectively in solving these problems. They are in many different areas—production, distribution and marketing, sales, personnel management, engineering, finance, consumer satisfaction, and others.

There is also an expanding need for education at all levels from the elementary and secondary schools through the two-year and four-year colleges and graduate schools to provide a supply of people who will be qualified to meet the needs of the industry in labor, management, research and development. We also need to develop, through education, a consumer group with knowledge of the desirability and use of our products.

To accomplish these goals, a strong active committee representing all facets of the industry is required. The new constitution proposes a committee on Education and Research which will have responsibility for identifying and communicating to appropriate institutions and agencies the educational and research needs of the floriculture industry in New York State, and for assuring that effective programs to meet these needs are developed and are made available to the membership. It shall also be responsible for maintaining liaison with, and encouraging and supporting the programs of, agencies and institutions in New York State with educational and research programs in floriculture and related areas.

This committee, with representation from all branches of the flower industry of New York State, will rapidly become an effective voice speaking on behalf of our membership in promoting the welfare of the industry by doing things together that we are unable to accomplish as individuals.

'After Lighting'

(continued from page 1)

The 'interrupted lighting' program is a good example of a photoperiodic manipulation during the early stages. The philosophy of 'interrupted lighting' was to give a week or so of short days to stop vegetative growth and start the formation of florets. Long days were then applied for a week or so which apparently stopped or slowed down the formation of the florets and caused the enlargement of the receptacle. When the plant was again placed under short days, floret initiation continued. The practical result was a flower with a greater number of florets, which in general produced a higher quality product. The detrimental effect was a delay in flowering of approximately the same number of days as the long day interruption. The success of 'interrupted lighting' depended to a large extent on the environmental conditions and cultivars. Improved cultivars have reduced the value of the 'interrupted lighting' program in most instances.

'After lighting' as the name indicates occurs in the later stages. In fact, the long days are applied after the ceasation of floret initiation, approximately 4 weeks after the start of short days. The exact starting time depends on the environmental conditions and cultivar. "After lighting" does not increase the number of florets, but rather increases the flower diameter. It does this by causing the individual florets to be longer. Thus flowers with larger diameter are produced by 'after lighting'. The general recommendation to "pull cloth until color shows" is no longer valid. This information also indicates when black cloth pulling is no longer necessary.

The following is a report of the work we did with 8 standard chrysanthemums.

Rooted cuttings, courtesy of Yoder Brothers, Barberton, Ohio, were planted on 2 dates, August 25 and October 12, 1967. They were planted in a 2-1-1 (soil:perlite:peat) steamed sterilized soil and the cultural conditions were considered normal. Fertilization levels were maintained and the crops were regularly sprayed for insects and disease according to the recommendations given in Cornell Recommends. The greenhouse temperatures were 60° night with a 65-70° day temperature.

August 25 . . . . . The cultivars used were 'Pink Chief', 'Giant #4 Indianapolis White', 'Giant Betsy Ross', 'Good News', and 'Yellow Knight'. All the plants were exposed to long days for 3 weeks. Short days were applied to all the treatments by covering with black cloth. One treatment was kept under continuous short day conditions until flowering (continuous SD), the other 2 treatments were "after lighted", ie light were turned on after 3 or 4 weeks of short days and kept on until the crop flowered. The results are recorded in table 1 and figure 2. The florets are naturally long on 'Yellow Knight' and 'after lighting' apparently made them too long and the plants were grotesque and unsaleable.

The delay was always greatest with the 3 week treatments, however, it also should be noted the greatest flower diameter and largest individual florets were always found in the 3 week "after lighting" treatments. Flower weight was apparently not greatly affected by the 'after light' treatments, at least no trends were indicated.

October 12—The cultivars included 'White Pink Chief', 'Giant #4 Indianapolis White', 'Mefo', 'Yellow Shoesmith' and 'Yellow Knight'. The treatments were continuous short day (SD), "after lighting" treatments starting after 3, 4, and 5 weeks of short days and an "interrupted lighting" treatment which consisted of 9 short days followed by 12 long days and then short days to flowering. The results are recorded in Table 2 and shown for Gt. #4 Ind. White in figure 1.

The 'interrupted lighting' treatment increased the number of florets in every cultivar. The floret number increase was also reflected in a greater flower weight and a delay of 1 to 2½ weeks. However, there was little effect on flower diameter as compared to the continuous short day treatment.

The "after lighting" treatments, in general, did not increase the floret number, were delayed and had no apparent effect on flower weight. The "after lighting" treatment did increase flower diameter and the length of the individual florets. This 3 week "after lighting" treatment had a more severe effect than in the August planting. In both seasons (August or October), the 3 week 'after light-

(continued on page 3)

Table 1: The effect of 'after lighting' on 5 cultivars of standard chrysanthemum planted on August 25, 1967.

Variety	Treatment (wk. of SD)	Delay (days)	Diameter (inches)	Weight (g)*	Longest floret (inches)	No. of ray florets	overall shape** Rounded	overall shape** Compact	Value***
Pink Chief	3	3	5.3	34.7	3.5	298	★	★	S
	4	0	5.1	34.4	3.3	332	★★	★★	S
	cont. SD	0	4.9	36.0	3.2	395	★★★	★★	S
Gt. #4 Ind. White	3	14	6.2	50.3	4.4	356	★	★	S
	4	8	5.9	51.7	3.9	364	★★	★★	S
	cont. SD	0	5.4	51.4	3.7	378	★★★	★★★	S
Gt. Betsy Ross	3	11	6.1	41.3	4.1	411	deformed	★	U
	4	0	5.5	39.8	3.5	468	★★	★★	S
	cont. SD	0	5.3	43.5	3.3	487	★★★	★★★	S
Good News	3	11	5.8	47.2	3.6	384	★	★	S
	4	5	5.7	48.1	3.3	377	★★	★★	S
	cont. SD	0	5.1	44.1	2.9	388	★★★	★★★	S
Yellow Knight	3	25	13.7	34.9	6.9	402	florets too long		U
	4	11	13.4	44.9	6.8	438	★	★	S
	cont. SD	0	11.4	37.1	5.5	421	★★	★★	S

*g—gram: approx. 29.7 g per oz.
**overall shape—a rating system where ★★ is more than ★.
***value: S=saleable
U=unsaleable

'After Lighting' *(continued from page 2)*

Table 2: The effect of 'after lighting' and 'interrupted lighting' on 5 cultivars of standard chrysanthemum planted on October 12, 1967.

Variety	Treatment (wk. of SD)	Delay (days)	Diameter (inches)	Weight (g)*	Longest floret (inches)	No. of ray florets	overall shape** Rounded	Compact	Value***
White Pink Chief	3	16	4.3	17.6	2.8	dead centers	★	★	S
	4	6	4.2	17.4	2.7	328	★	★	S
	5	2	3.9	18.0	2.7	315	★★	★★	S
	cont. SD	0	3.8	17.9	2.6	320	★★★	★★★	S
	I L	8	3.7	20.0	2.5	393	★★★	★★★	S
Gt. #4 Ind. White									
	3			budded but never showed color					U
	4	16	4.3	18.0	3.5	303	★	★	S
	5	15	4.3	16.8	3.2	295	★★	★★	S
	cont. SD	0	4.0	13.2	2.7	292	★★★	★★★	S
	I L	17	4.2	22.6	3.0	463	★★★	★★★	S
Mefo									
	3			partial flowering					U
	4	13	4.6	20.0	3.1	373	★	★	S
	5	12	4.8	22.8	3.1	378	★★	★★	S
	cont. SD	0	4.4	20.2	2.7	368	★★★	★★★	S
	I L	18	4.4	38.2	3.0.	635	★★★★	★★★★	S
Yellow Shoesmith									
	3			partial flowering					U
	4	7	5.4	31.4	3.4	343	★★	★	S
	5	5	5.3	22.1	3.0	359	★★	★★	S
	cont. SD	0	4.5	22.7	3.0	350	★★★	★★★	S
	I L	8	4.4	25.2	3.0	516	★★★★	★★★	S
Yellow Knight									
	3			partial flowering					U
	4	14	12.0	18.2	5.8	321	florets too long		U
	5	11	11.1	21.0	5.5	300	florets too long		U
	cont. SD	0	9.6	19.0	5.0	309	★	★	S
	I L	12	9.6	21.0	4.9	357	★★	★★	U

*g—gram: approx. 29.7 g per oz.
**overall shape—a rating system where ★★ is better than ★.
***value S=saleable
U=unsaleable

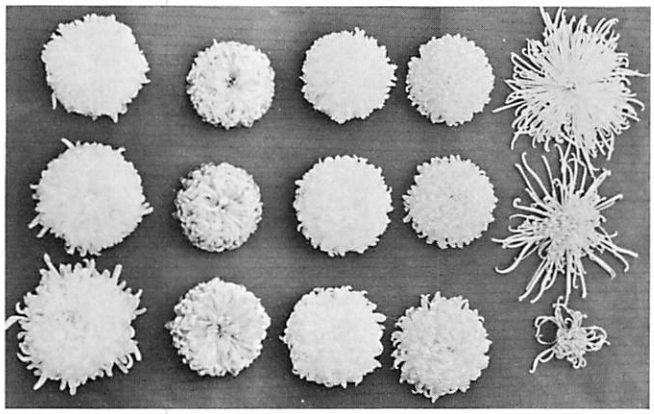


Figure 2. 'After Lighting' of 5 Chrysanthemum cultivars (left to right) Gt. #4 Ind. White, Pink Chief, Gt. Betsy Ross, Good News and Yellow Knight. The treatments were (top to bottom) continuous short day, 4 weeks short days—long days to flower and 3 weeks short days—long days to flower.

ing' treatment appeared to be started too early which had an effect of destroying the pleasant appearance of the flowers. The 5 week 'after lighting' treatment had less delay, but also had less effect on increased flower diameter than the 4 week 'after lighting' treatment.

Summary—'Afterlighting' seems to be yet another tool the chrysanthemum grower can use to perfect his product. The manipulation will be useful to the good grower who is presently producing a good product. We would recommend as a trial the 4 week 'after lighting' treatment. The best treatment will have to be determined by each grower under his cultural and environmental conditions and with his cultivars. Although the chrysanthemums can be grown with extreme precision each grower does it a little differently. 'After lighting' must fit into each individual growers program.

Suggested trial—4 weeks after the start of short days (lights off or pulling black cloth) expose the plants to long days (turn lights back on or stop pulling black cloth). In the summer, may terminate short days somewhat earlier. During the winter, however, may need a somewhat longer short day period.

Be sure to try this on a small group of plants, for there will be a delay and under your growing conditions the plants may grow like our 3 week 'after lighting' treatments in the experiments just described.

Successful application of 'after lighting' will result in a larger diameter flower, less pulling of black cloth and a delay in flowering.

Convention Program Next Issue

News And Views From Our Industry

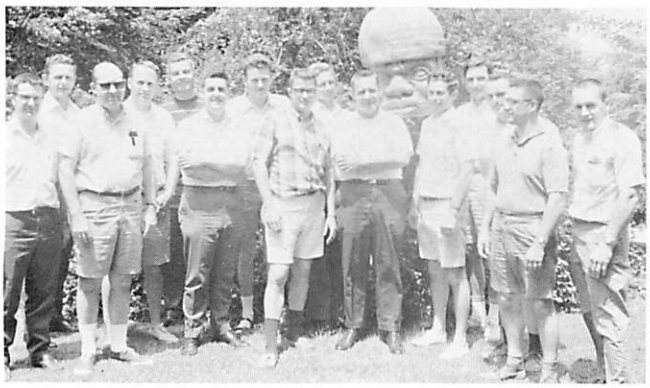
by Carl F. Gortzig

Cooperative Extension Agents Participate in Employee Management Training Sponsored by Grants from New York Florists' Club and Kenneth Post Foundation

Fifteen Cooperative Extension Agents from counties throughout New York State participated in a week-long training program in floriculture employee management held June 9-13 at the State University of New York Conference Center at Planting Fields, Oyster Bay, Long Island, New York. The program is a part of a research and training project in floriculture employee management being conducted jointly by the Department of Floriculture and Ornamental Horticulture and the New York State School of Industrial and Labor Relations, both at Cornell University. The project is co-sponsored by grants from the Kenneth Post Foundation and the New York Florists' Club.

Agents were introduced to various aspects of employee management and studied instructional techniques appropriate to teaching employee management to operators of floriculture businesses. Agents will in turn present programs for commercial floriculture managers in their counties during the next several years.

Professor William W. Frank, New York State School of Industrial and Labor Relations and Professor Carl F. Gortzig, Department of Floriculture and Ornamental Horticulture, both at Cornell University, were conference leaders. Participating agents are shown in the accompanying photograph.



Agents and faculty participating in employee management training program are, left to right—Alton Keller, Oneida; William Sanok, Suffolk; Prof. William Frank, I&LR Cornell; William McEvoy, Chemung; William Titus, Nassau; Charles Williams, Capital District; Jan Jansen, Orange; Walter Neuhauser, Onondaga; Ralph Freeman, Suffolk; James Ashton, Dutchess; Edward Zuckorski, Chemung; Prof. Carl Gortzig, Dept. of Floriculture; Prof. George Good, Dept. of Floriculture; Irvi Gillow, Erie; and Robert Kozlowski, Erie. Studying and missing the picture were Robert Brewster and Charles Sheer, Suffolk; and Frank Stadelberger, Nassau.

At the closing session of the conference, representatives of the Kenneth Post Foundation and the New York Florists' Club joined the group for dinner and presented certificates of completion to the agents. Attending on behalf of the Kenneth Post Foundation was Joseph Yedowitz, Yonkers, and on behalf of the New York Florists' Club, Mel Dauernheim, Wantagh, Isadore Fight, Neptune, New Jersey, Isidore Jablons, New York, Club Secretary, Charles Luff, Bayport, Club President, and Paul Schneeberg, Sayville, Dr. John Seeley, Head, Department of Floriculture and Ornamental Horticulture, Cornell University presided at the dinner.

Dr. Seeley reviews employee management training programs with representatives of sponsoring industry groups.
Left to right: Walter Neuhauser, Cooperative Extension Agent, Onondaga County; Joseph Yedowitz, Yonkers, Director, Kenneth Post Foundation; Dr. Seeley, Paul Schneeberg, Sayville, New York Florists' Club Scholarships and Fellowships Committeeman.

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College of Agriculture's Exhibit
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NEW YORK STATE FAIR
at the Fairgrounds
in Syracuse
August 26 through September 1
1969

In This Issue

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YOUR EDITOR,

Bob Langhans