Interrupted Short-Day Improves Standard Chrysanthemums

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High quality flowers, accurately timed, is our goal in successful year-around production of chrysanthemums. The timing of mums has been accurately worked out and production schedules are available through your jobber. Producing high-quality blooms, however, is still a challenge to the skill of the grower, especially during extensive periods of low light intensity (winter). We are sure interruption at the start of the short day treatment will help to improve quality in some large flowered types. The exact best treatment for each variety should be worked out by the originator of the variety.

Among the troubles which growers experienced on large flowering mums in 1947 (see New York State Flower Growers Bulletin 27) were bullhead flowers in which the outer petals developed early because of cloudy weather during late August which advanced the normal date for bud formation. Then an extended period of bright weather delayed development of the inner petals and permitted more to continue to form. In some cases several growing points formed within the bud, producing the peculiar bullhead flower.

Certain varieties sometimes produce undesirable open centers as illustrated by the upper flowers in the photographs. This fault is common with such varieties as "Monument" and the spider type "Queen's Lace" and is less noticeable on the incurved varieties. It occurs because the days are short enough from October 1 to March 10 for bud development to take place as soon as the artificial light treatment is discontinued and short day treatment begun.

It was reasoned that if a period of short days to set bud, followed by long days could produce abnormal flowers under natural conditions, as occurred in 1947, a similar combination might overcome these undesirable open-centered flowers under controlled daylength conditions. The present investigation was begun, therefore, to find what combination of interrupted short days would be most effective.

The first treatments were made on plants flowered in November 1950 at near normal season but with controlled daylength. This was followed by a winter crop of rooted cuttings planted on October 17, pinched November 1, and given the daylength treatments indicated in the chart after the short day-long day treatment. As indicated, all plants were given short days until in full bloom. A long day is greater than 14½ hours of light, including twilight; a short day is less than this period.

Results of earlier trials indicated that 8 short and 8 long days would be generally desirable, and this was recommended at the special session for mums and miscellaneous crops at this year's Short Course. Twelve (12) short and 10 long days are equally effective in reducing the number of disc florets which compose the green center, and an actual petal count revealed that this treatment was most effective in also increasing the number of showy ray florets. All plants were grown with a minimum temperature of 60°F.

The chart shows the average proportion of total, ray, and disc florets, or "petals," for five varieties counted. Continuous short day (Con. SD) corresponds to the present method of giving short days continuously after the plants have reached the desired height under long days and the other treatments are various interrupted short days.

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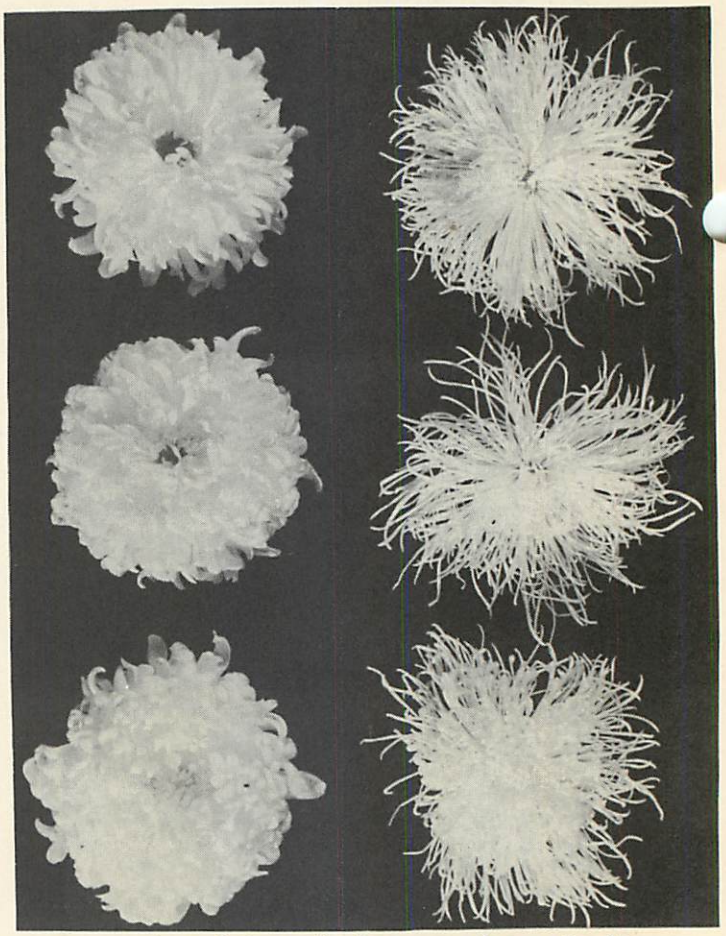
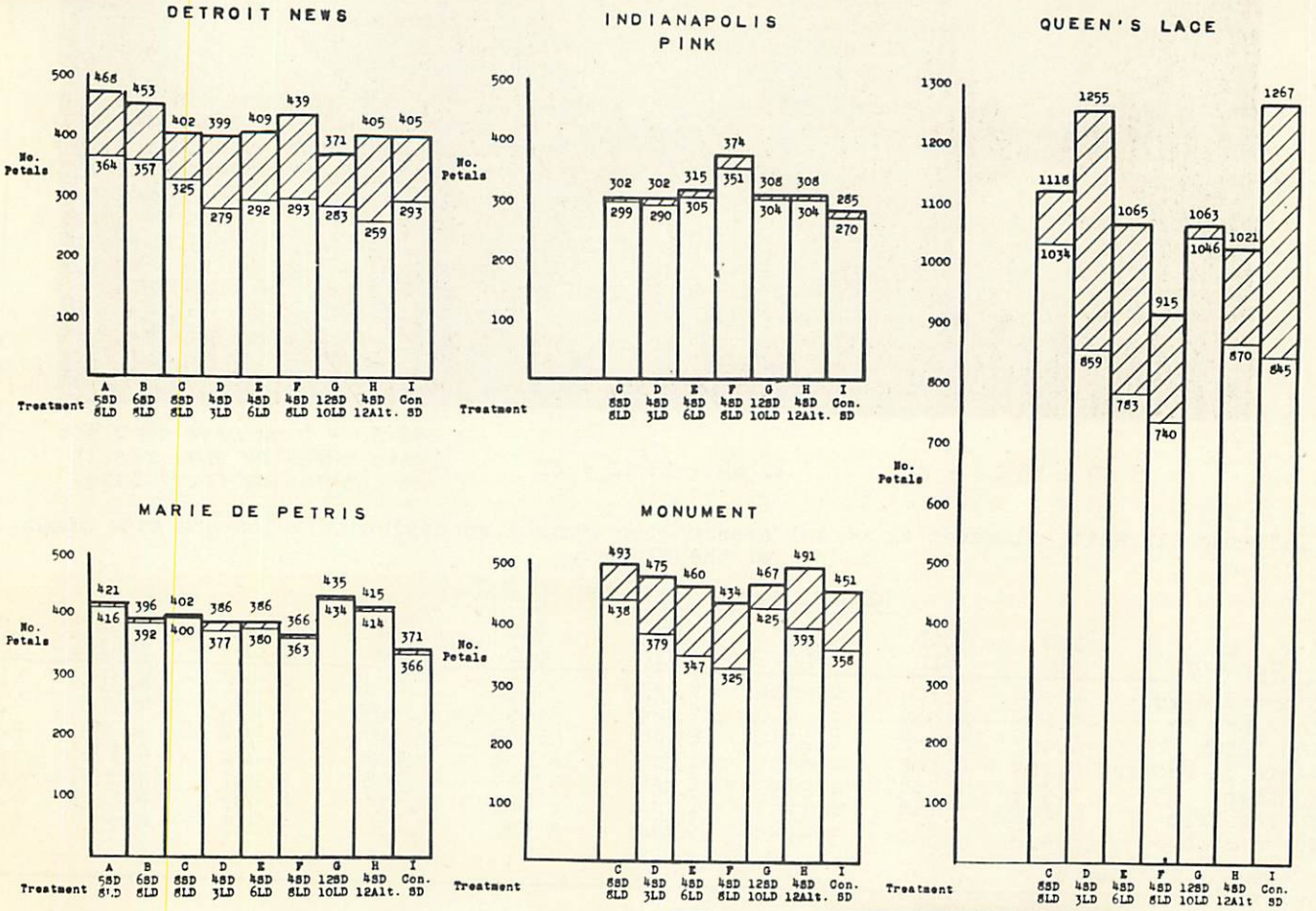


Monument and Queen's Lace produce single flowers if continuous short days are given from the start of the short day treatment (top) and the least number of disc petals in relation to the ray petals (lower) with 12 short and 10 long days. An intermediate effect is obtained when 8 short and 8 long days occur at the beginning of the short day treatment (middle).

* Mr. F. F. Horton and his assistants cared for the plants during their growth.

AVERAGE NUMBER OF DISC AND RAY PETALS FROM FLOWERS GIVEN VARIOUS SHORT DAY INTERRUPTIONS.

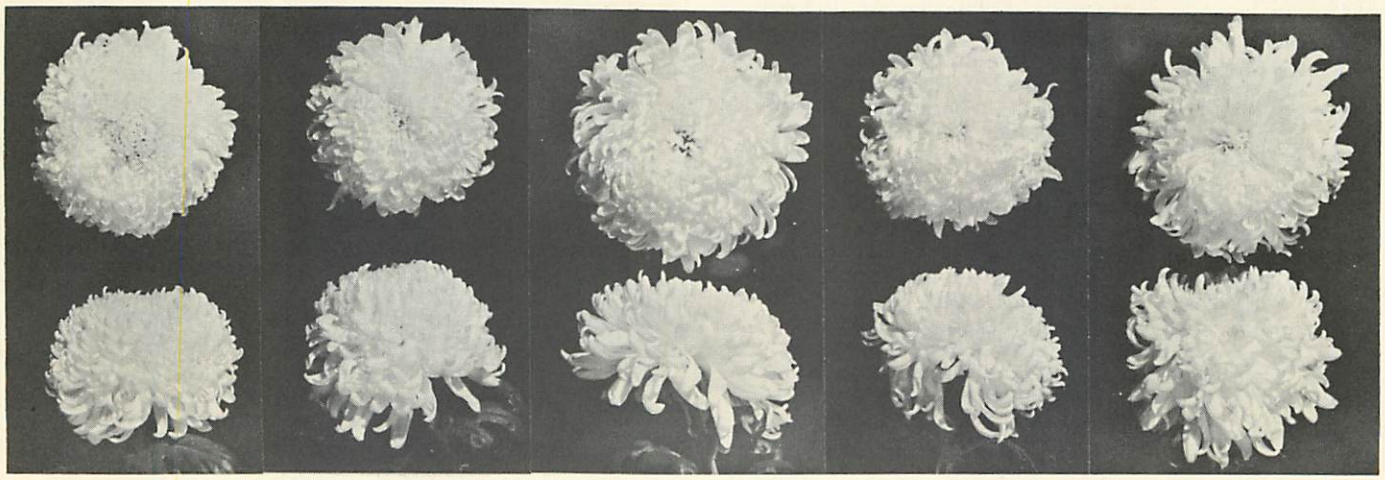


SD = Short Day

LD = Long Day

Con.SD = Continuous Short Day

Alt. = Long Day, Short Day, Long Day, etc.



Silver Sheen is known to produce best flowers in September and poorest flowers during winter. It should be avoided for normal and winter season but responds dramatically to controlled photoperiod. These flowers were produced in normal season.

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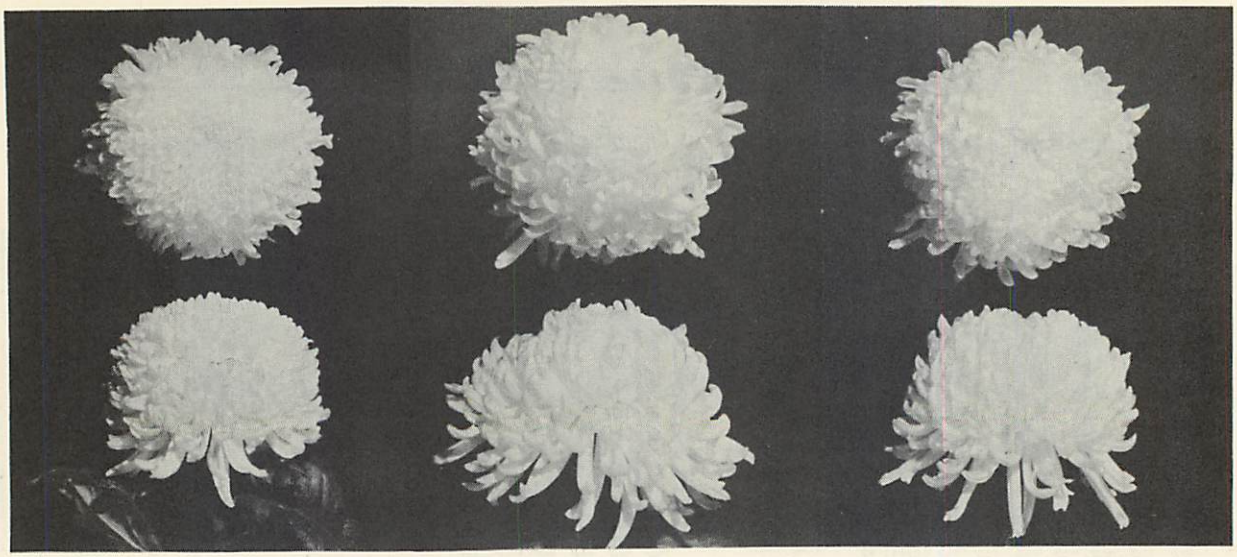

5 SD + 15 LD + SD

12 SD + 15 LD + SD

30 SD + Long Days to bloom gave much the same result as Continuous Short Days.

Indianapolis White flowered at normal season with controlled daylength. Top and side views of the flowers.

MEAN DIAMETER OF FLOWER (Inches)

Variety	5SD 8LD	6SD 8LD	8SD 8LD	4SD 3LD	4SD 6LD	4SD 8LD	12SD 10LD	4SD 12Alt.	Con. SD
Detroit News	4.005	4.165	3.844	3.960	3.996	4.069	4.111	4.383*	4.043
Ind. Bronze	3.898	4.006	3.981	3.962	3.993	3.995	4.270*	4.250	4.128
Ind. Pink	4.067	3.988	4.225	4.088	4.063	4.110	4.404	4.375	4.419*
Marie de Petris	4.127	4.144	4.087	4.222	4.188	4.082	4.061	4.194	4.308*
Monument	3.909	3.893	4.263	4.058	4.322	4.308	4.297	4.575	4.581
Yellow Mefo	4.418	4.338	4.119	4.350	4.488	4.333	4.588	4.669*	4.456
Queen's Lace	5.458	5.680	5.516	5.440	5.682	5.420	5.816	5.250	6.015*

* Largest flowers.

Note the effectiveness of 8 short - 8 long days and 12 short - 10 long days in reducing singleness in the varieties "Monument" and "Queen's Lace" and of 12 short - 10 long days in increasing the number of desirable ray petals in such varieties as "Marie de Petris" and "Queen's Lace."

The table shows we can expect a slight decrease in the diameter of the flowers in certain varieties by interrupted short day treatment. Continuous short days produced the largest flower diameters for the varieties "Indianapolis Pink," "Marie de Petris," "Monument," and "Queen's Lace." However, 12 short - 10 long days produced the best flower shape for the variety "Indianapolis Bronze," and 4 short - 12 alternate long and short days for "Yellow Mefo" and "Detroit News."

In timing a crop which is to receive an interrupted short day treatment, we must start the short day treatment earlier than normally, advancing the date by about the number of long days which will be used to interrupt the short day period. For example, in this experiment all treatments were timed to bloom on the same date with the control treatment receiving short days beginning December 15. Short days were given plants in the 12 short - 10 long day treatment from December 5 to 17, long days from December 17 to 27, then short days to flowering. If longer stems are desired, the time between pinching and start of the short day treatment can be lengthened, but flowering will then be later than normally scheduled and should be calculated in the program.

An interrupted short day treatment of 12 short days, 10 long days, then short days to flowering has made it possible to improve the quality of pompons by improving the spray formation; now this same treatment can be used on certain standard varieties where quality is poor because of open centers. We suggest the disseminator of a variety determine the effect of such a treatment on a new variety. This published for the variety will help the grower to obtain superior quality in his varieties or help him decide which varieties he should grow at one time of year where no special manipulation is desired. To do this, each variety should be treated with (1) continuous short day, (2) 8 to 12 short days followed by 8 to 10 long days then short days, (3) 4 or 5 short days followed by 8 to 15 long days.

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Your Editor,

Kenneth Post