Timing Four Carnation Varieties*

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Materials and Methods

Fifty-four rooted cuttings of each cultivar "Apollo", "CSU White Pikes Peak", "Ohio Light Pink Sim", and "Improved Sidney Littlefield" were obtained (courtesy of Yoder Bros., Barberton, Ohio) and planted 5 inches by 7 inches (four plants per square foot) in 8-foot-4 inch by 3 foot raised beds in steam pasteurized soil on January 7, 1967.

The plants were pinched once and were grown under 18-hour and Natural Day photoperiods. The 18-hour photoperiod was achieved by using 60 watt incandescent lamps with built-in reflectors spaced 3½ feet apart and 4 feet above the soil surface. The lights turned on ½ hour before sunset and remained on until the daylight hours plus the period from sunset to end of lighting totaled 18-hours. The light intensity ranged from 10 to 20 ft-c at the soil surface. The Natural Day photoperiod was achieved by exposing plants to the natural daylength.

In the greenhouse night temperatures were 52°F and day temperatures 60°-65°F when controllable. All plants were fertilized once per week with ¼ pound 20-5-30 soluble fertilizer per 100 square feet of bench area. A regular preventative insect and disease control program was used following planting. Data recorded were date of flowering, flower number, plant height and grade. Flowers were graded by using the proposed Society of American Florists grading system.

Results

Peak flowering time. The peak flowering periods for each variety grown under the Natural Day and 18-hour photoperiods are shown in Table 1. In the 18-hour photoperiod Apollo peaked first (May 25) whereas varieties CSU White Pikes Peak, Ohio Light Pink Sim, and Improved Sidney Littlefield all peaked on June 5. The number of days required for Apollo to peak was 138 whereas the other 3 varieties took 149 days.

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Carnations grown under the Natural Day photoperiod peaked on June 5 and June 15. Varieties which peaked on June 5 (149 days to bloom) were Apollo and Ohio Light Pink Sim. Those peaking on June 15 (159 days to bloom) were CSU White Pikes Peak and Improved Sidney Littlefield. In this study Ohio Light Pink Sim was the only variety in which photoperiod did not have a measurable effect.

Duration of the flowering period. The number of days for each of the Natural Day and 18-hour crops to be harvested are listed in Table 1. The duration of the crop for Apollo was less in the 18-hour photoperiods. However, only Ohio Light Pink Sim took less time to be harvested in the Natural Day photoperiod when contrasted to the 18-hour treatments. For Improved Sidney Littlefield the duration of the crop was about two weeks in both photoperiodic treatments.

Table 1. Peak flowering periods and duration of flowering time of four carnation varieties grown under Natural Day and 18-hour photoperiods.

Variety	Peak		Duration of Crop	
	Date	Days	Date	Days
18-hour				
Apollo	May 25	138	May 18–Jun 4	17
CSU White Pikes Peak	Jun 5	149	May 27–Jun 12	16
Ohio Light Pink Sim	Jun 5	149	May 18–Jun 12	25
Imp Sid Littlefield	Jun 5	149	May 27–Jun 9	13
Natural Day				
Apollo	Jun 5	149	May 28–Jun 24	27
CSU White Pikes Peak	Jun 15	159	Jun 7–Jun 23	16
Ohio Light Pink Sim	Jun 5	149	May 27–Jun 13	17
Imp Sid Littlefield	Jun 15	159	Jun 8–Jun 20	12

Height of crops. Table 2 shows the average height of each variety in each photoperiodic treatment. In all cases the plants in the 18-hour photoperiod were taller or in other words had longer stems than those in the Natural Day photoperiod. Photoperiod had the greatest effect on stem length in Apollo and Improved Sidney Littlefield.

Table 2. Average height in inches of four carnation varieties at flowering after exposure to 18-hour and Natural Day photoperiods.

Variety	Photoperiod	
	18-hour	Natural Day
Apollo	30	22
CSU White Pikes Peak	35	31
Ohio Light Pink Sim	36	31
Improved Sidney Littlefield	30	22

Mean grade. The mean grade for each of the varieties grown are shown in Table 3. Varieties Apollo and Ohio Light Pink Sim yielded higher grades in the 18-hour photoperiod than in the Natural Day photoperiod. Improved Sidney Littlefield and CSU White Pikes Peak had slightly higher grades in the Natural Day photoperiod. All varieties in both treatments produced salable flowers.

Discussion

In previous studies we have worked solely with the variety CSU White Pikes Peak. A considerable amount of information has been accumulated concerning the response of this variety to 18-hour, 13½-hour, 9-hour and Natural Day photoperiods. The results of this work were reported earlier (1, 2, 3, 4, 5).

Table 3. Mean grade[a] for 4 varieties grown under Natural Day and 18-hour photoperiods.

Variety	Mean Grade	
	18-hour	Natural Day
Apollo	3.8	3.4
CSU White Pikes Peak	3.6	3.7
Ohio Light Pink Sim	3.8	3.4
Imp Sid Littlefield	3.5	3.6

[a] 4.0 equals Blue Grade, 3.0 equals Red Grade, 2.0 equals Green Grade, and 1.0 equals White Grade

This study was designed to evaluate the response of four different carnation varieties to two photoperiods. Since results showed several differences between the four varieties another study with eleven varieties was carried out and will be discussed in another report.

Number of days to flower. The varieties Apollo, CSU White Pikes Peak, and Improved Sidney Littlefield flowered approximately ten days sooner in the 18-hour photoperiod than the Natural Day grown plants. Similar results have been found in previous studies (1, 2, 3, 4, 5). It is interesting to note plants grown in the 18-hour photoperiod fell into two basic flowering groups. One group, variety Apollo, required 138 days to flower whereas the other three varieties needed 149 days. At the present time it may be premature to suggest carnations have some type of a response group classification. Results to be reported in our next paper and future research may substantiate this idea. Thus far, classification groups are well defined for chrysanthemums and snapdragons. Perhaps in a few years similar classification groups may be well defined for carnations.

It should also be emphasized the natural daylength from sunrise to sunset at planting was 9½ hours, in mid March 12 hours, and in mid May 14½ hours. This increasing daylength could explain some of the small differences between the Natural Day and 18-hour treatments.

Plant height. Results in Table 2 further confirm former work (1, 2, 5). Overall height of the four varieties was greater in the 18-hour photoperiod than in the Natural Day photoperiod. Observations indicated fewer nodes and longer internodes developed in the 18-hour grown plants. This also was reported earlier (1, 2, 4, 5).

Mean grade. Photoperiod did not affect mean grade to any great degree. A good quality stem and bloom can be grown under 18-hour photoperiods. Practically all stems in each of the four varieties was strong enough to hold the bloom between the 11 and 1 o'clock position.

General comments. The information presented in this paper has many implications. One of the more important ones is whether or not carnations have some type of response groups. Our next paper will yield more information on this and also some of our future research.

Summary

Carnation varieties Apollo, CSU White Pikes Peak, Improved Sidney Littlefield, and Ohio White Pink Sim were grown under 18-hour and Natural Day photoperiods at

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52°F night and 60°-65°F day temperatures and single pinched. Data recorded were date of flowering, flower number, plant height and grade. The results were as follows:

1. Eighteen-hour plants flower sooner than Natural Day grown plants.
2. Plants grown under 18-hour photoperiods were taller, had fewer and longer nodes than Natural Day grown plants. Differences in height did occur between varieties in both photoperiods.
3. Plants in both treatments yielded excellent mean grades.
4. The results presented here may imply carnations may have some type of a response group classification.

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