Definite Long Days, Warm Temperatures Favor Fuchsia Flowering

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In 1980 several North Carolina growers did not have their fuchsia hanging baskets in flower for Mother's Day. For years they had grown the same varieties, potted and pinched the plants in the same way, and grown the plants under natural daylengths. In 1980, though, some growers showed their concern for energy conservation and grew plants at cooler temperatures than in previous years. Their concern about fuel conservation was noble but their fuchsias were vegetative or late in flowering.

Flowering of fuchsias is promoted by long days, in contrast to crops such as poinsettias and chrysanthemums which are short day crops. Fuchsias which are planted in the winter are exposed to lengthening days as the season progresses and growers rely on natural long days in late March to promote flowering. This practice works when night temperatures are at least 60°F, and often closer to 65°. Flowering will be delayed at cooler night temperatures, however, and this popular Mother's Day crop might not be ready for sale.

In 1981 we obtained rooted cuttings of the popular varieties 'Dark Eyes' and 'Swingtime' from Ralph Repp, a fuchsia propagator in Waynesville, NC. Shoot apexes were examined to make certain plants were vegetative at the start of the experiment. Cuttings were then potted in 5-inch plastic pots, one cutting per pot. Plants were taken to the Phytotron (Southeastern Plant Environmental Laboratories, N. C. State University) on February 23 and fumigated with DDVP (Vapona) to be certain no insect pests were introduced into the research facility. Photoperiod-temperature treatments were started in the growth chambers the following day. The treatment were:

	Temperature	Daylength
1.	64°F day - 57°F night	9 hours + 3 hours of light
2.	64° 57°	9 hours only
3.	72° 64°	9 hours + 3 hours of light
4.	72° 64°	9 hours only
5.	79° 72°	9 hours + 3 hours of light
6.	79° 72°	9 hours only

Lighting during the 9-hour period was accomplished with fluorescent and incandescent lights at an intensity of approximately 4500 ft-c. The 3-hour light period was from 11 PM to 2 AM, with incandescent lights. Plants also were placed in the Department of Horticultural Science greenhouses at night temperatures of 55, 60, and 65°F, under natural daylengths (in Raleigh the daylength on February 23 is 11 hours, 11 minutes).

Plants in the Phytotron were watered with a tube-watering system and fertilized daily with a modified Hoagland's solution. Plants in the greenhouses were watered manually and fertilized with 20-20-20 or $CaNO_3/KNO_3$ on a weekly schedule.

There were 9 plants of each variety in each treatment.

Plants were examined regularly to determine if flower initiation had occurred. Dates when flower buds were macroscopically visible were as follows:

Environmental conditions		Cultivar 'Dark Eyes'	Cultivar 'Swingtime'
64-57°	9 hrs + 3	March 25	March 31
64-57	9 hrs only	-	-
72-64	9 hrs + 3	March 20	March 26
72-64	9 hrs only	-	-
79-72	9 hrs + 3	March 20	March 26
79-72	9 hrs only	-	-
55° greenhouse,	natural day	April 3	April 12
60°	" "	April 3	April 12
65°	" "	March 30	April 12

Flower initiation did not occur under the short day conditions, regardless of temperature. Flower initiation was accelerated at the warmer temperatures under long day conditions. Flowering occurred simultaneously at 72-64° and 79-72° but flower size was larger at 72-64° and plants were of higher quality than those grown at 79-72°. Flowering was delayed at 64-57° but acceptable plants were produced under long days. Photographs of shoots from representative plants in the Phytotron treatments were taken on April 21. The effect of photoperiod on flowering of the 'Dark Eyes' is shown in Figure 1, and the impact of temperature on 'Swingtime' is shown in Figure 2.

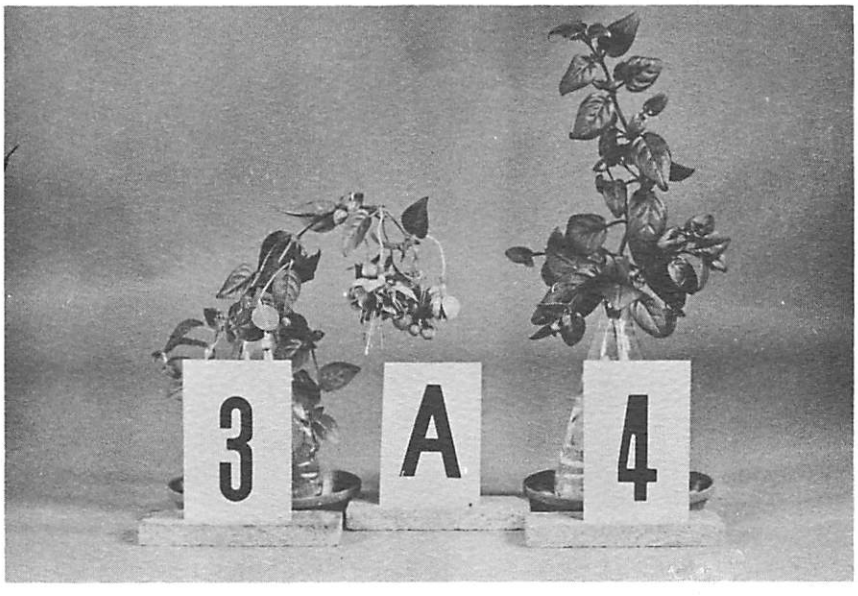

Figure 1. Shoots of the variety 'Dark Eyes' removed from plants grown at 72° day - 64°F night. Trt. 3, 9 hours + 3 (LD); Trt. 4, 9 hours only.

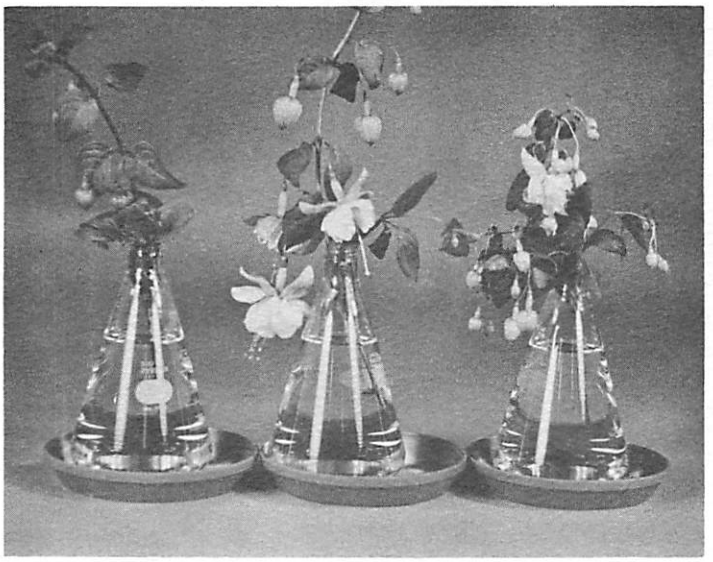

Figure 2. 'Swingtime' shoots from plants grown under long days. Left to right, 64-57°F; 72-64°F; 79-72°F.

Shoots from representative plants in the greenhouse phase of the experiment also were photographed, on April 15 (Figure 3). These treatments more nearly correspond to commercial greenhouse conditions. The plants grown at the lower temperatures under natural daylengths were not floriferous enough to be acceptable at the conclusion of the experiment.

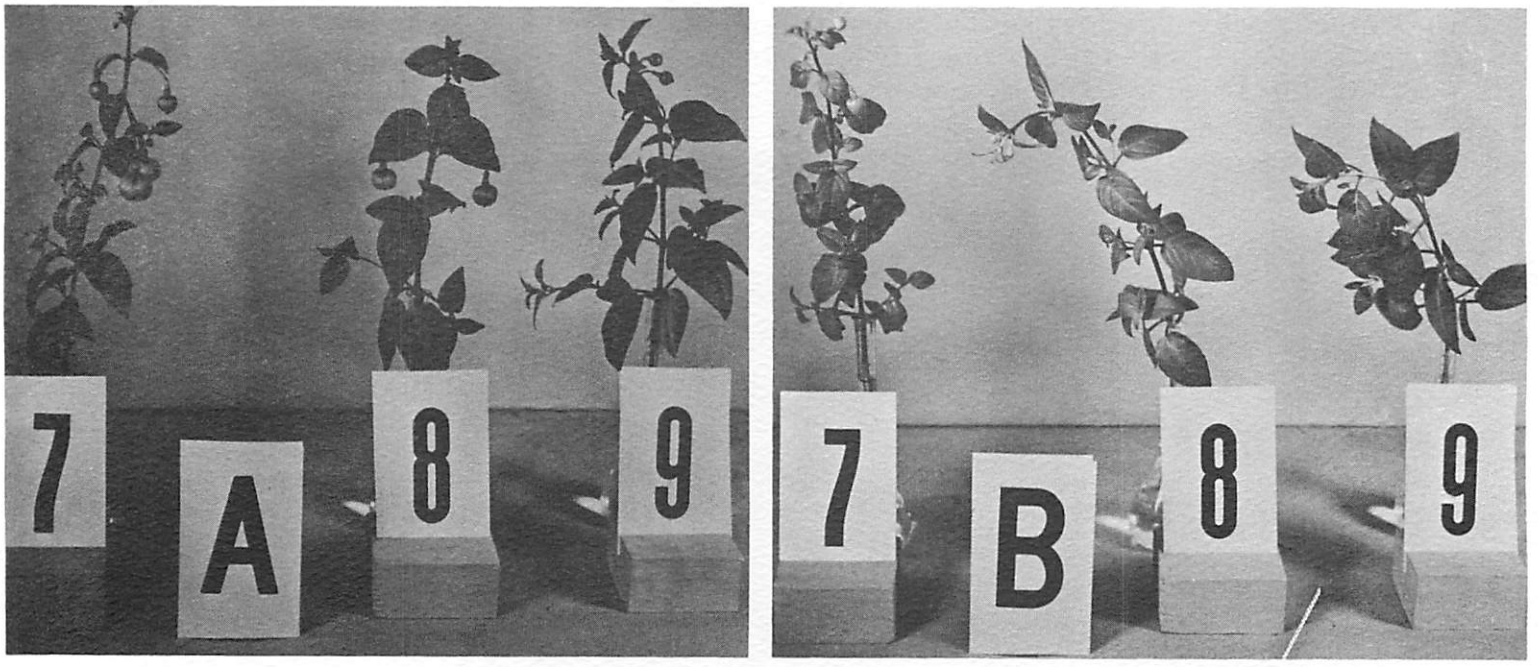

Figure 3. Shoots from 'Dark Eyes' (A) and 'Swingtime' (B) plants grown in the departmental greenhouses under natural daylengths, beginning February 23. Temperature treatments are: 7, 65°F night; 8, 60°F night; 9, 55°F night. Shoots photographed April 15, 1981.

Summary and Conclusions

The definite long days provided in the Phytotron did have a positive influence on fuchsia flowering. The optimum environmental conditions were long days combined with a 72° day, 64° night. In the greenhouse phase of the experiment it was apparent that a night temperature of 55°F was not satisfactory under natural daylengths because of the excessive delay in flowering. The variety 'Dark Eyes' responded more favorably than 'Swingtime' but the delay was still apparent.

Growers who plan to use cooler than optimum night temperatures for growing fuchsias should plan to use interrupted lighting when they want flower buds to form and develop. Mum lighting would be adequate. Some adjustments in greenhouse management might have to be made, as fuchsia hanging baskets often are suspended overhead and would be above the lighting fixtures.

Fuchsia research at N. C. State University will be continued, with emphasis on daylength and temperature control under greenhouse conditions.