

SHASTA DAISY RESPONSE TO PHOTOPERIOD AND VERNALIZATION

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Inconsistencies exist concerning the role of photoperiod and vernalization in flowering of Shasta Daisy (*Leucanthemum superbum*) cultivars. Flowering was hastened by increased day length in several cultivars (3,4). Individual cultivars were either obligate long day plants for flowering (2) or required vernalization to flower (5). Recent work with 'Snow Lady' showed that long days, but not vernalization, hastened flowering (facultative response) (1). This investigation was conducted to determine the role of photoperiod and vernalization time on growth and flowering of three *Leucanthemum superbum* cultivars.

Methods

Transplants of *Leucanthemum superbum* 'Becky,' 'Snow Cap,' and 'Snow Lady' in 72-celled flats were transplanted to 6-inch pots containing Fafard #3 medium. Plants were grown in a double-layer polyethylene-covered greenhouse with a heating set point of 65°F and ventilation at 78°F. Fertilization of plants consisted of a weekly application of 150 ppm nitrogen using 20-10-20.

Ten weeks after potting, 54 plants of each cultivar were placed in a walk-in cooler at 40°F for 3, 6, or 9 weeks and were irrigated as needed with clear water. While in the cooler, plants received nine hours of incandescent light (8:00 AM to 5:00 PM CST) at a minimum of 10 foot-candles. Eighteen control plants of each cultivar were placed in a glass-covered greenhouse with a heating set point of 64°F and ventilation at 76°F. Control plants and those removed from vernalization were placed under either natural short days (SD) or long days (LD) provided by incandescent light from 10:00 PM to 2:00 AM CST. Fertilization resumed when plants were removed from the cooler. Beginning March 14, plants in short-day treatments received black cloth from 5:00 PM to 8:00 AM CST until flower buds opened. Data recorded at the time of first open flower was flower date and shoot height. A market quality rating (0-5) and flower shoot number were recorded when plants had five open flowers.

Results

All plants of 'Becky' flowered under LD, regardless of vernalization time, while none of the plants under SD flowered (Table 1 on page 24). Time to flower decreased and flower shoot number and quality rating increased with increasing vernalization time. Shoot height was greatest after six weeks of vernalization under LD. 'Becky' showed an obligate requirement for LD to flower, and plant growth characteristics and quality were improved by at least six weeks of vernalization under LD.

All plants of 'Snow Cap' flowered under LD and 36% flowered under SD, regardless of vernalization time (Table 1 on page 24). Shoot height and flower shoot number increased after plants

received six weeks of vernalization under LD. Overall quality rating was greater under LD than under SD. Time to flower decreased with increasing vernalization time under LD. 'Snow Cap' showed a facultative requirement for LD to flower. However, this response may be viewed as obligate in practical application because the number of plants flowering under SD was low.

All plants of 'Snow Lady' flowered under LD and 81% flowered under SD, regardless of vernalization time (Table 1). Shoot height was greater overall under LD than under SD with the greatest shoot height occurring after three or six weeks of vernalization. Flower shoot number was also greater overall under LD than under SD with the greatest flower shoot number occurring after six weeks of vernalization under LD. Though there was no difference in quality rating with increasing vernalization time under SD or LD, quality rating under LD was higher overall than under SD. Time to flower decreased with increasing vernalization time under SD and LD, and was shorter under LD than under SD. 'Snow Lady' showed a facultative requirement for LD to flower, though a large number of plants flowered under SD. However, plants under LD flowered 7.8 days earlier, were 2 inches taller, had 3.6 more flowering shoots and a quality rating higher than plants under SD. Therefore, LD would be beneficial in practical application.

The Shasta Daisy cultivars tested in this study varied in response to photoperiod and vernalization time. 'Becky' showed an obligate requirement for LD to completely flower while 'Snow Cap' and 'Snow Lady' showed a facultative response. However, in all three cultivars, shoot height, flower shoot number, and market quality rating increased while time to flower decreased with increasing vernalization up to six weeks under LD. Therefore, LD and six weeks vernalization would be needed to ensure rapid flowering and the highest plant quality.

Can you imagine . . .

working at the following company? It has a little over 500 employees with the following statistics:

- 29 have been accused of spousal abuse
- 7 have been arrested for fraud
- 19 have been accused of writing bad checks
- 117 have bankrupted at least two businesses
- 3 have been arrested for assault
- 71 cannot get a credit card due to bad credit
- 14 have been arrested on drug-related charges
- 8 have been arrested for shoplifting
- 21 are current defendants in lawsuits

In 1998 alone, 84 were stopped for drunk driving.

Can you guess which organization this is? Give up?
ANSWER CAN BE FOUND ON PAGE 50

Table 1. Response of three *Leucanthemum xsuperbum* cultivars to short and long photoperiods and vernalization duration.

Photoperiod	Vernalization (weeks)	Shoot Height (cm) ^z	Flower Shoot Number	Quality Rating ^y	Days to Flower	Flowering Plants (%)
'Becky'						
Short days	0	-	-	0.0	-	0
	3	-	-	0.0	-	0
	6	-	-	0.0	-	0
	9	-	-	0.0	-	0
Long days	0	45.4	4.8	1.7	63	100
	3	57.9	5.8	2.4	59	100
	6	66.1	7.7	2.7	56	100
	9	47.9	8.3	2.8	46	100
			Q****	L***	L***Q**	L***Q**
'Snow Cap'						
Short days	0	15.7	0.4	0.0	75	33
	3	-	-	-	-	0
	6	17.3	1.8	1.1	61	89
	9	16.3	0.9	0.4	53	22
			ns	ns	ns	Q**
Long days	0	26.6	4.8	3.3	55	100
	3	26.6	8.8	3.9	52	100
	6	30.6	11.1	4.0	48	100
	9	25.8	9.9	3.8	44	100
			L***Q**	L***Q***	ns	L***Q***
'Snow Lady'						
Short days	0	15.6	5.3	1.8	60	78
	3	20.6	6.1	1.9	58	78
	6	19.7	5.7	2.3	56	78
	9	16.5	7.2	2.2	44	89
			Q*	ns	ns	L**
Long days	0	14.5	7.8	3.1	49	100
	3	22.4	8.6	3.3	47	100
	6	27.3	14.1	3.3	46	100
	9	18.9	8.3	2.9	44	100
			Q***	Q**	ns	L***

English Conversion 2.54 cm = 1 inch.

^y Quality Rating: 0=no flowers, 1=very poor, unsalable; 2=poor, unsalable; 3=average, salable; 4=good, salable; 5=excellent, salable.

^z Not significant (ns) or significant linear (L) or quadratic (Q) trend at P=0.05 (*), 0.01(**), or 0.001 (***).



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