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ALSTROEMERIA CULTURAL RESEARCH 1975-1976 UNIVERSITY OF MINNESOTA THE INFLUENCE OF NIGHT INTERRUPTION WITH INCANDESCENT LIGHT AND SHOOT PRUNING TECHNIQUES

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Alstroemeria hybrida cv. Regina plants[1] were directly received from M. C. van Staaveren, Aalsmer, The Netherlands, on May 22, 1975. They were wrapped in dry tissue paper with a small amount of perlite; all new growth and leaves appearing dead (bleached) as they had gone through USDA quarantine fumigation. The fleshy rhizomes and roots were, however, white, alive, and were immediately planted in 6 inch clay pots filled with a 1:1:1 mixture of soil, peat, perlite into which superphosphate had been added. Rapid vegetative growth occurred and plants were shifted when roots became crowded into 10 inch clay pots on August 1, and into 16 inch plastic pots on December 12. We feel that at this final shift the developing plants could have been placed into ground beds or raised benches with at least 20 inches (50 cm) of loose well prepared soil. However, in our research, we did not do this.

By early winter the young plants had developed numerous shoots which were on the average 15-25 inches (40-65 cm) long and all the apices terminated with aborted buds and were "blind." Half of the plants were cut back to the soil level and half were left unpruned on November 13 in an attempt to promote reproductive shoots. From November 13 until April 1, half of the above two treatments were placed either under normal days or given night interruptions (long days) from 10 p.m. to 3 a.m. with incandescent light (100-watt lamps, 34 inches (86.5 cm) apart and 33 inches (84 cm) above pot level). Vegetative growth continued to develop during the winter and on January 5, 1976, shoots were either heavily thinned (75 percent), partially thinned (50 percent), or were not thinned. Thinning consisted of removing the weakest and smallest vegetative shoots.

The plants were grown at 53°-55°F (12°-13°C) night temperature and fertilized according to soil tests and tissue analysis. We observed a foliar disorder (Fig. 1) and when compared to past tissue analysis we applied commercially available trace (micro) elements and symptoms ceased to develop. We offer these elemental levels as seen in Table 1 as nutritional ranges for growing alstroemeria.

Results

Reproductive shoots began to appear in late January. From visible buds to anthesis we observed that it required about 40 days. The number of cymes which bear flowers in an inflorescence varies from between two and seven with the most common number recorded being five. We have observed that the number of flower cymes in an umbel is a function of stem diameter. Tertiary and quantenery buds easily abort in response to any environmental stress. Secondary buds are not fully developed at the time of harvest. However, the secondary flower buds reach anthesis after being cut, extending the keeping life of the stem. The data of number of flowers per stem is therefore based on the number of primary and secondary buds (Table 2). Tertiary flowers, if present on a cyme at harvest, usually do not develop to anthesis.

[1]National representative: The Fred C. Gloeckner Co., Inc., 15 East 26th St., New York, NY 10010.

Long days (night interruptions) increased the number of flowering stems per plant, decreased the average number of flowers per stem, and had no effect on stem length at anthesis (Table 2). Long days also resulted in earlier flowering (Fig. 2).

Pruning the shoots back to ground level on November 13, 1975, increased flower stem production 18 percent under long days but decreased production 15 percent under short days. Pruning back increased the average number of flowers per stem but had no effect on average stem length (Table 2). Stem removal also delayed the date of flowering but once production started, flowering occurred at a more constant rate than those plants which were not cut back (Fig. 3).

Partial thinning of shoots on January 5, 1976, when the numbers were excessive, increased the number of flowering stems produced per plant. Heavy thinning, however, decreased production (Table 2). Thinning had no effect on average stem length but increased the average number of flowers per flowering stem.

Based on these results, it would appear that alstroemeria plants should be cut back sometime in October or November and thinned of excessive weak and older growth in January. Long day (night interruptions) from mid-December to mid-March also would be recommended to hasten anthesis date by 3 to 4 weeks. Constant high levels of nutrition are advised as we observed alstroemeria are heavy feeders.

Yearly production of alstroemeria in Europe has been reported to be 50 to 70 flowering stems per plant in one article and 50 to 90 flowering stems per square yeard in another. Plants planted on May 22 have produced 100-129 flowering stems during the time period of March 17 to June 15 of the following year in our experiments. An additional 35 to 45 flowering stems of reasonable quality were produced from June 15 to August 1.

Floral preservative trials were run with tap water and distilled water as control to compare Floralife^{R}, Petalife^{R}, and Roselife^{R}. Three keeping quality trials were conducted at 70°F (21°C) under 10 hours of fluorescent lighting. No great differences were observed between treatments and all kept for 12-14 days. Preservatives may decrease individual flower shattering (abscission) and increase vase life by 1 or 2 days. We have also observed stems and leaves can wilt to an excessive degree, but the flowers remain turgid. When wilted stems are recut and placed in water, recovery is rapid.

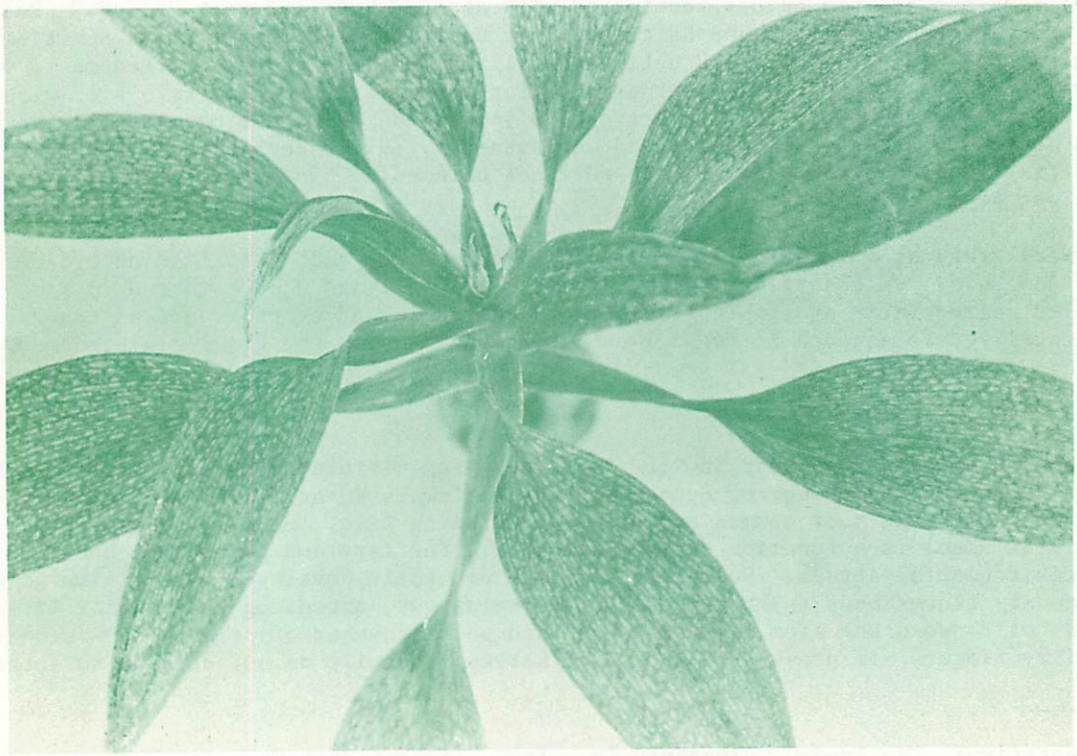

Figure 1. Alstroemeria leaves with nutritional deficiency symptoms which disappeared when commercially available complete microelements were applied. Possible Cu. deficiency according to tissue analysis.

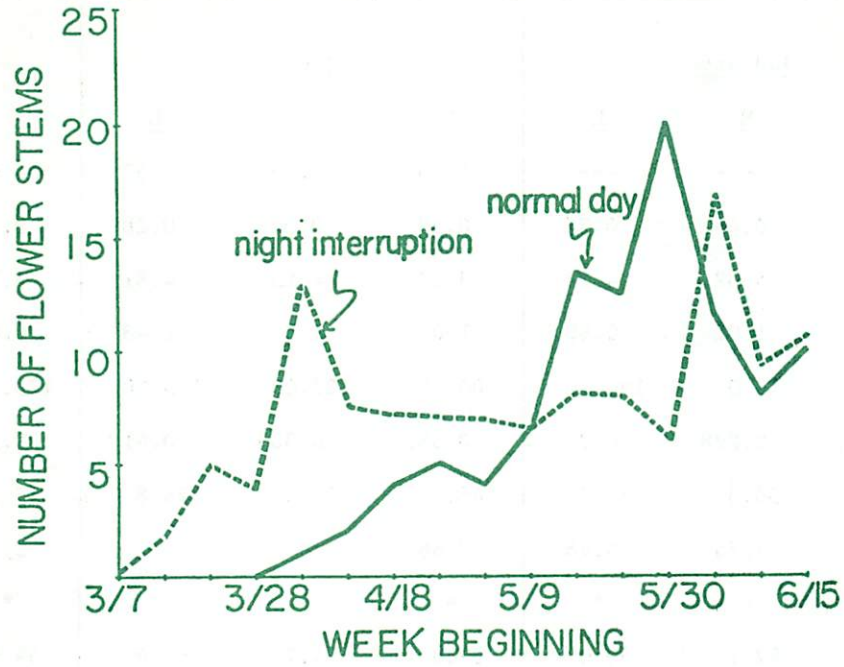

Figure 2. Alstroemeria hybrida cv. Regina production from 3/7/76 - 6/15/76. Plants were grown under normal photoperiod or given a five hour night interruption from 10:00 p.m. - 3:00 a.m. with incandescent light.

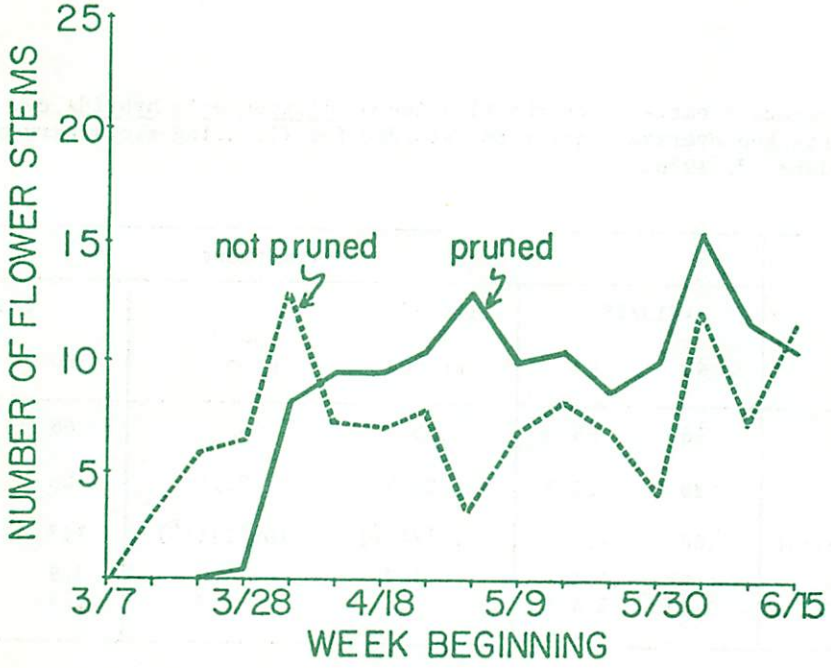

Figure 3. Alstroemeria hybrida cv. Regina production from 3/1/76 - 6/15/76. Plants were either pruned to the ground on 11/13/76 or allowed to grow normally.

Table 1. Nutritional elemental ranges found in normal, green vigorous Alstroemeria hybrida cv. Regina leaf tissue tested in January and June 1976. Plants were fed according to soil test results. Foliar samples were taken from the tip (T), mid (M), and lower (L) stem position.

	January			June			Range Level Recommended		
	T	M	L	T	M	L			
N	----	----	----	4.70	3.78	5.57	3.8	-	5.6
P%	0.66	0.44	0.35	0.39	0.30	0.28	0.3	-	0.7
K%	4.19	4.62	4.12	3.68	4.15	4.81	3.7	-	4.8
Ca%	0.62	1.01	0.88	1.03	1.31	1.43	0.6	-	1.4
Fe ppm	194.00	258.00	190.00	100.00	123.00	135.00	175.0	-	275.0
Mg%	0.233	0.298	0.293	0.331	0.388	0.410	0.2	-	0.4
Zn ppm	68.8	50.3	34.7	46.4	31.2	28.8	35.0	-	68.8
Cu ppm	5.31	6.75	4.98	2.66	*	*	2.7**	-	15.0
Mo ppm	*	*	*	*	*	*	*	-	*
Mn ppm	61.4	87.1	69.0	59.0	74.7	68.6	59.0	-	87.1
B ppm	13.1	18.6	21.4	15.43	15.1	16.6	13.0	-	50.0

* Levels too low to detect by the techniques used for tissue analysis.

** No leaf symtomology was observed at a 2.7 ppm level, however tissue with 2.49 ppm Cu expressed symptoms (Fig. 1).

Table 2. Effects of various treatments on the flowring of Alstroemeria hybrida cv. Regina plants. Date represents the average statistics recorded for flowering stems harvested from March 14, 1976 to June 27, 1976.

	Treatment						
	11/13/75		11/13/75		1/5/76 thinning		
	ND	LD	pruned	not pruned	no	50%	75%
Stem length cm	66	65	65	65	66	65	64
Stem length in.	26	25.5	25.5	25.5	26	25.5	25.25
Flowering stems per plant	106	117	127[y] (97[z])	108[y] (114[z])	117	129	107
Number flowers per stem	4.5[x] 3.4[w]	4.1 3.4	4.3 3.6	4.0 3.3	3.9 2.9	4.3 3.2	4.3 3.4

[z]normal day plants

[y]long day plants

[x]number of primary flowers open at harvest

[w]number of secondary flowers

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