

8. Larson, R. A., and M. L. McIntyre. 1968. Residual effect of cycocel on poinsettia height control. *J. Amer. Soc. Hort. Sci.* 93:667-672.
9. Tjia, B., S. Ohpanayikool, and J. Buxton. 1976. Comparison of soil applied growth regulators on height control of poinsettia. *Hort-Science* 11:373-374.
10. USDA. 1978. Floriculture Crops. Production area and sales, 1976 and 1977; intentions for 1978. Crop Reporting Board, ESCS, SpCr 6-1(78). 27 pp.
11. Wilfret, G. J., B. K. Harbaugh, and T. A. Nell. 1978. Height control of 'Pixie' poinsettia with a granular formulation of ancymidol. *HortScience* 13:356. (Abstr.).
12. Witte, W. T., and B. Tjia. 1976. Effect of ancymidol impregnated propagation blocks on height of poinsettia. *Proc. Fla. State Hort. Soc.* 89:283-284.

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## KALANCHOE—A POTENTIAL NEW POT CROP FOR FLORIDA<sup>1</sup>

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### Materials and Methods

*Additional index words.* Photoperiodism, devernialization.

**Abstract.** Eleven kalanchoe cultivars, 'Adobe Rose,' 'Cactus Candy,' 'Goddess,' 'Montezuma,' 'Nugget,' 'Osage Orange,' 'Pixie,' 'Rotkappchen,' 'Texas Sunset,' 'Tabasco' and 'Toltec,' were evaluated during winter, spring and summer of 1978. All cultivars flowered in fewer days during the spring than in winter. 'Rotkappchen' was the only cultivar to flower normally during the summer.

Kalanchoes (*Kalanchoe blossfeldiana* P.) are fleshy leaf succulents, introduced primarily as Christmas flowering pot plants in the early 1960's (2). The more important commercially produced, vegetatively propagated cultivars 'Mace' and 'Telstar' are tall plants having large leaves and red to reddish-pink flowers borne on long flower stalks.

Development of additional cultivars during the 1970's offered a wider range of plant sizes, leaf shapes and sizes and flower colors, and has led to increased commercial popularity of kalanchoes in recent years (4).

The unique leaf forms of kalanchoes make them attractive foliage plant long after flowers have been removed. The commercial appeal of kalanchoes is no longer limited to the Christmas season since consumers are finding kalanchoes an appealing plant year around.

Kalanchoes offer growers a novel, commercially attractive alternative to other more traditional foliage and flowering crops, suitable for mass or retail markets. Additionally, recommended cultural requirements may make kalanchoes a viable year round replacement crop for other short day crops such as poinsettias and chrysanthemums. Kalanchoes require high light and fertilization levels, but labor requirements are minimal since pinching and disbudding are not required (1, 3, 4). Night temperatures of 62-67°F (16.5-19.5°C) have been suggested during the 6 week short day period. Mikkelsen has noted that night temperatures above 75°F (24°C) delay or completely inhibit flowering on certain cultivars (4).

This study was initiated to evaluate 11 kalanchoe cultivars as year round flowering pot plants for Florida and the Southeastern United States.

Rooted cuttings of 11 kalanchoe cultivars, 'Adobe Rose,' 'Cactus Candy,' 'Goddess,' 'Montezuma,' 'Nugget,' 'Osage Orange,' 'Pixie,' 'Rotkappchen,' 'Texas Sunset,' 'Tabasco' and 'Toltec,' were planted November 23, March 3 and June 1. Each cutting was planted in a 15.5 cm plastic container using a sand:peat:perlite (1:1:1, v/v) potting mix amended with 4.5 kg dolomite, 2.3 kg superphosphate and 1.4 kg Perk<sup>2</sup> per 0.8 m<sup>3</sup>. Plants were fertilized at every watering with 200 ppm N and K.

Plants were grown in a lightly shaded glass greenhouse (approx 25% shade) and given 2 weeks of long days followed by 6 weeks of short days. Short days were provided for 15 hrs nightly from 1700 to 0800 hrs during the winter and spring and 1900 to 0900 hrs during the summer months. Long day conditions were resumed following the short day treatments.

Night temperatures were maintained at 62°F (18°C) during the winter and spring with low night temperatures during the summer rarely being lower than 75°F (24°C). Fan and pad cooling was provided during spring and summer months.

The experiment was terminated and data taken when 25% of the florets on each plant showed color. Additional data included plant height and width.

### Results and Discussion

Plants produced from November to May were of high marketable quality. Flowering of kalanchoe cultivars during the summer months was either erratic on each plant (partial flowering), delayed or completely inhibited. 'Rotkappchen' flowered during all 3 seasons. 'Cactus Candy,' 'Texas Sunset,' 'Osage Orange,' 'Adobe Rose' and 'Nugget' required longer than 12 weeks to reach a marketable flowering stage during the summer. 'Goddess,' 'Tabasco,' 'Toltec' and 'Montezuma' flowered within 12 weeks, but only a small percentage of the lateral shoots flowered (Table 1).

Lateral shoots on 'Pixie' flowered, but flowering of the terminal was inhibited. Zrebiec (6) observed similar morphological abnormality on 'Cherie' and concluded that suppression of flowering in the terminal shoot resulted from high temperatures (heat delay) and was essentially a devernialization process. Differences in cultivar response to heat delay as observed in this study have been reported by Pertuit (5) who found 100% flowering in 'Mace' grown at 69°F (21°C) night temperatures and given 2 wks of SD, but 'Thor' and 'Telstar' under similar conditions had 0 and

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<sup>2</sup>A commercial minor element supplement. Ed.

Table 1. Influence of time of year on days to flower of 11 Kalanchoe cultivars.<sup>z</sup>

Cultivar	Time of year		
	Winter	Spring	Summer
Nugget	90	68.5	—
Cactus Candy	83	67.3	—
Goddess	83	64.5	—
Pixie	96	66.5	—
Tabasco	88.8	67.0	—
Texas Sunset	86.3	69.0	—
Osage Orange	82.8	68	—
Toltec	95.0	64.8	—
Montezuma	80.0	65.0	—
Adobe Rose	83.0	68.8	—
Rotkappchen	91.7	67.8	10.3

<sup>z</sup>Days to flower represents the time from potting to 25% of florets showing color.

17% flowering. Flowering in 'Thor' and 'Telstar' was increased by extending the number of short days to 3.4 or 5 wks.

Plant height on 'Pixie,' 'Tabasco,' 'Toltec' and 'Rotkappchen' was greater in the winter than spring (Table 2)

Table 2. Influence of time of year on plant height (cm) of 11 Kalanchoe cultivars.<sup>z</sup>

Cultivar	Time of year		
	Winter	Spring	Summer
Nugget	24.0	25.0	—
Cactus Candy	28.2	36.0	—
Goddess	21.2	30.3	—
Pixie	31.0	20.8	—
Tabasco	32.7	29.3	—
Texas Sunset	24.3	34.8	—
Osage Orange	25.0	32.0	—
Toltec	38.3	28.0	—
Montezuma	36.2	33.3	—
Adobe Rose	28.2	37.0	—
Rotkappchen	33.2	31.0	32.8

<sup>z</sup>Plant height measured from pot rim to the uppermost floret.

and remaining cultivars were taller in the spring. Size of each rooted cutting at the beginning of each study may have influenced the final height of the flowering plant and

Table 3. Influence of time of year on plant width (cm) of 11 Kalanchoe cultivars.

Cultivar	Time of year		
	Winter	Spring	Summer
Nugget	26.3	25.0	—
Cactus Candy	28.5	25.3	—
Goddess	19.3	17.0	—
Pixie	23.0	16.8	—
Tabasco	19.0	17.6	—
Texas Sunset	22.5	20.5	—
Osage Orange	23.7	24.8	—
Toltec	20.0	16.3	—
Montezuma	26.2	25.0	—
Adobe Rose	26.8	24.5	—
Rotkappchen	19.5	22.5	30.0

may partially have accounted for differences in cultivar response to time of year. Plant width of all cultivars except 'Osage Orange' and 'Rotkappchen' was greater in the winter months (Table 3).

All cultivars flowered in fewer days during the spring than winter. 'Adobe Rose' and 'Cactus Candy' required 69 and 68 days to flower in the spring and 83 days during the winter, an increase of 2 weeks (Table 1). 'Toltec' flowered 30 days earlier in the spring.

These results indicate kalanchoes can be successfully grown during the winter and spring months, but further research is necessary to evaluate flowering potential of kalanchoes during the summer months. Evaluation of other cultivars, extending the night length or the number of short days may increase flowering percentage.

#### Literature Cited

1. Anonymous. 1977. Kalanchoe culture. *Grower Talks*. 41:1-6.
2. Irwin, J. 1972. Try a "new" crop—Kalanchoes. *Florist Review* 151:23, 56, 58.
3. Mikkelsen, J. 1975. A-B-C of kalanchoe culture. *Ohio Flor. Assoc. Bull.* 550:7.
4. ———. 1977. Kalanchoe culture. *Ohio Flor. Assoc. Bull.* 570: 8-9.
5. Pertuit, A. J., Jr. 1977. Influence of temperatures during long night exposures on growth and flowering of 'Mace,' 'Thor' and 'Telstar' kalanchoe. *HortScience* 12:10-19.
6. Zrebiec, V. 1978. Flower induction, initiation and development in Kalanchoe and the effects of night temperature and photoperiod on flowering. Masters thesis. Ohio State University. 27 p.

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## EVALUATION OF HEAT TOLERANT MUMS FOR FLORIDA<sup>1</sup>

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**Abstract.** Spray and pot grown chrysanthemum cultivars were evaluated for use in summer flowering programs.

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Spray chrysanthemum cultivars 'Belair,' 'Celebration' and 'Gem' produced marketable flowers, but 'Accent' had short peduncles and stems. All pot chrysanthemum cultivars evaluated, 'Dazzler,' 'Wild Honey,' 'Pinktive,' 'Intrepid Gold' and 'Intrepid White' were high quality pot plants. Flowering of all cultivars was delayed by 1 to 14 days by summer growing conditions.

Chrysanthemum production represents a substantial segment of the floriculture industry in Florida (2, 5). The primary production period is October 1 to May 15 when climatic conditions are suitable for quality production outdoors. Reduced market demand and the lack of heat toler-