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Fig. 1. Terminal bud removed from plant on left 4 weeks after start of short-day treatment. Terminal bud removal results in a shorter plant and more cyme development. Flowering is delayed several days.

KALANCHOE PRODUCTION

Joe W. Love

One of the most underrated florist crops is the Kalanchoe. Few potted plants offer the consumer such lasting quality. Some growers recently have included the Kalanchoe in their rotation and have found immediate acceptability from retail florists and mass markets.

With the introduction of many new cultivars, the image of the Kalanchoe has changed dramatically. No longer is the Kalanchoe characterized as a large cabbage-leaved, tall plant. A wide assortment of varieties with various plant habits and flower color is available for the growers' selection. Important cultivars that should be considered in a program include: Exotic (orange), Exotic Gold (apricot), Exotic Yellow (yellow), Feuerball (scarlet red), Feuerzauber (scarlet red), Gelbe Melody (yellow), Granat (red), Jean (rose), Korall (orange/red), Rotkappchen (orange/red), and Zora (red).

Mikkelsens, Inc. in Ashtabula, Ohio, and J and L Plants in Canyon, Texas, are two major sources of Kalanchoes. These companies supply small liners on a year-round basis. Some growers have obtained a propagator's license to produce their own plants. Varieties started from seed are limited, with Tetra Vulcan, Vulcan, Red Empress, Tom Thumb, and Ramona being the most popular.

Propagation: Propagation of Kalanchoe cuttings is a relatively easy task. Mist propagation is suggested for best results. Like any rooting medium, good aeration and drainage are essential. Excellent results have been obtained with equal parts by volume of peatmoss and perlite. Bottom heat should be provided from September through March. Most cultivars root within 15 to 21 days. Since most popular Kalanchoe varieties are patented, a license agreement must be obtained from the originator.

Cuttings should measure from four to five inches in length. Larger leaves may be trimmed in half to facilitate spacing. Insert cuttings about 1 1/2 inches deep in the rooting medium. Allow ample spacing between rows and within the rows.

Cuttings may be propagated directly in the final container. Mist propagation should be used until rooting is accomplished. This system has particular merit for those plants finished in 4- or 5-inch pots. The chief disadvantage of this system is that it requires more propagation area than conventional propagation methods.

Media: A grower should pay particular attention to selection of a growing medium. Mikkelsen recommends equal parts peat, perlite and soil; Erwin of J and L suggests 5 parts soil, 4 parts peat and 4 parts terragreen. Love, NCSU, has had excellent results with 3 parts milled pine bark (passes through 1/8-inch screen), 1 part sand, and 1 part peatmoss.

The pH of the medium should be adjusted between 6.2 - 7.0. Bark mixtures must be limed heavily to raise the pH. A cubic yard of the NCSU medium should be limed with 10 lbs. dolomitic limestone plus 3 lbs. hydrated lime. Kalanchoes are sensitive to zinc deficiency. Therefore, phosphorus should be eliminated since it ties up available zinc. The medium selected should be analyzed prior to use. Pasteurize the growing medium with steam for 30 minutes at 180°F.

Planting: Deep planting of cuttings should be avoided. The soil ball of plants rooted in small pots should be potted from 1/4 to 1/2 inch above the new soil line.

Only clean clay or plastic containers should be used. Kalanchoes may be marketed in various size containers. Four to 4 1/2-inch azalea pots are popular for one plant, while 5- to 6-inch azalea pots are used for one or multiple plants. Some growers have used as many as five to seven plants for larger containers. Fewer large-leaved plants are required to produce specimen plants.

Pinching: Removal of 1/2 to 3/4 inch of the growing point is necessary to produce branched plants. Establish plants for six weeks before pinching during the winter months; four weeks during spring, summer and early fall. Plants should be kept under long days during the establishment period to promote soft, vegetative growth. After pinching, plants should remain under long days for several additional weeks.

Short-Day Treatment: Most Kalanchoe varieties require from 5 to 6 weeks of short-day treatment for flower initiation. For uniform flower initiation, six weeks of short days are recommended. Flower buds are visible after this initial short-day treatment. Once flower buds are visible, plants will flower under any photoperiod.

Days are naturally short for flower initiation from October 1 to March 1. Artificial short days are necessary from March 1 to September 30. Kalanchoes need a minimum of 13 hours of darkness; best response is with 10 hours of daylight and 14 hours of darkness. Black cloth or plastic is placed over the plants at 6 p.m. daily and removed each morning at 8 o'clock. In order to provide long days for vegetative growth (mid-September to March 15), allow 16 hours of continuous light. Natural day-lengths are extended to 16 hours with supplemental light of at least 10 foot candles intensity.

After short-day treatment is initiated, most varieties require 11 to 12 weeks to flower during summer and 14 weeks in winter. A few varieties flower after 9 to 10 weeks.

Spacing: Spacing varies with pot size and variety. Varieties with large fleshy leaves require additional space. Space 4-inch plants, 7" x 8"; 5-inch plants, 9" x 9", and 6-inch plants, 11" x 11". Greenhouse bench area may be conserved by spacing plants pot tight during the first several weeks after potting.

Temperature: Plants should be grown at 60°F night, 70° - 75°F day. Kalanchoes grow rapidly when the night temperature is maintained at 65°F, but this is impractical due to the high cost of fuel. Flowering of some varieties is delayed when grown at high night temperature (above 75°F). Evaporative cooling is recommended to control excessive summer temperature; fan-jets are useful to maintain proper day temperature during winter months.

Watering: Hand-watering should be performed in the morning. Large, fleshy leaves of some varieties make this system difficult to perform. Moisture on the plants at night will encourage powdery mildew.

With spaghetti tube watering, care should be taken to insure ample watering of the whole volume of soil. Dry spots enhance the danger of soluble salt injury and uneven growth.

Subirrigated plants on mats or sand are easier to care for than hand-or tube-watered plants. Any suspicious plants should be rogued.

Fertilization: Many conflicting reports on Kalanchoe fertilization exist in the literature. Plants may be fertilized at each watering with 200 ppm nitrogen and 150 ppm potassium or bi-weekly with 2 lbs. of calcium nitrate and 1 lb. potassium nitrate per 100 gallons. Regardless of the method selected, thorough watering is necessary to insure some leaching to prevent soluble salt accumulation.

Love, NCSU, recommends top dressing with 14-14-14 Osmocote. After the plants become established, apply one level teaspoon per 6-inch container; correspondingly less or more for smaller or larger containers. Minor elements must be applied to the growing medium. These nutrients may be applied either in the irrigation water or mixed with the growing medium (follow manufacturer's recommendation).

Fertilization applications may be reduced several weeks before flowering. Fertilize plants just before selling; they will last longer for the consumer.

Light Intensity: Ample light is necessary to produce quality Kalanchoe plants. Full light should be provided from mid-October to May. A light shade is necessary during summer (about the same as for potted chrysanthemums). Pink flowered varieties may be finished in summer near evaporative cooling pads.

Growth Regulators: Some tall growing Kalanchoe varieties require growth regulator treatment, e.g., Mace, Korall, Granat, Zora. Spray plants once to run-off with 3700 ppm B-Nine after the plants have received three weeks of short-day treatment. A second application may be necessary two weeks later.

Insects: Aphids, worms and fungus gnats are particularly troublesome on Kalanchoes. The Federal Environment Pest Control Act makes it unlawful to apply a pesticide in any manner except as stated on the container label. Read the entire label carefully for correct dosage rates, application directions and precautions concerning the pest on your crop and under your growing conditions.

Diseases: Powdery mildew is the most troublesome foliage disease. Fortunately, many varieties are resistant. Regular sprayings with Benlate during summer months will control mildew. Stem and root rots are prevented with Benlate and Truban drenches.