phytotoxicity. Lower STS concentrations gave decreasing protection. In another test Schlumbergera held at 26°C in the dark for four days dropped all their buds and flowers, due to ethylene build up within the plant. However, plants sprayed with 4mM STS lost few of their flowers and buds when sprayed at 2, 3, or 4 weeks ahead of storage (simulated shipment). The cost of STS was figured to be less than 0.1 cents per plant at 1981 prices (4).

After consideration of these tests, it is easy to see how advantageous it would be to use 2mM STS before shipping. However, silver thiosulfate is not currently registered for use as described herein. Check with your local extension agent for the up to date information on STS usage in your area.

* Presented as a term paper in a greenhouse crop production course.
** A 2mM spray is made by dissolving 680 mg silver nitrate in a liter of water and 4 g sodium thiosulfate in another liter of water. The silver nitrate solution is slowly stirred into the sodium thiosulfate solution to make 2 liters of 2mM spray. Note that this concentration is about 7 times as concentrated as the STS spray recommended for seed type geraniums.

References

MINIATURE AFRICAN VIOLETS
David Reider, Student and Jay S. Koths, Professor of Floriculture

Although the horticultural industry has been well acquainted with the standard size African violet (Saintpaulia sp.) for many years and has made it one of the most popular flowering pot plants, it has not yet realized the full potential of its dwarf cultivars, the miniature African violets. These smaller growing cultivars are only about half the size of the standard cultivars, yet offer most of the colors, floral variations and leaf patterns of the larger cultivars. These miniature plants offer the grower advantages in their production and sale because of their smaller size.

The miniature African violet is for all practical purposes identical in form to the standard size African violet, but scaled down in all parts with the possible exception of the flowers which in some cultivars are equal in size to those of the standard cultivars. The average size of a miniature African violet plant is about six inches across when mature, compared with the ten to twelve inches of a standard size cultivar. The leaves of the miniature African violet may be smooth or scalloped and come in various shades of green, some being mottled with white on the upper surface. The flowers come in shades of blue, purple, red, pink, and pure white; they may be single, semi-double, or double. The plant has a neat and attractive appearance and offers good variety.

Miniature African violets are propagated by leaf cuttings. The cuttings should be taken from healthy stock plants grown under optimum conditions. Leaves used for cuttings should be mature with no signs of damage. They should be healthy and have about a one inch petiole. The cutting may then be treated with a weak rooting hormone if desired although good rooting will take place without the
use of one. The leaves are stuck about one inch apart. There are many different choices of medium which are usable as long as they provide the necessary moisture retention, drainage and aeration. Possible rooting media would be sand, peat, vermiculite or some combination of these. The leaves form rootlets and then several small shoots, each one producing a separate plant when transplanted.

The shoots produced from a leaf cutting are generally ready to transplant in about 5 months after being stuck. The shoots can be potted up individually in 2 to 2 1/2 inch plastic pots using a loose well aerated medium, such as two parts peat, one part soil and one part extender such as perlite or shredded styrofoam, amended with superphosphate and enough lime to give a pH of 6.0 to 6.5. Plastic pots are used because African violet leaf petioles are sensitive to burning caused by the accumulation of fertilizer salts on the rims of clay pots. After potting, they should be fed weekly with a fertilizer solution such as 15-15-15 or 15-0-18 at a rate of 8 oz/100 gals.

As in the production of any plant, light and water are major factors in the growing of quality miniature African violet plants. Miniature African violets should never be allowed to dry out, the potting medium always kept moist, but not wet. If the soil mix is kept too moist it may result in rotting of the succulent roots, crowns, and leaf petioles; if allowed to dry for any length of time poor growth and flower production will result. It is important to remember that cold water on the leaves of African violets will cause spotting. Leaf spotting will be averted by watering with warm water or by the use of capillary mats to water from below. African violets are also sensitive to too much or too little light. Excessive light, such as in a improperly shaded greenhouse during the summer, will result in burning of leaves and flowers and shortened leaf petioles. Under insufficient light, poor flowering and leaf petiole elongation will occur. A good light intensity for miniature African violets would be in the area of 1000-2000 foot candles. One way of assuring proper lighting for African violets is to grow them under artificial lights; 600 foot candles for 16 hours a day should result in good growth and flower production.

Miniature African violet plants are not only attractive; they offer the grower advantages over the larger Saintpaulia cultivars with increased numbers per unit area and lower shipping costs. They present the retailer a good looking and saleable plant. Give these charming little plants a try.

Low temperature and/or short days induce flower bud initiation in the fall. Thus, there are several ways in which to induce flower initiation. First, flowering will take place below 55°F night temperature, no matter what the day length is, but flowering is not uniform. Temperatures less than 50°F prevent flower initiation. Flowers are readily initiated at temperatures of 59-68°F with nights of 12 hours or more. Twenty to twenty-five long nights are adequate for flower initiation. After this time, the photoperiod will not affect the development of the flowers. At a night temperature of 52°F flowering should occur in nine or ten weeks after initiation (1). Thus, to ensure a Christmas crop, at 55°F with nine hour days, begin using black cloth about September 15 (2).

As reported by Heins et. al. (5), 100 ppm benzylaminopurine will increase flower bud numbers by forty percent when applied two weeks after the start of short days. Also, when applied during the vegetative growth period, the phyllodes increased by as much as one hundred fifty percent (5).

Environmental stresses such as high temperature and low light intensity during shipping of Schlumbergera cause a C,H, (ethylene) build up within the plant. The ethylene in turn has caused as much as thirty percent bud and flower drop during shipping. It has been noted that silver nitrate prevented C, H, - induced abscission in plants. However, its use is limited because of poor mobility in the plant and phytotoxic effects (4). Veen and Van de Geijn (3) found that silver thiosulfate (STS) was mobile.

Various tests have been conducted with STS on a variety of plants including Schlumbergera by Cameron and Reid in 1981 (4). Some of their tests showed that cactus pretreated with 4mM silver thiosulfate (STS) spray kept ninety percent of their flowers and eighty percent of their buds after having been exposed to 0.5 ul/liter ethylene for a seven day period. The 4mM was made by mixing silver nitrate with sodium thiosulfate in a molar ratio of 1:4. In comparison the control plants lost all flowers and dropped eighty-five percent of their buds. When using this treatment caution must be exercised. They found that the 4mM spray did cause some blistering of phyllodes that left dark pits. However, they did find that 2mM sprays** also provided the same protection from ethylene, but without any appreciable
GROWING CHRISTMAS CACTUS
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There is a distinction between the Christmas cactus and the Thanksgiving cactus. Schlumbergera (formerly Zygocactus) bridgesii, the Christmas cactus, has rounded lobes on the upper margin of the phylloclades (leaves), and blooms naturally in mid December. Schlumbergera truncata, which blooms naturally in middle to late November, is the Thanksgiving cactus. While S. truncata can be easily identified by the two to six serrate projections of its phylloclades, it has often been mistakenly called Christmas cactus (1).

The Christmas cactus grows as an epiphyte on the branches of trees and decaying bark in its native habitat of Brazil. For this reason, the growing medium should contain a high percentage of organic matter, with the addition of good drainage for commercial growing. Schlumbergera should be grown moist but not overwatered to avert disease problems during months of low light intensity and low temperatures. The pH of the root medium should be 5.5 to 6.2. Fertilizer applied at the rate of 200-300 ppm nitrogen from 20-10-20, 15-16-17 (1), or 20-20-20 (2), every two weeks is generally sufficient. Osmocote has also been effective for large pots applied at 1/2 the recommended rate. In order to prevent iron deficiency, cupping of new growth and marginal chlorosis, apply chelated iron at 4 oz. per 100 gallons water 2 or 3 times during the growing period. Stop fertilization in August or September 1 to 2 months before the start of flower bud initiation (1). In mid August, start to withhold some water. This is not to encourage flower bud development as previously thought. Instead, this slows the plant metabolism so that carbohydrates are stored in the plant instead of being used for more new growth (2). While withholding some water, the plants should not be put under excessive water stress. Water should not be withheld when buds become visible since this may cause bud abortion or undersized flowers (2).

Propagation may start as soon as select stock plants, free of disease and other problems, have finished flowering. Cuttings of one to three phylloclades can be twisted off at the joints. Bottom heat of 70°F should be used. These cuttings will begin rooting in 2 to 3 weeks at which

References