with growth regulator sprays. Hildrum (7) blamed flower abcission on high temperatures, low light intensity and insecticide fumigation.

Cultural Requirements. Clerodendrums are best grown in media containing large amounts of organic matter (1, 3, 4, 5, 9). Plants prefer moist, well drained media because overwatering can cause leaf drop. Sustained, high nitrogen fertilization in the form of 100 to 200 ppm N. constant feed (3) or 20% N liquid feed every week at the rate of 2.4 g per liter will produce satisfactory growth. Slow-release materials such as Osmocote™ may also be used but may need to be reapplied to maintain foliage color and assure consumer satisfaction. *C. thomasoniae* tolerates heat and warm coastal conditions and will thrive outdoors in tropical and subtropical areas (9). Plants will grow at (50° F.) however low temperatures inhibit growth. Hildrum (7) recommended a growing temperature of (70° F.) but noted that (60° F.) prevented bud drop. When grown outside in Auburn, Alabama, plants have not survived the winter. Howard (9) indicated that plants are also susceptible to dry, windy atmospheres and this might explain some of the problems encountered in growing them in hanging baskets. Full sun is essential for rapid growth and adequate flowering but clerodendrums are slightly shade tolerant. Short days promote flowering (7), however the use of a growth retardant may make the short day treatment unnecessary. No disease problems have been encountered in Auburn research. Tobacco ring spot virus has been isolated from clerodendrums by Wisconsin researchers (1,3). Botrytis flower blight and leaf spot have been reported to cause problems in Florida and New York (3). Whiteflies have been observed on Auburn plants. Beck (3) stated that whiteflies are squatters on clerodendrum and eggs have never been seen on the plants. Mealybugs (9), spider mites (3), scale (9), aphids (3), and tarnished bugs (3) may infest *C. thomasoniae.*

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INFLUENCE OF CULTURE ON TIPBURN OF SPIDER PLANT, CHLOROPHYTUM COMOSUM (THUMB.) BAK.[1]

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Abstract. **Spider plant or airplane plant, a member of the Liliaceae family from South and Central Africa, grows in leafy rosettes with a broad white stripe down the center and sometimes along edges of dark green leaves. The plant is used primarily as a hanging basket, and is very popular. Although relatively trouble-free, spider plant frequently has burned (necrotic) areas at leaf tips and edges, and infrequently in the center of the white area. Fluoride in potting soil or irrigation water can cause this necrosis. To reduce fluoride tipburn of spider plant, soil pH should be elevated to 6.5 to 7.0 by additions of a liming material.**

The word Chlorophytum is derived from the Greek word, chloros, meaning green and phyton, a plant. Chlorophytum has been used as a green house plant for many years. Goethe, the German writer, obtained one in 1828. The habit of the spider plant of producing young plants at the end

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of the flowering stalk intrigued him and Gothe gave young plants to many of his friends. The plant has been popular ever since (8).

The herbaceous plant is rhizomatous with green leaves having one or several broad yellow or white stripes down the center. The leaves grow in a thick tuft, some 1 to 2 ft long and 1 inch wide. Small white flowers are borne on long stalks. The flowers soon fade and leafy off-shoots form. The plant is excellent when placed in a pot or border. However, the most popular use is as a hanging basket. A specimen plant in a 6 inch hanging basket with small plantlets attached to cascading flower stalks creates a beautiful decoration.

Plants can be propagated by division of root stalks, but most frequently plants are propagated by plantlets produced on the ends of the flower stalk. Plantlets should have well formed roots before removal from the mother plant. Research (3) has shown that the largest number of plantlets are formed under short day conditions (maximum of 8 hr of daylight/day).

Spider plants have been called both delicate and tough (4,9). They are a rampant grower, and will tolerate both warm and cool temperatures. A vigorous root system develops if soil is maintained at low to medium moisture content. Although the plant can tolerate low soil moisture for short time periods, plants will deteriorate if maintained in low light conditions. Light levels should be at least 100 ft-c in the house and higher levels will maintain a more attractive plant. Spider plants are seldom troubled with insect pests or disease pathogens. Although the plants will grow in many types of soil mixes, an open well aerated mix is preferred. Plants in the home need a minimum of additional fertilizer, but for commercial production 1 1/2 lb N, 1/2 lb P and 1 lb K of a slow release fertilizer/yd^3 of soil is adequate. For constant feed, a solution of 150 ppm N, 50 ppm P and 100 ppm K will produce good growth.

The spider plant frequently has tips that are necrotic or "burned." These unsightly tips may be 1 inch in length or longer. Previous research (1,2,5,6,7) has shown that fluoride (F) produced necrotic tips on several plants and that increasing pH of the soil mix reduced necrosis. To determine the relationship between tip necrosis and F content of leaves of chlorophytum, 2 experiments were initiated.

Materials and Methods

Experiment I. An experiment was initiated February 20, 1974 to determine influence of soil amendments on tip necrosis and leaf tissue F of spider plant. Six plants were placed individually in 5 inch pots containing a 2:1:1 (v/v/v) of German peat:pine bark:cypress shavings by volume and containing 14-14-14 Osmocote and Perk at the rate of 8 and 1 lb/yd^3, respectively and under approx 2,000 ft-c. This basic mix was also used in Experiment II. An additional 6 plants were placed in the above mixture plus single superphosphate at the rate of 5 lb/yd^3. Treatments 3 and 4 were initial mixture plus dolomite at the rate of 5 or 10 lb/yd^3. Pots were watered twice weekly. On May 13, 1974 length of tip necrosis of the 2 largest leaves was measured and leaf tissue was taken for F analysis.

Experiment II. A second experiment was initiated September 24, 1974 to study the influence of other soil amendments on tipburn of spider plant and pH and soluble salts of the soil mix. Various ingredients were added to the basic soil mix (Table 2). Quantities of materials added to soil provided equal amounts of calcium with the exception of magnesium sulfate ($MgSO_4$) and single superphosphate (SSP). Soluble salts and pH of the various mixes were determined at the initiation of the experiment. November 20, 1974 length of tipburn was determined.

Results and Discussion

Soil amendments of the first experiment had a definite influence on tipburn of spider plant and tissue F (Table 1). Plants grown in soil containing 10 lb/yd^3 dolomite contained the least amount of F and had the smallest amount of tipburn. Plants growing in soil containing superphosphate had most F and tipburn. Superphosphate contains approx 1.5% F and has caused tip necrosis and high F content of *Cordyline terminalis* Kunth 'Baby Doll' (1,5) and *Dracaena deremensis* 'Janet Craig' (7).

Ten lb/yd^3 of dolomite was not as effective in Experiment II as in Experiment I (Table 2). Calcium carbonate ($CaCO_3$) and calcium hydroxide ($Ca(OH)_2$) reduced tipburn. An examination of

Table 1. Influence of superphosphate and dolomite on tipburn and tissue F of spider plant.

Treatments	lb/yd^3	Tipburn (in.)	Tissue F (ppm)
Control	--	0.24 b[z]	20.8 b
Superphosphate	5	0.49 a	41.8 a
Dolomite	5	0.22 b	15.0 c
Dolomite	10	0.10 c	13.8 c

[z]No. in a column followed by similar letters are not significantly different at the 5% level.

Table 2 shows that an increase in acidity (decreasing pH) correlates with an increase in tipburn. Soluble salts may also influence tipburn, although earlier research indicates that soluble salts are not related to tipburn caused by F (5). Calcium content of soil did not appear to be related to F induced tipburn. Calcium sulfate mixed with soil so that the calcium content added was equal to that of calcium added by the addition of dolomite, $CaCO_3$ and $Ca(OH)_2$, (hydrated lime) increased tipburn. The effect of the added material on pH, not the amount of Ca added appeared to determine the reduction of tip necrosis.

Where tipburn of spider plant is a problem, additions of 5 to 10 lb/yd^3 dolomite or approx 1/4 lb (1/4 cup)/ft^3 should reduce tipburn. If plants are already potted and they exhibit tip necrosis, a drench with a solution made by adding 1 lb of $Ca(OH)_2$ to 100 gal water (or approx 1 teaspoon to a gal) will elevate the pH. A second application may be necessary if soil is extremely acid. Other measures that will reduce tipburn caused by F are those that reduce transpiration: high humidity and moderate light and temperature (1,2). Soil components that contain high amounts of F should not be used and fertilizers which contain superphosphate should be avoided.

Table 2. Influence of soil amendments on tipburn of spider plant and pH and soluble salts of medium.

Treatment	lb/ yd^3	Tipburn (in.)	pH	Soluble salts
Hydrated Lime	4.4	0.05 a[z]	6.8 a	147 a
Calcium Carbonate	5.0	0.10 a	6.8 a	315 b
Dolomite	10.0	0.17 ab	5.9 a	119 a
Control	–	0.20 ab	4.4 b	91 a
Calcium Sulphate	9.0	0.42 b	3.9 c	679 c
Superphosphate	5.0	0.42 b	3.8 c	1106 d

[z] No. in a column followed by similar letters are not significantly different at the 5% level.

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PROPAGATING THE YELLOW AFRICAN TULIP TREE

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Abstract. **The Yellow African Tulip' tree, Spathodea campanulata, was introduced into the United States in 1970. Seeds were received from Peter Greensmith in Kenya. One seedling out of six produced yellow flowers, and the remainder bore the orange-red flowers usual in this species. To date distribution has been limited because of the difficulty of propagation by vegetative means. Propagation by cuttings and air layers has been unsuccessful, and results of grafting on seedlings of red flowered S. campanulata are uncertain.**

In 1970 a new yellow-flowered form of African tulip tree, *Spathodea campanulata* Beauv. was introduced into the United States. Seeds came to the USDA Subtropical Horticultural Research Station from Peter Greensmith's nursery in Nairobi, Kenya. Excitement ran high in anticipation of bloom, since we had heard that the flower color was a brilliant golden yellow. Three years later, one of the six seedlings did bloom and indeed it was as beautiful as had been reported. The flowers were as large as the common red-flowered variety and the color was a clear yellow of outstanding brilliance.

Self pollination of the flowers produced no seed set so we awaited flowering of the other five seedlings intending to cross pollinate between yel-