

applications of 5 ppm uniconazole were more effective than one but no different than a single spray at 10 ppm (Table 2). Likewise, no difference in plant growth was evident between the uniconazole drenches at 0.0625 or 0.125 mg a.i./pot. The foliar spray of chlormequat plus damin-ozide produced plants of a similar height with one or two applications and a height equivalent to the paclobutrazol and uniconazole sprays. No differences in plant growth were evident between the formulations of paclobutrazol when used as a foliar spray or a medium drench. The paclobutrazol sticks were as effective as the soil drenches at the same amount of chemical per pot regardless of number of sticks used per pot. The efficacy of uniconazole compared to paclobutrazol was similar with 'Supjibi' as with 'Glory'.

This research demonstrates that several growth regulators, alone or in combination, can effectively control height of poinsettias when grown in a shadehouse in central Florida. Use of the triazole growth regulators needs to be more precise than with chlormequat, as too high a concentration or too great a volume of uniconazole or paclobutrazol could produce plants too short to be marketable. The spike formulation of paclobutrazol is as effective as the spray or drench application methods and could reduce exposure of the ecosystem to the chemicals. Previous research (not published) has shown that at least two spikes per pot are necessary to get even growth of pruned poinsettia plants, especially with the use of subsurface irrigation.

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MEDIA LIME RATE AND PRUNING AFFECT LEAF MOTTLING OF *EPIPREMNUM AUREUM* 'MARBLE QUEEN'

ROBERT J. STEINKAMP¹

Fafard Inc.

3723 Hogshead Rd., Apopka, FL 32703

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Abstract. Leaf mottling on *Epipremnum aureum* (Lind. & Andre) Bunt. 'Marble Queen' was affected by media lime rate and pruning. Rooted cuttings, planted in 6-inch azalea pots, were grown in media amended with either 1, 3, 5, 7, 9, or 11 lbs/yd³ dolomitic limestone. After 6 weeks, plants to be pruned

were cut back, and the experiment was terminated after 13 weeks. Number of mottled leaves was much greater with 3, 5 or 7 lb/yd³ lime rates than mottling on plants with 1, 9, or 11 lb/yd³ rates. Leaf mottling was also more severe on pruned plants compared to unpruned plants. No differences were found in fresh plant weights for lime rate or pruning treatments. Leaf tissue manganese concentrations ranged from 913 to 1331 ppm suggesting possible manganese toxicity.

Epipremnum aureum (pothos) is one of Florida's most commonly produced foliage plants, grown mainly as totems and hanging baskets. Growers obtain these plants as either rooted or unrooted cuttings from various domestic and international sources. Once plants are well established in hanging baskets, vines are often pruned back to improve

¹Florida Technical Services Manager, Fafard Inc., 3223 Hogshead Road, Apopka, FL 32703.

plant fullness and provide material for propagation. Although primary cultural problems are diseases, pothos is also subject to an apparent physiological problem.

During production, pothos sometimes develop leaf mottles that occur on both upper and lower surfaces of lower leaves of older plants and/or plants which have been cut back for stock production. Irregularly shaped purple or brown blotches surrounded by a yellow haze develop first at leaf tips and then spread along leaf margins and into mid-rib areas eventually covering entire leaves. In severe cases, leaf veins turn purple and leaf tips develop necrosis, rendering plants unsalable.

Similar symptoms occurring on pothos, hibiscus, bean, soybean, potato, chrysanthemum and cucurbits have been attributed to manganese toxicity (Schubert, 1992). Manganese toxicity symptoms have also been observed on tomato and have been described as a downward leaf curling, with leaf veins showing a dark purple necrosis with some brown spotting in adjacent tissue (Bunt, 1976). On older leaves, manganese excess has been reported to cause brown spots surrounded by a chlorotic zone or circle (Jones et al., 1991).

Previous evaluations by this author have shown that pothos with high leaf manganese concentration do not always exhibit mottling symptoms (unpublished). Low media pH values are often observed when mottling symptoms occur and symptoms occur most often on pruned plants. The experiment described was conducted to determine effects of media lime rate and pruning on occurrence of leaf mottling of pothos.

Materials and Methods

The experiment was set up as a 6 x 2 factorial. Pothos plants were pruned or unpruned and grown in media amended with either of six lime rates. Experimental design was completely randomized with seven replications per treatment.

Growing medium was composed of 3 sphagnum peat:1 polystyrene (v/v) amended with 8.4 lb/yd³ 19N-2.58P-9.96K Osmocote, 1 lb/yd³ Micromax (GraceSierra, Co., Milpitas, CA), and either 1.0, 3.0, 5.0, 7.0, 9.0 or 11.0 lb/yd³ dolomitic limestone. Lime was very fine, with 95% passing through a #325 mesh (45 µm) U. S. Standard sieve.

Uniform rooted cuttings of *Epipremnum aureum* 'Marble Queen' (Marble Queen pothos) were planted in 6-inch plastic azalea pots on 27 July 1992. Plants were grown in a poly-covered greenhouse where maximum light intensity at plant level was 3500 ft-c. Production air temperatures ranged from 80 to 100F and plants were watered as needed. On 3 Sep. 1992, vines on one-half of the total number of plants receiving each lime treatment were pruned back to within 4 inches of the medium surface, and fresh weight of cut material was determined. At experiment termination on 25 Oct. 1992, number of mottled leaves per pot was recorded and final fresh weights were determined (for pruned plants, pruning weights were added to obtain total fresh weight). Mineral nutrient levels of leaf tissue and media pH were also determined.

Results and Discussion

Number of mottled leaves per pot was affected by media lime rate (Table 1). Number of mottled leaves was much greater with intermediate lime rates (3, 5 or 7 lb/yd³)

Table 1. Effects of lime rate and pruning on number of mottled leaves per pot, fresh weight of foliage and final medium pH of *Epipremnum aureum* 'Marble Queen' grown in 6-inch azalea pots from 27 July, until 23 Oct. 1992.

Lime rate ² , lb/yd ³	mottled leaves ¹	Fresh wt (g) ^x	Final pH ^y
1	4.3	385	4.3
3	15.0	352	4.5
5	19.2	377	4.7
7	15.4	367	5.6
9	3.8	390	6.2
11	5.2	379	6.4
Significance ^v			
linear	ns	ns	***
quadratic	***	ns	**
cubic	**	ns	ns
Plants pruned	13.7	392	5.2
Plants not pruned	7.3	358	5.4
Significance ^v			
linear	***	ns	ns

²Dolomitic lime was incorporated into growing medium at planting time, 27 July 1992.

¹Number of mottled leaves per plant, counted on 23 Oct. 1992.

^xFinal fresh weight of foliage was measured on 23 Oct. 1992. Total fresh weight of foliage from pruned plants was determined by totaling fresh weight obtained when foliage was cut back on 3 Sep. 1993 and fresh weight of foliage determined when experiment was terminated on 23 Oct. 1992.

^yFinal pH of growing medium was determined on 25 Oct. 1992.

^vns, **, *** Nonsignificant or significant at P ≤ 0.01 or P ≤ 0.001.

than mottling on plants with 1, 9, or 11 lb/yd³. If mottling was caused by excess manganese uptake, low pH levels resulting from low lime rates should produce plants with more mottled leaves, since manganese solubility increases with decreasing pH levels. However, few mottled leaves developed on plants grown in medium with lowest lime rate. Possibly, manganese has reduced availability or was more readily leached at pH 4.3, final pH of lowest medium lime rate.

Pruned plants had more mottled leaves per pot than unpruned plants (Table 1). After pruning, nutrients may have accumulated behind the cut, so that older leaves on pruned plants contained higher nutrient concentrations than corresponding leaves on unpruned plants. No differences were found in fresh plant weights for lime rate or pruning treatments, indicating that in this study, mottling did not reduce plant growth.

Mature, fully expanded leaves were taken from one plant per treatment for manganese level determination. Manganese in leaf tissue was high in all treatments and ranged from 913 to 1331 ppm, suggesting that pothos may be a manganese accumulator. If mottling is caused by manganese toxicity, symptoms are induced within the range of leaf tissue concentration found.

To avoid leaf mottling symptoms, pothos growers should maintain growing media pH values above 6.2. However, more research is needed to fully understand pothos leaf mottling.

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