Improving Long Term Availability of Calcium & Magnesium in Container Production

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Nature of Work: Container plants held over for a second year exhaust the supply of calcium and magnesium in the original potting substrate. Plants become deficient, develop chlorosis and fail to grow. They loose quality if not top-dressed with dolomitic lime. This top-dressing adds an extra step and expense to the production cycle. The objective of this project is to incorporate an initial charge of dolomitic lime with different sized particles in an attempt to extend the rate of release of calcium and magnesium over 18 months.

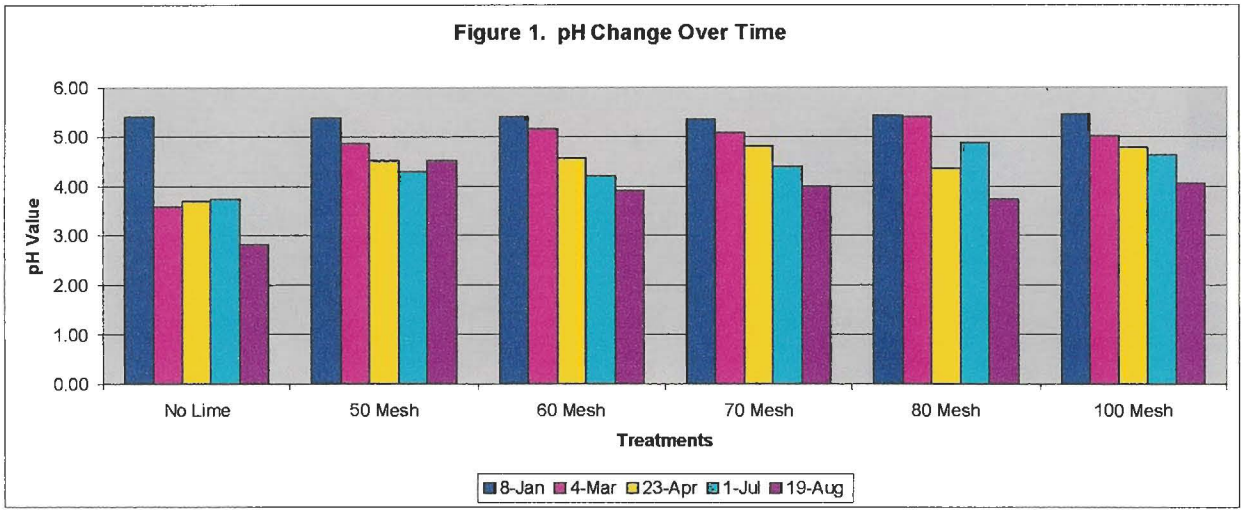
A single incorporation of dolomitic lime at potting could buffer pH while supplying calcium and magnesium for 18 months. It is well known that smaller particles of lime rapidly release and change pH. Large particles release slowly causing little pH change. In agronomic soils, lime particles in the 100 mesh size release in about 2 weeks, in the 40-50 mesh size, release takes place over 24 months. The agronomic research is focused on reducing particle size for maximum release in one year. No work has taking place with container media where a blending of particle sizes of lime could be used to attempt to extend the calcium and magnesium release over 18 months or more.

Screened particle sizes of dolomitic lime was incorporated into a nursery production substrate to determine the longevity and quantity of the calcium and magnesium over 18 months. The treatments were applied to the substrate prior to planting the *Ilex crenata* 'Green Luster' into three gallon pots on April 1, 2003. Osmocote Pro, 20-4-8 with minors, was incorporated at 15#/cubic yard. The fertilizer contained 0.2% magnesium. The treatments are 1) no lime, 2) 10# dolomitic lime /yd^3 - 50 mesh, 3) 10# dolomitic lime /yd^3 - 60 mesh, 4) 10# dolomitic lime /yd^3 - 70 mesh, 5) 10# dolomitic lime /yd^3 - 80 mesh, and 6) 10# dolomitic lime /yd^3 - 100 mesh. The pH changes, soluble calcium and magnesium levels in the substrate were monitored for 18 months.

The four substrate samples from three treatment pots were combined into a composite sample and sent to the UGA Soils Laboratory for the Nursery/Greenhouse Artificial Substrate Analysis. Samples were taken on April 1, 2003; April 17, May 1, May 29, June 26, July 24, August 21, September 18, November 13, January 8, 2004; March 4, April 29, June 24 and August 19. Evaluation of the last 5 dates were used to determine long term effect.

Results and Discussion: The lower mesh particles had no greater effect than the higher mesh particles after 18 months. The normal 100 mesh treatment produced overall the best long term effect on pH change and magnesium levels (Figures 1 and 3). The calcium levels were less uniform, but overall there appeared to be no treatment that was more consistent than the 100 mesh lime treatment (Figure 2).

Significance to the Industry: The larger lime particles did not release calcium or magnesium at a greater after eighteen months than the finest lime particles. There was no long term container production benefit from using larger sized lime particles in the potting mix.



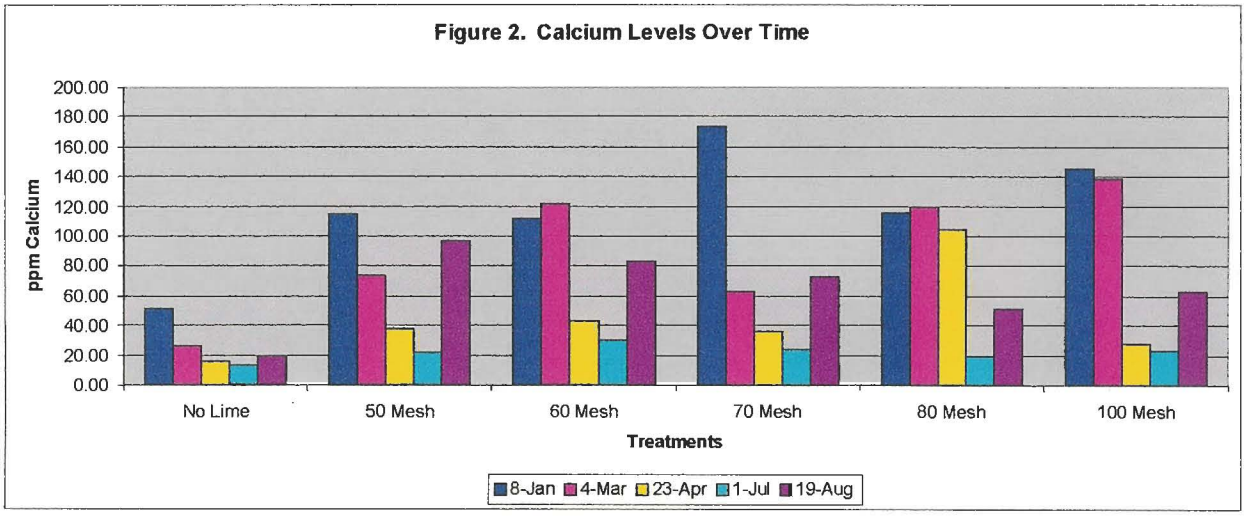


Figure 3. Magnesium Levels Over Time