

LIMESTONE CONTAINS (a little) MANGANESE AND BORON

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When a fertilizer such as limestone is used it may contain hidden elements. Widmer, Mugaas and Wilkins (1976)* reported that scorch on Easter lilies increased with increasing limestone rates. Analyses of Minnesota limestone disclosed average levels of 8 ppm boron and 970 ppm manganese. They conclude that this could increase scorch.

Does limestone in this area contain these levels? Samples from Maine and Connecticut were analyzed by J. Gordon Hanna, Chief Chemist at the Connecticut Agricultural Experiment Station. The results are:

	<u>Boron</u>	<u>Manganese</u>
Connecticut limestone	16 ppm	135 ppm
Maine limestone	22 ppm	115 ppm

This means that limestone sold in Connecticut contains more boron but far less manganese than Minnesota limestone.

Connecticut soils are notoriously low in boron. For carnations and snapdragons an application of 1/2 oz. of borax per 100 sq. ft. is recommended once or twice a year. Since many Connecticut soils require 10 lbs. limestone per year, how much boron is added?

* Widmer, R. E., R. Mugaas and H. F. Wilkins. 1976. Lime and phosphate effects on Easter lilies, *Lilium longiflorum* thunb. Minnesota State Florists Bulletin 12/1/76:1-7.

If 10 lbs. of limestone containing 20 ppm boron are applied, 0.003 oz. of boron will be included. This is a very small amount. If a soil mix is very acid and 30 lbs. limestone are incorporated per cubic yard, only 0.01 oz. boron will be added. This is not likely to be toxic since it is only 1/50th the rate used on carnations and snapdragons once or twice each year.

Manganese toxicity, on the other hand, frequently occurs in steam pasteurized soils. This has been attributed to peat that is high in manganese. Steaming causes a chemical reduction of the manganic form to the manganous form which is more soluble and can cause toxicity.

Steaming lily soil is not generally recommended unless the soil is thought to contain pathogens. If a lily bulb is carrying pathogens, planting in a steamed soil will probably increase the severity of disease. Steaming will also increase manganese availability.

The limestone available in Connecticut contains relatively little manganese. This may explain why rates as high as 30 lbs./cu.yd. have not caused the problems experienced in other areas.



Figure 1. Leaf tip burn on 'Ace' Easter lilies. This may have been manganese phytotoxicity.