More on Trace Element Nutrition

by W. D. Holley

The accompanying photographs illustrate several common symptoms of boron hunger. One of the earliest appearing symptoms on carnations is that of water soaked stripes in the petals. In White Sim these may turn reddish in color. Curled and deformed petals are common. One bench of plants known to be deficient in boron produced a high percentage of flowers with burned petal edges. The burning was plainly visible on flowers before harvest but increased after harvest.

Varying numbers of petals from singles to crippled doubles are other obvious symptoms of boron hunger. Branching high on the flower stem, blasting of flower buds, and in extreme cases, foliage with white margins or bleached foliage, are other symptoms of boron hunger.

Plants that show extreme symptoms are worthless. Even young buds just visible are probably already affected. Replanting with healthy cuttings and applying boron will produce good flowers quicker than trying to bring plants like those illustrated back to normal by feeding boron. (See Colo. Bul. 82 for application rates of boron)

Iron

Although no iron deficiency symptoms have been found in Colorado greenhouses recently, iron hunger is a likely possibility with present methods of culture. Iron sulphate has been the standard nutrient source of iron for a long time, but in many soils it is tied up quickly. The chelated iron available in recent years is not easily tied up in the soil. It usually has 10½% iron in a form that can be used immediately by plants. The usual soil application is 2 to 4 ounces per 100 square feet, 3 or 4 times a year. In liquid feeding on a constant basis, one ounce should be added to 1000 gallons of irrigation water. Iron sulphate is not satisfactory in liquid feeding as it reacts with the other chemicals in a concentrate tank to form rust and sludge. Chelated iron does not give this problem.

Magnesium

Magnesium is present in sizeable quantities in most well water hence should not be deficient in soils irrigated with hard waters. Most limestones contain some magnesium, with dolomitic limestone a particularly good source. The city water supply of Denver contains up to 10 ppm of magnesium. It's not definitely known just how much magnesium we should maintain as an optimum level in the soil. Many nutrient solutions used in gravel culture contain as much as 50 ppm. Since there is more accumulation of magnesium in soil than in gravel, 12½ ppm should be adequate in water treated for liquid feeding. To add approximately 12½ ppm of magnesium to water, use 8 ounces of magnesium sulphate (epsom salts) per 1000 gallons of water. This addition would bring the Denver city water to near 25 ppm. Magnesium sulphate may be applied dry at the rate of 1 pound per 100 square feet.

Greenhouse Cooling Notes

As a regular feature we are planning to publish brief notes applying to cooling of greenhouses. Experiences gained by our grower-readers will be most welcome.

(1). At Colorado A & M we have been able to get a good comparison of the amount of cooling we can expect when comparable houses are cooled with high pressure mist (600 psi) and with fans and evaporative pads. The maximum temperature in the misted house with relatively still air was consistently 6 degrees warmer than the fan-pad cooled house. The mist nozzles were spaced evenly throughout the house, using one nozzle per 160 square feet of floor space.

Your editor,
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