Iron And Manganese Toxicity In Geraniums

by Dr Bill McElhannon, Mirco Macro Labs

During the spring of 2001, I have evaluated approximately 50 situations where growers experienced iron and manganese toxicity of geraniums. In the past few years, iron and/or manganese toxicity has become the most common fertility problem observed with geraniums by this laboratory. This short article describes symptoms, typical analytical results, my explanation of the cause, and recommended treatment of this disorder.

Symptoms: Iron/manganese toxicity symptoms affects the older leaves first. Chlorotic yellow spots are first observed, and then a general chlorosis and necrosis develops as the problem becomes more severe. Root growth may appear healthy, but growth and leaf expansion is reduced. With geranium stock plants, cutting production is greatly reduced.

Media and tissue analysis: Media analysis will indicate low pH (generally <5.4), but iron and/or manganese may not indicated as high when using saturated media extract interpretative guidelines. Tissue analysis will indicate high iron, high manganese, or both elements may be high. In some cases one of these elements may be high, and the other may be low. However, in all cases plant symptoms are similar.

Cause: The primary cause of this problem is low media pH. Iron and manganese availability is increased by low pH values . Geraniums are very efficient iron and manganese accumulators and when media pH values are below 5.8 geraniums may accumulate significant levels of these elements. In most cases, severe problems occur when pH values are below 5.4. Low media pH values may be due insufficient lime amendments for the crop grown or due to use of ammonium containing fertilizers. Alkalinity of irrigation water also influences changes in media pH. Alkalinity of most southeastern waters is generally low. This, in combination with use of acidic fertilizers, can reduce the media pH fairly rapidly.

Solution: Get the pH up. Elevate media pH values to 6.0 –6.4, and the problem simply goes away. In severe cases, damaged leaves will not improve, but substantial improvement will be observed with the new growth. Cleary's Liquid Limestone is the best product to use. Potassium bicarbonate will also raise the pH, but it is only a short term fix. Liquid limestone will efficiently raise the pH and stabilize pH values for a significant period of time.

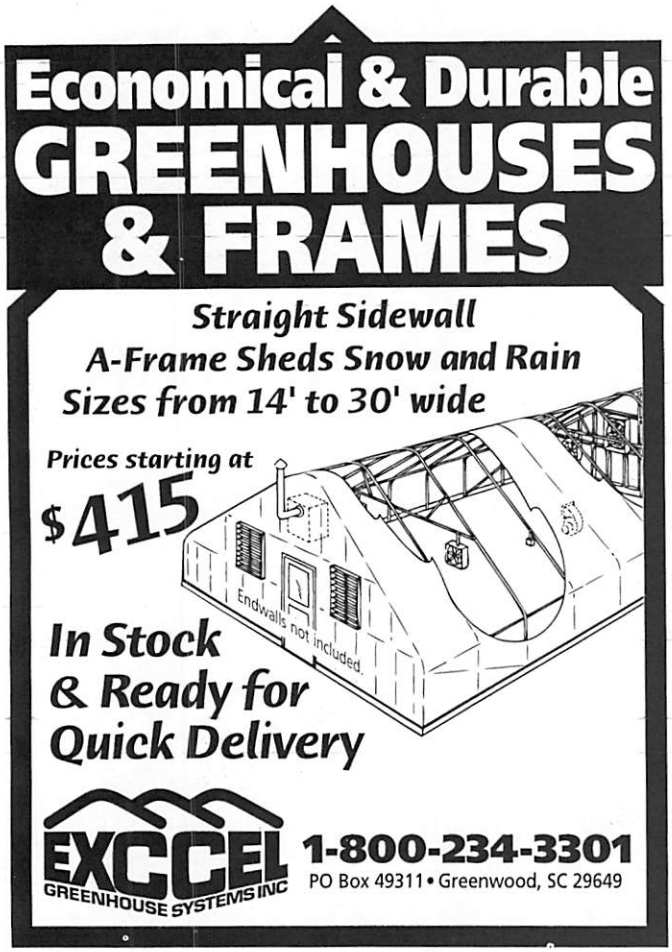
My recommendations are as follows:

1. Calculate the number of pots filled with a cubic yard of mix.

2. Add one third to one half gallon of liquid lime to that number of pots. Set your injector at the lowest ratio possible.

3. Cleary's Liquid lime weighs 12 lbs/gallon and is 50% active. This means that you will be adding 2-3 lbs of limestone per cubic yard of mix. This rate is generally sufficient to increase media pH values by 1 to 1.5 pH units.

Sources of information: Dr. Paul Fisher , University of New Hampshire and Dr. Bill Argo, Blackmore Co., have published and excellent article on iron/manganese toxicity of geraniums: "Iron-Out": A nutritional program for geraniums and other crops prone to iron and manganese toxicity at low media pH is available from the U of NH Extension Service web site: http://ceinfo.unh.edu/Agriculture/Documents/IRONOUT.pdf



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