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Watch Your Soil Manganese

Manganese (Mn) is a minor component in the normal plant metabolism, however, without enough present it can significantly depress specific enzyme systems. Since enzymes control the rate of plant metabolism, and proper metabolism results in optimal crop yields. Thus, it becomes very important to have sufficient amounts of manganese available.

In the laboratory there are many ways that Mn can be extracted from the soil, of course, the goal of this extraction procedure is to simulate the soils ability to replenish nutrients removed by the plants. Today the generally excepted method involves the use of a chelating agent, DTPA, to facilitate removal of the Mn from the soil. This is followed by analysis of the solution for Mn. Any quantitative values referred to in this article will be based on this kind of analysis.

Brown and Boer (1983) found that soils in California generally ranged from 1 to 300 ppm of manganese, they concluded that "deficiencies of Mn .... are rare in California." Indeed Viets & Lindsay(1973) had indicated that even for Mn sensitive crops, Mn greater than 1.0 ppm was probably sufficient. This was consistent with the low incidence of Mn deficiency in California.

There are, however, some interesting characteristics about Mn in soil that should be considered before dismissing Mn as a factor in California soils. First, Mn availability in the soil solution (ie. Mn 's solubility) is decreased by increasing pH. Thus, soils with a pH above 7 are more susceptible to showing Mn deficiency. This is consistent with the classical effect routinely observed where Mn deficiency was the result of over liming fields.

Second, Mn can be converted to different forms by chemical oxidation. The oxidized form is not readily available for plant use. This means that in well aerated soils Mn is more likely to be in the oxidized form and thus the soil will react as though it has a lower Mn level than the lab analysis may show. And as is always the case, different corps have different susceptibility to Mn deficiency. Among the most susceptible are Sugar Beets and Wheat followed by Beans, Apples, Peaches, and Strawberries. Less susceptible, but still to be considered are Rice and Tomatoes. Given this information one should consider Mn deficiency as a possible problem when Mn is at 10 ppm or below, when the pH of the soil is above 7, and when the soil has a sandy texture (better aeration).

The question is how often does one find this combination of characteristics? When soils analyzed at Sunland Analytical are evaluated for these characteristics it was found that 3.2% of the soils fell into this category. This does not mean that all of these soils required Mn, but when less than optimal yields are being obtained from fields with these characteristics, Mn may be the answer. Sunland automatically flags these characteristics for you when Mn is part of the soil test package you request. Be a step ahead and have your soil analysis done at Sunland.