

14. THE MINOR MINORS

(Manganese, Copper, Molybdenum, Chlorine)

Manganese

Manganese (Mn) deficiency is not nearly as common as zinc deficiency but can be a problem on calcareous soils and on soils with an alkaline pH. Since the metallic nutrients (zinc, iron, copper, manganese) compete with each other, an excess of one can induce a deficiency of another. Zinc and iron induced manganese deficiencies are certainly possible when large amounts of either zinc or iron are applied. In case of deficiency, manganese can be applied either directly to the soil or by foliar spray.

Manganese toxicity is more common than manganese deficiency. Mn toxicity is often one of the first disorders to appear when soils become too acid. Manganese levels in leaves can be used to monitor soil pH; as soil pH drops, Mn levels in leaves will increase. Poorly drained soils are also candidates for Mn toxicity.

Copper

Copper deficiencies are not common but can occur on peat soils and on very sandy soils (and occasionally on other type soils). Copper deficiencies are usually associated with specific soil types; unless copper deficiency has been previously reported on the particular soil type in question it is very unlikely that copper deficiency will be a problem on that soil.

Plant analysis is not a good method of delineating copper deficiency because of the very low levels of copper that are found even in healthy plant tissue. The only definitive method of diagnosing a copper deficiency is to see if a response can be obtained by the addition of copper.

Copper toxicity can be a problem in some cases. Extensive spraying with copper fungicides can cause a soil buildup of copper over the years that can be toxic, esp. if the soil is acid.

Molybdenum

Molybdenum (Mo) is needed in less quantity than any other plant nutrient, yet field Mo deficiencies have been reported. Mo deficiencies almost invariably occur on acid soils and usually liming of the soil will correct the problem just as easily as applying molybdenum. Mo deficiency is highly unlikely on alkaline and/or calcareous soils but is possible on soils derived from serpentine parent material.

Molybdenum toxicity of crops does not occur, but high molybdenum levels in plants used as livestock feed can create a livestock poisoning known as molybdenosis. Molybdenosis is especially acute at low copper concentrations and is felt by some to be

molybdenum induced copper deficiency. It is usually corrected by supplementing feed rations with copper.

Chlorine

Although chlorine is an essential element for plants, no cases of field deficiencies are known to the author. A possibility of chlorine deficiency has been suggested for sugar beets grown in Washington. When diagnosing a field problem, the fieldman can pretty well forget about chlorine deficiency being involved.