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MINOR ELEMENTS CAN BE OVERDONE

By L. T. JONES, B.Sc. (Agric.), Plant Research Division

The term "minor elements" which is now commonly used and well understood by farmers and gardeners, refers to the five essential plant foods—copper, zinc, manganese, molybdenum and boron. These five essential plant foods are needed by all plants in minute quantities and it is relatively easy to use them in excess of actual requirements or even in toxic amounts. In practice this is not usually a problem with cereals and pastures. The important exception is when zinc alone is added to a cereal crop low in copper and the extra zinc accentuates the copper deficiency, and poorer yields are obtained.

With citrus trees, copper deficiency is often controlled by the use of a soil dressing of bluestone or copper sulphate at the rate of 1-4 lb per tree depending on the size of the tree. For safety this material is normally placed in a circular furrow about 3 feet out from the trunk of the tree. If this quantity of bluestone is broadcast uniformly up to the trunk of the tree, it may severely injure the root system so that the tree either dies or quickly sheds its leaves.

Most of the local cases of minor element toxicity have been met with in market gardens but the principles involved apply equally as well to home gardens and the recommendations discussed will refer specifically to these two fields. It is usual to recommend a copper application of about 10 lb. per acre of bluestone as adequate and safe. The copper containing fungicides—Bordeaux spray and Copper oxychloride also supply copper to the plant. Zinc may be applied as zinc oxide at 3-5 lb. per acre or as zinc sulphate at 5-10 lb. per acre. The zinc containing fungicides such as Ziram and Zineb also supply zinc to the plant. It is recommended to apply 10-20 lb. of manganese sulphate per acre for row placement and up to 56 lb. per acre if broadcast. A more popular method is to use a 1 per cent. manganese sulphate foliage spray. Although manganese deficiency is prevalent in market gardens, manganese excess is also a very common problem as the result of the unwarranted heavy applications of manganese sulphate. It is quite common in garden crops, and especially in tomatoes, to see a characteristic yellow leaf symptom which in many cases has been induced by toxic levels of copper, zinc or manganese either singly or combined.

Sodium molybdate at 2 lb. per acre is one method of controlling molybdenum deficiency in the very susceptible crops such as cauliflower, rockmelons and cucumbers. In the seedbed, 3 oz. of sodium molybdate to 10 square yards of bed is used and this is sufficient for their complete life. A foliage spray of 1 oz. or less of sodium molybdate to 4 gallons of water may also be used, if applied when the plants are reasonably young.

For the control of boron deficiency, it is usually recommended to apply borax at the rate of 10-20 lb. per acre, as higher rates may be toxic.

It has been found from local experience that the minor elements can be safely applied at the rates previously quoted and furthermore, annual applications at these rates do not appear as yet to have built up to toxic levels. It is also evident that...
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