MANGANESE TOXICITY OF CHRYSANTHEMUMS

Commercial chrysanthemum growers have occasionally encountered poor growth, chlorosis and die-back which has not appeared to be due to disease or normal cultural problems. Manganese toxicity has been suspected in these cases and has been confirmed by high manganese content of the leaves of such plants.

During 1965 and 1966, Dr. A. L. Brown of the Department of Soils and Plant Nutrition at Davis cooperated with us in some greenhouse experiments designed to learn more about manganese toxicity of chrysanthemums following soil steaming.

In the first experiment, an unamended Sorrento Clay Loam was used with steaming treatments of 1/2 hour at 180°F and 1 hour at 212°F in an autoclave. In the second experiment, a mixture of 1/2 redwood sawdust and 1/2 Campbell Silty Clay was composted for four months, then steamed in the greenhouse for 1 & 4 1/2 hours respectively. Additions of lime, phosphate, chelated iron, and manganese were made singly and in combinations. Plant height, dry weight and concentrations of manganese in leaf tissue were measured.

Some of the findings in the two experiments were as follows:

1. Steam sterilization when no manganese was added, increased plant growth in both experiments. Temperature and time of steaming did not result in differences between steamed treatments.

2. Steam sterilization at all times and temperatures increased manganese concentrations in the leaves. Although this was more notable when manganese was added, it also occurred with the field soils.

3. Applications of manganese reduced the growth of "Good News" and "Detroit News" but not of "Albatross". Depressed growth and chlorosis were more noticeable following steaming.

4. Applications of lime, phosphate and chelated iron had little or no effect on plant growth or concentrations of manganese in plant tissues.

5. For "Good News" and "Detroit News", the critical concentration of manganese in leaf tissue appeared to be approximately 800 ppm. "Albatross" was not affected at concentrations up to 1700 ppm. "Albatross" did not develop as high concentrations of manganese in the leaf tissue following steaming as did the "News" cultivars.