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MANGANESE DEFICIENCY OF SUBTERRANEAN CLOVER IN WESTERN AUSTRALIA

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Although manganese deficiency is quite common on cereals in Western Australia, only recently has an extensive occurrence on subterranean clover been found. Compared with cereals, subterranean clover is evidently resistant to manganese deficiency. Even in areas where total death of cereal crops not receiving manganese fertiliser occurs, the undercover of subterranean clover generally grows quite satisfactorily.

Symptoms of the deficiency affecting subterranean clover were first noted in Western Australia at Esperance in 1952, and later at Denmark. In both these cases the deficiency occurred on land that had been limed, resulting in a more alkaline soil with corresponding fall in soil manganese availability.

Manganese-deficient subterranean clover occurring under normal paddock management was first observed at Bremer Bay in 1956. Little land development has occurred in this area, so the extent of the deficiency cannot be assessed.

The deficiency showed up on a variety of soils. Deep sands and sandy or gravelly surfaced soils overlying clay or sandy clay at variable depth are the types affected. The deficiency was noted on both Dwalganup and Mt. Barker strains of subterranean clover. An analysis of leaves and petioles of Dwalganup showed 7 parts per million manganese at flowering and an analysis of leaves and petioles of Mt. Barker showed 13 p.p.m. manganese shortly before full flowering.

In 1957 very small areas of manganese deficient Dwalganup subterranean clover were noted at Jerramungup (6 in. sand over clay) and at Wannamal (gravelly sand). The deficiency is not expected to be of economic importance in either of these districts.

DEFICIENCY SYMPTOMS

Plant growth is adversely affected early in the growing season. Particular leaf symptoms on the Dwalganup and Mt. Barker strains of clover differ to some extent.

The symptoms on Dwalganup are rather similar to those of potassium deficiency. Older leaves are first affected. Leaf colour changes from green to dull yellow-brown. Small spots of dead tissue occur over the
In the Mt. Barker variety, plants showing mild deficiency develop a pale yellow-green colour and the leaves eventually show interveinal chlorosis. When the deficiency is acute, interveinal tissues of older leaves die, followed by complete death of the leaf. Plants at this stage are often very small and bright yellow with dead yellow-brown older leaves. Many plants die completely.

Some recovery often occurs with warmer spring weather but recovering plants still show interveinal chlorosis, and generally have brittle stems. Seed production is greatly reduced. The symptoms on Mt. Barker subterranean clover are generally similar to those of iron deficiency.

**CONTROL**

Production of clover was doubled by the application of 40 lb. of manganese sulphate per acre even though the plots were not fenced until a month before cutting, and prior to this the plots receiving manganese sulphate were preferentially grazed. It is probable that much lower rates of application will be sufficient to correct the deficiency as clover is not nearly as susceptible as cereals and 14 lb. of manganese sulphate per acre is generally used for cereals on manganese-deficient areas. In 1958 an experiment testing the immediate and residual effects of soil and spray dressings of manganese sulphate, will be commenced.