1-1-1965

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MOLYBDENUM INCREASES CEREAL YIELDS ON WHEATBELT SCRUBLAIN

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IN four field experiments and two paddock strip trials since 1960, molybdenum applied to wheat and oats grown on scrubplain soils in the eastern wheatbelt increased yields by up to 3½ bushels of wheat and 5½ bushels of oats per acre.

This and associated work with pasture legumes has revealed widespread molybdenum deficiency in plants grown on these scrubplain soils.

The only well-documented record of a previous experimental response to molybdenum in the wheat growing areas was a report by Teakle (1944) of a response by subterranean clover to molybdenum application at Yericoin. This experiment was on an ironstone gravelly sand.

In the higher rainfall areas molybdenum deficiency of subterranean clover has been recorded at Donnybrook (Dunne 1950), Nannup, Bridgetown and Balingup (Fitzpatrick 1957) and on sandy and gravelly soils in other areas of the lower South-West (Fitzpatrick 1962).

Molybdenum deficiency in vegetables occurs on sandy soils near Perth (Dunne and Jones 1948). No previous responses of cereals to molybdenum have been recorded in Western Australia. Cereals require less molybdenum for growth and seed production than most other plants.

Responses of Cereals at Gutha, Bodallin and Wilroy

The Department of Agriculture conducted a number of experiments in the 1940's in which molybdenum application to cereals gave no response. Renewed interest in molybdenum deficiency of cereals followed the inspection of molybdenum treated strips of wheat on the property of Mr. T. H. Way of Gutha, by one of the authors* in 1959. As there was some indication that molybdenum was beneficial in these strips, he initiated the three Gutha experiments investigating the effect of molybdenum on cereal yields.

The results of these three experiments are summarised in the table below. In the three experiments the response to molybdenum was larger with 1 cwt. of sulphate of ammonia per acre than without sulphate of ammonia. For example, in Experiment 1, molybdenum gave no response without sulphate of ammonia but with sulphate of ammonia, molybdenum application increased yields by 3.6 bushels an acre.

In Experiment 3 sulphate of ammonia without added molybdenum reduced oat yields, whereas no yield reduction occurred where molybdenum was applied with sulphate of ammonia.

For highest yields with sulphate of ammonia at these three sites extra molybdenum was required.

In paddock strip trials in 1964 on the property of Mr. P. Thomas at Wilroy,

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* Mr. R. J. Doyle, then Agricultural Adviser at Geraldton.
MOLYBDENUM DEFICIENCY IN CEREAL GROWING AREAS OF WESTERN AUSTRALIA

MAJOR cereal growing areas of Western Australia, showing locations of experiments where cereals responded to molybdenum and where responses of legumes and cereals are expected to be widespread on gravelly and sandy soils.

- Experiments where cereals responded to molybdenum.
- Areas where molybdenum deficiency on light land is so severe that responses of cereals and pastures on scrubplain soils may be general.
- Areas where molybdenum deficiency on scrubplain soils appears to be milder but pasture legumes respond to molybdenum over large areas.