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Iron Deficiency of Oats in the Lower South West

By E. N. FITZPATRICK, M.Sc. (Agric.), Research Officer, Plant Research Division, and R. SPRIVULIS, B.Sc. (Agric.), Agricultural Adviser, Dairying Division, Denmark

Oats grown on the acid peaty sands of the West and South Coastal areas of Western Australia develop iron deficiency. This deficiency can be cured by spraying with iron sulphate. A 2 to 4 per cent. solution can be applied through a low volume spray without damage to the plants. The spray should be repeated when deficiency symptoms reappear. Growing oats on these soils is not recommended.

One of a number of mineral deficiencies found in plants growing on the Plantagenet series of acid peaty sands in the west and south coastal districts of Western Australia is iron deficiency of oats. This is a deficiency which is only rarely recorded under field conditions elsewhere.

Oats is the only species severely affected. Other plants can suffer from iron deficiency but no severe cases have been seen on these soils. Healthy plants of other species are often seen among iron deficient oats.

The Soils

The Plantagenet peaty sands carry a low heath vegetation containing tea-tree, paper-bark, blackboy, kangaroo grass, bottlebrush and in some instances, stunted jarrah. Tea-tree, kangaroo grass, bottlebrush, or, (occasionally) stunted jarrah, may be the dominant species.

The soils are infertile, are often waterlogged in winter and are naturally acid. In the undeveloped state, they are low in nitrogen, phosphate, potash, copper and zinc apart from having a low iron content.

Normal practice is to sow them down to subterranean clover pasture after clearing, using one ton of ground limestone an acre, and copper-zinc-super phosphate. It is also necessary to apply potash to the subterranean clover pasture in the second and subsequent years to maintain it in a healthy condition. In some instances, manganese deficiency of oats has also been observed on these soils.

Because of the low natural fertility and the occurrence of winter waterlogging, farmers are not normally recommended to grow oats on these soils. However, a paddock may contain small patches of this soil type on which oats will be affected by iron deficiency. If the clover has not been healthy on the area previously, the oats will also be affected by nitrogen shortage. Also unless copper and zinc have been previously applied these deficiencies could be expected to affect the oat crop.
Iron deficient oats (left) on Plantagenet peaty sand show up as a yellow patch in an otherwise healthy crop, most of which is on a different soil type.

**SYMPTOMS**

For a few weeks after germination, the oats can grow on the iron reserves in the seed, but later the leaves develop a paler green colour than normal. This pale green colour changes rapidly to yellow, and the leaf veins are affected last. This results in alternate strips of yellow and green down the length of the leaf, giving the leaf a striped appearance. The leaf then becomes uniformly yellow, turns white, and finally dies. The youngest leaves of the plants are first affected.

**TREATMENT**

A 2 to 4 per cent. iron sulphate spray (2 to 4 lbs. of iron sulphate in 10 gallons of water) should be applied at 10 to 20 gallons an acre immediately the plants become pale in colour, and should be repeated whenever the symptoms reappear. One spray is rarely enough to completely overcome the deficiency.

After spraying, the plants stay green and look healthy for some weeks but they gradually become unhealthy again as the iron is immobilised in the older leaves of the plant and the young growth develops iron deficiency.

In a trial carried out at Northcliffe in 1957, the following green yields were obtained—

<table>
<thead>
<tr>
<th>Treatment</th>
<th>cwt./acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>No iron</td>
<td>1.8</td>
</tr>
<tr>
<td>Iron Sulphate spray at 1/4 per cent. applied</td>
<td>45.9</td>
</tr>
<tr>
<td>Iron sulphate spray at 1 per cent. applied</td>
<td>87.3</td>
</tr>
</tbody>
</table>

In other work, a 4 per cent. spray has been used without damage to the plant and has given a better leaf colour and a longer effect than the 1 per cent. spray.

On these soils, soil applications of iron sulphate can also be used to overcome the deficiency in oats. The lowest rate used...
in trials (56 lb. per acre) has effectively overcome the problem.

The residual value of soil applications has not been investigated.

**Oats are Very Susceptible to Iron Shortage**

Field observations show that oats are particularly susceptible to iron deficiency. Barley is not severely affected and healthy plants are commonly seen growing among iron deficient oats. Similarly, subterranean clover is not as severely affected as oats. Although iron deficiency does occur in subterranean clover, particularly where potassium levels of the soil are low, healthy subterranean clover plants are commonly seen amongst oats acutely affected by iron deficiency.

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**SOME BOOKS FOR FARMERS**

The following books on agriculture, recently published and obtainable to order from most booksellers, have been added to the stock of the Library Board of W.A. and may be borrowed freely from any public library associated with the Board, or consulted at the State Library of Western Australia.

**FARM MANAGEMENT**

**CATTLE GRIDS FOR PRIVATE ROADS:** Fixed equipment of the farm leaflet No. 7 issued by the British Ministry of Agriculture, Fisheries and Food. Lond., [1962].


**FRUIT GROWING**


**IMPROVEMENT IN OLIVE CULTIVATION:** by F. P. Pansiot and H. Rebour. Rome, 1961. (FAO agricultural studies, No. 50.)

**THE ORCHARD AND FRUIT GARDEN:** A new pomona of hardy and sub-tropical fruits; edited by E. S. Hyams and A. A. Jackson. Lond., 1961.

**DISEASES AND PESTS**

**AGRICULTURAL PESTICIDES:** A guide to their safe use and to first aid treatment in cases of poisoning; by D. C. Trainor. [2nd Rev. Ed.]. [Syd., 1961]. Issued by the N.S.W. Department of Public Health.

**THE PROFITABLE USE OF FARM CHEMICALS:** by S. Laverton. Lond., 1962.

**FORESTRY**


**TREE POISONING WITH 2,4-D and 2,4,5,-T:** by R. Truman: Bulletin No. 2 issued by the New South Wales Forestry Commission. Syd., 1958.

**GENERAL**


**AN INTRODUCTION TO STATISTICAL SCIENCE IN AGRICULTURE:** by D. J. Finney. 2nd Ed. Lond., 1962.
Today you could buy a 40 h.p. crawler at a lower price than the HD3... but next year, and the years after that, you'd regret it. A tractor is an investment—and your HD3 will still be operating profitably long after others have become a liability. This is the security that the name ALLIS-CHALMERS gives you. Now look at some of HD3's terrific features.

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