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YELLOW DWARF DISEASE OF CEREALS

Fig. 1.—The “red leaf” symptom of yellow dwarf on a Balridu oat crop which was almost 100 per cent. affected. The Avon oat crop at left was unaffected.

Fig. 2.—Early symptoms on Blenda oats showing pale blotches on leaves.

Fig. 3.—The “red leaf” symptom on Algerian oats.
YELLOW DWARF DISEASE OF CEREALS

By H. L. HARVEY, B.Sc. (Agric.), Senior Plant Pathologist

YELLOW dwarf, caused by the barley yellow dwarf virus (Oswald and Houston 1951) was recorded in this State for the first time last season. There is reason to believe that this disease has been present for some years but in the past its symptoms have been confused with various environmental and nutritional disorders.

In the course of one season’s observations yellow dwarf has attracted most attention in oats and a limited occurrence has been noted in barley. Only isolated cases were apparent in wheat.

The areas most favoured for the occurrence of the disease seem to be the South-West, the Great Southern and Esperance districts, which appear to be more suitable climatically for the spread of the disease than is the wheat belt proper. These are predominantly oat districts which also grow barley but very little wheat.

SYMPTOMS AND EFFECTS

Yellow dwarf usually occurs as roughly circular patches of stunted yellow plants. These patches vary from a few feet to several yards across, but occasional affected plants are found scattered among normal plants. A severe case was noted at Darkan where an 18-acre crop of Ballidu oats was almost 100 per cent affected (Fig. 1.)

The severity of symptoms may vary with the host species or variety, the age of the plants, the time of infection, the environment and possibly strains of the virus.

On young plants, the earliest symptom appears two or three weeks after infection and consists of a pale yellow blotching or mottling near the leaf tip (Fig 2). This mottling progresses down the leaf blade and is followed by a more pronounced yellow colour. A striped effect sometimes develops and leaf margin serrations may

Fig. 4.—Stunting of diseased Blenda oat plant. Healthy plant of the same age at left.
occur. There is a tendency in barley and wheat for the yellowing to move more quickly down the sides than in the middle of the leaves, until the whole leaf blade may be affected.

It is sometimes noticeable in barley and wheat that the youngest leaf is yellow as it emerges. In the case of oats, a red colour generally follows the initial yellowing and eventually becomes very pronounced (Fig. 3.)

Stunting or dwarfing of the plant and excessive tillering is very pronounced if it is infected in the early seedling stage. This was illustrated when oat seedlings in the one-leaf stage were inoculated by means of infective aphids (Rhopalosiphum padi). Within four or five weeks these plants were only half the height of the healthy control plants of the same age (Fig 4). At four months, stunting was even more marked in the diseased plants and they had developed two or three times as many tillers. Plants which were inoculated a week or so later showed the usual leaf symptoms but were only slightly stunted.

Failure to head or the production of incompletely filled heads may also result from yellow dwarf, depending on the stage of growth when infection occurs. In the above experiment, the oat plants inoculated at the one-leaf stage failed to produce heads, while the healthy plants matured and headed normally. Plants inoculated at a later growth stage produced heads but some of the florets were "blasted". (Fig. 6.)

More than 30 different grass species are reported to be susceptible to yellow dwarf. Among these are bromes, fescues, barley grass, canary grass, couch grass and cocksfoot. Reports indicate that couch grass and cocksfoot may carry the virus without showing symptoms.

CAUSE AND SPREAD

The virus responsible for yellow dwarf is spread by certain species of aphids that transmit infective sap from diseased plants to healthy plants in the course of feeding. The virus is not known to spread by seed, soil or other means.

The prevalence of the disease is therefore proportional to the prevalence and activity of the aphid carriers (vectors). Spring and autumn are the seasons of greatest aphid activity.
CONTROL CONSIDERATIONS

In other countries, several approaches to the control problem have been tested in the past decade, but without satisfactory practical solution.

Insecticides

In small scale experiments, investigators have had only limited success in spraying the aphid carriers to control the disease. Therefore insecticides offer small hope of controlling the disease economically in large areas of cereals at the present time.

Resistant Varieties

Plant breeders are tackling the problem by attempting to develop cereal varieties resistant to yellow dwarf but at present no commercial varieties are available which can be recommended for use in Western Australia. The oat variety Avon last season showed a measure of tolerance to the disease, that is, the ability to grow reasonably well in spite of infection. It may be worth a trial in suitable areas.

Reference has also been made by workers in other countries to varying time of planting to escape the main aphid infestations in autumn and thus avoiding heavy infections of seedlings. However, the aphid build-up and migration may vary from year to year and district to district and much more information on this matter will have to be obtained before it is known whether varying the time of planting will aid in the control of yellow dwarf in Western Australia.

REFERENCE


FARM STATISTICS NOW OVERDUE

The Deputy Commonwealth Statistician (Mr. R. J. Little) has appealed to those farmers who have not lodged their statistical returns for the year ended 31st March last to forward them to the Bureau of Census and Statistics immediately.

Mr. Little said that in recent years farmers had shown a growing awareness of the value of statistics and tended to submit returns more promptly. However, although most farmers had already lodged their forms, there were some who had not yet complied with the Statistician’s requirements. Their returns were now urgently needed to enable early release of information which is used extensively by farmers’ organisations, marketing authorities and government departments for the ultimate benefit of the primary producer.

Mr. Little urged farmers who have not yet finalised their returns to do so immediately. Advice and assistance will gladly be given by letter or personal interview at the Bureau’s Office, 189 St. George’s Terrace, Perth.
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