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Rusts revisited after another wet summer

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RUSTS REVISIT AFTER ANOTHER WET SUMMER

Wheat leaf and stem rust occurrence in 1999 resulted in a rust epidemic estimated to cause $20 million in lost production in 1999. Despite the awareness of rust-risk today, inflexibility in switching production to resistant varieties will again result in high rust disease levels for some areas in 2000. Rob Loughman, Jat Bhathal, Kith Jayasena and Robin Wilson report on the levels of resistance in various cereal varieties and the management options open to those growers who find rust in susceptible varieties this season.

Introduction

The Western Australian environment has traditionally been affected by cereal rust diseases on an infrequent basis. While susceptible wheats have provided wheat rusts with ample host material in Western Australia, only when exceptional climatic factors of summer rain and adequately wet springs occur have major epidemics been experienced - seven this century, including 1999.

A major factor in the current prominence of wheat rusts has been the occurrence of a new leaf rust strain (designated 104-1,2,3,(6),(7),11) in Western Australia since 1990. Originating in eastern Australia, the reasons for the particular success of this strain, compared with other previous leaf rust strains already present in Western Australia, are unclear.

In contrast, stem rust strains have remained comparatively stable over several decades and development of new strains has not been a significant factor in recent stem rust occurrence.

Historically, low sheep numbers (reducing summer grazing pressure), record high areas of wheat production (providing 30 per cent more wheat area compared with 10 years ago), wet conditions and potential for earlier sowing have contributed to increased rust survival. However, research is demonstrating the opportunity to benefit from a range of management strategies designed to minimise the impact of rust diseases.

Options are designed to reduce risk through re-tuning crop management between years of low and high rust-risk. This is a difficult task to achieve on a large scale, particularly as this is the first time in Western Australia’s farming history that growers have had the challenge of successfully managing risk of combined leaf and stem rust occurrence in wheat.

Learning from varietal performance in 1999

Different types of resistance may occur in different varieties. Highly resistant varieties or ‘cleanskins’ develop no rust, while varieties with partial resistance to rust normally develop a little rust but will not require spraying.
Approximately 25 per cent of the area sown in 1999 was to varieties with combinations of some leaf and stem rust resistance. Among these, Brookton, Camm, Carnamah, Cunderdin, Datatine, Janz, Krichauff, Machete, Nyabing and Perenjori represented yield-competitive varieties that would provide highly effective means of avoiding losses from leaf and stem rusts in 2000, and which did not require fungicides.

Seven of the 10 varieties most widely grown in 1999 were susceptible to either leaf or stem rust or both. As a general rule, varieties moderately to very susceptible to either leaf or stem rust may require fungicide treatment.

Only around half of wheat area sown in 1999 was to varieties with partial resistance to leaf rust. Varieties such as Ajana, Arrino, Karlgarin, Spear and Stiletto recorded yield losses of 10-30 per cent in a range of experiments severely affected by leaf rust.

The contribution of partial leaf rust resistance to yield under severe disease was substantial (see Figure 1).

Varieties Amery, Tincurrin and Westonia were very prone to stem rust and losses of 10-50 per cent were recorded from stem rust experiments in 1999.

Experimental results over a series of years indicate that around 70 per cent of the yield loss from leaf rust can be prevented with a single standard-rate fungicide spray. This is generally the most economic means of preventing yield loss in susceptible infected varieties.

In 1999, single sprays prevented 70-95 per cent of yield loss from leaf rust at Mingenew, but only 50 per cent of loss at Newdegate under severe leaf rust pressure. In the northern agricultural region, profitable responses were observed in 80 per cent of experiments involving fungicide spray of leaf rust in recent years.

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Fungicide control

Fungicide-use increased in the 1999 season. This further developed the trend of broader adoption of in-crop fungicide in Western Australia. Fungicide will remain a key means of disease control in 2000 for some varieties lacking rust resistance (see Table 1).
In general, leaf rust control is readily achieved with fungicide and highly economic responses are frequently observed.

**Stem rust**

Control of stem rust with fungicide is possible but can be more difficult. The disease can develop quickly and should be controlled early for best results. Highly effective fungicide treatments are required.

Experiments in 1999 with single high rates of fungicide application prevented almost 80 per cent of losses from leaf and stem rust in Amery and approximately 70 per cent of losses in Westonia, and despite the expense were highly profitable (see Figure 2).

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**Figure 2 - Yield response to control of stem rust which became severe in Westonia wheat, Salmon Gums 1999. Unsprayed (nil) plots were compared to those that had been treated experimentally, with Folicur 430SC applied either once at the standard rate (145mL/ha), or twice three weeks apart at the high rate (290mL/ha).**

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**Important tips on fungicide use**

Learn to distinguish leaf and stem rust from each other and also from other leaf spot diseases. Guides are available for this purpose. If in doubt, use local agronomy support or the AGWEST Plant Laboratories diagnostic service.

Monitor crops regularly throughout spring, checking the most susceptible varieties at least every week. If treatment is required, timely application is essential. Look for early leaf rust on the oldest green leaves, while early stem rust can be first spotted low on stems.

The optimum time for spraying leaf rust is as soon as it is detected but after early flag leaf emergence. For stem rust, spraying is best as soon as it is detected but after early head emergence. Earlier spraying than these times may be warranted in situations of severe infection, but never spray before early stem elongation (jointing stages).

Repeat spraying may be required to achieve benefits of spraying prior to flag leaf development.

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Strips of green and yellow Stiletto wheat resulting from control of leaf rust with fungicide at Newdegate in 1999 (Main Photo). Leaf yellowing and premature death from severe leaf rust infection (inset Top) was delayed by fungicide (inset Bottom), resulting in yield increases of 0.4 - 0.8 tonnes per hectare.