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Plant Breeding Institute
Cereal Rust Laboratory

Cereal Rust Report
Season 2004

Wheat Stripe Rust Epidemic
Situation Report as at the end of September

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The stripe rust epidemic continues to progress in most wheat growing regions of Australia, with the first reports from Queensland occurring in late September. Fungicide applications have been commonly employed, with many crops requiring follow-up applications. This report is designed to provide some perspective to the overall epidemic, and communicate recent information from the pathotype survey and experiences with fungicide control programs.

Epidemic development

Disease progress: Samples were received from seed increase plots at Naracoorte (SA) and Horsham (Vic) in late March, and both were infected with the WA pathotype (134 E16 A+). The first samples from commercial fields were processed in late July (Merredin, WA) and early August (Esperance, WA; Millicent, SA; Grenfell, southern NSW; Bellata, northern NSW). The epidemic in WA was initially centred on Merredin and Esperance, but has subsequently spread rapidly among much of the Great Southern region. Figure 1 presents the sample numbers received at PBI Rust Lab, indicating a rapid development in September. However, these numbers are considerably less than for the same period during the first major epidemic in 2002.

Figure 1
Samples received at the Cereal Rust Lab, PBI Cobbitty, from Western Australia in 2004.

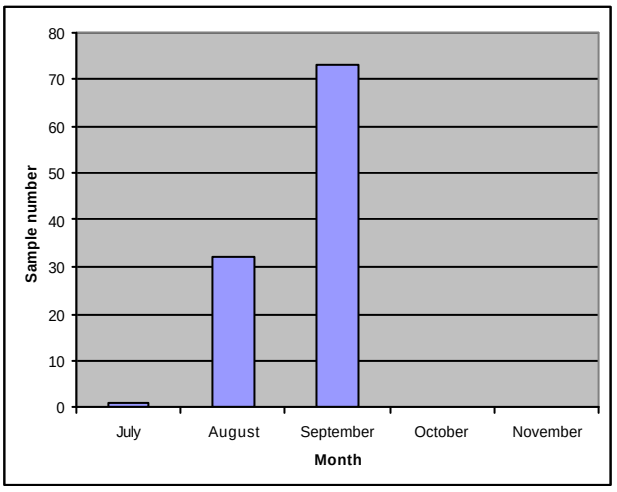

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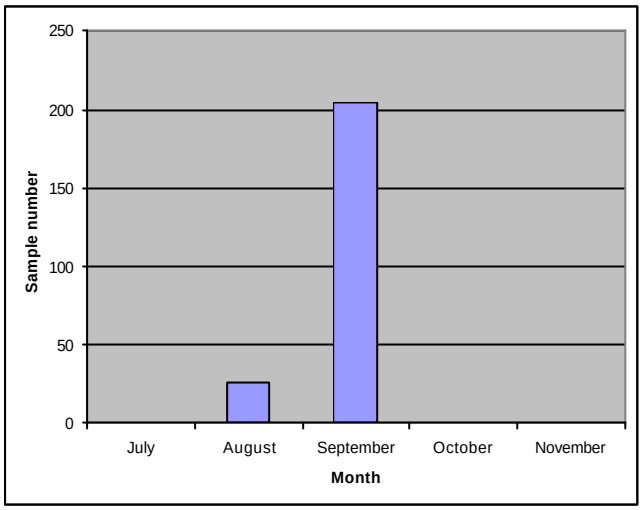
Figure 2
Samples received at the Cereal Rust Lab, PBI Cobbitty, from eastern Australia in 2004.



Temperature effects: There is no evidence to suggest that stripe rust has become adapted to higher temperatures. Experience indicates that where daily temperatures are high (25-30^{0}C) and night temperatures continue to fall below 15^{0}C, the pathogen will survive in infected leaf tissue; a return to cool-mild conditions will then allow the disease to re-emerge. Experimental data published for southern NSW [1] indicates that the disease develops most rapidly when the average day temperature is about 16°C but will continue developing up to average daily temperatures of 20-21°C. Although some maximum temperatures have reached the upper 20s in September, the night temperatures have been much lower and have kept the daily averages below 20°C. Development will also be a function of variety response to stripe rust, with disease progress most rapid on very susceptible wheats and becoming slower as the resistance improves.

Pathotype Survey

At the time of writing, nearly 400 samples have been received for pathotype analysis, with almost 100 received in the past week. To date, 40 samples have been confirmed as the WA pathotype (134 E16 A+) and these samples represent the early locations in WA and eastern Australia. Hence it is expected that this pathotype will be the dominant stripe rust pathotype in 2004. One sample from barley grass has been confirmed as the barley grass stripe rust (BGYR), although recent enquiries suggests that barley grass infections are now becoming more commonly observed. Given the extensive epidemic in wheat crops, it might be expected that these recent barley grass collections will yield wheat stripe rust pathotypes.

At present, there is no evidence of any new pathotypes emerging in the pathogen population.

Variety Rankings

Variety responses to the WA stripe rust pathotype, as published in various state based sowing guides, have provided useful indicators of field performance. However in certain situations where disease began early or where crops were affected by high disease pressure in ideal conditions, the response to stripe rust has been worse than anticipated. Nevertheless, the relative ranking of varieties has not altered appreciably, and it is expected that sowing decisions for the coming season will continue to be based on current rankings. Wherever possible, decisions to decrease areas sown to susceptible varieties will have a positive impact in reducing overall disease levels, both within and between seasons.

Head Infections

Reports are now being received of varying levels of head (spike) infection. This was a problem in 2003, and some information on the biology of head infection was circulated in Cereal Rust Report 2003 (Number 1, 6 November 2003). In summary, head infection is expected to cause grain shrivelling resulting in increased screenings in severe situations. Seed discolouration has not been observed by the authors, but has been reported in the literature.

Spray Control Using Fungicides

Several difficulties have been experienced in the current season:

1. The onset of adult plant resistance (APR). In general, most varieties are expected to show APR at flag leaf emergence, but this appears to have been delayed in some circumstances up until heading.
2. Protecting the flag leaf. Early disease onset has meant that fungicides have been required more than once in order to protect susceptible varieties through to flag leaf and beyond. It will be of great value to gather experiences in the use of strategies that combine pre-plant treatments and in-season foliar sprays to determine economic benefits.
3. Post spray 'bronzing': Several reports indicate that crops sprayed with propiconazole and triademefon look visually worse in the days immediately after spraying. This is not uncommon and has been similar to that experienced in previous heavy epidemic seasons.

[1] Ellison, P.J. and Murray, G.M. (1992). Epidemiology of *Puccinia striiformis* f. sp. *tritici* on wheat in southern New South Wales. Australian Journal of Agricultural Research 43: 29-41.

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The triazole fungicides prevent new infections of stripe rust and stop development of young infections. However, infections that are more than about one week old continue to develop as dead areas in the leaf although they do not usually sporulate. At this time of year it takes about 2 weeks from infection to symptoms appearing. Thus, symptoms of stripe rust can be expected to continue developing for up to a week after the spray is applied. Therefore in situations with established infection there will be some leaf area lost to the disease even with spraying, but it will be far worse where spraying was delayed.

4. Logistics: Delays between ordering and application of fungicides have been a problem, exacerbated with anticipated short supply of chemicals in some districts.

Conclusion

The 2004 epidemic is currently in full swing with many growers and advisors continuing to make difficult decisions for fungicide control in the current season and variety sowing intentions for 2005. Further reports will be circulated in the event of new information arising from the pathotype survey that may assist in these decisions. Sampling of crops and trials will continue to be an important means of monitoring the pathogen population. Given the large sample numbers being processed at the Cereal Rust Laboratory at PBI Cobbitty, it will be particularly important to sample from varieties showing unexpected high levels of disease, and not take a sample from every entry at a particular site.

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Cereal rust samples may be collected and posted in paper envelopes to the following address:

Australian Cereal Rust Survey
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