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THE UNIVERSITY OF SYDNEY

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Cereal Rust Report

Season 2011

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# Cereal Rust Survey 2011 Progress Report
## New Leaf Rust Pathotype and Re-emerging Stripe Rust Pathotype

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Despite a short period of warm weather in early September, cool spring temperatures have prevailed over much of eastern Australia. Rainfall has been variable with timely events in August and early October bringing welcome relief to many cropping districts in the east. However expected yields without significant follow up rainfall may serve to delay decisions to take action on rust infections in spring. This report summarises recent data arising from the Annual Cereal Rust Survey, and highlights the potential for the cereal rusts to cause damage in 2011.

### Wheat Stem Rust

Stem rust of wheat continues to be common across south eastern Australia. To date, only one pathotype has been detected so far in the samples received from various locations in Victoria and South Australia, *viz.* 34-1,2,7 +Sr38. This pathotype was also the most commonly isolated pathotype from this region during the 2010 season. Growers of cultivars rated as Moderately Susceptible to Susceptible should monitor crops carefully for stem rust over the coming months as this pathogen is better adapted to warm temperatures and is most damaging at post heading growth stages.

### Wheat Leaf Rust

Following 5 years of very low incidence, leaf rust has become common and widespread in eastern Australia in 2010 and 2011. Recent samples of leaf rust collected from variety Wyalkatchem in South Australia have been identified as a new pathotype, one which combines virulence for the genes *Lr13* and *Lr20*, both present in this variety (pt. 76-1,3,5,7,9,10,12 +Lr37). This is not the first pathotype to be detected in Australia with this virulence combination, with three others detected previously; pts 76-1,3,5,9,10,12 and 10-1,3,9,10,11,12, and 53-1,(6),(7),10,11. While the first two have been present at low levels only in eastern Australia in recent years, the latter has not been detected since 2001 and is considered to be likely extinct. While the full impact of the new pathotype on Wyalkatchem is yet to be determined, it is important to note that it has only been detected in eastern Australia and the leaf rust response of this variety in WA remains unchanged.

### Wheat Stripe Rust

Sample numbers in the current season are noticeably lower than those of recent years, and this has largely been a consequence of a much later epidemic onset. A major factor in this pleasing observation has been the widespread industry adoption of early season protection using fungicides on fertilizer, seed dressings, in furrow liquids and foliar applications tank

mixed with herbicides for early season protection. Delay epidemic onset and we go a long way towards minimizing pathogen pressure in the spring period. However, these early season strategies will be expected to decline, and varieties known to be vulnerable will require supporting foliar protection to minimize anticipated yield penalties during grain fill.

Stripe rust pathotypes recovered to date from survey samples are presented in Table 1. The 'WA-Yr17' pathotype is clearly dominant, and especially among higher sample volumes from southern NSW. Varieties vulnerable to this pathotype will require monitoring and timely foliar spray intervention.

Of particular importance is the recent recovery of the 'Yr17-27' pathotype in NSW. This pathotype, which combines virulence for *Yr17* and *Yr27*, was recovered from Livingston crops (Dubbo and Albury). Livingston, which combines both resistance genes, is expected to show more stripe rust development in the presence of the 'Yr17-27' pathotype. Preliminary data suggests Livingston will not be totally susceptible, although growers have sprayed as a precaution when noticing the first signs of significant hot spots. Stripe rust response for Livingston will be reviewed at the end of the season when all varieties are re-assessed based on current season and historical data sets.

Current data from the 2011 stripe rust survey indicates the association of pathotypes recovered from certain varieties (Table 2). Varieties known to be vulnerable to the 'WA-Yr17' pathotype have tended to select this pathotype from the pathogen population – note for example Mace (SA regions) and Ventura (NSW). In contrast, a range of pathotypes reflecting the current frequencies have been recovered from EGA Gregory, EGA Wedgetail, Lincoln and Wyalkatchem. For regions in NSW, Lincoln and EGA Gregory continue to perform well for stripe rust resistance. Although Livingston crops were expected to yield the 'Yr17-27' pathotype, early samples were clearly not this pathotype. There are many Livingston stripe rust samples still in the process of pathotype determination, and so the frequencies of pathotype recovery from this and other varieties can be expected to change as data from the survey progressively emerges.

## Barley Grass Stripe Rust

The form of stripe rust adapted to barley grass has been frequently sampled in 2011. In certain situations such as screening nurseries, there also appears to have been some limited foliar damage to barley. Samples to date indicate that barley grass stripe rust has been the cause, and further experiments will be conducted to test the hypothesis that a new pathotype may be involved. Although this is unconfirmed, it highlights the need to monitor barley for stripe rust symptoms and particularly in situations where nearby barely grass communities are also well infected.

## Conclusions

The cereal rusts are notoriously shifty in their capacity to overcome resistance developed in commercial varieties. From the above examples in 2011, it is clear that an active monitoring program across a broad geographical area is imperative if we are to contain the worst effects of these diseases.

To this end, rust samples for pathotype analysis should be sent to the Australian Cereal Rust Control Program at the address given below. It is vital that samples are sent only in paper as plastic packaging will kill rust spores. Well infected leaves and/or stems should be folded flat in paper envelopes together with information including location, variety if known and contact email addresses, and then mailed without delay to:

The Australian Cereal Rust Control Program
University of Sydney
Plant Breeding Institute
Private Bag 4011
Narellan NSW 2567

**Table 1.** Distribution of wheat stripe rust pathotypes (mid October 2011)

| Pathotype | Queensland | nNSW | sNSW | Victoria | SA | Total |
|---|---|---|---|---|---|---|
| **134 E16 A+** | 3 | 4 | 8 | 3 | 2 | 20 |
| **134 E16 A+J+** | 1 | 1 | 12 | | | 14 |
| **134 E16 A+J+T+** | 1 | 2 | 6 | | | 9 |
| **134 E16 A+17+** | 11 | 15 | 71 | 8 | 9 | 114 |
| **134 E16 A+17+27+** | | 1 | 1 | | | 2 |

**Table 2.** Pathotypes of wheat stripe rust recovered from selected varieties (mid October 2011)

| Variety | 134 E16 A+ | 134 E16 A+J+ | 134 E16 A+J+T+ | 134 E16 A+17+ | 134 E16 A+17+27+ | Samples to Date |
|---|---|---|---|---|---|---|
| **EGA Gregory** | 2 | 2 | 2 | 14 | | 28 |
| **Livingston** | 2 | | | 4 | 2 | 17 |
| **Sunzell** | 2 | | | 7 | | 12 |
| **Ventura** | 1 | 1 | | 6 | | 12 |
| **EGA Wedgetail** | 1 | 2 | | 6 | | 11 |
| **Mace** | | | | 8 | | 11 |
| **Lincoln** | | | 1 | 1 | | 6 |
| **Wyalkatchem** | 1 | | 1 | 1 | | 5 |

**Figure 1.** Stripe rust (Puccinia striiformis) continues to be observed in late maturing crops.

**GENERAL ENQUIRIES**

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Cobbitty NSW 2570
T 02-9351 8800 (Reception)
F 02-9351 8875

**RUSTED PLANT SAMPLES**
can be mailed in paper envelopes;
do not use plastic wrapping or plastic lined packages.
Direct samples to:

Australian Cereal Rust Survey
Plant Breeding Institute
Private Bag 4011, Narellan NSW 2567

The Australian Cereal Rust Control Program is supported by growers through the Grains Research & Development Corporation.