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Plant Breeding Institute
Cereal Rust Laboratory

Cereal Rust Report Season 2003

Stripe Rust Head Infection

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Stripe rust, caused by *Puccinia striiformis*, has reached epidemic levels eastern Australia in 2003. Over the past two weeks there has been widespread reporting of stripe rust head infections in a range of varieties across most wheat producing districts. These notes provide some background in response to many enquiries concerning the nature, anticipated consequences and possibilities for controlling stripe rust head infections.

Symptoms

Bleached, discoloured florets with faint evidence of yellow rust spores can be seen from first inspection of suspect heads (see Plate 1). These symptoms may be initially confused with other diseases, such as Fusarium head scab.

Peeling back glumes from affected florets will reveal abundant yellow rust spores being produced on the inside of the floret adjacent to the developing seed (see Plate 2). The disease has in fact been referred to as glume rust, and the pathogen was once given the now obsolete name of *Puccinia glumarum*.



Plate 1 Bleached florets with traces of yellow rust spores evident in severe head infection



Plate 2 Peeled glumes reveal "buckets" of spores adjacent to the developing seed

Infection cycle

Spores germinate and infect florets from heading to flowering, with symptoms developing over the following 10 to 20 days. Infection does not occur after flowering. Conditions for spore germination are the same as those required for canopy infection: cool temperatures (optimally 8 to 12°C) and 100% humidity. In contrast to foliar infection, infected florets are unlikely to support further cycles of infection because spores are enclosed largely on the inside of the glume. However the encased spores may be liberated at harvest and move in air currents to infect available host plants, typically self sown wheat, and so improve opportunities for pathogen survival between cropping seasons. Although spores may adhere to seed, they are not expected to survive for more than a few days. Stripe rust is not a seed borne disease.

Variety responses

There are observable differences in the response of varieties to head infection. In general, varieties resistant in the canopy will be resistant in the head; conversely, those susceptible in the foliage will tend to support a heavy inoculum load and head infection may become severe. However there are many situations where severe head infection has occurred despite moderate to low levels of rust in the crop canopy. This is due to high levels of inoculum that may be generated from crops adjacent to or nearby the unexpected head infections.

Anticipated impact on crop yield

It can be expected that head infection will produce shrivelled grain, although the extent of this will depend on how early the infection established in a particular floret and how many florets become infected. Screenings will be expected to increase with severe infections. Seed staining has been reported in severe cases of head infection. Note that the pathogen does not produce toxins that would prevent the use of downgraded seed as stock feed.

Control of head infection

Chemical control of head infection is not considered to be effective, despite the excellent levels of disease reduction that can be achieved with foliar sprays. This is due to poor, if any, translocation of fungicide from the flag leaf to the head, and poor coverage of chemical targeted for head control only.

General enquiries:

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

Australian Cereal Rust Survey
Plant Breeding Institute
Private Bag 11
Camden NSW 2570

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

