A high incidence of crown rot (fusarium spp.) in wheat grown under high levels of nitrogen

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Crown rot of wheat (Fusarium spp.) is generally not considered to be a major root pathogen in South Australia (3). It was therefore unexpected that, in an experiment examining the effect of rate and timing of N fertiliser on 2 varieties of wheat, a high incidence of crown rot should be diagnosed. This paper reports on the effects of variety and fertiliser regime on the incidence and severity of crown rot.

Methods

Osprey and Spear wheat were sown at 200 viable seeds/m2 on 27 June 1988 at the Charlick Experiment Farm, Strathalbyn (average annual rainfall = 492mm). The following 7 N treatments were imposed: 0, 50, 100kgN/ha (as urea) applied at sowing, 50, 100kgN/ha 9 weeks after sowing, 50kgN/ha at sowing plus 50kgN/ha post sowing or 5 applications of 20kgN/ha. Plots were sown with 90kg/ha of double superphosphate amended with 2% triadimefon to minimise the development of take-all (Gaeumanno yressp.) (1). The experiment was sown after a 6-year subterranean clover pasture considered to be grass free by the farm manager. Plots were harvested with a small plot harvester. Fifty plants were sampled at maturity from each plot and tillers were categorised as either diseased (based on stem browning above the first node) or symptomless. Loss of potential yield was then calculated (2).

Results and discussion

Annual rainfall was 20% below average and during October, when the crops flowered, only 6mm fell. Applying N depressed the yield of both cultivars.

The incidence and severity of crown rot was high; mean incidence of basal browning averaged over all treatments was 84% and the mean loss of potential yield was 51%. There were no significant differences between varieties or N treatments for either disease parameter. The loss in potential yield was significantly correlated with basal browning in both varieties. The control of take-all in this experiment (only 1-2% of tillers affected) may have given a competitive advantage to Fusarium spp. which could account for the unexpectedly high incidence of the disease. In addition the very dry spring may have given Fusarium an advantage. This may also help to explain why results of trials in S.A. testing fungicide-amended fertilisers have given inconsistent yield results.

1. Ballinger, D.J. and Kollmorgen, J.F. (1988).Aust. J. Exp. Agric. 28 : 635-38.

2. Klein, T.A., Burgess, L.W. and Ellison, F.W. Aust. J. Exp. Agric.(in press).

3. Murray, G.M. and Brown, J.F. (1987). Aust. Plant Path. 16 : 34-37.