

Infection of wheat tissues by *Fusarium pseudograminearum*

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Crown rot of wheat is a significant cause of yield losses in many wheat producing countries. In Australia crown rot is predominantly caused by the fungus *Fusarium pseudograminearum* (teleomorph *Gibberella coronicola*). Partial resistance has been identified in a small number of wheat lines, such as 2-49 and Sunco, but the mechanisms of resistance shown by these lines have not been identified. This study aims to identify key growth periods of *F. pseudograminearum* during crown rot development in wheat and compare these periods across partially resistant and susceptible lines in order to determine how the disease progresses and when resistance mechanisms are induced. Extensive field trial comparisons between susceptible and partially resistant host genotypes indicate a much slower spread of the fungus in the younger tissues of resistant individuals. These experiments are based on both visible symptom development and re-isolation of the pathogen from tissues at a distance from the infection site. On the basis of these experiments we hypothesise that *F. pseudograminearum* can proliferate significantly in the host tissue before any disease symptoms are apparent. In experiments currently underway, the increase in fungal load in each inoculated host genotype is being measured using a real time multiplex polymerase chain reaction (PCR) assay, allowing simultaneous detection of both pathogen and host DNA. Fungal DNA levels are being monitored across a range of time points from initial infection up until production of gross disease symptoms and at increasing distances from the infection site. Since current disease rating systems for seedlings and plants in the field rely heavily on browning of leaf sheaths and tiller bases, these investigations will illuminate more clearly the relationship between the extent of fungal infection and the expression of disease symptoms in susceptible cultivars and at the same time give indications of the time-course of resistance expression in partially resistant wheat lines.