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Microclimatic Requirements for Wheat Blast (*Magnaporthe grisea*) and Characterisation of Resistance in Wheat

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Abstract

Magnaporthe grisea is the causal pathogen of wheat blast, which can cause high yield losses in subtropical wheat production. Wheat blast has been a critical problem for wheat production areas in South America. The temperature and wetting period are important factors in the development of wheat blast. The effect of temperature (20, 23, 26, 29 and 32°C) and spike wetness time (24, 48, 72 and 96 h) on the flowering stage of ears were studied in the susceptible wheat cultivar BR18. The results showed that higher temperatures (>26°C) are conducive to the growth and infection of this pathogen, which is capable to induce high disease severity even at 29°C and 32°C. A minimum spike wetness time of 24 h was required for infection; wetting periods above 24 h had little effect on infection and the development of disease symptoms.

Twenty-seven wheat lines were assessed for their resistance to wheat blast in a standardised screening assay in the climate room. Inoculations were performed on the leaves and on the ears in separate experiments in order to test the organ-specific responses. The set of tested cultivars represented a wide range of susceptibility/resistance responses to wheat blast. Leaf infection was not correlated with ear symptoms. Upon ear inoculation at flowering stages, cultivar MILAN showed the highest resistance to *M. grisea*, but this was associated with a relatively high susceptibility to *Fusarium* head blight (FHB, *Fusarium graminearum*). SUMAI 3 and GONDO-CBRD were susceptible for *M. grisea*, but relatively more resistant to *F. graminearum*. The study indicates the existence of resistance sources in wheat lines to blast. However, it also demonstrates different resistance factors being involved in the infection of wheat ears with head blight and blast.

Keywords: *Fusarium* head blight, *Magnaporthe grisea*, resistance, temperature, wetting periods, wheat blast