

Compatible and Incompatible Interactions Involving the *Bt10* Gene in Wheat for Resistance to *Tilletia tritici*, the Common Bunt Pathogen

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Abstract: The goal of this study was to determine the nature of the compatible and incompatible interactions involving the *Bt10* gene for resistance to common bunt (*Tilletia tritici* (Bjerk.) Wint.) in wheat. The differentially virulent races T1 and T27 of *T. tritici* were employed to inoculate the wheat lines Neepawa (susceptible) and its sib BW553, a near isogenic line containing *Bt10*. Inoculated crown tissues were sampled between 5 and 21 days following sowing and examined with light and confocal microscopy. Based on detection of autofluorescence in the tissues of the coleoptile in association with infection hyphae, the host perception of pathogen invasion in both compatible and incompatible interactions occurs as early as 5 to 6 days following seeding (dfs). At 8–10 dfs, there are clear differences between compatible and incompatible interactions; the rapid accumulation of callose around invading fungal hyphae during the very early penetration stages in incompatible host-interactions is a predominant morphological feature in the incompatible interaction involving *Bt10* and race T1. However, callose also accumulated in cells in the zone of infection in the compatible interaction involving race T27 on BW553 and, to a lesser extent, involving both races on Neepawa, but failed to coalesce around invading hyphae. Thus, callose accumulation appears part of the host response to invasion but is not a determining factor in the incompatible interaction. This conclusion is supported by expression studies that measured transcripts of the *callose synthase* gene.

Keywords: callose accumulation; autofluorescence; host-parasite interaction; pathogen invasion