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## Genetics of resistance to septoria tritici blotch in the Portuguese wheat breeding line TE 9111

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**Abstract** We report the genetics of resistance of the Portuguese wheat breeding line TE 9111 to septoria tritici blotch (STB), which is caused by *Mycosphaerella graminicola*. TE 9111 is the most resistant line known in Europe and combines isolate-non-specific, partial resistance with several isolate-specific resistances. We show that, in addition to high levels of partial resistance to STB, TE 9111 has a new gene for resistance to *M. graminicola* isolate IPO90012, named *Stb11*, that maps on chromosome 1BS, the *Stb6* gene for resistance to isolate IPO323 and, probably, the *Stb7* gene for resistance to isolate IPO87019. All of these genes are closely linked to microsatellite markers, which can be used for marker-assisted selection. TE 9111 may therefore be a valuable source of resistance to STB for wheat breeding, especially in Mediterranean environments.

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### Introduction

Septoria tritici blotch (STB), caused by the ascomycete fungus *Mycosphaerella graminicola*, is now the most important foliar disease of wheat in many regions of the world, including Europe, the Mediterranean, South America, the USA and parts of Australia (Eyal et al. 1973; Eyal et al. 1987; Hardwick et al. 2001; Loughman and Thomas 1992; Polley and Thomas 1991; Schlüter and Janati 1976). Resistant cultivars provide an effective and economical way of controlling STB, but until recently little was known about the genetics of resistance to STB in wheat and breeders had to rely on unknown genes.

Recent work has focused on the genetics of resistance to STB in northern European varieties, but little is known about the genetics of resistance in the southern Europe and Mediterranean regions where the disease is often more severe than in colder regions. STB can be particularly severe when early sowing is followed by rainfall in late winter or spring (Catedra et al. 2003; Nasraoui et al. 2003; Schlüter and Janati 1976), which is typical of the conditions found in Mediterranean-type environments.

The Portuguese breeding line TE 9111 is the most resistant line to STB known in Europe. In tests on adult plants with single-pycnidium isolates of *M. graminicola*, TE 9111 was the second most resistant line of all those tested after the Brazilian cultivar Veranopolis, which has long been known to be an important source of resistance (Brown et al. 2001).

As in other diseases of wheat such as powdery mildew and rusts, resistance to STB may be specific or partial. Specific resistance is near complete, oligogenic and follows a gene-for-gene relationship (Arraiano et al. 2001b; Brading et al. 2002; McCartney et al. 2002; Somasco et al. 1996), whereas partial resistance is incomplete, polygenic and isolate-non-specific (Chartrain et al. 2004b; Jlibene et al. 1994; Simon and Cordo 1998; Zhang et al. 2001). Eleven genes (*Stb1–10* and *Stb12*) for