

The inhibitor of *Pm8* in certain 1BL.1RS wheat genotypes

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Pm8 for resistance to powdery mildew is one of the disease response genes carried by the widely used 1BL.1RS chromosome with 1RS derived from Petkus rye. However, *Pm8* when challenged by avirulent *Blumeria graminis tritici* cultures is not expressed in all wheat genetic backgrounds. According to Ren et al. the dominant suppressor of *Pm8* is located in close proximity to the *Gli-A1/Glu-A3* loci on chromosome 1AS. These loci are closely linked with the *Pm3* locus. Different selections of Veery and Bobwhite vary in response to powdery mildew even though they have the 1BL.1RS translocation. F2-derived F5 populations developed from crosses between resistant and susceptible (suppressed) selections of each cultivar segregated for response to powdery mildew and resistance in some segregating lines was recessive (dominant inhibition). These populations were subjected to analysis with functional markers for *Gli-A3* and *Pm3*. We have shown that wheats lacking a *Pm3* powdery mildew response either possessed a functional transcribed allele (e.g. Chinese Spring which lacked a known *Pm3* resistance specificity), a terminated allele, or were null. Our analyses indicate that lines with functional alleles of *Pm3*, including the Chinese Spring allele, show suppression of *Pm8*, which we presume to be an orthologue of *Pm3*. We are developing transient assays to test our prediction that *Pm8* will not function when combined with functional *Pm3* alleles, and also combining the translocation in lines with *Pm3* alleles. We know of no wheat genotype with 1BL.1RS and a named *Pm3* resistance allele.

This work has important implications in understanding the commonly reported phenomenon of resistance gene suppression (or dilution) in wheat wide crosses, as well as the actual genetic basis of suppression. It also raises the issue of functions of different alleles transformed into a single wheat genotype.

