

Screening maize inbred lines with introgressed *Wsm* loci for resistance to the potyviruses *Johnsongrass mosaic virus* (JGMV) and *Sorghum mosaic virus* (SrMV)

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Abstract Maize dwarf mosaic disease is one of the most important viral diseases of maize throughout the world. It is caused by a set of related viruses in the family *Potyviridae*, genus *Potyvirus*, including *Maize dwarf mosaic virus* (MDMV), *Sugarcane mosaic virus* (SCMV), *Johnsongrass mosaic virus* (JGMV) and *Sorghum mosaic virus* (SrMV). Resistance to another member of the family *Potyviridae*, *Wheat streak mosaic virus* (WSMV), is conferred by three loci (*Wsm1*, *Wsm2*, *Wsm3*) from the maize inbred line Pa405. These loci conferred resistance to the potyviruses MDMV and SCMV, but it was not known whether they conferred resistance to JGMV or SrMV. In this study, we studied whether *Wsm* loci are effective in conferring resistance to JGMV and SrMV, and to better understand the interactions among *Wsm* loci. Near isogenic lines (NILs) carrying one or two of the *Wsm* loci introgressed into the susceptible line Oh28 and F1 progeny from NIL× Oh28 were tested for their response to JGMV and SrMV. Our results indicated a single allele of *Wsm1* provides 64-100% resistance to JGMV, while *Wsm2* and/or *Wsm3* provide very little resistance. Similarly, a single *Wsm1* allele conferred 40-100% resistance to SrMV while *Wsm2/Wsm3* provide no resistance to SrMV, but modify resistance in plants with one *Wsm1* allele. Resistance conferred by the three genes is influenced by the interactions among the genes and the virus species.

Keywords Potyvirus, JGMV, SrMV, Resistance screening, *Wsm* loci, Maize

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