

Diallel analysis of leaf disease resistance in inbred Brazilian popcorn cultivars

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ABSTRACT. We estimated general and specific combining abilities and examined resistance to northern leaf blight (*Exserohilum turcicum*) and to gray leaf spot (*Cercospora zea-maydis*) in a set of nine inbred popcorn lines. These inbreds were crossed in a complete diallel scheme without reciprocals, which produced 36 F₁ hybrids. Two experiments with a square lattice design and three replications were conducted during the 2008/2009 crop season, in Maringá, PR, Brazil. The severity of northern leaf blight and gray leaf spot was assessed under natural infestation conditions. Data were examined by individual and joint analysis of variance. Individual and joint Griffing's diallel analyses were carried out for adjusted means. General combining ability and specific combining ability were significant ($P < 0.10$) by the F-test for northern leaf blight and gray leaf spot infestation levels. This denotes that additive and non-additive gene effects both contributed to resistance to these diseases, but that the additive gene effects were more important. Among the inbred lines, P₈ and P₉ gave the highest resistance to northern leaf blight, and P₃ and P_{4.3} gave the highest resistance to gray leaf spot. The hybrids P_{7.4} x P₈ and P_{4.3} x P₉ could be exploited by reciprocal recurrent selection to provide genotypes with both northern leaf blight and gray leaf spot resistance. Significant interaction between general combining

ability and crop season ($P < 0.10$) denotes the importance of environment, even though the disease levels in the hybrids were quite consistent.

Key words: *Zea mays* L.; Combining ability; Northern leaf blight; *Exserohilum turcicum*; Gray leaf spot; *Cercospora zea-maydis*