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Field resistance of crosses of sesame (*Sesamum indicum* L.) to charcoal root rot caused by *Macrophomina phaseolina* (Tassi.) Goid.

El-Bramawy M.A.S., Abdul Wahid O.A.:

Plant Protect. Sci., 42 (2006): 66-72

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Two segregating generations (F_3 and F_4) from 6×6 half-diallel crosses, excluding reciprocals, of a sesame breeding program were exposed to natural infection by the root rot pathogen (*Macrophomina phaseolina*) in two successive seasons (2004 and 2005). There was highly significant variability in the progeny of all investigated crosses which might be a valuable tool for further breeding programs for root rot disease management. The level of infection in 2004 ranged from 2.63% (cross $P_2 \times P_5$) to 52.42% ($P_4 \times P_5$) in the F_3 , and from 1.28% ($P_1 \times P_5$) to 51.78% ($P_4 \times P_5$) in the F_4 . During 2005, infection varied from 1.01% ($P_2 \times P_5$) to 50.91% ($P_4 \times P_5$) in the F_3 , and from 1.00% ($P_3 \times P_4$) to 48.00% ($P_4 \times P_5$) in the F_4 . These

crosses were ranked resistant or highly susceptible and gave seed yields per feddan (= 4200 m) of 536.67, 361.67, 641.67, and 408.33, respectively. The F_3 's and F_4 's of five crosses, i.e. $P_1 \times P_2$, $P_1 \times P_4$, $P_1 \times P_5$, $P_2 \times P_6$, and $P_3 \times P_4$, were resistant in both segregating generations and both seasons. Such crosses might be helpful for breeding programs due to their stable resistance. Lines from the crosses $P_1 \times P_6$, $P_2 \times P_4$ and $P_4 \times P_5$ could also be used for improving resistance due to an increase of inherited resistance from one generation to another. The estimated heritability showed high values in all cases and indicated that selection for these traits could be useful for breeding programs for resistance to root rot with seed yield potential. Correlation coefficients showed that there were some positive correlations such as percentage of infection by *M. phaseolina* between both generations (F_3 's and F_4 's) as well as within each generation during a season's evaluation, i.e. 0.742, 0.976, 0.846, 0.732, and 0.987. The highest

significant and positive correlations assisted in the selection of some crosses to be used in breeding programs and will aid breeders to achieve sesame cultivars with charcoal root rot resistance.

Keywords:

sesame; root rot; *Macrophomina phaseolina*; disease resistance; seed yield; field conditions

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