

2007 Soybean Promotion Board Progress Report

TITLE: Effects of genotype on severity of charcoal rot and yield in soybean.

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OBJECTIVES:

1. To determine the effect of cultivar on charcoal rot development and yield in naturally and artificially infested, non-irrigated fields.
2. To evaluate cultivar susceptibility in controlled environmental studies.

RESULTS:

Cultivar reactions to charcoal rot in the field and greenhouse are being determined by comparing inoculated with non-inoculated plots. Plots were inoculated by growing the charcoal rot pathogen, *Macrophomina phaseolina*, on millet seed and mixing the inoculum with soybean seed at planting. Resistance is measured as the relative reduction in emergence of the inoculated rows compared to the non-inoculated rows and, in the field, to yield.

In the field, plant stands and yields in the inoculated plots for all cultivars were reduced, and there were differences among cultivars. In 2007 in the maturity group IV cultivars, stands in the inoculated plots ranged from 6 to 65%. Stands in the non-inoculated plots ranged from 68 to 98%. Analysis showed that there were significant differences among cultivars in the inoculated plots, with DP4546, DK4763, DK4967, and LS90-1920 having the greatest stands, above 55%. In the maturity group V cultivars, stands in the inoculated plots ranged from 7 to 55%, and 81 to 100% in the non-inoculated plots. The cultivars DP5806, FFR5663, DPL105, and FFR5116 had the greatest stands, greater than 44%. Yields for the cultivars listed in the inoculated plots for group IV and group V cultivars were approximately 49% and 57% relative to the non-inoculated plots, respectively. Cultivars tested in both 2006 and 2007 that demonstrated the most resistance to charcoal rot include DPL105 and DP5806 for group V cultivars and DP4546, DK4866, and DK4967 for group IV cultivars.

This year we also tested the effect of inoculum rate on disease development using three rates of inoculum and six cultivars. Stand reduction increased with an increase in inoculum and all levels of inoculum caused some stand reduction in all cultivars. The cultivars responded as expected with DP4546 being the most resistant to charcoal rot and HBK 4924 and AV47G7 the most susceptible and DP4724 and DK4967 falling in between. The differences among cultivars were the same at all three inoculum levels.

Greenhouse and growth chamber inoculations were conducted over the winter. While more work needs to be done to refine these techniques; they are producing similar results to those of the field and should be very useful in screening cultivars for charcoal rot.