# IMPACT OF POTASSIUM STRESS ON SOYBEAN APHID POPULATIONS

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A field experiment was conducted during the 2004 growing season to assess the effect of soil potassium on soybean aphid populations. Three K treatments were established in 10 ft x 25 ft plot with KCl fertilizer applications of 0, 50 and 100 lb K /acre. Each treatment was replicated 14 times. Phosphorus was applied at planting at a rate of 100 lb/acre to avoid P deficiency in the field. Leaf tissue and soil tests were taken during the growing season to quantify nutrient levels. Soybean aphid development and reproduction was monitored by placing neonate nymphs in small clip cages. Cages contained a single aphid and two cages were placed in each plot. Aphid development, the number of offspring produced, and mortality was measured daily for daily for 35 days. Soybean aphid population data were used to produce life tables to document aphid time to adulthood, mean generation time, survivorship, and rate of population growth.

Mean soil K levels were 59.8, 112.9, and 149.2 ppm for the low, medium and high K treatments respectively. Leaf tissue K levels expressed as percentage of dry matter were 1.6, 2.4, and 2.4 for the low medium and high treatments respectively. Soil P levels did not differ significantly among the three treatments and averaged 23.2 ppm.

Life table analysis showed no significant difference in mean generation time among the three treatments. Additionally, there were no differences in the intrinsic rate of population increase, and net reproductive rate between the medium and high K treatments. However, aphids on the low K treatment showed a significantly greater intrinsic rate of population increase, and net reproductive rate in comparison to the medium and high K treatments. These results indicate that soil K levels in the range of 60 ppm can result in increased soybean aphid populations and may increase the likelihood of soybean aphid outbreaks and yield losses in K stressed soybeans.

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