## BLACK ROOT PROBLEMS ON POORLY DRAINED SOILS IN GEORGIA G. J. Gascho University of Georgia Tifton, GA R. E. Baird Mississippi State University Starkville, MS

## Abstract

Thousands of acres of cotton in flatwoods soils of southeast Georgia and in other poorly drained soils are affected by black root. The symptoms of the malady are black roots with an external rough charcoal texture, sometimes with nodules and often with necrotic internal rings. Leaves are modeled, often with some red color. Flowers are abnormally shaped, with stigmas extending far above the rest of the flower. The malady results in early square abscission, hard locked- and/or rotted-bolls and low lint vield. No causal organism was isolated in 3-year's efforts, but earlier experience with soybean in the same soils indicated chloride toxicity may be the culprit. Plant and soil analyses in late 1998 indicted that chloride concentrations were high in affected areas, as gauged by the earlier soybean research. Black roots on cotton were produced in the greenhouse in early 1999 by additions of high concentrations of chloride as either KCl or NaCl. Field experiments were conducted in 1999 at two flatwoods sites (Appling and Berrien counties) where black root had severe effects in 1996, 1997, and 1998. The experiments were in a randomized complete block design arranged in split-plots. Main plots were three chloride rates, subplots were 48 varieties that are currently popular in Georgia. There were four replications and 576 (6 ft x 30 ft) plots at each location. Severe symptoms were found at the Berrien county site. Symptoms were less pronounced at the Appling site in 1999. Addition of chloride increased leaf and root chloride concentrations, but did not significantly affect lint yield, likely due to within experiment spatial variations. No variety completely escaped black root symptoms at the Berrien county site, but significant and similar lint yield differences were recorded due to variety at both sites. A list of the lint yields obtained by variety is available and should help cotton growers in affected areas. As for soybean, varieties that retained more of the chloride in the root rather than transporting it to the leaves had the highest yields. Plans include research on the better yielding varieties and with the addition of amendments to provide anions to compete with chlorides.

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