

**AGRONOMIC AND ECONOMIC EVALUATION OF ROUNDUP-READY,
BXN, AND CONVENTIONAL WEED CONTROL SYSTEMS IN ARKANSAS**

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Abstract

Field studies were conducted on two soil types in the Delta area of Arkansas in 2001, 2002, and 2003 to compare crop injury, weed control, yields and economic returns of conventional weed control systems to the BXN and Roundup Ready systems.

The field studies were conducted for three years on a Tunica clay loam soil and a Commerce silt loam soil. The clay loam soil had a wide range of broadleaf weeds including morningglories, velvetleaf, prickly sida, spotted spurge, and hemp sesbania; grasses included barnyardgrass and red sprangletop. The silt loam site contained Palmer pigweed, entireleaf morningglory, and velvetleaf as well as large crabgrass and red sprangletop. The studies were conducted with four replicates of six treatment combinations in each of the three systems. Treatment combinations included preemergence (PRE), postemergence (POT), and postemergence directed (PD) applications of conventional herbicides as well as Buctril and Roundup in appropriate systems. In 2003, two treatments in the Roundup Ready system and one treatment in the BXN system were changed to reflect a total postemergence utilization of the two systems. Three cotton varieties of very similar genetic background were selected - ST474, BXN47, and ST4793RR. Cotton at each site was grown using recommended practices for fertilization, insect control, plant growth regulation, and defoliation.

The clay loam study resulted in fairly serious phytotoxicity only in 2001, where PD treatments were applied to very small cotton; no other serious phytotoxicity was observed. Weed control at this site was variable among treatments, with no situations where weeds appeared to compete heavily with the cotton. Weed control was more consistent in the Roundup Ready system, with more escaped weeds present in the BXN and conventional systems. Cotton yields were high for the three years of this study, lint quality was fairly consistent, and gin turnout was high, averaging about 44%. Lint yield was generally higher in the Roundup Ready system, although not consistently significant. Weed control costs, including differential seed costs and application costs, averaged \$53, \$82, and \$91 per acre, respectively, for the RR, BXN, and conventional systems for the three years. Net returns from the Roundup Ready system for the three years averaged \$105/A higher than the BXN system, and \$148/A higher than the conventional system. This difference reflects higher yields and lower costs in the Roundup Ready system.

Palmer pigweed predominated the weed spectrum on the Commerce silt loam site. Phytotoxicity was low in this site all three years. Control of Palmer pigweed was very good with the Roundup Ready system, and ranged from good to poor with the BXN and conventional treatment combinations; reduced control was observed from those treatments utilizing Staple postemergence. Late season removal of these weeds was necessary for mechanical plot harvest, although the cost of this practice was not considered in the economic evaluation. Yields were high, quality was fairly consistent, and gin turnout was high, averaging about 43%. Weed control costs for Roundup Ready, BXN, and conventional systems averaged \$49, \$77, and \$81 per acre, respectively, for the three years. Net returns from the Roundup Ready system for the three years averaged \$110/A higher than the BXN system, and \$215/A higher than the conventional system. This difference, again, reflects higher yields and lower costs in the Roundup Ready system.