RHIZOME JOHNSONGRASS (*SORGHUM HALAPENSE)* CONTROL WITH CONVENTIONAL AND TRANSGENIC HERBICIDE PROGRAMS

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Abstract

Utilization of transgenic cotton varieties is a new tool for combating perennial weeds. These programs include Roundup Ready and BXN cotton varieties. Combinations of new and old herbicide programs allow for increased weed selectivity and reduced crop injury in non-herbicide resistant cotton programs. This research was conducted to determine the long term effect of these programs under yearly climatic and ecological variances. Additionally, observation of these technologies over an extended period is required to identify occurrences associated with repetitive use.

Studies utilizing the BXN and Roundup Ready transgenic cotton varieties in addition to a conventional cotton weed control program were established in 1997 and 1998. Treatments were applied both years to the same location in the Brazos River Bottom near College Station, Texas in an area heavily infested with both rhizome Johnsongrass (*Sorghum halapense)* and two morningglory species; Sharppod *(Ipomonea trichocarpa*) and Tall (*Ipomoea purpurea*). Five herbicide programs were evaluated in this study and were replicated four times utilizing plot sizes of eight rows by fifty feet. The treatments included a BXN program using Treflan and Caparol as respective pre-plant incorporated and pre-emergence applications. Buctril and Select were applied early post emergence as a tank-mix in 1997, while in 1998 a second tank-mix was applied mid-post. The Roundup Ready system was divided into two programs. The first program was an early post treatment of Roundup followed by late cultivation. The second program utilized one application of Roundup early post followed by a late hooded application. The conventional program utilized Treflan and Caparol pre-plant incorporated and pre-emergence. A tank-mix of Staple and Assure II were applied early post in 1997, however, an additional tank-mix application was necessary in 1998.

In 1997, late season rhizome Johnsongrass control of greater than 95% was achieved when Roundup early post applications were followed by a mid post, hooded Roundup application and, with the BXN program utilizing Select for Johnsongrass control. The conventional program provided 87% control of rhizome Johnsongrass with Assure II while Roundup followed by cultivation provided 74% control. For late season morningglory control, the conventional program provided 97% control while the BXN and both Roundup programs provided from 81% to 89%.

In 1998, the BXN and the conventional programs provided greater than 97% control of rhizome Johnsongrass by late season, while the Roundup early post followed by a Roundup hooded application provided significantly less rhizome Johnsongrass control of 93%. The Roundup followed by cultivation again showed reduced effectiveness providing only 74% control of rhizome Johnsongrass. Late season Morningglory control of 93% was observed with the conventional program while the BXN program achieved 83% control. The Roundup early post followed by Roundup hooded application resulted in reduced control of 70% while the Roundup followed by the cultivation treatment only provided 58% morningglory control.

Cotton yields for 1997 were not significantly different except for the untreated plot which yielded nothing. In 1998 the BXN and conventional programs obtained yields of 693 lbs./A and 720 lbs./A respectively which were significantly higher than both Roundup programs. The Roundup yields were 453 lbs./A and 458 lbs./A respectively, for the Roundup followed by cultivation and Roundup followed by Roundup hooded application.

All treatments except the Roundup followed by cultivation were effective at controlling rhizome Johnsongrass over the two-year period. However, by reducing the Johnsongrass competition the morningglory infestation increased from 1997-1998. With increased morningglory pressure and decreased control, the Roundup Ready programs sustained significant yield reductions. The conventional and the BXN programs maintained acceptable morningglory control for both 1997 and 1998.

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