A BELTWIDE EVALUATION OF WEED MANAGEMENT IN TRANSGENIC AND NON-TRANSGENIC COTTON

J. W. Wilcut and S. D. Askew
North Carolina State University
Raleigh, NC
B. J. Brecke
University of Florida
Jay, FL
D. C. Bridges and S. M. Brown
University of Georgia
Griffin and Tifton, GA
J. M. Chandler
Texas A&M University
College Station, TX
R. M. Hayes
University of Tennessee
Jackson, TN
J. A. Kendig
University of Missouri Delta Center
Portageville, MO
D. K. Miller
Louisiana State University
St. Joseph, LA
R. L. Nichols
Cotton Incorporated
Raleigh, NC
C. E. Snipes
Mississippi State University
Stoneville, MS

Abstract

Experiments were conducted at 15 locations in 1997 and 1998 in Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, Tennessee, and Texas to investigate weed control, cotton tolerance, and yield of new transgenic herbicide resistant cotton varieties with standard non-transgenic varieties. The non-transgenic varieties planted included Stoneville 474 except in Texas where DPL 50 was planted. The BXN variety used at all locations was Stoneville BXN 47. The Roundup Ready varieties included DPL 5690RR in Texas, DPL 5415RR in Georgia, Florida, Mississippi, Louisiana, and North Carolina (1998 only). Paymaster 1220RR was planted both years in Tennessee and Paymaster 1330RR in North Carolina in 1997. There were weed-free checks for the Roundup Ready, BXN, and non-transgenic varieties at all locations which allowed for direct comparison of the yield potential. These weed-free plots were treated with Treflan at 1.0 pint/acre preplant incorporated (PPI) followed by a preemergence (PRE) treatment of Cotoran at 2.0 to 3.0 pints/acre. These plots were kept weed free with weekly hand weedings and hoeings.

Herbicide systems evaluated for the non-transgenic varieties included Treflan PPI plus Cotoran PRE followed by (fb) either 1) Cotoran at 2.0 pints/ac plus MSMA at 2.0 lb ai/ac early post-directed (EPDS) fb Bladex at 26 fl. oz./ac plus MSMA late post directed (LAYBY) or 2) Staple at 1.2 oz product/ac early postemergence (EPOST) over-the-top fb a LAYBY of Bladex plus MSMA. The BXN system used Treflan PPI fb Cotoran PRE fb Buctril at 0.5 lb ai/ac EPOST fb a LAYBY of Bladex plus MSMA. The Roundup systems included 1)Treflan PPI fb Cotoran PRE fb Roundup at 1.0 to 2.0 pints/ac EPOST fb a LAYBY of Bladex plus MSMA, 2) Treflan PPI fb Roundup as needed (ASN), 3) Roundup ASN fb a LAYBY of Bladex plus MSMA, and 4) Roundup ASN with no other herbicides. Roundup Ultra was the formulation of Roundup used and it was applied postemergence over-the-top on 4L cotton or smaller. All applications made after the 4L growth stage of cotton were post-directed or applied under a spray hood to minimize contact with cotton foliage. Buctril and Roundup Ultra were not applied with any spray adjuvants while a non-ionic surfactant at 0.25% (v/v) was applied with Staple, EPDS, and LAYBY treatments.

Sicklepod control in North Carolina was better with Roundup systems than with the traditional EPDS plus LAYBY system, the Staple system, or the BXN system. However in Georgia and Florida, sicklepod control was comparable with all herbicide systems and technologies. Morningglory control which included entireleaf, tall, and ivyleaf morningglory was excellent with all systems in North Carolina, Tennessee, and Texas. Pitted morningglory control was better in North Carolina in 1997 with systems that used EPOST herbicides. Common cocklebur control in Tennessee, smallflower morningglory control in Georgia and Florida, redweed control in Georgia, Palmer amaranth in Missouri, common lambsquarters in North Carolina, velvetleaf in Texas, prickly sida in Georgia, Tennessee, and North Carolina was good to excellent with all systems. Smooth pigweed control in Louisiana was near 100% with all systems except the BXN system which controlled smooth pigweed 75%.

Yields of cotton kept weed free were comparable for all varieties with only minor and inconsistent differences seen across all locations in both years of the study. All weed management systems in 1997 except the BXN system conserved at least 90% of the weed-free yields when averaged across all locations. The BXN yield protection was down due to a late grass infestation in Mississippi in the 1997 trial. Averaged across seven locations in 1997, the standard EPDS and LAYBY system yielded 94% of the weed free, the standard plus Staple EPOST plus a LAYBY yielded 95% of the weed free, the standard plus Buctril plus the LAYBYyielded 82% of the weed free, and standard plus Roundup plus a LAYBY yielded 97% of the weed free. In 1998 averaged across seven locations, the standard EPDS and LAYBY system yielded 92% of the weed free, the standard plus Staple EPOST plus a LAYBY yielded 92% of

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:746-746 (1999)
National Cotton Council, Memphis TN

the weed free, the standard plus Buctril plus the LAYBY yielded 93% of the weed free, and standard plus Roundup plus the LAYBY yielded 98% of the weed free yields.

With the Roundup technology, many producers are looking at reducing inputs of other herbicides. Averaged across locations in 1997, the Roundup alone ASN systems yielded 98% of the weed free check, Roundup plus the LAYBY yielded 91% of the weed free, Treflan plus Roundup yielded 99% of the weed free, and residual herbicides at planting plus Roundup EPOST plus a LAYBY yielded 97% of the weed free. In 1998 averaged over seven locations, the Roundup alone ASN system yielded 86% of the weed free, Roundup plus the LAYBY yielded 95% of the weed free, Treflan plus Roundup yielded 96% of the weed free, and residuals at planting plus Roundup EPOST plus a LAYBY yielded 98% of the weed free yields.

At several locations in the 1998 trials, Roundup Ready weed management systems that used only Roundup without soil applied herbicides yielded less than systems which used soil applied herbicides plus Roundup. These lower yields may reflect the early season interference from uncontrolled weeds which stunted cotton growth and development and lasted throughout the growing season at these locations.