WEED MANAGEMENT ON THE TEXAS SOUTHERN HIGH PLAINS USING A COMPUTER BASED DECISION SUPPORT SYSTEM

L. L. Lyon, J. W. Keeling,
P. A. Dotray and L. K. Blair
Texas Agricultural Experiment Station
and Texas Tech University
Lubbock, TX
G. G. Wilkerson and J. W. Wilcut
North Carolina State University
Raleigh, NC

Abstract

Cotton production on the Texas High Plains is unique because of the relatively short growing season, erratic rainfall, and the types of annual and perennial problem weeds. The introduction of Staple (pyrithiobac) herbicide and cotton varieties resistant to Roundup Ultra (glyphosate) and Buctril (bromoxynil) provide cotton producers several postemergence-topical herbicide options.

A computer-based herbicide program developed at North Carolina State University recommends postemergence herbicide treatments based on weed density, weed size, weed competitiveness, and herbicide efficacy. A new program, Herbicide Application Decision Support System (HADSS), was modified for use in cotton in 1998 and evaluated in field experiments at the Texas Agricultural Experiment Station near Lubbock in 1999. Treatments were evaluated at a location naturally infested with Palmer amaranth (*Amaranthus palmeri*) and devil's-claw (*Proboscidea louisianica*). Treatments included: 1) Treflan (trifluralin) preplant incorporated (PPI) at 0.75 lb ai/A followed by (fb) HADSS postemergence (POST) recommendations; 2) HADSS POST recommendations alone; 3) Treflan PPI fb commercial standards; 4) Weed-free check; and 5) untreated check. All treatments were conducted in Roundup Ready (glyphosate-tolerant), BXN (bromoxynil-tolerant), and conventional cotton varieties. Weed density was determined and applications were made at the 1-2 leaf, 6-8 leaf, and 10-12 leaf cotton growth stages. Weed control was evaluated 14 days after each application. The experimental design was a randomized block with a split plot arrangement with four replications. Plot size was 27 by 50 feet.

HADSS recommendations paralleled producer standards in the Roundup Ready system. In the Roundup Ready system Palmer amaranth was controlled at least 98% in the PPI fb POST treatments based on HADSS. Similar control was observed with the commercial standards, whereas control with POST only (HADSS) was 80%. Season-long devil's-claw control was at least 95% for all three treatments. In the conventional system, late-season Palmer amaranth was controlled 99% with the commercial standards, which was superior to the PPI fb POST (HADSS) recommendations (92%) and the HADSS recommendations alone (65%). Devil's-claw was controlled 95% with the commercial standards, which was better than PPI fb POST (HADSS) and POST only (HADSS) (88%). Palmer amaranth control in the BXN system with PPI fb POST (HADSS) and the commercial standards was 88%. This control was better than POST only (HADSS) (55%). Devil's-claw was controlled 95% with PPI fb HADSS recommendations and the commercial standards. POST only (HADSS) controlled devil's-claw 88%. HADSS recommendations were different from commercial standards in the BXN and conventional systems.

All three weed management systems produced similar yield within each variety. Overall, the BXN system yielded less than the Roundup Ready and conventional systems. The three herbicide treatments in the Roundup Ready system increased net returns over weed control costs compared to hand-hoeing alone. There were no differences in net returns between the treatments. In the conventional system, the treatments were not different in net returns, but were higher than the weed free check. The commercial standards produced higher net returns than the PPI fb POST (HADSS) recommendations and POST only (HADSS) recommendations in the BXN system, which were the same as the weed-free check. Overall, the Roundup Ready system produced the greatest net returns.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1489-1490 (2000)
National Cotton Council, Memphis TN