EFFICACY AND ECONOMICS OF GLUFOSINATE-TOLERANT COTTON. K.M. McCormick, P.A. Dotray, J.W. Keeling, E. Segarra, T.A. Baughman, and W.R. Perkins. Texas Tech University, Lubbock, TX; Texas Agricultural Experiment Station, Lubbock, TX; Texas Cooperative Extension, Vernon, TX; and Bayer CropScience, Idalou, TX.

ABSTRACT

Neither visible injury nor reductions in yield were observed in studies conducted since 1995 when glufosinate was sprayed over the top of glufosinate-tolerant cotton. Glufosinate provides broad-spectrum control of various weeds, is fast acting, but has limited translocation. The objectives of this research were to compare the efficacy and costs of weed control systems in glufosinate-tolerant, glyphosate-tolerant, and conventional cotton. A randomized block design with split-plot arrangement and four replications was used in studies conducted in 2003 at the Texas Agricultural Experiment Station near Lubbock, TX. The variety of cotton was the main plot factor, which included FM 989, FM 989 RR, and FM 981 LL. The treatment within a variety was the subplot factor, which included weed control system, weed-free, and weedy check. Applications for each weed control system within a variety were applied as needed according to labeled recommendations; therefore, applications were made independent of the other varieties. Weed-free plots were maintained by hand-hoeing, plus minimal cultivation. A blanket application of trifluralin was applied preplant to all plots and incorporated. Control of devil's-claw (*Proboscidea louisianica*), Palmer amaranth (*Amaranthus palmeri*), and silverleaf nightshade (*Solanum elaeagnifolium*) was recorded, and net returns above weed control costs was calculated based on lint yields and weed control costs.

The treatments for the conventional weed control system included trifluralin preplant incorporated (PPI) at 0.75 lb ai/A followed by (fb) pyrithiobac at 0.06 lb ai/A + MSMA at 0.75 lb ai/A postemergence-topical (POST) fb cultivation fb cultivation fb hand hoeing. The glufosinate-tolerant weed control system included trifluralin PPI at 0.75 lb ai/A fb glufosinate POST at 0.42 lb ai/A fb glufosinate POST at 0.42 lb ai/A fb cultivation fb hand hoeing, while the glyphosate-tolerant weed control system included trifluralin PPI at 0.75 lb ai/A fb glyphosate POST at 0.75 lb ae/A fb glyphosate postemergence-directed (PDIR) at 0.75 lb ae/A. The glyphosate-tolerant weed control system attained the highest control of silverleaf nightshade (90%), followed by the glufosinate-tolerant (49%) and conventional (3%) systems. Devil's-claw and Palmer amaranth were controlled at least 95% by all systems. Lint yields from the glyphosate-tolerant system, glufosinate-tolerant system, and conventional system were 1050 lbs/A, 821 lbs/A and 736 lbs/A, respectively. Seed costs plus technology fees, herbicide and application costs, and mechanical inputs were used to calculate overall weed control system costs. The system costs for glyphosate-tolerant, glufosinate-tolerant, and conventional cotton were $69/A, $88/A, and $99/A, respectively. The glyphosate-tolerant system had the highest net returns above weed control costs ($522/A), followed by the glufosinate-tolerant ($291/A) and conventional ($374/A) systems. These data show that the glyphosate-tolerant system needed the least number of inputs and had the highest lint yields and net returns above weed control cost when compared to glufosinate-tolerant or conventional systems. However, additional studies over years are needed to determine the consistency of these findings.