LIGHT-ACTIVATED HOODED SPRAYER: A TWO-YEAR EVALUATION IN HIGH PLAINS COTTON

D. Alan Peters
Texas Tech University
Lubbock, TX
Peter A. Dotray
Texas Tech University, Texas Agricultural Experiment Station,
and Texas Agricultural Extension Service
J. Wayne Keeling
Texas Agricultural Experiment Station
Lubbock, TX
John B. Wilkerson and F. Henry Moody
University of Tennessee
Knoxville, TN

Abstract

Field experiments were conducted in 2000 and 2001 near New Deal, TX to compare weed control in a Roundup Ready cotton production system using mechanical cultivation, a conventional hooded sprayer, and a light-activated hooded sprayer. Treatments included Treflan at 1.5 pt/A applied preplant incorporated (PPI) followed by Caparol at 1.2 qt/A applied preemergence and mechanical cultivation as needed; Treflan PPI followed by a postemergence over-the-top (POT) broadcast application of Roundup Ultra at 1 qt/A at the four leaf growth stage, and Roundup Ultra applied at 1 qt/A with a conventional hooded sprayer (HS) as needed; Treflan PPI followed by Roundup Ultra POT broadcast and Roundup Ultra applied at 1 qt/A with a light-activated hooded sprayer (LAS) as needed; and Treflan PPI followed by a POT application of Roundup Ultra at 1 qt/A on a fourteen inch band over the row at the four leaf stage and Roundup Ultra applied at 1 qt/A with LAS as needed. 'Paymaster 2326 RR' cotton was planted at a seeding rate of 15 lb/A on 40 inch rows on May 9, 2000 and May 10, 2001 and harvested November 20, 2000 and December 10, 2001. Experimental design was a randomized complete block consisting of four replications. Plots were 8 rows by 600 feet. Preplant incorporated treatments were applied February 29, 2000 and March 2, 2001, and incorporated with a springtooth harrow. Preemergence applications were made on May 10 both years. Postemergence treatments were applied on June 9, July 3, and July 18 in 2000 and June 9 and July 5 in 2001. Weeds were 1 to 6 inches in height at the time of application. Control of Palmer amaranth, common cocklebur, and silverleaf nightshade was visually rated on June 17 (early season), July 28 (mid season), and August 14 (late season) in 2000 and June 23, July 19, and August 2 in 2001. The amount of spray solution used by the LAS was determined by subtracting the volume remaining after spraying a single plot from the initial volume in the tank. Percent herbicide savings was calculated based on the amount of solution required to apply a broadcast treatment.

In 2000, control of Palmer amaranth ranged from 83-88% for all treatments at the early rating. At the mid and late season ratings, the LAS treatments provided at least 88% control and were similar to HS and greater than cultivation. Common cocklebur control with LAS was similar to HS and greater than cultivation at all rating dates. Silverleaf nightshade was controlled 31-40% by all treatments at the early rating. At the mid and late season ratings, LAS provided control similar to HS and greater than cultivation.

In 2001, Palmer amaranth and common cocklebur control at all rating dates was similar to HS and ranged from 75-93% for both weeds when LAS was used following a POT broadcast application of Roundup Ultra. However, when LAS was used following a band application, Palmer amaranth control at the mid and late season ratings was reduced when compared with LAS following a broadcast application. At the early and late season ratings, silverleaf nightshade control with LAS was similar to HS, but mid season control was greater for HS (80% vs 68%).

Herbicide savings in 2000 were 85% for the June application, 63 and 67% for the July 3 application, and 56 and 71% on July 18. In 2001, observed herbicide savings were 73% for the June application and 84 and 62% for the July application. Lint yields ranged from 380 to 430 lb/A in 2000 and 500 to 940 lb/A in 2001. No significant differences were observed in yield in either year.

In addition, fields were weed mapped in 2001 to determine whether weeds were randomly distributed over the field and to observe population changes over time. These studies indicate the weed control programs utilizing LAS may control weeds similar to a conventional hooded sprayer and significant herbicide savings were observed