

ANNUAL AND PERENNIAL WEED CONTROL IN LIBERTY LINK COTTON

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Abstract

Cotton weed control systems on the Texas Southern High Plains typically include dinitroaniline herbicides applied preplant incorporated (PPI) in combination with Roundup UltraMax in Roundup Ready cotton. A new weed management tool available to growers in the near future is Liberty Link cotton. Since its development in 1995, researchers have evaluated tolerance and weed control in Liberty Link cotton. Field studies were conducted at the Texas Agricultural Experiment Station near Lubbock in 2001 and 2002 to evaluate the effects of Liberty on Liberty-tolerant stripper cotton lines when applied at selected growth stages, rates, and sequential timings. Additional studies were conducted to evaluate weed control in Liberty Link cotton using Liberty in combination with residual herbicides. The varieties observed for the tolerance tests were designated as experimental numbers 8000515 and 8000535, which are lines derived from the genetic backgrounds of two commercially available varieties. Cotton tolerance was evaluated in three separate tests including different growth stages, rates and sequential timings.

For the growth stage test, Liberty was applied postemergence topical (POST) at 0.54 lb ai/A to both lines at the cotyledon, 2- to 3-leaf, first square, first bloom, peak bloom, and cut-out growth stages. In a second test, Liberty was applied to both lines at different rates including 0.36, 0.72, 1.44, and 2.88 lb ai/A POST. The final tolerance test conducted was the sequential test in which Liberty was applied at the cotyledon, 2- to 3-leaf, and 4- to 5-leaf stages POST, and at the same rate postemergence-directed (PDIR) late season. Visual injury was evaluated 7, 14, and 21 days after each Liberty application. Plant heights were recorded 14 and 21 days after treatment. Cotton plants were mapped at harvest and yield and fiber quality characteristics determined.

Both stripper cotton lines exhibited excellent tolerance to Liberty applications throughout each growing season. Treatments had no adverse effects on visual injury, plant height, first position bolls, nodes per plant, or yield. Liberty applications also had no effect on fiber properties such as micronaire, length, and strength.

Additional field studies were conducted in 2001 and 2002 to evaluate Palmer amaranth (*Amaranthus palmeri*), devil's-claw (*Proboscidea louisianica*), and silverleaf nightshade (*Solanum elaeagnifolium*) control in Liberty Link cotton. Treflan at 0.75 lb ai/A was applied preplant incorporated to all plots. Treatments for this test included: 1) Caparol at 1.2 lb ai/A preemergence (PRE) followed by (fb) Liberty POST; 2) Liberty POST; 3) Caparol PRE fb Liberty POST fb Liberty POST; 4) Liberty POST fb Liberty POST; 5) Caparol PRE fb Liberty POST fb Liberty POST fb Liberty POST fb Liberty PDIR; 6) Liberty POST fb Liberty POST fb Liberty PDIR. Liberty was applied at 0.36 lb ai/A for all treatments POST and PDIR. Palmer amaranth, devil's-claw, and silverleaf nightshade control was evaluated after each Liberty application. For both Palmer amaranth and devil's-claw, a year by treatment interaction was not present so years were pooled and control of these weeds was averaged over years. Two applications of Liberty in combination with Treflan PPI controlled Palmer amaranth and devil's-claw season long (95%), while three applications did not improve control of these weeds. In 2001, silverleaf nightshade control increased to 65% with three applications of Liberty. In 2002, silverleaf nightshade control was improved after two (50%) and three (72%) Liberty applications.

Two perennial weed control tests were conducted in 2002 to evaluate Texas blueweed (*Helianthus ciliaris*) and woollyleaf bursage (*Ambrosia grayi*) control before planting. Liberty was applied POST to these weeds on May 21 at the following rates: 1) 0.36 lb ai/A; 2) 0.42 lb ai/A; 3) 0.52 lb ai/A. At 7 days after treatment (DAT) Liberty controlled Texas blueweed 85 to 95%. However, by 28 DAT, a rate response was observed and Liberty at 0.36 lb ai/A provided 60% control, while the highest rate (0.52 lb ai/A) provided 90% control. By 42 DAT little to no Texas blueweed control was observed. Liberty controlled woollyleaf bursage 95 to 100% across all three rates at 7 DAT. At 28 DAT, control of this weed decreased to 80 to 90%, and no control was observed at 42 DAT.

The development of Liberty Link cotton will provide a new option for weed control programs on the Texas Southern High Plains. Liberty Link seed should be available on a limited acreage basis for the 2003 growing season, and varieties should be available for commercial use by 2004. Therefore, studies will be continued to evaluate weed control in Liberty Link cotton on both annual and perennial weeds across the Texas Southern High Plains.