WEED MANAGEMENT IN STRIP-TILLAGE COTTON

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Abstract

The number of strip-tilled cotton acres on the Texas Northern High Plains has increased to compensate for high energy costs as well to conserve water and manage soil erosion. Strip-tillage is a tillage system in which strips (generally 10 to 12 inches wide and 30 inches from center to center) are tilled prior to planting rather than broadcast tillage. The strips serve as the seedbed. It is likely that the number of strip-tilled cotton acres will continue to increase as producers attempt to reduce inputs to improve profitability for a given crop. In order for a strip-tillage cropping system to be effective, weed control must be achieved. The development of herbicide-resistant cotton varieties has facilitated the shift from conventional-tillage to strip-tillage systems and has also led to the reliance on herbicides as a primary means of weed control. The lack of broadcast tillage presents some unique problems with the use of preplant incorporated (PPI) herbicides (primarily dinitroanalines). In addition to herbicides applied PPI, herbicides are also applied after planting prior to crop emergence (preemergence, PRE), and after crop emergence (postemergence, POST) in order to lessen or eliminate weed competition with the crop.

The objective of this study is to evaluate various weed management systems in strip-tillage cotton using PPI herbicides applied broadcast and incorporated into the tilled strip to control weeds prior to planting, and using PRE and POST herbicide applications following planting. Studies were conducted in Farwell, Texas in 2006 and 2007 on Acuff and Bippus soils under center-pivot irrigation. FiberMax® 960BR was planted in 2006 and FiberMax® 9058F was planted in 2007. The study was arranged in a randomized complete block design with four replications. Individual plots measuring 15 by 30 feet. Treatments consisted of all combinations of pendimethalin PPI at 1.0 lb ai/A, prometryn PRE at 1.2 lb ai/A, and POST treatments of either glyphosate at 0.75 ae/A or a tank-mix of pyrithiobac at 0.063 lb ai/A plus S-metolachlor at 1.27 lb ai/A. All treatments were applied with either a CO_2 backpack sprayer or a tractor-mounted compressed air sprayer, both of which were calibrated to deliver 10 GPA. Visual assessments of Palmer amaranth (*Amaranthus palmeri* S. Wats.) control were made throughout the growing season on a scale from 0 to 100%. Two rows by 6.6 feet were hand-harvested from each plot at crop maturity. Data were analyzed by ANOVA and means were separated using Fisher's Protected LSD at P=0.05.

In 2006, pendimethalin applied alone controlled Palmer amaranth better than prometryn alone and equal to the combination of the two herbicides. The addition of POST treatments controlled early-season palmer amaranth at least 90%, except where pyrithiobac + S-metolachlor was used without PPI or PRE herbicides. Late-season Palmer amaranth control improved when POST herbicides were added to prometryn treatments. In areas that received no PPI or PRE herbicides, the addition of POST herbicides controlled late-season Palmer amaranth less than 80%. Lint yields were pooled according to POST treatment. Plots containing the addition of pyrithiobac + S-metolachlor or glyphosate had greater yields than plots that received no POST treatment. In 2007, early-season Palmer amaranth was controlled 100% regardless of the PPI or PRE treatments used. Palmer amaranth was controlled 100% early-season where pyrithiobac + S-metolachlor was applied, regardless of the use of PPI or PRE herbicides. The addition of glyphosate to pendimethalin treatments also controlled palmer amaranth 100% early-season. A sequential

application of glyphosate following the early-season glyphosate POST treatment was made due to late-season weed pressure. No other treatment received sequentials of any kind. The sequential application of glyphosate controlled late-season palmer amaranth 100% regardless of the use of PPI or PRE herbicides. Pendimethalin followed by (fb) prometryn fb pyrithiobac + S-metolachlor also controlled late-season palmer amaranth 100%. Yields were again pooled according to POST treatment. Plots containing the addition of pyrithiobac + S-metolachlor or the addition of glyphosate produced greater yields than plots that did not receive POST treatments.