WEED MANAGEMENT IN CONVENTIONAL AND STRIP-TILLAGE COTTON IN NORTH CAROLINA

S. D. Askew, J. W. Wilcut,
S. B. Clewis and J. D. Hinton
North Carolina State University
Raleigh, NC

Abstract

Strip-tillage cotton is becoming more common in North Carolina. By tilling only a narrow strip and leaving residue in inter-row spaces, sand blasting and erosion are reduced compared to conventional full-width tillage. Water infiltration is improved just as with no-till but soil temperatures are often warmer in the strips compared to no-till. These advantages are allowing North Carolina producers to adopt conservation tillage, and it's benefits, while avoiding the problems in seedling establishment and slow early-season growth often encountered in no-till.

The registrations of Buctril (bromoxynil), Roundup (glyphosate), and Staple (pyrithiobac) for postemergence application in cotton also have improved the chances of success in conservation tillage. These herbicides have different weed control spectrums and thus, different needs for supplementary soil-applied or layby herbicides. Deciding which system is correct depends on the target weed spectrum, suitability of available cotton varieties to the growing region and tillage system, and herbicide-resistance management and carryover in rotational crops. Studies were conducted in 1999 at four North Carolina locations to evaluate herbicide systems using Buctril, Roundup Ultra, and Staple in conventional and strip-tillage cotton for weed control and cotton response and yield. Cotton varieties were 'Stoneville 474', 'Stoneville BXN47', and 'Paymaster 1220RR'. The study was conducted as a split-split plot with two main plots, three subplots, and five sub-subplots for a total of 30 treatments. Main plots were strip or full-width tillage. Subplots were non-transgenic, Buctril-resistant, and Roundup-resistant cotton cultivars. And sub-subplots included: nontreated and weed-free controls, and three herbicide systems.

The herbicide systems differed only in the soil-applied herbicide option and the fact that POST herbicides were matched to the appropriate cotton cultivar (e.g. Roundup-resistant, Buctril-resistant, and non-transgenic). Soil-applied herbicide options were: Prowl at 0.75 lb ai/A plus Cotoran at 1.0 lb ai/A PRE broadcast, Prowl PRE banded 12", and no PRE herbicide. Postemergence herbicides as appropriate for Roundup-resistant, Buctril-resistant, and non-transgenic cotton cultivars, respectively were: Roundup at 1.0 lb ai/A as needed, Buctril at 0.375 lb ai/A plus Bueno 6 (MSMA) at 1.0 lb ai/A, and Staple at 0.032 lb ai/A plus Bueno 6. All herbicide systems included a layby application of Caparol (prometryn) at 1.2 lb ai/A plus Bueno 6 at 2.0 lb ai/A post directed. The weed-free control allowed assessment of yield potential for each cultivar. The three herbicide systems evaluate the need for soil applied herbicides with each cultivar. Arcsine square root-transformed weed control data and yield data were subjected to analysis of variance with sums of squares partitioned to reflect location interactions and the split-split plot treatment design.

All herbicide systems controlled the following weeds at least 94%: jimsonweed (*Datura stramonium*), entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula*), tall morningglory (*Ipomoea purpurea*), goosegrass (*Eleusine indica*), and yellow nutsedge (*Cyperus esculentus*). Staple systems did not control common lambsquarters (*Chenopodium album*) or Texas panicum (*Panicum texanum*) and Buctril systems were week on smooth pigweed (*Amaranthus hybridus*) and Palmer amaranth (*Amaranthus palmeri*). When soil-applied herbicides were not used, Roundup controlled prickly sida (*Sida spinosa*) and sicklepod (*Senna obtusifolia*) better than Staple or Buctril. Roundup controlled all weeds evaluated at least 94% with or without soil-applied herbicides.

At some locations cotton lint yield decreased when fewer soil-applied herbicides were used. Yield decreases at these locations usually coincided with increased weed pressure. Even though late-season weed control was high with Roundup systems, yield was reduced at some locations when no soil-applied herbicides were used due to early-season weed interference. Within location and tillage options, yield potential did not significantly differ between the three cultivar-types as assessed by the weed-free controls. Tillage never affected cotton lint yield except two instances where Roundup-resistant cotton at Goldsboro, NC and Buctril-resistant cotton at Clayton, NC yielded more in strip till than in full-width tillage.

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