

IMPACT OF TILLAGE PRACTICES, ROW WIDTHS, AND HERBICIDE PROGRAMS ON WEED SPECIES SHIFTS AFTER FOUR YEARS

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ABSTRACT

A long-term field experiment was initiated near Blackville, SC in 2001 to assess the impact of tillage type, crop row width, and herbicide programs on shifts in the weed spectrum. The test site was planted to soybean in 2001 and 2003 and corn in 2002 and 2004. In 2000, prior to initiating the experiment, the test site was planted to conventionally tilled corn. In all years, conventional tilled plots were disked while conservation tilled plots were strip tilled and deep tilled with an in-row shank or deep tilled with a ParaTill with no surface tillage. The test site at initiation of the experiment mainly contained large crabgrass and Palmer amaranth, with minimal perennial weeds. The soil seedbank was evaluated following the 2003 crop through exhaustive germination of soil cores. Conventional tilled, narrow-row plots from a 0- to 2-inch depth averaged 45,000 Palmer amaranth seed/acre compared with 377,000 Palmer amaranth seed/acre in reduced tilled plots. At the same depth, carpetweed numbers in narrow rows were 1.9 million seed/acre in conventional tilled plots compared with 3.6 million seed/acre in the absence of surface tillage. In wide rows (38 inch), strip tillage generally lowered weed seed numbers compared with conventional tilled plots. Weed biomass in glyphosate-treated plots averaged over row widths in the fall of 2004 was 18 and 71 lb/acre in conventional and conservation tillage systems, respectively. In non-glyphosate plots, weed biomass averaged 312 and 740 lb/acre in conventional and conservation tillage systems. The greater weed biomass in conservation tilled plots was mainly due to a shift in the weed spectrum to common bermudagrass and Carolina horsenettle in the absence of glyphosate. This research shows that glyphosate is needed to minimize perennial weed occurrence in conservation tilled corn and soybean production systems in the southeastern United States.