WEED COMMUNITY COMPOSITION OVER EIGHT YEARS OF CONTINUOUS GLYPHOSATE USE IN A CORN-SOYBEAN ANNUAL ROTATION. Mark R. Jeschke and David E. Stoltenberg, Graduate Research Assistant and Professor, Department of Agronomy, University of Wisconsin, Madison, WI, 53706.

Field research was conducted from 1998 through 2005 to determine the effects of primary tillage system and glyphosate use intensity on weed community composition in a corn-soybean annual rotation. Six weed management treatments were compared across three tillage systems: moldboard plow, chisel plow, and no-tillage. Weed management treatments were based on six levels of glyphosate use intensity: glyphosate applied postemergence (POST), glyphosate applied POST and late POST (in corn only), glyphosate applied POST followed by inter-row cultivation (in corn only), glyphosate applied POST rotated annually with a non-glyphosate herbicide program, a soil-residual herbicide applied preemergence (PRE) followed by glyphosate applied POST, and a non-glyphosate program. Plots (6.1 m by 12.1 m) were maintained in the same location for the duration of the experiment. Weed seedbank density was measured prior to crop planting and weed plant density was measured several times each growing season. Weed plant density and species richness were typically lower in the moldboard plow system than in the chisel plow and no-tillage systems. Weed species richness was typically greater in glyphosate-based weed management treatments than in non-glyphosate treatments, in which a few highly competitive species became dominant over time. Weed community composition was affected little by most glyphosate-based treatments, with common lambsquarters, giant foxtail, and pigweed species remaining the most abundant species over time. Similarly, total weed density in glyphosate-based treatments changed little or decreased over time. However, in treatments where weed management consisted of glyphosate applied POST only once, giant ragweed, shattercane, and large crabgrass plant densities and seedbank densities increased over time, particularly in the chisel plow and no-tillage systems; however, increased densities of these species had little effect on total weed seedbank density. Although only minor changes in weed community composition associated with glyphosate use intensity occurred over 8 yr, an extended emergence period may be a key mechanism by which weed populations persisted or increased over time.

2006 North Central Weed Science Society Proceedings 61:77.