

MEASURING THE EFFECTS OF ROTATIONAL TILLAGE SYSTEMS ON POPULATION DYNAMICS IN CORN AND SOYBEANS. Ryan P. Miller, Beverly R. Durgan, and Gregg A. Johnson, Graduate Research Assistant and Professors, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108.

A long-term study of tillage rotations was initiated in the fall of 1998 at the University of Minnesota Southern Research and Outreach Center in Waseca Minnesota. Tillage rotations were implemented over two fields in a corn and soybean rotation. Tillage rotations consisted of continuous chisel plow, continuous strip till, continuous no-till, no-tilled soybeans followed by strip tilled corn, no-tilled soybeans followed by chisel plowed corn, and chisel plowed soybeans followed by strip tilled corn. Tillage operations were performed in the fall, and field cultivation was conducted in spring following all chisel plow treatments. Initial weekly weed assessments were taken in the summer of 2002. The assessments included cataloging weed species, weed species number, average weed heights, weed node or leaf number, and were conducted during the first seven weeks after planting. These assessments were made in permanently established 0.25 meter square quadrates. There were eight quadrates per plot with four located in the inter-row space and four located in the intra-row space. In addition to weekly weed assessments several environmental factors were recorded including: beginning of the season percent residue cover, weekly gravimetric soil moisture, hourly soil temperature, and daily atmospheric weather conditions. Weekly weed assessments are used to analyze weed population dynamics under the different tillage and crop rotations. Results indicate that tillage and crop rotations influence weed population dynamics. Additional studies will determine how tillage rotations will be utilized in an integrated weed management system.