

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 in a corn-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; in addition field cultivation was conducted in spring following all chisel plow treatments. Weekly weed assessments were taken for seven weeks after planting in 2002 and 2003. Data collected included weed species, weed species number, average weed heights, and weed node or leaf number. These assessments were made in permanently established 0.25 meter square quadrats. 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. Results indicate that tillage and crop rotations influence weed population dynamics. As levels of tillage disturbance increase, velvetleaf densities decrease and densities of small seeded broadleaves increase. Additional studies will determine how tillage rotations can be utilized in an integrated weed management system.