

**RISKS OF WEED SPECTRUM SHIFTS AND HERBICIDE RESISTANCE IN IRRIGATED ROUNDUP READY CROPPING SYSTEMS - A WESTERN NEBRASKA PERSPECTIVE AFTER 8 YEARS.** Robert G. Wilson\*, University of Nebraska, Scottsbluff, NE 69361; Stephen D. Miller and Andrew R. Kniss, University of Wyoming, Laramie, WY 82071; Philip Westra, Colorado State University, Fort Collins, CO 80523; and Phillip W. Stahlman, Kansas State University, Hays, KS 67601.

Experiments were conducted at three irrigated locations: Scottsbluff, NE, Fort Collins, CO, and Torrington, WY from 1998 through 2005 to determine if glyphosate use patterns in glyphosate tolerant cropping systems influenced weed control by placing selection pressure on weed species, altered weed population dynamics, or lead to the development of glyphosate-resistant weeds. Experiments were designed as a two factorial split plot set in a randomized complete block design with four replications. Main plots were either continuous glyphosate tolerant corn or a rotation of glyphosate tolerant corn, sugarbeet, corn, sugarbeet, wheat, corn, sugarbeet, and corn. Sub-plots were glyphosate at 0.4 kg/ha applied postemergence twice each spring, glyphosate at 0.8 kg/ha applied postemergence twice each spring, a rotation of glyphosate at 0.8 kg/ha applied postemergence twice each spring followed the next year by a non-glyphosate treatment, or a non-glyphosate treatment each year. The seed bank was examined each year before crop planting. Weed density was measured before herbicide treatment, 2 wk after the last postemergence treatment, and at crop harvest when crop yields were also determined. After 6 yr of study the weed population at Scottsbluff declined and shifted from kochia and wild proso millet dominated population to a predominately common lambsquarters population. Common lambsquarters seed and plant populations increased to a greater extent in areas treated with the half rate of glyphosate. For the first time in 2003, the increase in weed density in the half rate glyphosate treatment resulted in a 42% decrease in corn seed yield. In reaction to the increase in common lambsquarters, each of the glyphosate sub-plots was split and half of the plot received acetochlor plus atrazine preemergence. The addition of a preemergence herbicide to postemergence glyphosate provided 91 and 98% common lambsquarters control in the half and full rate glyphosate treatments, respectively. After 8 yr of study, the weed population in the non-glyphosate treatment shifted to kochia. Two weed management strategies; glyphosate at 0.8 kg/ha twice each year, alternating glyphosate at 0.8 kg/ha twice each year with a non-glyphosate treatment, and non-glyphosate treatment were both equally effective in reducing weed density.