

EVOLVED RESISTANCE TO ACETOLACTATE SYNTHASE INHIBITING HERBICIDES IN COMMON SUNFLOWER, GIANT RAGWEED, AND SHATTERCANE IN IOWA. Ian A. Zelaya and Micheal D.K. Owen, Research Associate and Professor, Department of Agronomy, Iowa State University, Ames, IA 50011–1011.

From 1997 to 2001, Iowa farmers reported inconsistent common sunflower (*Helianthus annuus* L.), giant ragweed (*Ambrosia trifida* L.), shattercane [*Sorghum bicolor* (L.) Moench] and woolly cupgrass [*Eriochloa villosa* (Thunb.) Kunthweed] control with acetolactate synthase (ALS) inhibiting herbicides. Cross-resistance to imidazolinone (imazethapyr) and sulfonyleurea (chlorimuron) herbicides was confirmed in a common sunflower population from Cherokee, IA, which had a > 35-fold resistance increase compared to a common sunflower susceptible population from Ames, IA. Cross-resistance was also established in a giant ragweed population from Scott County, IA. Compared to a susceptible giant ragweed population from Zearing, IA, the Scott County biotype demonstrated a > 20-fold resistance increase to triazolopyrimidine sulfonanilide (cloransulam) and sulfonyleurea (primisulfuron + prosulfuron) herbicides. Resistance to imazethapyr (20-fold increase) was confirmed in a shattercane population from Malvern, IA; however, the population was susceptible to nicosulfuron. Both woolly cupgrass populations from Union County, IA were susceptible to imidazolinone (imazethapyr + imazapyr) and sulfonyleurea (nicosulfuron) herbicides. Utilizing an *in vivo* ALS assay, differential 2,3-diketone accumulation in the tissues of treated resistant plants confirmed greenhouse herbicide efficacy trials. Field history records suggested that resistance evolved in environments where ALS inhibiting herbicides represented an important component of the selection pressure. For further details refer to: Zelaya, I. A., and M. D. K. Owen. 2004. Evolved resistance to acetolactate synthase-inhibiting herbicides in common sunflower (*Helianthus annuus*), giant ragweed (*Ambrosia trifida*), and shattercane (*Sorghum bicolor*) in Iowa. *Weed Sci.* 52:538–548.