EFFECT OF DELAYED WATERHEMP EMERGENCE IN SOYBEAN ON GROWTH AND FECUNDITY. Robert G. Hartzler, Bruce A. Battles and Dawn E. Refsell, Professor, Research Associate and Graduate Assistant, Department of Agronomy, Iowa State University, Ames, IA.

Four experiments were conducted in central Iowa during the 1998 and 1999 growing seasons to evaluate the effect of delayed waterhemp emergence in soybean planted in 0.76 cm rows. Four emergence cohorts were established in each experiment: 1) waterhemp emerging immediately after planting (approximately 14 days after planting (DAP)), 2) waterhemp emerging at two trifoliate soybean stage (25-30 DAP), 3) waterhemp emerging at four trifoliate soybean stage (38-42 DAP), and waterhemp emerging at six trifoliate soybean stage (48-52 DAP). A total of sixty plants per cohort were identified shortly after emergence and monitored throughout the growing season. Percent survival, biomass accumulation and fecundity of the cohorts were determined.

Waterhemp survival averaged over the four locations was 91, 72, 52 and 19% for the first, second, third and fourth cohorts, respectively. At three sites, the first waterhemp cohort averaged approximately 300 g dry matter per plants, whereas at the other location waterhemp emerging shortly after planting accumulated more then 1.3 kg per plant. Waterhemp growth parameters were combined from the three locations with lower biomass acumulation due to similarity in growth and response to delayed emergence, whereas the fourth site was analyzed separately. At the three sites with similar responses, biomass was reduced 79, 95 and 99% when emergence was delayed until the V2, V4 and V6 soybean stage, respectively. At the other site, emergence delays resulted in 45, 78 and 90% reductions in biomass. Plants emerging shortly after planting at the sites with lower productivity averaged approximately 320,000 seeds per plant. At the fourth location, the first cohort averaged more than 2 million seeds per plant, with one plant producing more than 5 million seeds. Reductions in seed production due to delays in emergence was closely correlated to biomass reductions.

Delays in waterhemp emergence in relation to soybean planting resulted in rapid reductions in biomass accumulation. Due to the reduced biomass, waterhemp plants emerging after the V4 stage of soybean are unlikely to significantly affect soybean yields in most settings. However, due to the prolific seed production of this species, late-emerging weeds may maintain or build the seedbank.