SEEDLING MORTALITY AND BIOMASS REDUCTION OF THREE WEED SPECIES ESCAPING SOIL APPLIED HERBICIDE. Konanani B. Liphadzi and J. Anita Dille, Graduate Research assistant and Assistant Professor, Department of Agronomy, Kansas State University, Manhattan, KS 66506.

The use of bioeconomic models can be useful to growers in facilitating weed management decision making. Expected yield loss after application of control is often calculated based on a reduction in numbers of weeds, but the model assumes these survivors are as competitive as uncontrolled weeds. The result is an over estimate of expected yield loss. Understanding the real change in escaped weed competitiveness will improve predictions of yield loss and will lead to better economic decisions. A field experiment was conducted at Ashland Bottoms Agronomy Research Farm in 2001. The objective was to determine the effect of density on weed seedling mortality and biomass accumulation with and without exposure to pre-emergence herbicide. Corn was sown on May 15 in 0.76-m rows. Known quantities of velvetleaf, Palmer amaranth, and giant foxtail seed (20, 50, 100, 500 seed m^{-2}) were sown one day after corn planting into paired plots of 2 x 1 m^2 centered over one corn row. The experimental design was a randomized complete block with 5 replicates. Flumetsulam for velvetleaf or isoxaflutole for giant foxtail and Palmer amaranth was applied to one half of each pair, both at a rate of 0.039 kg a.i. ha^{-1}. Weed emergence and mortality data were collected at 6, 9, 13, 16, 26, 30, 33, 40, 43, 46, 51, and 55 days after planting (DAP). Cohorts of emergence were marked with colored wires to enable us to track survivors. Isoxaflutole delayed Palmer amaranth and giant foxtail emergence by seven days compared to no delay in velvetleaf emergence with flumatsulam. By 55 DAP, total giant foxtail, Palmer amaranth, and velvetleaf seedling emergence ranged from 3 – 100, 13 – 27, and 8 – 156 seedling m^{-2} respectively, across densities either with or without herbicide. Velvetleaf and giant foxtail seedling mortality was not affected by herbicide application but percent mortality was greater at low density. Mortality for giant foxtail decreased from 88% to 20%, 52% to 10% for Palmer amaranth, and 36% to 11% for velvetleaf, ranging from low density to high density, respectively. Palmer amaranth seedling mortality was not affected by either density or isoxaflutole. Biomass of herbicide treated plants was 65% lower than untreated plants for giant foxtail and 42% lower for velvetleaf. The combination of low density and herbicide treatment tended to have higher seedling mortality despite high variability in emergence numbers. Biomass accumulation of giant foxtail and velvetleaf were reduced by exposure to herbicide.