

GROWTH AND DEVELOPMENT OF ANNUAL WEEDS BY COHORT EMERGENCE TIMES IN CORN. Kathrin Schirmacher*, J. Anita Dille, Dale L. Fjell, and David L. Regehr, Graduate Research Assistant, Assistant Professor, Professor, and Professor, Agronomy Department, Kansas State University, Manhattan, KS 66506.

Variability in biological processes that drive weed population dynamics is poorly understood. Comprehending the extent of and factors that cause this variation will improve our understanding of basic weed biology, and is valuable when incorporated into computer-based weed management decision support systems. One biological process that varies is the relative time of crop and weed emergence. The objective was to determine the effect of corn growth stage on the emergence, development, and growth of four cohorts of eight annual weed species. Field experiments conducted near Manhattan in 2001 and 2002 documented time of 50% weed emergence, crop and weed heights, growth stages, and cylindrical volume of annual weeds. The eight weed species were common lambsquarters, common sunflower, Palmer amaranth, velvetleaf, fall panicum, giant foxtail, large crabgrass, and shattercane. Each experimental whole-plot included the eight species grouped by cohort, with cohort identified at a given corn growth stage (0, VE, V1, V3). In both years, and across weed species, cohorts planted earlier (0 and VE) indicated higher emergence, establishment and seasonal developmental rates. In the first cohort, all eight species emerged. Germination of common lambsquarters and fall panicum seed in 2001, and large crabgrass in 2002 failed to produce many seedlings in cohort 1 (0), and yielded no plants in cohorts seeded at VE, V1, and V3. The only species to emerge in cohort 4 (V3) were velvetleaf and shattercane, though some of these seedlings exhibited high mortality early in the growing season as environmental conditions shifted from wet to dry in both years. Overall, velvetleaf and shattercane were the earliest emergers within a cohort, followed by common sunflower and giant foxtail, which exhibited intermediate emergence times among the weeds studied. Common lambsquarters, fall panicum, large crabgrass, and Palmer amaranth revealed more erratic emergence profiles and were usually the last species to emerge within cohorts. In summary, results of this research indicated that emergence of seedlings differed among planting cohorts. Plants of earlier cohorts were more successful at completing their reproductive life cycles, more so than cohorts planted at a later corn growth stage.