RELATIVE COMPETITIVE INDICES OF ANNUAL WEEDS USING CROP LOSS ESTIMATES. Kathrin Schirmacher and J. Anita Dille, Graduate Research Assistant and Assistant Professor, Agronomy Department, Kansas State University, Manhattan, KS 66506.

Environmental and social impacts of herbicide usage have been heavily debated. The integration of a Decision Support System (DSS) into given management strategies shows great potential for reducing the amount of herbicide applied, improving management methods, and assessing crop yield losses resulting from weed interference. The DSS currently being developed in Kansas lacks competitiveness information on multiple weed species. Refining this information database will lead to the validation of a more effective weed management tool. The objective is to determine the competitive indices of six selected annual Kansas weed species based on crop and weed growth, weed biomass, weed volume, and crop yield. A field study was conducted in 2001 at Ashland Bottoms Agronomy Research Farm. Common sunflower, giant foxtail, large crabgrass, Palmer amaranth, shattercane, and velvetleaf were sown immediately after corn planting on May 15, 2001. Plots were 8-m long by 3 corn rows wide. Weeds were sown within 0.10 m of the center row for a length of 4 m. Emerged seedlings were thinned to a density of 10 plants m^{-1} of corn row. Corn and weed height, canopy diameter, and leaf numbers were noted every 7 to 10 days. Corn was harvested on September 30, 2001 from 3 m of the center row, threshed, dried, and adjusted to 15.5%. Corn and weed height, weed leaf and tiller number, and weed volume data were fit to a sigmoidal response curve relative to days after planting. Species were ranked according to their influence on measured variables. Maximum corn height varied from 197 cm to 226 cm, with corn being the shortest in the stand of common sunflower. Weed height at the end of the growing season was 196 cm for common sunflower, followed by Palmer amaranth, velvetleaf, shattercane, giant foxtail, with large crabgrass being the shortest at 35 cm. Similar rankings were noted for leaf numbers, volume, and biomass measurements. Large crabgrass had the greatest number of tillers followed by giant foxtail and shattercane. Corn yield varied from 157 kg ha^{-1} with common sunflower to 633 kg ha^{-1} with large crabgrass. Preliminary observations indicated that common sunflower interference was more substantial than the other weeds that were evaluated. Weed height, leaf number, volume, and biomass tended to be greater for the broadleaf species than the grasses. Accordingly, common sunflower, velvetleaf, and Palmer amaranth were ranked 1, 2 and 4, and giant foxtail was ranked third in terms of crop yield.