

LIGHT LEVEL INFLUENCES ON THE RELATIVE COMPETITIVENESS OF SHATTERCANE AND COMMON SUNFLOWER. Stephanie R. Deines, J. Anita Dille, David L. Regehr, and Scott Staggenborg, Graduate Research Assistant, Assistant Professor, Professor and Professor, Department of Agronomy, Kansas State University, Manhattan, KS 66506.

Shattercane and common sunflower are two dominant competitors in Kansas row crops. Through understanding their relative competitiveness, improved weed management decisions can be made using economic thresholds or decision support systems. Common sunflower has proven to be more competitive than shattercane in the field due to its ability to capture more light. Common sunflower is taller and has greater leaf area than shattercane. The objective of the study was to determine relative competitiveness of common sunflower and shattercane in response to two light levels by comparing the relative yield and aggressivity of each weed species. In the greenhouse a replacement series was set up in a split-split plot design replicated four times. Eight plants were established in plastic pots 15 cm in diameter filled with clay silt loam. Each pot consisted of a monoculture of shattercane, a monoculture of common sunflower, or one of three mixtures in 75:25, 50:50, and 25:75 planting ratios. Fifteen pots per replicate were exposed to one of two light levels (full sunlight and 25% sunlight). The twenty-five percent sunlight was obtained by placing the pots under a tent of horticulture cloth. Plants were grown in the greenhouse under sodium halide lights at a daily mean temperature of 22C with a 16h photoperiod. The experiment was repeated with the first and second experiments initiated October 9, 2000 and July 11, 2001, respectively. Pots were rotated within each replication every third day to eliminate any edge effect and insure even lighting. Water was supplied via daily sub-irrigation to eliminate any competition for water. Pots were fertilized weekly with 23-19-17 to minimize nutrient competition. Individual plant height, weight, leaf area, and leaf number were measured at 14, 28, and 35 days after planting (DAP). Relative yield (RY) was determined by dividing the yield of a species in a mixture by the yield of the same species in a monoculture. Aggressivity of shattercane was determined by subtracting the RY of common sunflower from the RY of shattercane.

Relative yields of shattercane at 28 DAP were greater than the expected relative yield when grown with common sunflower across experiment dates and light levels, suggesting that shattercane was more competitive than common sunflower. Height and leaf area of shattercane at 28 DAP was significantly greater than common sunflower across experiment dates and light levels. In full sunlight, shattercane was 58 and 55% taller than common sunflower in the 50:50 ratio for experiments one and two, respectively. In 25% sunlight, shattercane was 21 and 41% taller than common sunflower in the 50:50 ratio for experiments one and two, respectively. Likewise, in full sunlight, leaf area of shattercane was 72 and 79% greater, while in 25% sunlight, was 75 and 78% greater than common sunflower for experiments one and two, respectively. The aggressivity of shattercane was significantly greater than zero across experiment dates and light levels, signifying that shattercane has a greater ability to capture light than common sunflower early in the growing season.