MODELING MULTIPLE WEED SPECIES INTERFERENCE IN CORN. J. Anita Dille, Stephanie R. Deines, Eric L. Blinka, David L. Regehr, and Scott A. Staggenborg, Assistant Professor, Former Graduate Research Assistant, Graduate Research Assistant, Professor, and Associate Professor, Kansas State University, Department of Agronomy, Manhattan, KS 66502.

Field studies were conducted to compare corn yield loss caused by common sunflower and shattercane populations to predicted yield losses modeled using an additive function, WeedSOFT®, or a multiple species rectangular hyperbolic model, and to derive competitive index values for common sunflower and shattercane when interfering with corn. Common sunflower and shattercane emerged with corn and were established at selected densities within 15 cm on either side of the corn row in experiments at Scandia and Rossville, Kansas between 2000 and 2002. Weed-free corn yield ranged from no harvestable yield at Scandia in 2001 to 5,380 kg ha^{-1} at Scandia in 2000 and 11,735 kg ha^{-1} at Rossville in 2001. Maximum predicted yield losses ranged from 27 to 69%. Low density mixed populations of common sunflower and shattercane caused less than additive yield losses. The current WeedSOFT® yield loss model under-predicted yield losses. The multiple species rectangular hyperbolic model was appropriate and indicated that intra- and inter-specific interference was occurring at very low densities. When common sunflower was assigned a competitive index value of 10, the competitive index for shattercane ranged from 0.5 to 1.6 indicating that common sunflower was 6.25 to 20 times more competitive than shattercane when interfering in corn across all locations and years except at Rossville in 2001 when they were equally competitive.