

WEED COMPETITIVE INDICES: CORRELATION WITH SOIL WATER DEPLETION AND GROWTH PARAMETERS. F. William Simmons, Nicholas T. Fassler and Chris D. Kamienski. Kohler, Associate Professor, Graduate Research Assistant, and Graduate Research Assistant, Natural Resource and Environmental Science and Crop Science Dept. University of Illinois, Urbana, IL 61801.

Herbicide selection and postemergence application timing is often based on perceptions of weed species composition, weed size, and weed density evaluations. In some cases decision software utilizes relative weed competitive indices (CI) to estimate critical periods of weed interference. Current estimates of weed CI are based on expert opinion. Our experiment was designed to investigate the potential correlation of soil-water depletion, weed biomass, and weed leaf area index (LAI) with existing CI values. An initial greenhouse study was conducted using seven weed species (giant foxtail, common lambsquarters, tall waterhemp, palmer amaranth, velvetleaf, cocklebur, and giant ragweed) planted in large 21-l pots instrumented with time domain reflectometry probes. Wetting and soil-water depletion cycles were conducted periodically as the weeds developed over a 60-d period. Volumetric water content was measured continuously at 2-h intervals throughout the experiment. Rank order of LAI agreed fairly well with existing CI values but was not a linear relationship. Biomass accumulation was not related to CI indices, particularly since the amaranthus species accumulated the most biomass but have current CI values much less than either cocklebur or giant ragweed. Soil water depletion rates were greatest for giant ragweed and least for giant foxtail but were nearly the same for all other species. Unique weed size-water depletion rate relations were identified for individual species as well as threshold soil-water contents where weed species wilting occurs.