

WEEDSOFT: A REGIONAL WEED MANAGEMENT DECISION SUPPORT SYSTEM. Alex R. Martin* and Lynn B. Bills, Professor-Extension Weed Specialist and Visual Basic Program Weed Science, Department of Agronomy and Horticulture, University of Nebraska, Lincoln, NE, 68583, David A. Mortensen, Associate Professor-Weed Ecologist, Department of Crop and Soil Sciences, Pennsylvania State University, University Park, PA, 16802, Chris M. Boerboom, Extension Weed Specialist/Associate Professor, Department of Agronomy, University of Wisconsin, Madison, WI, 53706, and William G. Johnson, Assistant Professor and State Extension Specialist-Weed Science, Department of Agronomy/Plant Sciences Unit, University of Missouri, Columbia, MO, 65211.

WeedSOFT, a Windows based weed management decision support system originally developed at the University of Nebraska is now being modified for use in seven North Central states. This effort will result in each cooperating state having a version of WeedSOFT, that addresses its unique soil and climatic conditions, weed species and crop production practices. This regional project involves Illinois, Indiana, Kansas, Michigan, Missouri, Nebraska and Wisconsin. WeedSOFT consists of two modules, Advisor and MapVIEW. Advisor supports preemergence, postemergence and pre + postemergence weed management decisions in four crops: corn, sorghum, soybean, and wheat. WeedVIEW provides visual images as an aid in weed identification.

Advisor computes a crop yield loss and dollar loss based on weed density, weed free yield goal, and expected crop price. Weed management strategies evaluated include cultivation, band herbicide application, broadcast herbicide application, and combinations of these tactics. The user may specify herbicide price, seed cost associated with herbicide resistant crop, application cost, cultivation cost, row spacing, and herbicide band width. Advisor then ranks the available strategies, including cultivation and various herbicide treatments and application methods in order of net return or in order of crop yield depending on the user's preference. Additional herbicide treatment selection criteria based on user input include soil properties, rotational crop, ground and surface water based restrictions, and crop and weed growth stage. Output includes an ordered ranking of weed management strategies based on net return or crop yield and a detailed economic and efficacy analysis of individual treatments. In addition an estimate of each treatments effect on the weed seedbank is provided.

WeedSOFT is useful in a teaching environment. Among the biological principles that can be illustrated using WeedSOFT are: differences in competitiveness of different crop species and weed species, the influence of weed and crop growth stage on crop-weed interference, and the influence of production practices including crop row spacing on crop competitiveness. The influence of environmental factors including soil properties and precipitation pattern on herbicide efficacy and risk to rotational crops can be systematically illustrated with WeedSOFT.