

MANAGING WEED CONTROL INPUTS WITH WeedSOFT

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This session of the conference is focused on evaluating the economics of production inputs. Of these inputs, herbicides and their application comprise a sizable expense in corn and soybean production. Although these costs may account for only 10 to 20% of the total cost of crop production, it could be argued that effect of weed management decisions on crop yield can be as or more important than other production decisions (Lauer 2000). Obviously, if poor weed management decisions are made, yields can be severely reduced. It has been shown that herbicides can be replaced with a combination of rotary hoeing and cultivation without reducing yield if timing and conditions are optimal (Mulder and Doll 1993). However, it is unreasonable to suggest that many Wisconsin growers can adopt this type of intensive management to eliminate herbicides as an input cost. Options for reducing herbicide inputs via reduced herbicide rates combined with cultivation and the success of reduced rate systems have been discussed previously (Doll et al. 1992, Buhler et al. 1995, Proost et al. 1996). The use of reduced rates requires additional management practices such as timely cultivation, which can limit the use of this practice. Another option to evaluate the value of herbicide programs will exist with the WeedSOFT software program that is being adapted for Wisconsin.

WeedSOFT is a bio-economic decision aid that essentially combines three components to assist in making weed management decisions for field-specific information. One component is a filter that determines which herbicides can be used given the current crop, its growth stage, next year's crop, soil type, field location, and other information. The second component is an evaluation of the weed's competition on the crop's yield. This component accounts for the different competitive abilities of the weeds (it assesses multiple species in combination), their densities, and their size relative to the crop. All three of these factors can have a major effect on the predicted yield loss if weed are not treated with a herbicide. With a herbicide application, the predicted yield loss is recalculated based on the efficacy of the herbicide on each weed species. The third component is the economic analysis where the economic returns for the available herbicides are determined. The economic return is the gain (increased yield with control x price) minus the cost of the herbicide program, which includes applicable herbicide, application, and technology costs.

WeedSOFT can provide assistance in two levels of weed management decisions. First, it can provide an initial assessment of herbicide options to ensure that the greatest value from the herbicide considering herbicide cost and performance while avoiding off label herbicide treatments that may cause injury or carryover. Second, it can be used to assess the potential economic returns if a re-spray treatment is being considered. During this presentation, we will evaluate the yield loss, weed control, and economic predictions for several management scenarios within these two areas. This will allow the audience to evaluate the economic potential for reducing herbicide inputs.

We are currently making additional edits to the herbicide treatments in the WeedSOFT program and will be field testing the Wisconsin version of WeedSOFT with consultants in 2001. Upon favorable review, the program will be released for sale for the 2002 growing season. Our efforts to adapt WeedSOFT for Wisconsin have been supported by the Wisconsin Corn Promotion Board.

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