

ESTIMATED ECONOMIC LOSSES FROM EARLY WEED COMPETITION IN WISCONSIN CORN AND SOYBEAN FIELDS. Nathanael D. Fickett, David E. Stoltenberg, Chris M. Boerboom, and Clarissa M. Hammond, Graduate Student, Professor, Professor, University of Wisconsin, Madison, WI 53706 and Weed Scientist, Department of Agriculture, Trade, and Consumer Protection, Madison, WI 53708-8911.

A survey of Wisconsin agricultural professionals in 2007 indicated the majority believed over 75% of both corn and soybean fields in Wisconsin were being managed with postemergence glyphosate programs. Thus, the potential for significant yield loss due to early-season weed competition exists. To understand this potential, weed and crop characteristics were documented in Wisconsin corn and soybean fields through surveys taken immediately before postemergence herbicide applications. In 2008 and 2009, weed height and density by species were surveyed every 3 to 4 days until postemergence herbicide application in 48 and 45 corn fields and 30 and 40 soybean fields, respectively. Approximately five fields per county at least 5 km apart were randomly selected to be surveyed. For each field, a surveyor walked a horseshoe pattern through the field starting and ending at the field's edge. Heights and densities of predominant weed species were estimated in 10 1-m² quadrats per field spaced at intervals of 30 paces. A modified version of WeedSOFT® was used to estimate crop yield losses based on the weed population characteristics.

Corn fields had average weed heights of 15 and 14 cm and weed densities of 102 and 93 plants/m² in 2008 and 2009, respectively. Soybean fields had average weed heights of 21 and 18 cm and weed densities of 107 and 98 plants/m², in 2008 and 2009, respectively. The early season weed growth and competition measured in the corn fields was estimated to cause a 4.4 and 4.8% yield loss in 2008 and 2009, respectively. In soybean fields, the average estimated yield loss from weed competition was 9.3 and 3.1% in 2008 and 2009, respectively.

The risk of crop yield loss due to early season weed competition can be reduced through the application of preemergence herbicides. In 12 on-farm soybean trials in 2009, the efficacy of a reduced rate of a preemergence herbicide in soybean was determined by comparing weed control using postemergence glyphosate weed control from sulfentrazone plus cloransulam at 130 g ai/ha plus 17 g ai/ha followed by glyphosate. Each trial used three replications and plots approximately 7 ha in size. Weed density and height by species were measured before the whole trial was treated with glyphosate. The preemergence herbicide reduced both broadleaf and grass weed density and height compared to the glyphosate treatment, but not in each field. Overall, the average density of broadleaf and grass weeds was reduced by 66 and 50% and heights were reduced by 20 and 30%, respectively.

Glyphosate has enabled growers to obtain highly effective weed control even if larger weeds are treated or if applications are made later in the season. However, this research suggests that the hidden cost from late weed control and early season crop-weed competition is resulting in corn and soybean yield losses in Wisconsin. Economically viable means of reducing the risk of yield loss need to be evaluated and adopted where feasible.