

COMPARISON OF POSTEMERGENCE HERBICIDES IN CORN WITH RESISTANCE TO GLYPHOSATE AND GLUFOSINATE. Mark M. Loux, Anthony F. Dobbels, William G. Johnson, Bryan G. Young, Chris Boerboom, Kevin Bradley, and Aaron Hager, Professor and Research Associate, Department of Horticulture and Crop Science, The Ohio State University, Columbus, OH 43221, Associate Professor, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907, Professor, Department of Plant, Soil, and Agricultural Systems, Southern Illinois University, Carbondale, IL 62901, Professor, Department of Agronomy, University of Wisconsin, Madison, WI 53706, Assistant Professor, Division of Plant Sciences, University of Missouri, Columbia, MO 65211, and Associate Professor, Department of Crop Sciences, University of Illinois, Urbana, IL 61801.

Glyphosate-resistant corn is now the predominant type of corn grown in the Midwestern United States, and many glyphosate-resistant corn hybrids are also resistant to glufosinate. While the price of glyphosate is currently low, a weed management system based on use of glyphosate-resistant hybrids and glyphosate may not be the most economical choice for some corn growers, due to differences in seed costs and the availability of other effective and economical POST corn herbicides. A primary objective of this research was to determine whether similar weed control and crop yield occurs when other POST herbicides are substituted for glyphosate in corn resistant to glyphosate and glufosinate.

A field study was conducted at a total of 11 sites in 2008 and 2009 to determine the effectiveness of four POST herbicide systems in corn resistant to glyphosate and glufosinate. POST herbicide systems included: glyphosate (840 g ae/ha); glufosinate (450 g/ha)/atrazine (560 g/ha); tembotrione (92 g/ha)/atrazine (560 g/ha); and rimsulfuron (13 g/ha)/nicosulfuron (26 g/ha)/dicamba (84 g/ha)/diflufenzopyr (34 g/ha). The two types of herbicide applications in the study were: 1) EPO - early POST application of a combination of POST and residual herbicides, when weeds were less than 7 cm tall; and 2) PRE/POST - application of residual herbicides at the time of corn planting, followed by POST herbicide application when corn was about 18 inches tall. The study was a 3-way factorial, where the factors were type of application, residual herbicide, and POST herbicide system. The residual herbicides were preformulated combinations of atrazine and s-metolachlor, or atrazine, s-metolachlor, and mesotrione. These were applied at 67% of the typical labeled rate for the soil type. Weed control was determined at the time of and 21 days after POST application, and just prior to corn harvest. This abstract includes late-season weed control and grain yield results from 2008 only, because data from all of the 2009 sites was not yet available at the time of abstract preparation.

Control of several weeds exceeded 90% at the end of the 2008 season regardless of treatment. Weeds in this group included velvetleaf, common lambsquarters, wild sunflower, yellow foxtail, redroot pigweed, ivyleaf morningglory, barnyardgrass, large crabgrass, and Pennsylvania smartweed. Weeds for which control exceeded 80% included common ragweed, common cocklebur, giant foxtail, and prickly sida. The following weeds were more effectively controlled by the PRE/POST than the EPO application, by a margin of 3 to 9%, when control was averaged over other factors: giant foxtail, tall waterhemp, common cocklebur, common ragweed, and tall morningglory. Tall waterhemp, common cocklebur, common ragweed, and tall morningglory were most effectively controlled where the residual herbicide was atrazine, s-metolachlor, and mesotrione.

POST herbicide affected control of only four weeds at the end of the 2008 season. Control of giant foxtail was similar for glyphosate and rimsulfuron/nicosulfuron/dicamba/diflufenzopyr (96%), but reduced by 3 to 5% for glufosinate and tembotrione/atrazine, respectively. Control of fall panicum exceeded 95% for all treatments except tembotrione/atrazine, for which the control averaged over other factors was 67%. Control of tall waterhemp and common ragweed exceeded 90%, averaged over other factors, but tembotrione/atrazine was more effective than the other herbicides for control of waterhemp, and rimsulfuron/nicosulfuron/dicamba/diflufenzopyr was less effective than the others for control of common ragweed. Corn yield in 2008 was not affected by residual or POST herbicide, but

was affected by type of herbicide application. The yield for the PRE/POST application was 5 bushels higher than the EPO, averaged over other factors.