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. Glyphosate is currently priced about the same or higher than glufosinate and several other broad-spectrum postemergence (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 glyphosate-resistant corn.

A field study was conducted at six sites in 2008 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. The late-season weed control and grain yield results are discussed here.

Control of several weeds exceeded 90% at the end of the season regardless of treatment. Weeds in this group included velvetleaf, common lambsquarters, prickly sida, wild sunflower, yellow foxtail, redroot pigweed, ivyleaf morningglory, barnyardgrass, large crabgrass, prickly sida, and Pennsylvania smartweed. 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, fall panicum, 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 system affected control of four weeds, and also corn yield. Control of giant foxtail and fall panicum generally followed the following order, from highest to lowest: glyphosate, rimsulfuron/nicosulfuron, glufosinate/atrazine, and tembotrione/atrazine. Control of tall waterhemp and common ragweed was affected by POST herbicide for EPO application only, and only where the residual herbicide was atrazine and s-metolachlor. For these treatments, tembotrione/atrazine controlled 97% of the waterhemp, and control ranged from 75 to 81% for the other POST herbicides. The nicosulfuron/rimsulfuron/dicamba treatment controlled 82% of the common ragweed, while control ranged from 98 to 100% for the other POST herbicide systems. Corn yield for the four POST herbicide systems, averaged over the other factors, was as follows: glyphosate – 199 bu/A; tembotrione/atrazine – 193 bu/A; glufosinate/atrazine – 190 bu/A; and rimsulfuron/nicosulfuron/dicamba/diflufenzopyr – 186 bu/A.

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