

INFLUENCE OF RESIDUAL HERBICIDE RATE AND TIMING ON WEED MANAGEMENT IN GLYPHOSATE-RESISTANT CORN. Daniel D. Schnitker, Bryan G. Young, William G. Johnson, and Mark M. Loux, Graduate Research Assistant and Associate Professor, Southern Illinois University, Carbondale, IL 62901, Associate Professor, Purdue University, West Lafayette, IN 47907, Professor, The Ohio State University, Columbus, OH 43210.

The adoption of glyphosate-resistant corn continues to increase as producers search for alternatives to traditional herbicide programs. The commercial use of glyphosate-resistant corn has resulted in less interest and use in residual herbicides applied prior to or at planting. Field research was conducted in Illinois, Indiana, and Ohio in 2006 to evaluate residual herbicide factors preceding a planned in-crop glyphosate application. The objectives of this research were 1) to determine the effect of residual herbicide rates and timings (14 days early-preplant and at planting) and 2) to evaluate postemergence glyphosate timings (early POST and late POST) on weed control and grain yield. Residual herbicide treatments included atrazine, atrazine plus simazine, atrazine plus isoxaflutole, acetochlor plus atrazine and atrazine plus *s*-metolachlor plus mesotrione.

Crop injury was not observed for any herbicide treatment. Control of giant foxtail, giant ragweed, and velvetleaf at the POST timing was up to 14% greater with a residual herbicide applied at planting than applied 14 days before planting. No significant differences were observed with the timing of the residual herbicides for control of common lambsquarters and redroot pigweed. Control of giant foxtail, giant ragweed, velvetleaf, and common lambsquarters from the residual herbicides at the early POST timing was up to 13% greater than the late POST application timing. Atrazine applied at 1.12 and 2.24 kg ai/ha or atrazine (1.12 kg ai/ha) plus simazine (1.12 kg ai/ha) provided less residual control of all broadleaf and grass species than the premix of acetochlor plus atrazine at the full labeled rate. Atrazine plus *s*-metolochlor plus mesotrione at a two-thirds and full labeled rate provided greater than 95% control of giant foxtail, velvetleaf, and common lambsquarters with greater than 80% control of giant ragweed. Atrazine applied at 1.12 to 2.24 kg ai/ha provided the least control of all broadleaf and grass species. Significant yield reductions, due to weed competition before the planned POST application of glyphosate at the V6 stage of corn growth, resulted from the application of the residual herbicides 14 days prior to planting rather than at planting. The timing of the POST glyphosate application had no significant effect on grain yield if a residual herbicide was applied at planting. Reliance on a single POST application of glyphosate resulted in up to 25% yield losses. This research suggests that the application at planting of a broad spectrum residual herbicide at near full labeled rates is necessary for optimal yields in glyphosate-resistant corn.