MANAGEMENT OF GIANT RAGWEED POPULATIONS THAT ARE DIFFICULT TO CONTROL WITH GLYPHOSATE. Jeff M. Stachler, Mark M. Loux, William G. Johnson, and Andrew M. Westhoven, Weed Science Extension Program Specialist and Professor, Department of Horticulture and Crop Science, The Ohio State University, Columbus, OH 43210 and Associate Professor and Graduate Student, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907-2054.

Over the past several years, Ohio and Indiana growers have experienced increasing difficulty controlling giant ragweed in glyphosate-resistant soybeans. In preliminary greenhouse studies with seed collected from problem fields, we observed a reduced response to glyphosate for a number of populations, which appeared to be indicative of glyphosate resistance. These populations were mostly from continuous glyphosate-resistant soybean fields that had been treated with glyphosate exclusively for a number of years. Field and greenhouse studies were conducted in 2006 with four giant ragweed biotypes from Ohio and Indiana to determine: 1) their response to foliar application of glyphosate, in comparison to two sensitive biotypes; and 2) whether they could be controlled with glyphosate-based weed management programs, when glyphosate was integrated with other herbicides.

In a field study where the resistant biotypes were compared with sensitive biotypes, a reduced response to glyphosate was observed for the resistant biotypes compared to two sensitive biotypes. Glyphosate was applied at 0.84 and 2.5 kg a.e./ha to plants 5 to 51 cm tall. Glyphosate was applied again at 1.7 kg/ha three weeks later to approximately half of the plants treated with 0.8 kg/ha initially. A total of 8 to 26 plants were treated per replication for the initial application. Glyphosate applied twice, or once at the higher rate, provided at least 93% control of the two sensitive populations. Control of the four suspect populations ranged from 50 to 76% for two applications of glyphosate, and from 45 to 81% for the single application at 2.5 kg/ha. While a maximum of only 2% of the plants from the sensitive populations showed substantial regrowth when treated twice, or once at the higher rate, the number of plants from the four suspect populations with substantial regrowth ranged from 5 to 59%.

In field studies conducted in no-tillage, glyphosate-resistant soybeans at the site of seed collection, most effective control resulted from a preplant application of glyphosate plus 2,4-D ester, followed by either: 1) two postemergence applications of glyphosate, 1.7 kg/ha followed by 8.4 kg/ha three weeks later; or 2) postemergence application of fomesafen (0.34 kg ai/ha) followed by glyphosate at 0.84 kg/ha three weeks later. Where the preplant treatment included residual herbicides, cloransulam at 24 g ai/ha plus flumioxazin at 72 g ai/ha, it was possible to control resistant plants with two postemergence applications of glyphosate at 0.84 kg/ha. The resistant biotypes were adequately controlled by herbicide programs consisting exclusively of two applications of glyphosate at only one of the four sites. Similarly, one postemergence glyphosate treatment did not effectively control resistant biotypes, regardless of the type of preplant treatment. While it was possible to obtain greater than 95% control of giant ragweed with the treatments mentioned here, these treatments did not completely prevent giant ragweed seed production. The population density at the end of the season, for plants that produced seed, ranged from 0 to 1.5 plants m^{-2} for the most effective treatments. However, when only plants taller than the soybeans were considered, the number of plants with seed ranged from 0 to 0.1 plants m^{-2} for these treatments. For these same treatments, up to 13% of plants with seed at the end of the season were known to survive postemergence glyphosate treatments. However, among all treatments and sites, up to 96% of the plants with seed at the end of the season were known to survive postemergence glyphosate treatments.