

OPTIMUM GAT SOYBEAN: HERBICIDE COMBINATIONS FOR PRE-PLANT BURNDOWN AND RESIDUAL WEED CONTROL. Nicholas V. Hustedde, Bryan G. Young and Joseph L. Matthews, Graduate Research Assistant, Professor, and Researcher, Department of Plant, Soil, and Agricultural Systems, Southern Illinois University, Carbondale, IL 62901.

The development of Optimum GAT soybean allows for the use of glyphosate and sulfonylurea herbicide combinations that would not be possible in current soybean cultivars. The herbicide combinations conceived for use in Optimum GAT soybean were evaluated at two field sites in 2009 for control of glyphosate-resistant horseweed and glyphosate-resistant common waterhemp. Herbicide treatments included: no residual herbicide, chlorimuron (17.5 g ai/ha) + rimsulfuron (17.5 g ai/ha), chlorimuron (35 g ai/ha) + rimsulfuron (35 g ai/ha), chlorimuron (17.5 g ai/ha) + rimsulfuron (17.5 g ai/ha) + flumioxazin (70 g ai/ha), and sulfentrazone (140 g ai/ha) + cloransulam (18 g ai/ha). All treatments were applied at 35, 21, and 7 days before soybean planting (DBP) in a no-till production system and included glyphosate (860 g ae/ha) + 2,4-D ester (530 g ae/ha). Glyphosate (860 g ae/ha) was applied postemergence to soybean at approximately 28 days after soybean planting (DAP).

Control of glyphosate-resistant horseweed was 95% or greater by 14 DAP when applied with any treatment containing chlorimuron + rimsulfuron, or cloransulam regardless of the pre-plant application timing. The application of glyphosate + 2,4-D without any residual herbicide resulted in less than 50% control of horseweed when applied at 35 DBP due to new emergence of horseweed. Herbicide treatment differences in control of horseweed by 28 days after the postemergence glyphosate application followed similar trends as the 14 DAP evaluations with less than adequate control for applications without a residual herbicide for horseweed.

Control of common waterhemp at 14 DAP ranged from 0 to 54% for the residual herbicides applied at 35 DBP compared with 60 to 89% control for herbicides applied at 7 DBP. The application of herbicides at 21 DBP resulted in similar or less control of common waterhemp at 14 DAP compared with the 7 DBP application timing, depending on the specific residual herbicide treatment. The combination of chlorimuron, rimsulfuron, and flumioxazin applied 7 DBP was the only treatment that resulted in greater than 75% control of common waterhemp by 14 DAP. Control of common waterhemp at 28 days after the postemergence glyphosate application was 83% or greater for all herbicide combinations at the field site located near Murphysboro, IL which was determined to contain primarily glyphosate-susceptible waterhemp. Applying chlorimuron, rimsulfuron, and flumioxazin at 7 DBP resulted in 75% control of common waterhemp by 28 days after the postemergence glyphosate application while all other treatments had less than 50% control at the field site near Desoto, IL. The Desoto site has been confirmed to contain glyphosate-resistant waterhemp.

This research demonstrates that an integrated approach to weed management that encompasses the application of appropriate residual herbicides near the period of weed emergence is necessary when managing multiple glyphosate-resistant weeds. In addition, the herbicides currently envisioned for use in Optimum GAT soybean did improve weed management compared with less diverse herbicide strategies.