

EVALUATION OF PROGRAMS FOR THE MANAGEMENT OF GLYPHOSATE-RESISTANT COMMON WATERHEMP IN SOYBEAN. Travis R. Legleiter, Nick Monnig, and Kevin Bradley, University of Missouri, Columbia, MO 65211

Field experiments were conducted in 2006 to evaluate various preemergence (PRE) and postemergence (POST) herbicide treatments for the control of glyphosate-resistant common waterhemp (*Amaranthus rudis*) in glyphosate-resistant soybean. In the first experiment, visual control ratings and the number of common waterhemp plants/9m² remaining at harvest were evaluated in response to PRE-only, PRE followed by POST and POST-only herbicide programs. PRE herbicide treatments evaluated included flumioxazin at 0.09 kg/ha, sulfentrazone at 0.28 kg/ha, alachlor at 2.8 kg/ha, and *S*-metolachlor plus metribuzin at 1.54 kg/ha plus 0.36 kg/ha while POST treatments included 0.86 kg/ha glyphosate, 0.14 kg/ha lactofen, 0.42 kg/ha aciflourfen, 0.86 kg/ha glyphosate plus 0.14 kg/ha lactofen, and 0.86 kg/ha glyphosate plus 0.42 kg/ha aciflourfen. All PRE followed by POST programs provided greater than 65% common waterhemp control 3 months after planting (MAP) and resulted in 16 or less common waterhemp plants/9 m² at harvest. PRE-only applications of sulfentrazone and *S*-metolachlor + metribuzin provided better visual common waterhemp control 3 MAP than applications of flumioxazin or alachlor but no differences in the number of common waterhemp plants/9m² remaining at harvest were observed between any of the PRE-only programs evaluated. All POST-only treatments provided less than 25% visual control of common waterhemp 3 MAP. POST-only treatments also resulted in higher numbers of common waterhemp plants/9m² remaining at harvest than PRE-only or PRE followed by POST programs. Lowest soybean yields occurred with POST-only programs while no differences in soybean yield were observed between PRE-only and PRE followed by POST programs except for programs that contained PRE applications of alachlor. The addition of either POST treatment to a PRE alachlor application resulted in higher soybean yields than applications of alachlor alone.

In a second experiment, POST applications of glyphosate at 0.86 kg/ha, 1.74 kg/ha, 3.47 kg/ha, and 6.94 kg/ha and combinations of glyphosate at 0.86 kg/ha plus lactofen at 0.14 kg/ha, fomesafen at 0.19 kg/ha, acifluorfen at 0.42kg/ha, carfentrazone at 0.004 kg/ha, cloransulam at 0.018 kg/ha, or 2,4-DB at 0.035 kg/ha were made to common waterhemp less than 15 cm in height to evaluate resistance of this population at the field level. Prior to application, 20 common waterhemp plants per plot were flagged and survival of these plants in response to each treatment was monitored until six weeks after treatment (WAT). At 6 WAT, 98% of the common waterhemp population survived applications of glyphosate at the labeled rate (0.86 kg/ha) while 53% of the populations survived eight times the labeled glyphosate use rate (6.94 kg/ha). Additionally, 90% or more of the common waterhemp survived applications of glyphosate in combination with lactofen, acifluorfen, fomesafen, or carfentrazone, suggesting the possibility of resistance to protox-inhibiting herbicides in this population as well. This possibility will be examined in future experiments.