RESPONSE OF SELECTED COMMON RAGWEED ACCESSIONS TO GLYPHOSATE, FOMESAFEN, AND CLORANSULAM-METHYL. Jeff M. Stachler and John L. Luecke, Assistant Professor and Research Specialist, Department of Plant Sciences, North Dakota State University and University of Minnesota, Fargo, ND 58108-6050.

Common ragweed is becoming increasingly difficult to control with postemergence soybean herbicides. Field experiments in 2007 indicated the presence of a common ragweed population resistant to PPO- and ALS-inhibiting herbicides in northern Clinton County, OH and another resistant to ALS-inhibiting herbicides and glyphosate in southern Clinton County, OH. A greenhouse study was established with seed from one sensitive common ragweed population, two original field collected resistant populations from Clinton County, OH, and five common ragweed subpopulations selected from the two resistant populations after various herbicide treatments. Two subpopulations from the northern Clinton County population were created by collecting seed from the best survivors of fomesafen plus cloransulam-methyl (3X) and fomesafen plus glyphosate (3X) in the greenhouse. Three subpopulations from the southern Clinton County population were created by collecting seed from the best survivors of glyphosate plus cloransulam-methyl (3X) and glyphosate plus cloransulam-methyl plus fomesafen (1X) in the greenhouse, and the best survivors of glyphosate plus fomesafen (1X) followed by glyphosate (1X) in the 2007 field experiment. Fomesafen plus cloransulam-methyl, glyphosate plus cloransulam-methyl, glyphosate plus fomesafen, and glyphosate plus cloransulam-methyl plus fomesafen were applied at 1X and 4X rates to all populations and subpopulations in a greenhouse sprayer. The 1X rate of fomesafen, cloransulam-methyl, and glyphosate was 342 g ai/ha, 18 g ai/ha, and 840 g ae/ha, respectively. Denstiny HC, a high surfactant oil (methylated) concentrate, and AMS was added to all herbicide combinations at 1% v/v and 2.8 kg/ha, respectively.

All herbicide combinations at the 1X and 4X rates controlled greater than 96% of the sensitive population. Fomesafen plus cloransulam-methyl at the 1X and 4X rates controlled less than 73% of the original northern Clinton County common ragweed population and its two subpopulations. Glyphosate plus cloransulam-methyl at the 1X and 4X rates controlled less than 85% of the original southern Clinton County common ragweed population and its three subpopulations. Fomesafen plus cloransulam-methyl, glyphosate plus cloransulam-methyl, glyphosate plus fomesafen, and glyphosate plus cloransulam-methyl plus fomesafen at 1X rates controlled 46, 48, 81, and 81%, respectively, of the southern Clinton County subpopulations selected with glyphosate plus cloransulam-methyl plus fomesafen. The level of resistance to glyphosate plus cloransulam-methyl was greater for all southern Clinton County subpopulations compared to the original southern Clinton County population.

These results indicate heritable resistance to a PPO- plus an ALS-inhibiting herbicide, an ALS-inhibiting herbicide with glyphosate, and an ALS- plus PPO-inhibiting herbicide with glyphosate in common ragweed. The level of resistance can increase in subsequent generations. This research suggests that multiple resistance can be selected and inherited if plants are not completely controlled by an herbicide combination.

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