

RESPONSE OF GLYPHOSATE TOLERANT AND SUSCEPTIBLE BIOTYPES OF HORSEWEED (*CONYZA CANADENSIS*) TO FOLIAR APPLIED HERBICIDES. James R. Martin and William W. Witt, Extension Professor and Professor, Department of Agronomy, University of Kentucky, Princeton, KY 42445

Glyphosate is usually more effective than paraquat for providing burndown control of horseweed (also known as marestail). However, it does not provide effective control consistently, particularly at the low glyphosate rates currently used by many growers. There were isolated cases where multiple applications of glyphosate failed to provide complete control of horseweed in Kentucky during 2001. Due to these unique circumstances, studies were conducted in 2002 at a farm site in Trigg County and at two sites on the UKREC near Princeton to evaluate strategies for horseweed control and to determine if glyphosate tolerant biotypes existed in Kentucky. Although crops were not planted in these studies, the timing of treatments were done to simulate burndown or in-season applications for Roundup Ready soybeans.

The Trigg County site was chosen because it had problems with escapes following multiple applications of glyphosate in 2001. Results of the Trigg County study in 2002 indicated this population had a high level of tolerance to glyphosate. Applying glyphosate at 0.75 lb ae/A to four-inch tall plants on April 25, resulted in only 60% control by June 6. These plants continued to survive when treated again on June 6 with an in-season application of glyphosate at 0.75 lb ae/A. The overall control rating, which accounted for burndown control of treated plants and residual control of newly emerging plants, was only 10% for this treatment on July 8. Using a similar approach, but increasing the rate of the in-season application of glyphosate to 1.125 lb ae/A, resulted in only 66% overall horseweed control on July 8. The addition of 2,4-D ester at 0.5 lb ae/A or cloransulam at 0.016 lb ai/A with glyphosate, tended to improve burndown control of treated plants, but control of late emerging plants was variable. However, the overall control on July 8 was at least 91% when both 2,4-D and cloransulam were mixed with glyphosate in the April 25 early preplant burndown treatment, or when the combination of 2,4-D plus glyphosate was applied as an April burndown spray followed by an in-season application of cloransulam plus glyphosate. The use of paraquat at 0.75 lb ai/A as a tank mix partner with cloransulam or with cloransulam plus 2,4-D as early preplant treatments followed an in-season application of glyphosate, provided 100% overall control on July 8. The in-season application of cloransulam plus glyphosate tended to improve control of plants previously treated with an early preplant application of glyphosate alone, but overall control was still only 63% by July 8. Subsequent greenhouse studies of plants collected from the Trigg County site confirmed this population was highly tolerant to glyphosate.

The two experiments at UKREC dealt with populations of horseweed that were more susceptible to glyphosate compared with the population in Trigg County. Treatments in the first UKREC study were applied on May 16 when horseweed was approximately 10 inches in height. The level of burndown control of horseweed in this study was 98% with glyphosate at 0.75 lb ae/A, 53% with cloransulam at 0.016 lb ai/A, 67% with 2,4-D at 0.5 lb ae/A, and 100% with glyphosate at 0.75 lb ae/A plus 2,4-D at 0.5 lb ae/A. In the second UKREC experiment, horseweed plants were mowed to an average height of five inches and treated on May 31. Glyphosate applied at 0.56, 0.75, 1.125, and 1.5 lb ae/A resulted in 77, 86, 93, and 100% burndown control of horseweed, respectively. The use of tank mix partners such as 2,4-D at 0.5 lb ae/A, cloransulam at 0.016 lb ai/A, or the premix of chlorimuron plus sulfentrazone at 0.14 lb ai/A tended to improve burndown control with glyphosate at the low rate of 0.56 lb ae/A. However carfentrazone at 0.008 lb ai/A or flumioxazin at 0.064 lb ai/A did not improve horseweed control when combined with glyphosate.

Results of these experiments indicate that glyphosate - tolerant biotypes of horseweed are present in Kentucky, and that herbicides with other sites of action are needed to provide effective burndown and residual control of this weed. The fact that glyphosate-tolerant and ALS-resistant biotypes have been

observed in neighboring states, makes it critical to develop strategies with alternative modes of action and to monitor fields for regrowth.