

CROP ROTATION AND HERBICIDE USE INFLUENCE POPULATION DYNAMICS OF GLYPHOSATE-RESISTANT HORSEWEED (*CONYZA CANADENSIS*) IN NO-TILL CROP MANAGEMENT SYSTEMS. Vince M. Davis\*, Kevin D. Gibson, and William G. Johnson, Graduate Research Assistant, Associate Professor, and Associate Professor. Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907.

Horseweed, *Conyza canadensis*, is an increasingly common and problematic weed in no-till soybean production in the eastern cornbelt due to the frequent occurrence of biotypes resistant to glyphosate. The objective of this study was to determine the influence of crop rotation, winter wheat cover crops (WWCC), residual non-glyphosate herbicides, and preplant application timing on the population dynamics of glyphosate resistant (GR) horseweed. A field study was conducted from 2003 to 2007 in a no-till field located in southeastern Indiana where spring emerging glyphosate-resistant biotypes are a common occurrence in no-till fields. The experiment was a split-plot design with crop rotation (soybean-corn or soybean-soybean) as main plots and management systems as subplots. Management systems were evaluated by quantifying in-field horseweed plant density, and seedbank density. The soybean-corn rotation reduced horseweed densities more than soybean-soybean rotation in the third and fourth years of the study. Spring preplant application timings consistently provided better horseweed control than fall application timings, and residual preplant herbicides demonstrated better control than glyphosate applied alone. Management systems also influenced the population structure (the ratio of GR and GS biotypes) after four years of management. The most dramatic shift was from the initial GR:GS ratio of 3:1 to a ratio of 1:6 after four years of residual preplant herbicide use followed by non-glyphosate postemergence herbicides. However, spring applied residual preplant herbicides followed by postemergence glyphosate reduced horseweed densities while providing equal or better crop yields compared to all other herbicide systems. Soybean producers with infestations of spring emerging GR horseweed populations should apply herbicides in the spring and diversify their weed management systems by rotating herbicide mode-of-actions and crops. Rotating herbicides had the quickest reduction in GR horseweed densities and were observed in the first year of the study while crop rotation provided a horseweed density reduction after the third and fourth years.