PERSISTENCE OF A GLYPHOSATE-RESISTANT HORSEWEED (CONYZA CANADENSIS) SEEDBANK UNDER VARIOUS WEED MANAGEMENT SYSTEMS. Vince M. Davis*, William G. Johnson, and Kevin D. Gibson, Research Associate, Associate Professor, and Assistant Professor, Department of Botany and Plant Pathology, Purdue University, West Lafayette, IN 47907.

No-tillage practices and glyphosate resistant soybeans are utilized on 60% and 81% of Indiana soybean production acres, respectively. Horseweed is an increasingly common and problematic soybean weed due to frequent occurrence of biotypes resistant to glyphosate. Over-wintering horseweed rosettes are vulnerable to tillage; however, other management strategies to protect no-tillage soybean production practices need to be determined. The objective of this study was to evaluate crop rotation, cover crops, glyphosate verses residual herbicide programs, and fall verses spring herbicide application timings on a glyphosate resistant horseweed seed bank. The goal is to evaluate these management strategies by there potential to change the dynamics of the soil seed bank composition in a mixed susceptible and resistant horseweed population. This study was established in a no-tillage field following a 2003 glyphosate resistant soybean crop that contained a moderate infestation of glyphosate resistant horseweed (1 plant yd^{-2}). This experiment is a split-plot design with crop rotation (soybean-corn-soybean or continuous-soybean) as the main plots and management systems as sub plots. Management systems are evaluated by monitoring in-field horseweed density and by counting viable horseweed seeds in the soil seed bank. Soil for seed bank evaluations is collected in the fall (post seed rain), spring, and late summer (pre seed rain). Seed bank density is determined in a greenhouse grow-out procedure. The average viable horseweed seed density in the starting soil seed bank for the trial was 11 viable seeds per lb of dry soil. By spring 2004, following fall herbicide applications, differences in viable horseweed seeds ranged from 32 viable seeds for fall applied glyphosate to 3 viable seeds per lb of dry soil for treatments that included a residual herbicide application. However, by the end of the summer (pre seed rain), there were no differences in seed bank density with an average of 5 viable seeds per lb of dry soil for all management strategies. In conclusion, the first year results indicate that less than half of viable horseweed seeds remain in the soil seed bank just prior to new seed inputs for all management strategies employed.

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