COMPARISONS OF RESIDUAL AND NON-RESIDUAL HERBICIDE PROGRAMS FOR WEED CONTROL AND CROP YIELD. Dawn E. Nordby and Aaron G. Hager, Extension Specialist and Assistant Professor, Department of Crop Sciences, University of Illinois, Urbana, IL 61801.

A broad weed control spectrum coupled with relatively low herbicide cost has contributed to the widespread adoption of glyphosate-resistant soybean. However, the same characteristics that resulted in such widespread utilization of glyphosate may hasten its demise as an effective tool for weed management. Additionally, the flexibility of application and lack of residual weed control often result in farmers delaying an initial glyphosate application beyond when weed interference has caused soybean yield loss. Several soil-residual herbicides remain effective on potentially glyphosate-resistant weed species. Utilization of these types of herbicide may potentially reduce the likelihood of crop yield loss when farmers delay the application of a postemergence herbicide. Field studies were conducted in 2005 and 2006 at three locations in Illinois to compare glyphosate and non-glyphosate weed control programs in corn and soybean. Weed control programs, comprised of two or more individual treatments, were grouped into the following categories: preemergence alone, preemergence followed by non-residual postemergence, preemergence followed by a residual postemergence, residual postemergence alone, non-residual postemergence alone, a weedy check and a weed-free control.

Soybean yield in the non-residual postemergence alone herbicide program was similar to that of the weed free, 3267 and 3600 kg ha^{-1}, respectively. However, weed biomass in the non-residual postemergence alone program, 120 g m^{-2}, was not similar to the weed free. All other herbicide programs resulted in soybean yields less than 2600 kg ha^{-1}. Weed biomass in these herbicide programs decreased from 995 g m^{-2} in the weedy check to 676, 500, 314, and 262 g m^{-2} in the preemergence alone, residual postemergence alone, preemergence followed by non-residual postemergence, and preemergence followed by residual postemergence programs, respectively. Two individual treatments that provided yield and weed biomass similar to the weed free included the postemergence alone (two-pass glyphosate) and the preemergence followed by non-residual postemergence (chlorimuron+metribuzin f/b glyphosate).

Corn yield was similar to the weed free, 11,013 kg ha^{-1}, for all herbicide programs except for the preemergence alone (9644 kg ha^{-1}) and weedy check (2675 kg ha^{-1}). Weed biomass differed by herbicide program. Weed biomass was similar to the weed free in all programs except the preemergence alone (612 g m^{-2}) and preemergence followed by residual postemergence (202 g m^{-2}).

Results of this research indicate that total postemergence weed management programs in corn and soybean can be successful at preserving crop yield while reducing weed biomass when herbicide applications are timely. Preemergence alone programs did not preserve crop yield and were weedy, likely due to inadequate rainfall and lack of late-season weed control.

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