

# Comparison of Non-Chemical Control Methods as Part of an Integrated Weed Management Strategy in Soybean

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## Principal Investigator

Kevin Bradley, University of Missouri

## Co-Principal Investigators

Prashant Jha, Iowa State University  
Sarah Lancaster, Kansas State University  
Bill Johnson, Purdue University  
Bryan Young, Purdue University

Karla Gage, Southern Illinois University  
Mandy Bish, University of Missouri  
Amit Jhala, University of Nebraska

## Overview of project objectives

Weeds with multiple herbicide resistances and a lack of new chemistries have resulted in the need to assess and integrate non-chemical weed control methods along with herbicides to develop more effective integrated weed management programs. One non-chemical option gaining traction is electrocution in common weed species. The project evaluates weed electrocution as a method of preventing weed seed production for common Midwest weeds encountered in soybean production systems, especially targeting those herbicide-resistant weeds and weeds that have escaped other control methods to grow above the soybean canopy.

The University of Missouri weed science program, with funding provided by the Missouri Soybean Merchandising Council, purchased an Annihilator 6R30 Weed Zapper for analysis at multiple sites across the North Central region. The trial includes 13 site years at 7 locations in Illinois, Indiana, Iowa, Kansas, Missouri and Nebraska. Another non-chemical treatment — such as in-row cultivation, hand-weeding or weed seed grinding mills — is included at each location as a comparison to the efficacy of the Weed Zapper. The electrocution treatment is used once the majority of weed species of interest have emerged through the soybean canopy and prior to weed seed set. Weed species are targeted by location based on predominant weeds, but the electrocution effectively kills many weeds contacted by the electrode and prevents seed-set across weed species.

## Key results

Field trials were conducted during the 2022 growing season at the location sites. The data gathered from the locations is being compared to the results from 2021 and will be presented at winter meetings and other events. Results show there is an effect on control of different weed species. When averaged across all sites and years, electrocution provided highest control of giant ragweed (mean control 76%) and waterhemp (69%). But there was high variability in control across the sites; at the Illinois location in 2021, the waterhemp control was less than 10%, but approximately 60% in 2022. In some locations waterhemp control was nearly 80% with electrocution alone.

Soil surface sweep samples collected in 2021 showed a greater reduction in viable seeds for waterhemp and Palmer amaranth (30% reduction over the non-treated areas). Soil surface sweeps for 2022 are being analyzed and will be compared with the previous year.

Overall, research results indicate weed electrocution can be a viable option to eliminate certain weed escapes and shows promise as a part of an integrated management program. More research will need to be conducted on effects of plant and soil moisture, electrocution boom placement, plant density on electrocution efficacy.

## Benefit to farmers

Many questions about the efficacy and efficiency of non-chemical methods as viable weed management options exist for U.S. soybean farmers. This research will help determine whether weed electrocution is a feasible and effective option in the North Central region.

## Links

[Comparison of Non-Chemical Control Methods as Part of an Integrated Weed Management Strategy in Soybeans](#)

*USB National Soybean Checkoff Research Database*