Comparison of Non-Chemical Control Methods as Part of Integrated Weed Management Strategy

Funding: $99,200

Principal Investigator

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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 with herbicides to develop more effective weed management programs. One non-chemical option gaining traction is weed electrocution. This technology may prevent weed seed production for some of the most common weeds encountered in Midwest soybean production systems; Palmer amaranth, waterhemp, giant ragweed, marestail, common lambsquarters and velvetleaf. The project compares weed electrocution as part of an integrated management program to other non-chemical treatments and explores the overall effectiveness of weed electrocution on common weeds, effects of weed density and effects of tractor speed.

The University of Missouri weed science program, with funding provided by the Missouri Soybean Merchandising Council, purchased an Annihilator 6R30 Weed Zapper for electrocution that is being used at multiple sites across the North Central region for analysis. Participating researchers have sites established in Illinois, Indiana, Iowa, Kansas, Missouri and Nebraska. At each site, a second non-chemical treatment is being employed to compare the feasibility and 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 targeted vary by location based on available equipment and predominant weeds. Comparative treatments are selected by the investigator at each location and include different pre- and post-planting herbicide treatments, in-row cultivation, hand weeding, windrow burning, weed seed grinding mills and more.

Key results

Field trials were conducted during the 2021 growing season at participating locations. The Weed Zapper was transported to all participating states at the appropriate stage during the growing season so electrocution treatments could be applied consistently. Each cooperator after completing harvest of the sites began conducting weed control evaluations. Data will be gathered from each of the participating locations once complete, and a summary of 2021 findings will be released as soon as it is available. Preliminary results indicate electrocution is effective in controlling above-canopy weeds that escaped other chemical and non-chemical control.

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.

USB National Soybean Checkoff Research Database link

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