

# Site-Specific Weed Management with Precision Application Technology

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## Principal Investigator

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## Overview of Project Objectives

Current herbicide practices focus on broadcast applications of pre-plant/pre-emergence and post-emergence products that deliver a constant distribution rate across an entire field. However, weed populations have great spatial variability, influenced by several factors. With recent improvements of sensors and sprayer technologies, the ability to detect and treat weeds on a real-time, site-specific basis is feasible. The long-term goal of this project is to optimize post-emergence herbicide applications with a smart sprayer system to stimulate the adoption of precision agriculture tools for more sustainable weed management.

## Key Results

Plot research was conducted at two locations in Wisconsin and Illinois comparing spot-spraying and broadcast spraying over different soybean growth stages. Pre- and post-emergence applications were done with both methods. Earlier post-applications resulted in higher savings of herbicide use, but required a broadcast layered herbicide for season-long weed control. Later application resulted in saving less herbicide. Nozzle settings affected herbicide coverage and effectiveness. Results indicate that the benefits of targeted application technology are effective in fields with low to intermediate weed pressure and treated with an effective pre-emergence herbicide program. In fields with high weed pressure, broadcast application is more effective.

In the Kansas small plot research, combining residual herbicides with targeted foliar sprays provided weed control that was as effective as broadcast application, but at a lower cost. In Nebraska, larger soybean fields tested with combinations of broadcast and smart-spray technology reduced weed density after six weeks. Application timing was tested as well, with spraying at V3 being the most effective at controlling weeds.

## Benefit to Farmers

This project will evaluate new weed management approaches using smart sprayer technology, which could improve control of hard-to-manage or resistant weeds. Farmers will gain insight into the potential return-on-investment of this new technology.

## Links

[Site-Specific Weed Management with Precision Application Technology](#)

*National Soybean Checkoff Research Database*

[Smart Spray Technology for Weed Management Gets a Closer Look](#)

*SRIN article*