Weed Control and Response of Dicamba-resistant Soybean to a Premix of Dicamba and Pyroxasulfone

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Introduction

- Producers in Nebraska and across North America are combating mounting herbicide-resistant weed populations.
- In 2017, Nebraska produced 3.3 billion bushels of soybean on 5.7 million acres at a production value of three billion dollars.
- In 2017, dicamba-resistant soybean came to the market with an intent to improve broadleaf weed control using dicamba.
- Dicamba-based premixes are under development and need to be tested to evaluate efficacy and crop safety.

Objective

To measure weed control of Amaranthus spp. (pigweeds), velvetleaf, and common lambsquarters and dicamba-resistant soybean response to a premix of dicamba and pyroxasulfone.

Materials and Methods

- In 2018, field research was conducted at the University of Nebraska-Lincoln at South Central Agricultural Laboratory near Clay Center, Nebraska.
- 15 herbicide treatments, including a nontreated control, were laid out in a randomized complete block design with four replications.
- PRE herbicide application was the day of planting, followed by POST application at the following soybean growth stages: V1 (early), V4 (mid), and V6 (late).
- Weed control ratings of pigweeds, velvetleaf, and common lambsquarters were taken visually at 14, 28, 35, 42, 56, and 70 days after planting.
- Above ground biomass of weeds was harvested from two 0.5 m² quadrats at 60 days after the final POST application and dry weight was recorded. Dry weight was converted to percent biomass reduction and compared to nontreated control.
- Data were analyzed in R software.

Results

- **Weed control at 14 days after PRE**
- **Weed control at 100 days after planting**
- **Soybean yield and weed biomass reduction**

Discussion

- PRE herbicide tank-mixes with and without dicamba provided similar control:
  - Pigweeds (96-98%), velvetleaf (92-98%), and common lambsquarters (71-92%) at 14 DA PRE.
- All PRE followed by POST programs provided 99% control of pigweeds, velvetleaf, and common lambsquarters and 100% weed biomass reduction at 100 days after planting and yields from 3,939 to 4,828 kg ha⁻¹.
- Pyroxasulfone plus dicamba applied PRE provided control for pigweeds (52%), velvetleaf (79%), and common lambsquarters (58%) at 100 days after planting, 25% biomass reduction, and yield 2382 kg ha⁻¹.
- Early-POST application of pyroxasulfone plus dicamba plus glyphosate resulted in 99% control of pigweeds, velvetleaf, and common lambsquarters at 100 days after planting, 80% biomass reduction, and yield of 2868 kg ha⁻¹.
- Sequential POST applications of dicamba achieved 99% control of pigweeds, velvetleaf, and common lambsquarters at 100 DA planting, 97% biomass reduction, and yield of 3386 kg ha⁻¹.

Conclusions and Future Research

- Results of this study suggest the pre-mix of pyroxasulfone plus dicamba utilized in a PRE followed by POST or sequential POST herbicide programs is an effective tool for the control of pigweeds, velvetleaf, and common lambsquarters.
- This project will be repeated in the summer of 2019 at the same location.
- Premix of dicamba and pyroxasulfone will be compared with other premixes.

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