

Glyphosate- or auxinic-resistant kochia and russian thistle prairie surveys

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$5,000.00	Active	April 2018 – March 2023	Alberta Wheat Commission; Manitoba Pulse and Soybean Growers; Manitoba Crop Alliance; Saskatchewan Canola Development Commission; Saskatchewan Wheat Development Commission; Western Grains Research Foundation	\$87,800.00

Project Description

To determine the distribution and abundance of glyphosate-resistant (GR) or auxinic-resistant kochia and other targeted weeds, including Russian thistle, waterhemp, and ragweed species, in Manitoba in 2018, Saskatchewan in 2019, and Alberta in 2021 through a survey of 300 sites in each province.

Kochia is a problematic, patch-forming tumbleweed in Western Canada. Herbicide-resistant kochia has previously been identified within parts of Western Canada. Russian thistle is another tumbleweed with herbicide resistance detected in the United States. The study purpose was to survey kochia and Russian thistle populations in Manitoba, Saskatchewan, and Alberta for herbicide resistance towards glyphosate and dicamba. The Manitoba survey was conducted in 2018, Saskatchewan in 2019, and Alberta in 2021. Kochia and Russian thistle were collected at approximately 300 sites in each province using a stratified random survey approach.

Outcome

Screening for the Manitoba Russian thistle populations were completed with no resistance to glyphosate or dicamba. Screening of the Manitoba kochia populations were completed and glyphosate resistance was detected in 58% of populations. Approximately 1% of the populations were dicambaresistant and two populations were resistant to both dicamba and glyphosate. This is the first documentation of dicamba-resistant kochia in Manitoba. A high degree (70 to 80%) of kochia populations found in corn and soybean fields were glyphosate-resistant.

Screening for glyphosate and dicamba resistance in Saskatchewan Russian thistle is complete. A total of 19 populations of Russian thistle were screened for glyphosate resistance. Only 21% were susceptible to glyphosate. A total of 32% of populations had a low degree of resistance (1 to 20% survival), 42% had moderate resistance (21 to 60% survival), while 1 population had high resistance (61 to 100% survival). Three of these populations demonstrated dicamba resistance, two with low resistance and one with moderate resistance.

Screening for glyphosate-resistant kochia for the 2019 Saskatchewan survey is complete. A total of 283 populations were screened. Glyphosate resistance was found in 88% of populations. A total of 32% of populations demonstrated low resistance, 34% moderate resistance, and 23% high resistance. The majority of kochia sampled in 2019 was from agricultural fields (253/328 populations), with another 56 populations originating in ditches adjacent to agricultural fields. The post-harvest weed resistance survey was conducted in 2021 for Alberta. Screening is ongoing.

The level of glyphosate resistance documented in Manitoba and Saskatchewan kochia populations is concerning. The high degree of spread is likely a consequence of its wind driven dispersal via tumbleweeds and resistance spreading during flowering with pollen movement. While glyphosate still has efficacy on some kochia plants within the population, the risk for further resistance evolving is high when glyphosate is used alone. This is similarly true for Russian thistle in Saskatchewan. Using multiple modes of action to kill these weeds is paramount for combating resistance, including:

- 1) pre-seed tank-mixing involving glyphosate;
- 2) sequential applications and layering during the field season including in-crop, pre-harvest, and postharvest sprays, and;
- 3) rotating modes of action between years, when feasible.

For kochia, it will be necessary to think outside of the critical period for weed control and try to achieve season-long control when at all possible. Boundaries and margins will need to be monitored and managed to prevent kochia from going to seed and tumbling.

Research Objective

OBJECTIVE 1

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