



Glyphosate- and dicamba-resistant kochia spreads in Saskatchewan

CATEGORY [weeds](#) | July 13, 2023

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Kochia resistant to multiple modes of action is a significant problem across the Canadian Prairies. Herbicide resistance to Group 2 ALS inhibitors was first identified on the Prairies in 1988, and a 2007 survey in 109 fields found 85% of the sites had Group 2 resistant kochia, including 6 of 7 sites in Saskatchewan. Subsequent surveys have found that all tested kochia samples are Group 2 resistant.

Glyphosate-resistant kochia (Group 9) was confirmed in Alberta in 2011. In 2012, 10 samples submitted by Saskatchewan farmers found that all were glyphosate-resistant. Surveys in 2013 in central and southern Saskatchewan and Manitoba found 17 glyphosate-resistant kochia sites in 9 municipalities in Saskatchewan and 2 in Manitoba. These resistant biotypes would also be resistant to Group 2 herbicides. A 2018 Manitoba [survey](#) found 58% of the kochia populations tested were glyphosate-resistant, while 1% were dicamba-resistant.

In 2015, a Group 4 resistant kochia biotype was identified in Saskatchewan. In Alberta, a 2017 survey found that all populations were resistant to ALS inhibitors, 50% were resistant to glyphosate, 18% were resistant to dicamba, and 10% were triple-resistant to ALS inhibitors, glyphosate, and dicamba.

The objective of this study was to survey and evaluate the occurrence and change in distribution of both glyphosate- and dicamba-resistant kochia in Saskatchewan. A randomized-stratified survey was conducted during the fall of 2019 at 303 sites within 171 rural municipalities (RMs) in central and southern Saskatchewan. Seed was collected from kochia plants at each site, and screened for glyphosate and dicamba resistance.

Glyphosate- and dicamba-resistant confirmed in many samples

Glyphosate resistance was detected in 87% of kochia samples, while 45% were dicamba-resistant. Populations resistant to both glyphosate and dicamba were found in 40% of samples, resulting in an assumed three way multiple resistance to Group 2 + Group 4 + Group 9.

Glyphosate resistance was found in 137 out of 171 RMs, and dicamba resistance was found in 87 RMs. Multiple resistance was found in 79 RMs. This was a substantial growth from the 2013 Saskatchewan survey when only 17 glyphosate-resistant samples were identified in 9 RMs.

Similar increases in kochia resistance has been found in Manitoba in 2018 and Alberta in 2021. The 2021 Alberta [survey](#) found 45% of sites were triple-resistant to Group 2, Group 9, and at least one Group 4 synthetic auxin of either dicamba or fluroxypyr. This survey found that fluroxypyr-resistant kochia was found at 44% of sites, and dicamba-resistant kochia at 28% of sites.

In this recent Saskatchewan survey, herbicide-resistant kochia was found in a diverse range of cropped fields, in spring cereals, oilseeds and pulses, as well as at oil well sites, ditches and railway rights-of-way. Resistant kochia was found primarily in wheat and canola fields, as expected, because of the high frequency of these two crops in rotation.

Herbicide management strategies for glyphosate resistant kochia were evaluated in Alberta and found that the [most effective approach](#) was layering pre-emergence applied sulfentrazone followed by fluroxypyr/bromoxynil/2,4-D or pyrasulfotole/bromoxynil-applied post-emergence.

A [similar layering approach](#) in field pea for Group 2 + glyphosate resistant kochia control in field pea found that saflufenacil pre-emergence with imazamox + bentazon post-emergence or layering carfentrazone + sulfentrazone pre-plant could provide effective control.

This paper shows the value of regular surveys in monitoring the development and spread of herbicide resistant biotypes. With the on-going development of herbicide-resistant kochia, including the recent confirmation of saflufenacil-resistant kochia, cultural methods will also be required to help control this problematic weed.

Mixing multiple, effective modes of action is the foundation of herbicide control, but reducing the soil seedbank will be important in helping to reduce herbicide selection pressure. A community-based approach is needed, since kochia is found in many cropped and non-cropped areas. Cultural strategies to increase crop competitiveness, and mowing weed escapes are strategies to help slow the spread of herbicide-resistant kochia.

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Photo by Shaun Sharpe. Glyphosate-resistant kochia 21 days after treatment.