MANAGE RESISTANCE*Now*

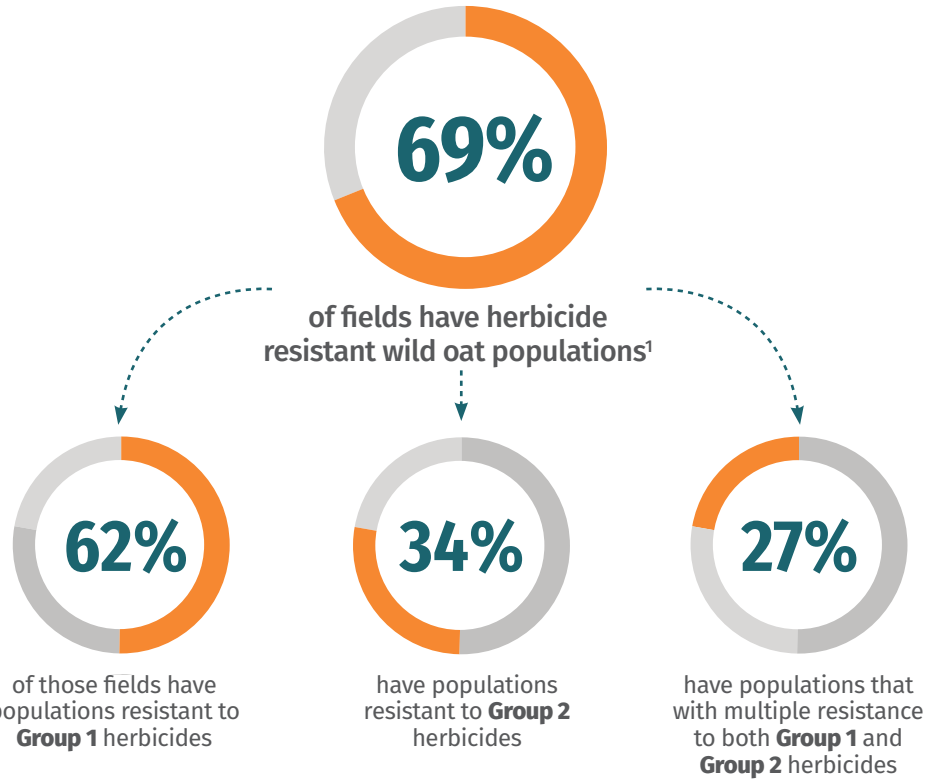
Protect your land, one field at a time

MANAGING HERBICIDE-RESISTANT WILD OATS

RISING RESISTANCE

Managing wild oats (*Avena fatua*) has been a challenge for Canadian growers for decades, especially in the Prairie provinces. Wild oats can cause severe yield losses, increased dockage, cleaning costs, and lower grade and quality.

Wild oat is an annual grassy weed that reproduces only by seed.



What does this mean?

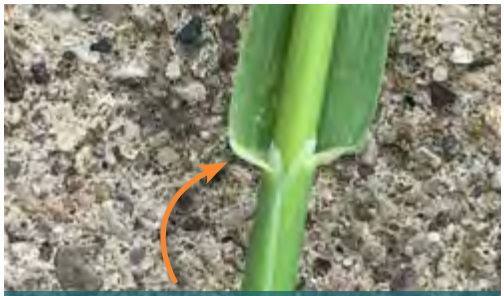
Wild oats with (multiple) resistance to both Groups 1 and 2 herbicides leave growers with very limited herbicide control alternatives.

Herbicide-resistant wild oats are a serious problem and resistance is on the rise. An initial wild oat herbicide-resistant survey[1] in Western Canada conducted 20 years ago revealed resistance to Group 1 herbicides was found in 15% of Western Canadian fields, and today, it's over 60%.

SCOUT EARLY AND KNOW HOW TO IDENTIFY WILD OATS

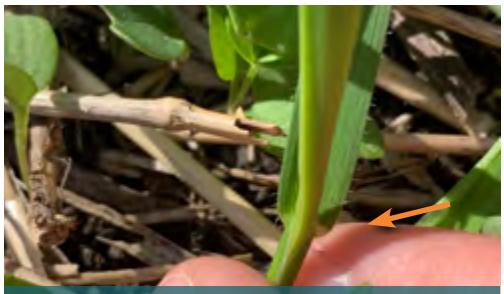
What do wild oats look like?

Wild oats look similar to cultivated oats. The dark, twisted awns protruding from the seeds, and grains 6-8 mm long at maturity are distinguishing features of wild oats.



Wild oats can be identified by its deep V in the collar region of the rounded leaf sheath with no auricles.

Wild oats have a high membranous ligule.



Wild oat leaves are flat and often have hairs on their margin.

The youngest emerging leaves often twist counterclockwise.

Photo credit: Breanne Tidemann

Tips for scouting

- The best time to scout for patches is after application of herbicide when the remaining weed patches have headed and are visible above the crop or after the field has been sprayed with a wild oat herbicide application and appears clean (except for resistant patches).
- Make note of suspicious looking weed patches:
  - Irregular shaped areas
  - Weed patches with no clear boundary
  - Patches comprised of a single weed species beside dead weeds of the same type.

BEST PRACTICES TO MANAGE WILD OAT HERBICIDE RESISTANCE

Adopting a combination of BMPs that include cultural, mechanical, biological and chemical control measures is essential to avoid or delay herbicide-resistant weeds including wild oats.

Refer to this factsheet for more herbicide resistance BMPs that apply to all weeds.

Adopt a combination of Best Management Practices to avoid or delay herbicide-resistant wild oats.

A single herbicide-resistant mutant is the starting point of herbicide resistance in a field.

1 **Mix and rotate herbicide active ingredients**

Combining multiple effective modes of action (Groups) in either a tank mix or in separate applications in the same growing season (i.e., soil active herbicides), significantly reduces the risk of finding that rare herbicide-resistant mutant weed in a field. Use alternative herbicide modes of action to Groups 1, 2 and 15 (eg. Group 9 or 10 in HR canola).[4]

2 **Use recommended herbicide rate and timing**

Delaying herbicide application past recommended weed growth stages costs you yield. Not only that, but, reduced rates and delayed timing can also select for certain types of herbicide resistance.

3 **Application technology**

Spray coverage matters. Maximize coverage on grassy weeds like wild oat by applying the herbicide on the upper end of the labelled water volume. Sprayers travelling at high speeds with low water volumes can compromise coverage and control.

4 **Diverse crop rotations**

Diversify rotations to include crops like winter cereals, competitive crop types, perennial forages and silage crops. ***Pro tip:*** *Silaging barley one week after heading can be more effective than in-crop herbicide application.**

5 **Give your crop a competitive edge with seeding rates**

Increasing seeding rate, and either establishing the crop before the weeds or utilizing delayed seeding are great control measures. When growing oats, seeding oats with a larger seed size has also shown to have benefits[3].

Pro tip: *Increasing crop seeding rate can decrease wild oat biomass and seed production.**

6 **Targeted Tillage**

Tillage can be considered when growing conditions for wild oat are ideal. If growing conditions are poor, tillage will have little effect. Strategic tillage in portions of the field with suspected resistance, can effectively control emerged wild oats, especially combined with other tools like delayed seeding. While tillage controls emerged weeds, any dormant seeds at the surface can be buried by tillage, effectively extending their persistence in the field versus leaving them on the surface to weather. ***Pro tip:*** *Spring tillage is more effective at decreasing wild oat emergence prior to seeding when compared to fall tillage. Zero till direct seeding is also effective for minimizing wild oat germination and reducing the need for in-crop herbicide application.**

Preventing wild oat seed shed and seed spread in a patch during harvest can reduce patch expansion from 30% to 35%[2].

Harvest weed seed control

Combines spread wild oat seeds up to 145 m. Try to contain the weed-infested patch during harvest and remove or destroy the straw from wild oat patches.

Pro tip: *In some countries, like Australia, growers have had success using a cage mill-based processing unit attached to rear of a combine to destroy wild oat seeds that have not shattered before harvest and are found in the chaff fraction as it exits the combine.**

ADDITIONAL STRATEGIES TO CONSIDER

- Feeding the crop and not the weeds (fertilizer placement).
- Composting manure or making silage for eight weeks has been shown to eliminate wild oat viability.
- Mow, mulch or desiccate (chemical) patches in areas of resistant weeds before they become a larger issue to prevent seed set.

UNDERSTANDING WEED SEED PRODUCTION AND SEEDBANKS

Wild oats are hardy. Their seeds shatter easily when ripe, but their germination is often delayed because the weed seeds lay dormant in the soil. Most seeds germinate within two years, but can remain dormant in the soil for up to nine years. Roughly 50% will germinate the first year following shed.

Photo credit: Neil Harker & Breanne Tidemann

DID YOU KNOW?

30%-70% of wild oat seeds shatter prior to wheat harvest in Western Canada.

Wild oats can **germinate over a wide range of temperatures** (5-30° C) resulting in early spring emergence and flushes throughout the growing season.

Wild oat **seed longevity increases** with burial depth.

The greatest wild oat **germination and emergence occurs from soil depths of 2-5 cm,** with the **majority of weed emergence from the top 2.5 cm of soil**.

A single wild oat plant produces an average of 20-150 seeds in a competitive crop, but can produce 1,000+ in a non-competitive environment.

MANAGE RESISTANCE*Now*

Protect your land, one field at a time

For more information, visit **ManageResistanceNow.ca**

This information is brought to you by CropLife Canada, Canola Council of Canada, Manitoba Crop Alliance, Prairie Oat Growers Association and SaskWheat.

Source: Resistant Wild Oat Action Committee

RESISTANT WILD OAT ACTION COMMITTEE

[1]Beckie, H.J., Shirriff, S.W., Leeson, J.Y., Hall, L.M., Harker, K.N., Dokken-Bouchard, F., and Brenzil, C.A. 2020. Herbicide-resistant weeds in the Canadian prairies: 2012 to 2017. Weed Technology. 34(3): 461-474. DOI: https://doi.org/10.1017/wet.2019.128

[2]Beckie, H., Hall, L., & Schuba, B. (2005). Patch Management of Herbicide-Resistant Wild Oat (Avena fatua). Weed Technology, 19(3), 697-705. doi:10.1614/WT-04-222R.1

[3]https://poga.ca/wp-content/uploads/2022/04/oat-grower-manual-2017.pdf

[4]https://weedscience.ca/wild-oat-action-committee/

* Pro tips provided by the Resistant Wild Oat Action Committee.