

# Invasive Plants in Alberta

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## Herbicide Resistance

Land owners and occupiers are responsible for controlling noxious weeds and destroying prohibited noxious weeds under the *Alberta Weed Control Act*. Listed plants in the Act cause problems for the environment, health or economy. Know your responsibilities under the Act. Regardless of where plants are located, prevention is always the most effective approach in dealing with invasive plants.

### What You Need to Know

#### What is the problem?

Herbicide resistance is the ability of a weed population to survive treatment by a herbicide that previously controlled that weed species effectively. Resistance develops when a few individuals in a weed population have a natural resistance to a particular herbicide. With repeated use of that herbicide, these resistant individuals survive and multiply until they make up most of the population.

Herbicides are classified into a number of groups based on their mode of action, in other words, the way in which they act within a plant to disrupt its growth. Weeds resistant to one herbicide are often also resistant to other herbicides in the same group (cross-resistance). Some weeds also become resistant to herbicides in more than one group (multiple resistance).

Herbicide resistance is most likely to emerge when a single type of herbicide or herbicides with a single mode of action are used repeatedly to control weeds at a

particular site. Annual weeds evolve herbicide resistance more often than perennial weeds.

If herbicides fail to control a weed, there could be many reasons, including application or calibration errors. These failures will often show up in patterns or strips related to the spray application and may contain several different weeds. However, if a single weed species is escaping control, and if the weed appears in patches not related to spray patterns, you should suspect herbicide resistance.

Resistance to glyphosate is an emerging problem. In the United States, the area of cropland with glyphosate-resistant weeds has almost doubled from 2010 to 2012.

#### Species to watch out for

Weeds known to have herbicide resistant populations in Alberta include the following:

- ball mustard (*Neslia paniculata*)
- chickweed (*Stellaria media*)
- cow-cockle (*Vaccaria hispanica*).
- false cleavers (*Galium spurium*)
- green foxtail (*Setaria viridis*)



Chickweed (*Stellaria media*)

Photo credit: Bruce Ackley, The Ohio State University, Bugwood.org

- hemp-nettle (*Galeopsis tetrahit*)
- kochia (*Kochia scoparia*)
- narrow-leaved hawk's-beard (*Crepis tectorum*)
- shepherd's-purse (*Capsella bursa-pastoris*)
- spiny annual sow-thistle (*Sonchus asper*)
- stinkweed (*Thlaspi arvense*)
- wild buckwheat (*Fallopia convolvulus*)
- wild mustard (*Sinapis arvensis*)
- wild oats (*Avena fatua*)

## Learn More

Find out more on this topic and access these additional resources at the following web page:  
[www.agriculture.alberta.ca/invasive-weeds](http://www.agriculture.alberta.ca/invasive-weeds)

**Resistant Weeds site at University of Guelph**

**Herbicide Group Classification**

**International Survey of Herbicide Resistant Weeds**

**Crop Protection Lab - Saskatchewan Agriculture**

**Herbicide Resistant Weeds factsheet from Ontario**

**Weed Resistance Risk Assessment Tool: Assess the risk of glyphosate resistance (from Monsanto)**

**Mix It Up: herbicide resistance information from Bayer Crop Science**

*Crop Protection 2013 (The Blue Book)*  
**Pesticide information for Alberta**

Most recently, glyphosate-resistant kochia (*Kochia scoparia*) has been showing up in southern Alberta.

The Crop Protection Laboratory at Saskatchewan Agriculture can test samples of suspected herbicide resistant weeds to confirm resistance. There is a fee for this service.

Dr. Linda Hall, Department of Agricultural, Food and Nutritional Science at the University of Alberta, can also provide advice on suspected cases of herbicide resistance, especially for weed species not previously known to be resistant.



Photo credit: Wendy VanDyk-Evans, Bugwood.org

**Green foxtail (*Setaria viridis*)**



Photo credit: Tom Heutte, USDA Forest Service, Bugwood.org

**Hemp-nettle (*Galeopsis tetrahit*)**

## What you can do

- Use a diversity of tools for controlling weeds, including cultural, mechanical and biological control practices as well as chemicals; this combination is an integrated weed management approach.
- Do not rely on a single herbicide: use herbicides from different groups in rotation, in sequence or in tank mixtures.
- Follow the rates and times of application on herbicide labels.
- Keep weed populations and soil weed seed banks low.
- Use the cleanest seed possible, and keep fields and field borders as weed-free as possible.
- Control weeds after harvest to prevent seed production.
- Avoid moving weed seeds, both within and between fields.
- Scout your fields often and keep records of herbicide use and performance.
- Maintain a competitive crop stand to suppress weeds.

Photo credit: Caleb Stemmmons, University of Wisconsin, Stevens Point, Bugwood.org



**Narrow-leaved hawk's-beard** (*Crepis tectorum*)

## General principles and resources

- Learn how to identify invasive plants.
- Be alert for weeds escaping herbicide application and respond early when they are found.
- Reduce the introduction of invasive plants, their reproduction and the movement of their seeds and plant parts.
- Use effective, appropriate methods to control invasive plants. Alberta Agriculture and Rural Development, Environment and Sustainable Resource Development, municipal Agricultural Fieldmen and city parks departments can provide advice on control methods. Always follow label instructions when applying any herbicide.

### **Alberta Invasive Plant Identification Guide (from Wheatland County)**

[www.wheatlandcounty.ca/DocumentCenter/View/12](http://www.wheatlandcounty.ca/DocumentCenter/View/12)

### **Alberta Invasive Species Council factsheets**

[www.abinvasives.ca](http://www.abinvasives.ca)

### **Alberta Weed Control Act and Regulations**

[www.agriculture.alberta.ca/weedcontrol-act](http://www.agriculture.alberta.ca/weedcontrol-act)

### **Alberta Weed Monitoring Network**

[www.agriculture.alberta.ca/weeds](http://www.agriculture.alberta.ca/weeds)



Photo credit: Ohio State Weed Lab Archive, The Ohio State University, Bugwood.org

**Spiny annual sow-thistle** (*Sonchus asper*)



**Wild buckwheat** (*Fallopia convolvulus*)



**Wild oats** (*Avena fatua*)

Barry Rice, sarracenia.com, Bugwood.org



**Wild mustard** (*Sinapis arvensis*)



**Stinkweed** (*Thlaspi arvense*)

Photo credit: Robert Vidéki, Doronicum Kft., Bugwood.org



**Kochia** (*Kochia scoparia*)



**Shepherd's-purse** (*Capsella bursa-pastoris*)

Photo credit: Mary Ellen (Mel) Harte, Bugwood.org

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