

Resistance of Weeds to Herbicides

In recent years, the number of herbicide-resistant weeds and the areas they infest in Manitoba have increased.

Herbicide-resistant weeds arise following repeated use of the same herbicide (or herbicide group) for a number of years on the same field. Growers who have developed weed resistance on their farms will typically see a weed, which is normally controlled by a herbicide, escape uncontrolled after a number of years of use of the same product or product group.

Herbicide resistance should be suspected under the following conditions:

- A weed species that the herbicide controlled in previous seasons now escapes the treatment, while other weeds which appear on the label continue to be controlled in the field.
- The escapes cannot be attributed to adverse weather or emergence after application (if a post-emergence product is in question).
- Irregular-shaped patches of a weed develop where the herbicide gives little or no control.
- Records of the past history of the field show repeated use of the same herbicide, or combinations of herbicides, which kill the weed in question in the same way. Herbicides are grouped by their mode of action so be aware of which group was applied over the field history.

Herbicide Resistant Weeds in Manitoba

Current Status of Herbicide Resistance	
Weed	Description of Resistance
Wild Oat	Resistant to Group 1 herbicides. Resistant to Group 2 herbicides (At present, confirmed in Manitoba only). Resistant to Group 8 herbicides. Resistant to three different groups of herbicides that includes: Group 1,2, and 8.
Green Foxtail	Resistant to Group I herbicides. Resistant to Group 3 herbicides. Resistant to herbicides in both Groups 1 and 3.
Wild Mustard	Resistant to Group 4 herbicides. Resistant to Group 5 herbicides.
Kochia, wild mustard, chickweed, hemp nettle	Resistant to Group 2 herbicides. Wild mustard, chickweed and hemp nettle confirmed in Manitoba only,

How to Identify Weed Resistance

It is important to avoid confusing herbicide failure due to resistance with herbicide failure due to various other factors (such as weather or application errors). When a herbicide fails to control weeds due to weather or application factors, that herbicide may work in the field the next season. But when herbicides fail due to the development of resistance, they will fail in subsequent years, regardless of weather or application procedures.

Avoiding Weed Resistance

It is far easier to avoid development of resistant weed strains than it is to eradicate or control them after they develop and infest an area.

To avoid the development of resistance on your farm, take the following steps:

1. Rotate herbicide usage so that the same herbicide is not used year after year. Rather than using the same product on an annual basis, consider using other products on a regular basis.
2. Be aware that when resistance to one product develops in a weed population, it can often mean the weed population has developed resistance to other herbicides that act in a similar manner. For example, green foxtail, which is resistant to trifluralin, may be resistant to Edge as well; kochia which is resistant to Ally, may be resistant to Refme Extra; wild oat populations resistant to Hoe-Grass 284 may be resistant to Achieve.
3. Keep accurate records of crop rotation and herbicide use. It will be easier to plan your long term weed management strategies if you have good records of your past management practices.
4. Limit the use of herbicides that remain active in the soil for extended periods of time. Examples are Ally and Amber. This is particularly important if these products have been used within the past four years.

If Weed Resistance Develops on Your Farm

It is important to identify weed resistance before it spreads across your farm. Plan on conducting a "patch watch" scouting program this summer to identify suspicious patches before they become difficult to manage. Resistant weed patches have been identified on fields where producers were unaware of their existence.

1. Report suspected cases of resistance on your farm to your Manitoba Agriculture, Food and Rural Initiative's local contact, Weed Supervisor or industry representative (see contact page).
2. Mow, cultivate or spot spray the patches. Resistant patches should not be allowed to produce seed.
3. Patchy areas should NOT be harvested with the rest of the field. Harvest these areas separately, and make sure to clean all harvesting equipment before leaving the area to prevent the spread of seeds across the field or to a neighbouring field.
4. Check patches each year to monitor their spread. Keeping your resistant weeds isolated to a manageable patch is easier than dealing with an entire field of resistant weeds.

Resistance Grouping

To help you plan your herbicide program, refer to the following Herbicide Groups table. To slow down the process of developing weed resistance, use products from different groups from year to year on your fields. New herbicides do not necessarily have a unique mechanism of action and may fall within the groups listed below.

Important: Herbicides that have the same mechanism of action may not control the same weed spectrum or have the same crop safety. For example, Assert and Ally have the same mechanism of action; however, Assert controls wild oats while Ally does not. Remember to read and follow label instructions.

<p>Group 1 (contain ACCase grasskiller) Achieve, Assure 11, clethodim, Elite*, Flax Max*, Fusion, Harmony, Hoe-Grass 2841II*, Horizon, Horizon BTM*, Muster Gold*, Poast Ultra, Prevail*, Puma 120 Super, Pursuit Ultra*, Total*, Triumph Plus*, Venture L</p>	<p>Group 2 (contain ALS/AHAS inhibitors) Absolute*, Adrenalin*, Accent, Ally, Approve, Assert, Champion 120 Extra*, Escort, Everest, Express Pack*, Express TNG, Frontline*, Frontline 2,4-D*, Harmony Total*, K2, Muster, Muster Gold*, Odyssey, Pinnacle, Prepass, Prism, Pursuit, Pursuit Ultra*, Refine Extra, Spectrum*, Sundance, Triumph Plus*, Trophy*, Ultim, Unity*</p>
<p>Group 3 (contain mitotic inhibitors) Dacthal W-75, Prowl 400EC, trifluralin</p>	<p>Group 4 (contain growth regulator herbicides) 2,4-D, 2,4-DB, Absolute*, Adrenalin*, Attain, Banvel 11, bromoxynil + MCPA ester*, Curtail M, dicamba, dicamba + mecoprop + MCPA, dichlorprop + 2,4-D, Dyvel, Dyvel DSp, Eclipse*, Elite*, Express Pack*, FlaxMax*, Frontline*, Frontline 2,4-D*, Grazon, Lontrel, MCPA, MCPB + MCPA, mecoprop, Pea Pack*, Prestige, Prevail*, Remedy, Spectrum*, Thumper*, Tordon 22K, Trophy*, Triumph Plus*</p>
<p>Group 5 (contain photosynthetic inhibitors triazines) Atrazine, Gesagard, Laddock*, Pea Pack*, Primextra 11 Magnum*, metribuzin, simazine, Sinbar, Velpar</p>	<p>Group 6 (contain photosynthetic inhibitors - nitriles/ benzothiadiazotes) Approve, Basagran, bromoxynil, bromoxynil + Mep A ester*, Elite*, Hoe-Grass 11*, Horizon BTM*, Laddock*, Thumper*, Unity*</p>
<p>Group 7 (contain photosynthetic inhibitors - ureas/ amldes) Diuron, linuron</p>	<p>Group 8 (unknown mode of action) Avadex BW, Avenge, Eptam 8E, Eradicane gE, Prefar</p>
<p>Group 9 (contain inhibitors of EPSP synthase) Glyphosate</p>	<p>Group 10 (contain inhibitors of glutamine synthetase) Liberty</p>
<p>Group 11 (inhibit carotenoid synthesis - triazoles) Amitrol 240</p>	<p>Group 14 (PPO (Protox) inhibitor) Goal, Reflex Group 19 (contains naptalam, inhibits auxin transport) Alanap 3</p>
<p>Group 15 (inhibit cell division - benzamides, chloroacetamides) Devrinol 50 DF, Dual II Magnum, Frontier, Kerb 50 WSP, Primextra 11 Manum*</p>	<p>Group 19 (contains naptalam, inhibits auxin transport) Alanap 3</p>
<p>Group 22 (photo system 1- electron diverters) Gramoxone, Reglone</p>	

Some products contain more than one active ingredient and therefore may appear in more than one group. In some instances, both active ingredients act to kill the same weed using different mechanisms of action. In these instances, use of tank mixes may slow down the process of developing weed resistance. New herbicides do not necessarily have a unique mode of action and may fall within the groups listed in the chart.