

Are your fields at risk for herbicide resistance?

Rate your risk

Actions speak louder than words. This is particularly true when it comes to managing herbicide resistant weeds. Your farming practices influence your risk of developing weed resistance. Look inside and take the test to rate your risk.



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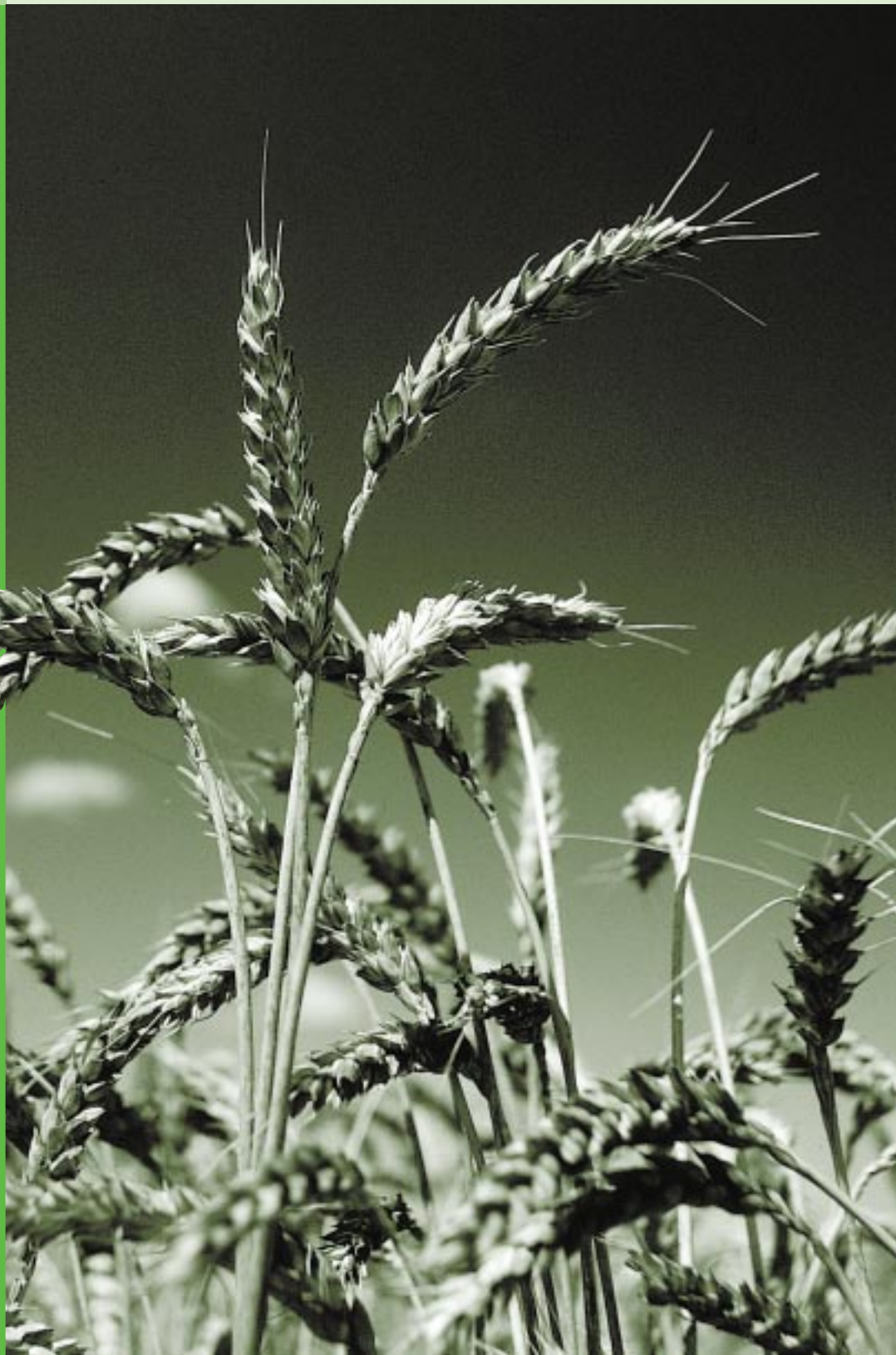
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The Quiz

Answer each question based on what you would most likely do if you found yourself in the situation. There are no “right” or “wrong” answers to these questions. When you’ve finished the quiz, score your answers on the key at the end of the quiz.

1

Inspecting your fields to check the effectiveness of your herbicide applications can be a very big task considering the size of your operation. As part of your inspection routine, you:

- a) walk around the perimeter of the fields looking for obvious signs of weed escapes or disease. You notice an irregular patch of weeds and mark the area. You plan to spray or mow before the weeds mature.
 - b) conduct a windshield survey of the fields, stopping to take a closer look at selected spots. You are confident in your herbicide application. One weedy patch catches your attention but it is probably an area that was missed during application.
 - c) set aside a number of days, before and after application, to walk through the fields, carefully scouting for weeds, disease and insects. After spraying, you pay special attention to patchy weed escapes, and record details in your log so that you can take appropriate action now and in future rotations.
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2

Last year you noticed a suspicious patch of wild oats in a field in which you have grown cereals for two years in a row. You decide to:

- a) plant wheat this year. You may even try that new semi-dwarf variety. The weed patch was probably just poor performance of the herbicide or extremely heavy weed pressure.
 - b) plant a different crop, maybe canola or peas, and switch to a different herbicide. You have concerns about resistant weeds so you will definitely choose a different brand of herbicide.
 - c) stick to your rotation plan that calls for planting a pulse crop, and using a herbicide from a different herbicide group than used previously. In your farm records, you record the exact location of the patch and type of weed. You do this to determine if the patch will spread or will be controlled in the future.
-

3

Rotating herbicides is one way to be proactive about herbicide resistance. This year you’re determined to:

- a) try herbicides with different names to control the weeds.
 - b) stick to your herbicide rotation plan in combination with your crop rotation plan. Your plan calls for using herbicides from groups with different modes of action in rotation from year to year.
 - c) use a tank-mix that combines two herbicide groups that control the same weed.
-

4

You've just finished harvesting your first field. Sun's shining, but you know it won't last. You're ready to move to the next field. You plan to:

- a) clean the combine and the chaff collector thoroughly before moving into the next field. This is your standard practice to reduce the risk of spreading weed seeds and disease from field to field.
- b) move into the next field but plan to stop and clean the combine when you finish this second field. You've identified a weed patch that you suspect is resistant in this second field and you don't want to take chances and spread the weeds.
- c) move into the next field and start combining. Cleaning your combine is a waste of time because you have never noticed any new or resistant weeds on your land or your neighbours.

5

A recent magazine article suggested that crops can gain a competitive advantage over weeds when sown using higher seeding rates, narrow row spacing, shallow seeding (when moisture conditions allow) and by using seed that's treated and free from weed seeds. As part of your game plan for planting this year, you:

- a) decide to try some of these recommendations. You'll plant half of your fields with certified seed to see if there's a difference in weed pressure and crop vigour compared to bin-run seed.
- b) stick with your normal planting routine. You have always had good success by controlling weeds once they emerge, with a herbicide that has worked well in the past. Considering the cost of some of these practices, spraying seems more economical.
- c) expand these practices into other fields. You have used the integrated approach in past years and believe that weed management begins at planting.

6

You've followed the herbicide label rates, but as the growing season progresses, you notice that one field has very large areas where weeds are still growing. You decide to:

- a) collect a sample of weeds and have it tested for resistance and re-spray with a product from a different herbicide group. Next year you plan to rotate to a different crop so that you can choose from a wider range of herbicide groups. Where feasible you will consider chem-fallow or growing a forage.
 - b) call the company who manufactures the herbicide and ask for a refund. You're not sure what went wrong this year because the herbicide has worked well in the past.
 - c) burn or mow down the patches where the weeds have escaped. The weeds haven't headed out yet and by getting to the weeds before they establish seed you will have fewer resistant weeds to contend with next year.
-

Add the points to rate your risk of having herbicide resistant weeds in your fields. Then determine if the corresponding risk profile matches your mindset and actions.

SCORING	Points		
Question	A	B	C
1	3	5	0
2	5	3	0
3	4	0	1
4	0	3	5
5	3	5	0
6	0	5	2

Rate your risk:	
Rating	Points
Low Risk	0 - 10
Medium Risk	11 - 20
High Risk	21 - 29

High Risk

You have little concern about herbicide resistance because you know that science will provide the answer to herbicide resistant weeds. In fact, you may even think that the talk about herbicide resistant weeds is just part of a plan to market new products. You're confident you don't have herbicide resistant weeds on your land. However, you're not sure that you have enough information to be able to assess the problem if it did exist. If something were to convince you that you had herbicide resistant weeds, you don't know if you would take action on it right away. There has been a lot of conflicting information on the subject – it's sometimes better to take a wait-and-see approach.

Time is money. You don't feel there's always a need to walk fields to check the stage or type of weeds before you spray. You've got a spray routine you use every year, and it's always worked. Why even bother walking your fields to determine if the herbicide is working. Maximizing your profitability is very important. Planting forages is not one of your priorities because you just can't see any value in those crops (and that goes double for fallow).

You've read about the importance of crop and herbicide rotation, and you've wondered if herbicide resistant weeds really could creep up on you. However, you're just too busy running your operation to worry about things that you cannot really control anyway.

WREAP RESPONSE

Herbicide resistant weeds are a reality any crop producer may face. If you think that managing for herbicide resistant weeds is someone else's problem, think again. The genetic potential for herbicide resistance could exist in every field. How quickly weeds develop herbicide resistance is uncertain, but WREAP members suspect that if the same herbicide group is used over and over again herbicide resistance may increase. It's a misconception to assume that new herbicide groups can easily be discovered to help combat resistant weeds.

Herbicide rotation is one tool available to manage herbicide resistant weeds. Taking the extra time to plan herbicide rotations for future growing seasons is time well spent. Choosing to rotate a herbicide with another trade name is not an effective management strategy for resistance. This is because you may not be rotating between herbicide groups, which is one tool available when it comes to managing herbicide resistance.

Herbicides are only one part of good weed control. Crop rotation keeps weeds off balance and can alter your weed spectrum. When you use a crop rotation, you vary planting dates, planting rate and fertility regimes, making it more difficult for weeds to adapt and become established.

If you think you might have a patch of resistant weeds, consider incorporating a forage in your rotation. An established forage crop such as alfalfa is very competitive. It can provide the opportunity to compete with many weeds over a number of years and decrease the need to apply a herbicide. Forages in a rotation also increase your future herbicide options in crops that are less competitive with weeds such as semi-dwarf cereals. If you decide to grow forages in a field where you think you might have resistant weeds, be sure to cut the crop before the weeds have set seeds in order to prevent the seeds from returning to the soil.

I suspect a real problem with herbicide resistant weeds in one field. How do I manage them?

- Use an integrated weed management approach that incorporates both cultural and chemical control practices.
- Determine which group of chemicals you have been using to control both grass and broadleaf weeds. Rotate among groups for both grass and broadleaf control.
- Use tank-mixes that allow you to control weeds in more than one way by combining two or more herbicide groups on the same weed.
- Consider growing a different crop, which may include forages. Rotating crops can alter your weed spectrum. That's because every crop differs in how it competes against weeds. A different crop can make it easier for you to rotate to herbicides from alternate groups. Forages such as alfalfa are good because you can use it as hay or sell it, but be sure to cut before the weeds go into seed.

Moderate Risk

You're convinced that weeds can adapt and become resistant to herbicides but you don't think it's a significant problem yet. To get the maximum benefits from herbicides, you scout your fields to determine weed spectrum and proper timing for herbicide application.

While planning for the coming growing season you jot down a few notes on what crops and herbicides you've used in the past and which ones you'll use this year. As you make notes you notice that although you've planned to rotate herbicide groups you haven't stuck to your guns. Often you make changes at application time based on economics, weed stage or the advice of your dealer. A crop rotation is planned but sometimes you have to change your plans to stay profitable. You use certified seed to plant your high value crops or when shifting to a new variety but otherwise you use bin-run seed for the rest.

Last year while scouting your canola you noticed a patch of wild oats, but you were not sure if it was poor herbicide performance or herbicide resistance. You're aware and concerned about resistance management but because of immediate pressures, such as time and money, it's difficult to practice resistance management.

WREAP RESPONSE

Sticking to your herbicide and crop rotation plan is critical to manage and delay resistance in your fields. Committing to a crop and herbicide rotation program may require more effort when you sit down and begin planning for the first time. However, in the long run you can save time and money because you'll decrease the risk of herbicide resistant weeds in your fields. The main time commitment when you plan a resistance management strategy is made up front.

If your herbicide program is too dependent on a single herbicide group, you have a greater chance of selecting for resistant weeds even if none have appeared to date. Start planning by choosing herbicides from other groups. One consideration may be to add a herbicide tolerant crop in your rotation, which allows the opportunity to use an alternate herbicide group.

Herbicides are only one component of good weed control. Use an integrated approach that combines cultural practices with herbicides. Plant certified seed to avoid the introduction or spread of weed seeds. High quality seeds also produce vigorous seedlings, important for achieving good crop competition and yield potential.

Use herbicides strategically. A herbicide application should provide a yield benefit that more than pays for the cost of the application. Scout fields and check herbicide labels to determine the need to spray and the best time to spray based on the leaf stage of the weed and crop.

How do herbicide tolerant crops affect herbicide resistant weeds?

Herbicide tolerant crops can increase herbicide rotation options. Incorporate herbicide tolerant crops into your current rotation to provide additional herbicide group choices for weed control. Repetitive use of any herbicide group increases the risk of herbicide resistant weeds developing on your farm.

Why should I adopt an integrated weed management (IWM) strategy?

An IWM strategy combines both chemical and cultural practices to manage weeds. The easiest way to start an IWM program is to introduce one new technique at a time.

Making your crop more competitive will help choke out weeds and help reduce the reliance on herbicides. Make an effort to:

- Seed at the high end of the recommended rate. High seeding rates will give your crop a better chance to compete successfully against weeds.
- Try any technique that will help your crop emerge early and compete with weeds such as narrow row spacing, shallow seeding (if sufficient moisture is available) or side-band fertilizer placement.
- Use certified seed instead of bin-run seed. Certified seed is your best source of seed since it's relatively free of weeds. Certified seed also produces vigorous seedlings, which are important for crop competition and maximum yield potential.

Aim to implement practices that keep weeds off balance, making it more difficult for weeds to adapt to herbicides.

- Grow highly competitive crops in your rotation such as fall rye, winter wheat, spring barley or annual forage to give crops a competitive advantage over weeds.
- Keep records of the herbicide groups that you are using for both grass and broadleaf weed control. Plan to rotate among herbicide groups and commit to it.
- Use tank-mixes that allow you to control weeds in more than one way by combining two or more herbicide groups on the same weed.
- Scout your fields to determine the most economic time to spray. Application at the early end of the label range provides better economic return than waiting until later stages.

Low Risk

You believe an ounce of prevention is worth a pound of cure. You're aware of the issue of herbicide resistance, either through first hand experience or knowledge from those who have faced the difficulty. You are convinced that herbicide resistance has the potential of becoming a problem and you practice a land stewardship approach that includes planned crop and herbicide rotation, good sanitation practices, thorough scouting and integrated weed management.

Planned crop rotation helps you organize your herbicide rotation. Even when the futures market tempts you to adjust your plan, most often you do not succumb, because you tend to focus more on long-term profit and stability rather than short-term gain. Besides, changing plans requires a lot of juggling to get back on track. At one time you may have relied on your memory to keep track of what herbicide was used where, but you now keep good records. To make your plan work, you maintain consistency, and there is no room for memory lapses.

You usually purchase certified seed and plant at higher seeding rates. You also spend time scouting your fields and treating problem patches. Although your time inputs are higher than what may be considered average, you believe that your good yields and low dockage penalties result in a fair return.

WREAP RESPONSE

Incorporating a strong crop rotation with cereals, pulses, oilseeds or forages means fields are at a lower risk for developing resistance. When using a diverse range of weed control strategies, weeds are less likely to adapt to herbicides – unlike a program that relies on one or two weed control tools. Even with a good crop rotation you need to make sure that you rotate among herbicide groups for both grass and broadleaf control. Try this strategy with tank-mixes. This will allow you to control weeds in more than one way – by combining two or more herbicide groups on the same weed.

Using a chaff catcher on your combine is a proven method of preventing weed seeds (resistant or not) from returning to the field. Feeding piles of chaff to livestock is a good way to dispose of them. The time spent at the end of every field to give the combine a quick sweep or to knock dirt off the cultivator shanks is time well spent. If you suspect herbicide resistant patches in a particular field, WREAP recommends cleaning the machinery more thoroughly. This will help keep resistant weed seeds isolated in the field and help prevent the spread of resistance.

Checklist

to identify weed resistance



To determine if fields are at risk for herbicide resistant weeds ask yourself the following questions:

- ✓ Was the correct herbicide rate applied?
- ✓ Was the herbicide applied within the recommended weed stage?
- ✓ Was the recommended water volume used for application?
- ✓ Was the sprayer properly calibrated?
- ✓ Was the appropriate amount of adjuvant used?
- ✓ Was the spray equipment (including nozzles) clean and in good working condition (i.e. no plugged or worn nozzles)?
- ✓ Were the weather conditions shortly before, during or after application ideal and not likely to have affected herbicide performance?
- ✓ If you had used a post-emergent spray, was the target weed present during application?
- ✓ Did the weed escapes appear to be in irregular patches rather than in strips or in a pattern that would indicate an application problem?
- ✓ Were the weeds in the field herbicide escapes, rather than a second flush of weeds?
- ✓ Was the crop healthy enough to provide adequate competition against the weeds?
- ✓ Were other weeds listed on the herbicide label controlled, while the weed of concern was not?

If the answer to many of these questions is yes, it's time to check those meticulous records that you have been keeping for years. What? No records? Can you remember enough details to answer the following:

- ✓ Has the same herbicide or herbicides from the same group been used in the same field or in the general area for several years?
- ✓ Has the uncontrolled weed been successfully controlled in the past by the herbicide used?
- ✓ Have you noticed a decline in weed control over recent years?
- ✓ Are there known cases of resistant weeds in an adjacent field or farms?

If the answer to these questions is also yes, then resistance should be suspected. Herbicide resistant weeds are manageable. The next steps are:

- ✓ Collect a sample of the suspected resistant population for a herbicide resistance confirmation test.
- ✓ Immediately eradicate the weed population to minimize build-up of resistant weed seeds in the soil. Options such as spraying with another herbicide group, using a non-selective herbicide or mowing the area need to be considered.
- ✓ Develop a field-specific long-term weed management plan.

Group Classification by Modes of Action of Grass/Broadleaf Herbicides*

GROUP	ACTIVE INGREDIENT	TRADE NAME
Group 1	Clethodim Clodinafop-propargyl Diclofop-methyl Fenoxaprop-p-ethyl Fluazifop-p-butyl Quizalofop-ethyl Sethoxydim Tralkoxydim	Select Horizon, Harmony Total, Platinum Hoe-Grass 284, Hoe-Grass II Champion Plus, Champion Extra, Fusion, Laser DF, Puma, Puma Super, Triumph Plus Fusion, Venture, Fusilade II Assure, Assure II, Muster Gold FlaxMax, Poast, Poast Ultra Achieve, Achieve Extra, Prevail
Group 2	Ethametsulfuron-methyl Imazamethabenz Imazamox Imazethapyr Metsulfuron-methyl Nicosulfuron Rimsulfuron Thifensulfuron Triasulfuron Tribenuron-methyl	Muster, Muster Gold Assert Odyssey Odyssey, Pursuit Ally Accent Prism Champion Plus, Champion Extra, Laser DF, Refine Extra, Harmony Total, Triumph Plus, Pinnacle, Freedom Gold Amber, Unity Crossfire, Express Pack, Muster, Muster Gold, Refine Extra
Group 3	Ethalfuralin Trifluralin	Edge Advance 10G, Bonanza, Fortress, Heritage, Rival, Treflan
Group 4	2, 4-D 2, 4-D B 2, 4-D P (dichlorprop) Clopyralid Dicamba Fluroxypyr MCPA MCPB Mecoprop Quinclorac	2, 4-D, Attain, Champion Plus, Dichloprop-D, DyVel DS, Estaprop, Shotgun, Thumper, Prestige, Tropotox Plus, Turboprop, Weedone CB, Express Pack 2,4-DB, Caliber, Cobutox, Embutox Estaprop, Turboprop, Dichloprop Curtail M, Lontrel, Poast FlaxMax, Prevail, Prestige Banvel, DyCler, DyVel, DyVel DS, Rustler, Target Attain, Prestige Achieve Extra, Buctril M, Champion Plus, Curtail M, DyVel, Laser DF, MCPA Poast, FlaxMax, Prevail, Target, Triumph Plus, Tropotox , Prestige, Platinum, Pea Pack Tropotox, Tropotox Plus Compitox, DyVel DS, Mecoprop, Target Accord
Group 5	Atrazine Cyanazine Hexazinone Metribuzin Simazine	Atrazine, Laddok, Primextra Light, Shotgun, Attrex Bladex Pronone, Velpar Crossfire, Lexone, Sencor, Pea Pack Princep Nine-T, Simazine
Group 6	Bromoxynil Bentazon	Achieve Extra, Buctril M, Hoe-Grass II, Laser, Pardner, Thumper, Unity, Platinum Basagran, Laddok
Group 7	Linuron Propanil	Afolan F, Linuron, Lorox Stampede EDF
Group 8	Butylate Difenzoquat EPTC Triallate	Sutan + Avenge Eptam, Eradicane Avadex BW, Fortress
Group 9	Glyphosate	Renegade, Roundup (all formulations), Rustler, Victor, Touchdown, Glyfos
Group 10	Glufosinate ammonium	Liberty, Roundup Fast Forward
Group 11	Amitrole	Amitrol 240
Group 15	Dimethanamid Metolachlor Propyzamide	Frontier Dual, Primextra Light Kerb 50W
Group 22	Diquat Paraquat	Reglone, Gramoxone PDQ Gramoxone, Gramoxone PDQ

* Because this chart combines the recommendations from Manitoba, Saskatchewan, and Alberta the herbicides listed may not be registered for use in all three prairie provinces. Check with the recommendations in your provincial guide.
N.B. All herbicides listed are trademarks of their respective companies.