



STRATEGIES FOR MANAGING HERBICIDE SHORTAGES

A collaboration of the Saskatchewan Wheat Development Commission, Saskatchewan Barley Development Commission, Manitoba Crop Alliance, Alberta Wheat Commission, and Alberta Barley Commission.

Recent history has shown us that the stability of crop protection products is not always guaranteed. Managing an on-farm herbicide program when herbicide resources are short is an important tactic farmers should have an understanding of.

Some considerations to help manage herbicide shortages include integrated pest management (IPM), tank mixes, spraying technologies, and increased spray efficacy.

Integrated Pest Management

Establishing a competitive crop can significantly reduce weed pressure. IPM strategies such as scouting, early seeding date, higher seeding rates, narrower row spacing, and fertilizer placement can all improve a

crop's ability to compete with weeds and may help reduce herbicide reliance.¹ Field history and scouting are important when making pre-burn decisions, and even more so if herbicide availability is limited. Some tactics that can be implemented are:

- Scout fields for weeds and consider field history to determine weed pressure.
- Fields known to have higher weed pressure may need to take priority if herbicides are limited.
- Spraying early while weeds are small means they are easier to control. Early control of small weeds can prevent yield loss due to weed competition.

In addition to scouting, multiple strategies can be used to improve the crop's weed competitive ability. All crops have a "critical weed-free period", the window during which crops are most susceptible to weed competition for light, water, and nutrients. For spring cereals, the critical weed-free period is the 1-3 leaf stage. It is important to keep weed pressure low until this period has passed, weed emergence after this period has a greatly reduced impact on yield, as the crop will have the competitive advantage. As mentioned above, spraying early has an added advantage – generally, the weeds are smaller, so lower herbicide rates can be an option to control weeds.

Early establishment of cereals can increase the crop's competitiveness with early emerging weeds. Research

1 - Saskatchewan Ministry of Agriculture. n.d. "Organic Crop Production Weed Management." Saskatchewan. Accessed 03 10, 2022. <https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/crops-and-irrigation/organic-crops/organic-crop-production-weed-management>.



has shown that ultra-early seeding of wheat, which is the practice of seeding based on a soil temperature, (seeding when the soil first reaches 2.5°C at the depth of seeding), rather than an arbitrary calendar date, can improve yield and yield stability.² The study found that both yield and yield stability were highest with earlier seeding dates, high seeding rates (400-450 seeds/m²), and shallow seeding depths (2.5 cm). It is highly recommended that a dual fungicide and insecticide seed treatment be used when seeding in an ultra-early system.

While research has not been conducted on the impact of ultra-early seeding on weed pressure, early seeding of cereals may result in reduced weed competition during crop establishment and the critical weed-free period, however, more research is needed.

Increased seeding rates can also be used to improve crop competitiveness with weeds. For cereals, a seeding rate of 250-400 live seeds/m² is adequate to provide weed competition.³ Increased seeding rates, when moisture is adequate, can also result in reduced tillering and earlier maturity.

Although it is very unlikely an operation will be able to change equipment as quickly as global markets impact crop protection products, row spacing is another tactic that can be considered to improve crop competitiveness. Narrow row spacing in cereals can provide a competitive advantage against weeds. Narrow row spacing promotes quicker canopy closure, which will reduce the ability of weeds to compete for resources.

2 - Collier, G.R.S.; Spaner, D.M.; Graf, R.J.; Beres, B.L. Optimal Agronomics Increase Grain Yield and Grain Yield Stability of Ultra-Early Wheat Seeding Systems. *Agronomy* 2021, 11, 240. OPEN ACCESS: <https://doi.org/10.3390/agronomy11020240>

3 - Lemerle, D, R Cousens, G Gill, S Peltzer, M Moerkerk, C Murphy, D Collins, and B Cullis. 2004. "Reliability of higher seeding rates of wheat for increased competitiveness with weeds in low rainfall environments." *The Journal of Agricultural Science* 395-409.

Herbicide Alternatives and Tank Mixes

If herbicide quantities are limited, producers may need to prioritize fields for pre-burn spray applications based on field-specific weed spectrum and pressure. Fields with higher weed pressure or larger weeds may require higher rates of glyphosate or the inclusion of a tank mix partner. The addition of a tank mix partner (see Table 1 for tank mix options), can be useful for improved weed control, managing herbicide resistance, and reducing the rate of glyphosate needed. If weed spectrum allows, it may be possible to reduce the glyphosate portion of the tank mix from 1 REL (Roundup Equivalent Litre) to 0.5 REL or lower.

Consult the product label for recommended herbicide rates; it is not recommended to reduce product rate below the recommended guidelines. This could lead to reduced efficacy and increase the risk of polygenic herbicide resistance. Lower rates of glyphosate may require application adjustments such as lower water volumes and the addition of a non-ionic surfactant (ex. Ag Surf® II, Agral® 90), which is on-label for lower rates of glyphosate. The non-ionic surfactant can increase the ability of glyphosate to penetrate the plant cuticle for absorption. If glyphosate is used with a tank mix partner, higher water volumes may need to be maintained.

Be sure to contact your retailer and confirm the status of pre-order herbicides to confirm their delivery. If certain herbicides are not available, growers should consider alternative plans. For example, if glyphosate is not available for all pre-burn acres, different herbicide groups should be considered. In these considerations, crop tolerance, weed spectrum, and re-cropping restrictions should also be factored in. If there are limited glyphosate supplies, growers will need to re-balance their herbicide program and decide if a reduced supply of glyphosate should be reserved for Round-Up Ready crop acres or if it needs to be used



for pre-burn applications. If glyphosate is dedicated to pre-burn applications, and glyphosate is unavailable for in-crop canola or soybean applications, then more traditional chemistries will need to be used. These decisions will be field-specific decisions based on the weed spectrum, resistance management, and re-cropping restrictions. Your provincial crop protection guide contains herbicide selection charts to help growers consider their herbicide options for different weed spectrums in various crop types.

[Saskatchewan Guide to Crop Protection](#)

[Manitoba Guide to Crop Protection](#)

[Alberta Guide to Crop Protection](#)

Herbicides to Control Emerged Weeds Before Seeding or After Seeding but Prior to Crop Emergence

Herbicide	Wheat	Barley
<i>Amitrol</i>	X	X
<i>CleanStart</i>	X	X
Glyphosate	X	X
<i>Enlist Duo</i>	X	X
The following products may or must be mixed with glyphosate		
+2,4-D (up to 294g ae/ac)	X	X
<i>Authority Charge</i>		
<i>Beloukha</i>	X	X
<i>Blackhawk</i>	X	X
+ Bromoxynil	X	X
+ Bromoxynil/florasulam	X	X
Carefentrazone	X	X
+Express FX	X	X
+Florasulam	X	X
Flucarbazone+tribenuron	X	
Flucarbazone+florasulam+carfentrazone	X	
<i>Goldwing</i>	X	X
+Heat Brands	X	X
<i>Himalaya Pass</i>	X	
+Intruvix	X	X
+Korrex II	X	X
+MCPA (up to 200g ae/acre)	X	X
+Olympus	X	
+Paradigm PRE	X	X
<i>Smoulder</i>	X	X
<i>Thunderhawk</i>	X	X
+Tribenuron	X	X
+Tribenuron/Metsulfuron	X	X
Voraxor	X	X

Information Sourced from 2022 Guide to Crop Protection. Saskatchewan Ministry of Agriculture



Tillage

Tillage can be used to control weeds prior to seeding. It is important to recognize that moisture will be limiting for many areas on the prairies this spring. Any soil disturbance, including heavy harrow can increase moisture loss. Additionally, soil disturbance (such as tillage) can increase weed seed germination, therefore multiple passes may need to be utilized. The first tillage pass will stimulate weed growth by aerating and warming the soil, the second pass can be used to control weed growth. Tillage increases moisture loss and erosion and can significantly impact crop establishment. In general, this is not a recommended weed control practice.

Spraying Technologies

Increasing spray efficacy and reducing waste of herbicides is an important consideration. Spray water quality, droplet size, and speed are all important factors when it comes to herbicide efficacy. Poor spray water quality can impact herbicide efficacy. Glyphosate can be significantly impacted by hard water. More information regarding spray water quality can be found [here](#). Another consideration to ensure maximum efficacy of pre-burn herbicides is droplet size: according to Sprayers101, finer sprays should be used for tank mixes that contain contact herbicides (group 1,6,10,14, 15, 22, 27) and herbicides that target grassy weeds.⁴

Spraying speed can also impact herbicide efficacy; in general, slower travel speeds result in more even spray deposition and better weed control. In addition to ensuring adequate spray efficacy, it is also important to consider ways to reduce spray waste. Reducing sprayer overlap with sectional control, priming the boom using

sectional control or a recirculating boom, use of an accurate herbicide metering device, and only mixing the amount of spray needed for field size are all small ways that can significantly reduce herbicide waste. More information can be found at Sprayers101.

With increasing herbicide costs and potential for herbicide shortages new spraying technologies such as spot spray may pencil out better in your budget this year than previously. Spot spray technologies such as WEEDit Quadro, Trimble WeedSeeker, and John Deere See & Spray Select can be utilized to reduce herbicide usage at burn-off. These technologies utilize selective spraying technology to only apply spray to green plants. They can significantly reduce herbicide usage in a pre-burn application, and with rising herbicide costs these technologies start to pay for themselves faster. At this time, the technology cannot selectively spray weeds within a crop, however the technology is rapidly advancing.

Planning Ahead

Good communication with retailers and booking herbicide early can significantly increase chances of getting the products needed. Retailers will be best able to give reliable estimates of product availability if you are straight-forward when herbicide shopping.

Clear and early communication gives you the time needed to make adjustments to your plan, including alternative products, adjusting rates where appropriate and making some investments in technology that can reduce herbicide usage. Seeding and spraying is go-time, so downtime waiting for herbicides that are not available will be frustrating and more impactful on yields and the bottom line than making some strategic adjustments in the last few weeks before seeding.

4 - Wolf, Tom. 2022. "Dealing with pesticide shortages in 2022." Sprayers101. 02. Accessed 02 25, 2022. <https://sprayers101.com/dealing-with-pesticide-shortages-in-2022/>



Summary

If herbicides are in short supply, the following list can be used to assist with herbicide management considerations on-farm:

1. Utilizing seeding BMPs that encourage development of a competitive crop??
2. What is the field history for weed pressure?
3. Take stock of available herbicides, what is incoming, and what is unknown to arrive
 - a. What is the worst-case scenario of products getting on the farm?
 - b. Have all available retailers been contacted?
4. Under the different scenarios, how short is the farm on required herbicide products?
5. Do certain require higher glyphosate rates based on expected weed pressure?
 - a. Can tank mixes or replacement products supplement weed control where extra control is required?
6. Can in-crop glyphosate be replaced with conventional herbicide protection products?
7. Are BMP spray techniques being implemented to ensure what efficiently and effectively herbicide application?
8. Can spot tillage be utilized?
9. Is full-field tillage (worst case scenario) the only remaining option?

Additional Resources:

Spray Water Quality:

<https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/crops-and-irrigation/weeds/water-quality-and-herbicides>

Dealing with Pesticide Shortages in 2022, Sprayers101

<https://sprayers101.com/dealing-with-pesticide-shortages-in-2022/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7020467/>

Wheat and Barley Target Seeding Rates:

<https://www.albertawheatbarley.com/the-growing-point/articles-library/wheat-and-barley-target-seeding-rates?back=1094>