



— Decision Guide 2020-2021 —

# TO MAKE THE BEST DECISIONS IT HELPS TO HAVE A GUIDE

GROWING SERIES

SEED

CROP PROTECTION

FERTILIZER





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# WELCOME TO THE DECISION GUIDE

You know where you want to be by the end of the season. But every year is different, and unforeseen challenges can make it tough to stay on course. Cargill is here to help. Our goal is to provide you with advice that can help you make the best choices for your farm, every step of the way. That's what the 2021 edition of the Cargill Decision Guide is designed to do.

This is not about what's best for us.  
This is about what's best for you.

Our Decision Guide is designed to cut through the noise and get to the heart of the matter. We've turned the concept of the product catalogue on its head and have brought together our agronomists' unique combination of hands-on experience, in-field observation, and Field Test results to offer you a set of recommendations.

It's what you would do if only you had the time.

At Cargill, we know that from before seeding until after harvest, you've got hundreds of decisions to make to get the most from your crops. And because we believe that sharing knowledge and insights leads to higher growth potential on your farm, we've introduced the **Cargill Decision Guide** – a publication loaded with locally relevant analysis paired with agronomic tools and resources, designed to help you successfully navigate those decisions for next year's growing season.

Here's how we see it. If we are to become your trusted partner, we must be open and let you know exactly what our agronomy team is thinking. Our hope is that you will use the well-researched opinions included in this guide and make choices for your farm according to what is most important to you.

On top of that, we've brought you tips, tricks and deeper insights designed to help you choose the set of crop protection and fertilizer products that complement your seed choices. We haven't wasted space on publishing the full range of choices out there. Instead, we've tried to cut through the noise to bring you our best product and application recommendations.

If you have any questions while going through the guide, contact your local Cargill representative or visit [CargillAg.ca](http://CargillAg.ca) for more information.

We hope the 2021 Decision Guide will help you grow your knowledge for this next season and beyond.

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**Always read and follow label directions.**

This guide is designed to help you make step-by-step decisions on your farm.

Using the information and knowledge contained within it, you can select the fertilizer, seed and crop protection products that work best for your farm – providing you with the ability to confidently manage your operation. We've even included a four-step process to help you best use the information in our seed section.





# THE BEST BRANDS IN SEED

Along with canola and soybean seed, Cargill is also proud to offer some of the best corn hybrids on the market. You'll find our agronomists' top corn picks included in this guide.

## HOW TO USE THE SEED GUIDE



### STEP 1

Prioritize the decision factors for each of your fields:

	FIELDS	1	2	3
Disease management				
Weed management				
Relative maturity				
Harvest ease/threshability				
Targeted return on investment				
Versatility				
Dry down (corn)				
Purpose (grain or silage)				
Drought tolerance (corn only)				



### STEP 2

Narrow your search down to the top two or three potential hybrids or varieties for each field.

		HYBRID/ VARIETY 1	HYBRID/ VARIETY 2	HYBRID/ VARIETY 3
FIELDS	1			
	2			
	3			



### STEP 3

Identify your choices based on your agronomic selection criteria.



### STEP 4

Finalize your decision based on discussions with your Cargill representative and reviewing yield data in your own area.

## Best for yield

### Yield is important. We get it. It drives revenue and profitability.

To dig deeper, we looked at as many comparable yield sources as possible and here's what we learned. When examining yield results for canola hybrids over the last three years, the law of statistics applies. On average, by province, regardless of brand or herbicide system, all hybrids yielded within a very narrow, average range – a normal distribution.

### SO WHAT DOES THIS MEAN?

First, all hybrids are good. Differences in yield only become noticeable or relevant as you look at the specific growing conditions on an individual farm or even a specific field.

- Are you in a short growing season zone or a long growing season zone?
- How common is it for you to get an early frost?
- What are the disease conditions on your farm?
- What is your soil type? How much subsoil moisture do you have?
- What are the weed conditions on the field you're seeding?

Different hybrids will shine under different conditions. Even some of the hybrids considered to be “best yielding” don't always perform in every situation.

Second, you need to think about what you're prepared to invest in terms of dollars and time.

What kind of input investment will you need to meet your yield objectives? Fertilizer requirements, disease concerns, weed competition, spray schedule, and timing windows are a few of the factors to consider.

At the end of the day, if you still want to see those top yielders, what do you do?

In the Seed section of this guide, we highlight top seed yielders in each province based on specific criteria. For example, if blackleg is a real issue on your farm, check our Best for Disease Management tab. You will see the hybrids our agronomists have recommended for disease management, as well as all the hybrids we sell with disease resistance.

Review the chart for other factors you need to consider and narrow your selection. We've also shared consistent top yielders in each category by province.

### Remember, it's best practice to grow multiple hybrids on your farm.

This is part of an **integrated management plan** that will help you to spread your risks from disease, resistance and weather. Plus, it allows you to be more strategic around timing your harvest schedule.

### ONE LAST THING

We can't say it enough. Your farm is unique. How a hybrid performs on your farm may be very different than how it performs on your neighbour's farm. Our crop inputs team is here to help you look at this guide and other local data available for your specific situation. We've taken the time to look at plots and Field Test newer canola hybrids in a range of conditions.

**Our promise to you – we will have an informed opinion to help you make that final choice.**

## COMPLETE LIST OF CANOLA HYBRIDS

Cargill's crop inputs team has scouted acres across Western Canada, using their expertise to help farmers in your area grow common and specialty crops. They know the factors you'll be considering for your 2021 crop and have compiled their observations to help you make the best choice for soybeans, canola or corn on your farm.

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING (INCLINE SCORE)	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BY 5105CL</b>	Std CL	1st gen	BL-R	Mid to long	2	2				
<b>BY 6074 RR</b>	Std RR	No	BL-R	Mid to long	2.3	1				SK
<b>BY 6076 CR</b>	Std RR	2nd gen	BL-R	Mid to long	2	2				AB
<b>BY 6090 RR</b>	Std RR	1st gen	BL-R	Mid to long	1.6	1		✓		SK
<b>BY 6204TF</b>	TruFlex	1st gen	BL-R	Mid	2.3	1				*
<b>DK 74-44 BL</b>	Std RR	No	BL-R+	Mid	2.4	1				
<b>DK 75-42 CR</b>	Std RR	1st gen	BL-R	Early	2.4	1				AB
<b>DK 75-45 RR</b>	Std RR	No	BL-R	Early	2.4	1				AB
<b>DK 75-65 RR</b>	Std RR	No	BL-R	Mid	2.3	1		✓		
<b>DKLL 81 BL</b>	Std LL	No	BL-R+	Mid	2.4	1				*
<b>DKLL 82 SC</b>	Std LL	No	BL-R	Early	2.1	1		✓		
<b>DKTF 97 CRSC</b>	TruFlex	1st gen	BL-R	Early to mid	1.7	2		✓		OTW
<b>DKTF 99 SC</b>	TruFlex	No	BL-R	Mid	1.5	2		✓		OTW
<b>DKTF 96 SC</b>	TruFlex	No	BL-R	Mid to long	2.4	1		✓		
<b>DKTF 98 CR</b>	TruFlex	2nd gen	BL-R	Early to mid	2.1	1				
<b>DKTFLL 21 SC</b>	TruFlex: LL+RR	No	BL-R	Early	2.2	1		✓		*
<b>L230</b>	Std LL	No	BL-R	Early to mid	3.2	3				SK,AB
<b>L233P</b>	Std LL	No	BL-R	Mid to long	2.9	2		✓	✓	MB
<b>L234PC</b>	Std LL	2nd gen	BL-R	Early to mid	2.7	3		✓	✓	*
<b>L241C</b>	Std LL	1st gen	BL-R	Early to mid	2	2				ALL

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING (INCLINE SCORE)	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>L252</b>	Std LL	No	BL-R	Mid to long	1.5	2				MB
<b>L255PC</b>	Std LL	1st gen	BL-R	Mid to long	1	2		✓	✓	ALL
<b>L258HPC</b>	Std LL	1st gen	BL-R	Mid to long	2	2	✓	✓	✓	*
<b>L340PC</b>	Std LL	1st gen	BL-R	Mid	2	2		✓	✓	OTW
<b>L345PC</b>	Std LL	1st gen	BL-R	Mid	2.4	2		✓	✓	
<b>L352C</b>	Std LL	1st gen	BL-R+	Mid to long	2.7	2				
<b>L357P</b>	Std LL	No	BL-R+	Mid to long	1	2		✓	✓	OTW
<b>LR344PC</b>	TruFlex: LL+RR	1st gen	BL-R	Early to mid	2	2		✓	✓	
<b>V14-1</b>	Std RR	1st gen	BL-R+	Mid	1.8	2	✓			AB
<b>V24-1</b>	Std RR	1st gen	BL-R+	Mid	1.6	2	✓			
<b>V25-3T</b>	TruFlex	1st gen	BL-R+	Early to mid	2	2	✓			<b>NEW</b>
<b>V25-5T</b>	TruFlex	1st gen	BL-R+	Mid	2.2	1	✓			<b>NEW</b>
<b>V33-1CL</b>	Std CL		BL-R+	Mid to long	2.2	1	✓			

\*Insufficient data available to provide yield rank.

**LEGEND**

**DISEASE PACKAGE**

BL = Blackleg Resistance  
 BL-R+= Enhanced Blackleg Resistance  
 S-IT = Improved Tolerance  
 OTW = Hybrids we're watching for 2021

**RATING SCALE**

1 Excellent      4 Fair  
 2 Very good      5 Poor  
 3 Average

**MATURITY**

Rating: Cargill assessment based on the three-year average of Canola Performance Trial Data (2016 through 2018), agronomist rating and seed manufacturer data where other data unavailable; <https://www.canolaperformancetrials.ca/>

All other data provided by seed manufacturer and/or Cargill agronomy team:

[www.dekalb.ca/canola/hybrids](http://www.dekalb.ca/canola/hybrids)  
[www.agro.basf.ca/basf\\_solutions/seedsandsystems/invigor\\_canola\\_west.html](http://www.agro.basf.ca/basf_solutions/seedsandsystems/invigor_canola_west.html)  
[www.brettyoung.ca/west-canada-seed-crop-inputs/canola-varieties](http://www.brettyoung.ca/west-canada-seed-crop-inputs/canola-varieties)

**CROP STRUCTURE / TABLING (INCLINE) SCORE**

0 or 1 = Very good = approximately 90 degree angle from the ground  
 2.5 = Ideal = approximately 65 to 70 degree angle from the ground  
 >3 = Too inclined = less than 65 degree angle from the ground

To support ease of harvest, we believe the crop incline that is easiest for equipment to move through is when canola is between the #1 and #3 position (at 60% color change or better).

**CLUBROOT GENERATION RESISTANCE**

1 = Denotes hybrids that have first generation resistance. These hybrids provide very good protection in most fields where clubroot has been identified or as an early prevention management strategy.

2 = Denotes varieties with second generation resistance. These hybrids should be used in fields where there are high spore loads or where there is evidence that there has been a breakdown in first generation resistance to the pathotypes in that field.

**LEGEND**

**CONSISTENT TOP THIRD YIELDER RATING**

Consistent Top Third Yielder Rating based on reported crop insurance data in each province for the 2017, 2018 and 2019 crop years. Yield data must be available for at least two years and varieties must have been seeded on 10,000 or more acres in each province to be considered for this rating.

MB indicates a top third yielding seed in Manitoba in at least two out of three years.  
 SK indicates a top third yielding seed in Saskatchewan in at least two out of three years.  
 AB indicates top third yielding seed in Alberta in at least two out of three years.

\*Indicates that there is fewer than two years of crop insurance data available for the variety.

**Data Sources:**

Manitoba Agricultural Service Corporation: Variety Yield Data Browser  
[www.masc.mb.ca/masc.nsf/mmpp\\_browser\\_variety.html](http://www.masc.mb.ca/masc.nsf/mmpp_browser_variety.html)  
 Saskatchewan Crop Insurance Corporation, Sask Management Plus, Online SMP Data:  
[www.scic.ca/resources/smp/smp-data?utm\\_source=saskcropinsurance.com&utm\\_medium=301](http://www.scic.ca/resources/smp/smp-data?utm_source=saskcropinsurance.com&utm_medium=301)  
 Agriculture Financial Services Corporation:  
 Yield Alberta [www.afsc.ca/crop-insurance/annual-crop-insurance/](http://www.afsc.ca/crop-insurance/annual-crop-insurance/)  
 Bayer CropScience/DEKALB:  
[dekalb.ca/canola/hybrids](http://dekalb.ca/canola/hybrids)  
 BASF Canada/InVigor:  
[agro.basf.ca/basf\\_solutions/seedsandsystems/invigor\\_canola\\_west.html](http://agro.basf.ca/basf_solutions/seedsandsystems/invigor_canola_west.html)  
 BrettYoung:  
[brettyoung.ca/west-canada-seed-crop-inputs/canola-varieties](http://brettyoung.ca/west-canada-seed-crop-inputs/canola-varieties)



## BEST FOR STRAIGHT CUTTING

### STRAIGHT CUT PRO TIP

*For those who are curious about straight cutting, the Cargill team encourages farmers to give it a try on a subset of acres with any of these varieties and see how it influences harvest time management.*

<p>HYBRID <b>L255PC</b></p>	<p><b>WHY WE RECOMMEND IT</b></p> <p>This one is a perennial favorite with the Cargill team. It stands tall, fills out, and yields reliably in all weather. The medium maturity and disease protection from blackleg and clubroot makes this a great fit for many farms. The pod shatter technology makes it stand out in this category.</p>
<p>SYSTEM</p> <p><b>InVigor</b></p> <p><b>LIBERTY LINK</b></p>	

<p>HYBRID <b>L345PC</b></p>	<p><b>WHY WE RECOMMEND IT</b></p> <p>Our team has been very excited to see how this new InVigor® hybrid finishes in 2020. In addition to the strong pod shatter trait that we've become familiar with, this mid-maturity hybrid also offers the promise of high yield plus first generation clubroot resistance.</p> <p><b>PRO TIP</b></p> <p><i>As with all InVigor hybrids, the InVigor RATE bagging system helps ensure you're seeding at the right rate to achieve a targeted plant stand of 5-7 plants per square foot.</i></p>
<p>SYSTEM</p> <p><b>InVigor</b></p> <p><b>LIBERTY LINK</b></p>	

<p>HYBRID <b>DKLL 82 SC</b></p>	<p><b>WHY WE RECOMMEND IT</b></p> <p>This early season hybrid with Liberty® tolerance provides a solid weed management option for those looking for an alternative to glyphosate in season or managing for Group 9 herbicide resistance. DKLL 82 SC has shown great promise as a straight cut canola over the last year in Cargill Field Tests. With the intense conditions during the harvest of 2019 this hybrid still held its integrity and yielded comparably to L233P.</p>
<p>SYSTEM</p> <p><b>InVigor</b></p> <p><b>LIBERTY LINK</b></p>	

<p>HYBRID <b>DKTF 96 SC</b></p>	<p><b>WHY WE RECOMMEND IT</b></p> <p>This is an overall solid canola hybrid with added weed control, the promise of good yields and the ability to straight cut. This canola is a great choice for farmers who love the pod shatter trait in Liberty® varieties but want the power of TruFlex™ against persistent hard to control weeds. In a side-by-side comparison with a non-TruFlex canola this year, we saw superior quackgrass control due to the flexibility provided by an in-season glyphosate application.</p> <p><b>PRO TIP</b></p> <p><i>This hybrid is a good fit for farmers who want the choice of straight cutting or delayed swathing.</i></p>
<p>SYSTEM</p> <p><b>InVigor</b></p> <p><b>DEKALB</b></p> <p><b>TruFlex</b> CANOLA</p>	

<p>HYBRID <b>L233P</b></p>	<p><b>WHY WE RECOMMEND IT</b></p> <p>Any list of best for straight cutting hybrids would be incomplete without this farmer favorite. This steady performer is a great option if you are straight cutting for the first time. It is an early-to-mid canola that has withstood poor weather, over-wintered and still delivered.</p> <p><b>PRO TIP</b></p> <p><i>The stalks can be a bit tough to cut in the fall, but a pre-harvest application of Reglone® Ion can help this hybrid cut like butter.</i></p>
<p>SYSTEM</p> <p><b>InVigor</b></p> <p><b>LIBERTY LINK</b></p>	

STRAIGHT CUT CANOLA HYBRIDS OFFERED BY CARGILL

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
<b>BY 6090 RR</b>	Std RR	1st gen	BL-R	Mid to long	1.6	1		✓		SK
<b>DEKALB</b>										
<b>DK 75-65 RR</b>	Std RR	No	BL-R	Mid	2.3	1		✓		
<b>DKLL 82 SC</b>	Std LL	No	BL-R	Early	2.1	1		✓		
<b>DKTF 97 CRSC</b>	TruFlex	1st gen	BL-R	Early to mid	1.7	2		✓		OTW
<b>DKTF 99 SC</b>	TruFlex	No	BL-R	Mid	1.5	2		✓		OTW
<b>DKTF 96 SC</b>	TruFlex	No	BL-R	Mid to long	2.4	1		✓		
<b>DKTFLL 21 SC</b>	TruFlex: LL+RR	No	BL-R	Early	2.2	1		✓		*
<b>InVigor</b>										
<b>L233P</b>	Std LL	No	BL-R	Mid to long	2.9	2		✓	✓	MB
<b>L234PC</b>	Std LL	2nd gen	BL-R	Early to mid	2.7	3		✓	✓	*
<b>L255PC</b>	Std LL	1st gen	BL-R	Mid to long	1	2		✓	✓	ALL
<b>L258HPC</b>	Std LL	1st gen	BL-R	Mid to long	2	2	✓	✓	✓	*
<b>L340PC</b>	Std LL	1st gen	BL-R	Mid	2	2		✓	✓	<b>NEW</b>
<b>L345PC</b>	Std LL	1st gen	BL-R	Mid	2.4	2		✓	✓	
<b>L357P</b>	Std LL	No	BL-R+	Mid to long	1	2		✓	✓	<b>NEW</b>
<b>LR344PC</b>	TruFlex: LL+RR	1st gen	BL-R	Early to mid	2	2		✓	✓	

See page 14 for rating scales. <sup>1</sup>Insufficient data available to provide yield rank.

BEST FOR  
DISEASE MANAGEMENT

**HYBRID L345PC**

**SYSTEM InVigor**

**LIBERTY LINK**

**WHY WE RECOMMEND IT**  
L345 combines pod integrity, clubroot and blackleg resistance with a competitive yield package. We are just starting to see acres ramp up and have several Field Tests in place to track its performance. At the beginning of 2020 we saw excellent emergence and big green leaves with this hybrid. We're anticipating great things and have flagged it as one to watch for 2021.

**HYBRID V14-1**

**SYSTEM VICTORY HYBRID CANOLA**

**Roundup Ready CANOLA**

**WHY WE RECOMMEND IT**  
This hybrid is equipped with both polygenic blackleg resistance and clubroot resistance to pathotypes 2,3,5,6, and 8, protecting your profits and maximizing yield potential. Our pathologists consider V14-1 to be an industry leader when it comes to blackleg resistance.

**PRO TIP**  
*If you live in an area where clubroot has been identified and are concerned about clubroot spreading to your farm, using a clubroot resistant hybrid like V14-1 is one component of a good clubroot management strategy to help reduce the spread of the disease.*

**HYBRID BY 6076 CR**

**SYSTEM BrettYoung**

**Roundup Ready CANOLA**

**WHY WE RECOMMEND IT**  
This is a great hybrid canola for disease management, including sclerotinia resistance, which can help in those years when it's hard to decide whether or not to spray a fungicide. It also offers blackleg resistance and second generation clubroot resistance. It's a late canola but worth the wait.

**HYBRID L234PC**

**SYSTEM InVigor**


**LIBERTY LINK**

**WHY WE RECOMMEND IT**  
This is a nice, early hybrid made for straight cutting with clubroot resistance that has been improved over L135C and yield and maturity similar to L233P. You'll feel comfortable with this hybrid from the time it comes out of the ground.

**PRO TIP**  
*Don't over-seed this hybrid as its legs may not be as sturdy as you might find with L255PC.*

**HYBRID  
DKTF 98 CR**

**SYSTEM**



**WHY WE RECOMMEND IT**

This new hybrid holds a lot of promise. In plots, it has shown really good standability for a taller hybrid. The vigor and performance have been strong – even when seeded late in a wet field with trash from last fall. In addition to its multigenic clubroot resistance, the TruFlex™ trait will help clean up fields longer into the growing season without hurting yield.

**PRO TIP**

*Use this herbicide program when you need a 12 lb hammer on those pesky weeds. You can spray up to one full Roundup Equivalent Litre twice, which will give you control of bigger weeds and tough to kill weeds like wild buckwheat.*

**CANOLA HYBRIDS FOR DISEASE MANAGEMENT**

Clubroot resistant varieties - If you are concerned about clubroot in your farming community or have confirmed clubroot on your farm, you should grow a clubroot resistant hybrid. If you are not concerned about clubroot but a clubroot hybrid has an agronomic package you desire such as potential for straight cut, standability or oil profile, you can grow the hybrid that best fits the needs of your operation, whether or not it is clubroot resistant.


CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
BY 5105CL	Std CL	1st gen	BL-R	Mid to long	2	2				
BY 6076 CR	Std RR	2nd gen	BL-R	Mid to long	2	2				AB
BY 6090 RR	Std RR	1st gen	BL-R	Mid to long	1.6	1		✓		SK
BY 6204TF	TruFlex	1st gen	BL-R	Mid	2.3	1				*
<b>DEKALB</b>										
DK 75-42 CR	Std RR	1st gen	BL-R	Early	2.4	5				AB
DKTF 97 CRSC	TruFlex	1st gen	BL-R	Early to mid	1.7	1		✓		OTW
DKTF 98 CR	TruFlex	2nd gen	BL-R	Early to mid	2.1	5				

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>InVigor</b>										
L234PC	Std LL	2nd gen	BL-R	Early to mid	2.7	3		✓	✓	*
L241C	Std LL	1st gen	BL-R	Early to mid	2	2				ALL
L255PC	Std LL	1st gen	BL-R	Mid to long	1	2		✓	✓	ALL
L258HPC	Std LL	1st gen	BL-R	Mid to long	2	2	✓	✓	✓	*
L340PC	Std LL	1st gen	BL-R	Mid	2	2		✓	✓	OTW
L345PC	Std LL	1st gen	BL-R	Mid	1.5	2		✓	✓	
L352C	Std LL	1st gen	BL-R+	Mid to long	2.7	2				
LR344PC	TruFlex: LL+RR	1st gen	BL-R	Early to mid	2	2		✓	✓	
<b>VICTORY</b>										
V14-1	Std RR	1st gen	BL-R+	Mid	1.8	2	✓			AB
V24-1	Std RR	1st gen	BL-R+	Mid	1.6	2	✓			
V25-3T	TruFlex	1st gen	BL-R+	Early to mid	2	2	✓			NEW
V25-5T	TruFlex	1st gen	BL-R+	Mid	2.2	1	✓			NEW

Refer to page 14 of this guide for an explanation of Cargill's clubroot ratings.  
 \*Insufficient data available to provide yield rank.


## BEST FOR EARLY MATURITY

**HYBRID**  
**DKLL 82 SC**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
Featuring pod integrity with good crop uniformity, this glufosinate-tolerant hybrid is similar in maturity to DK 74-44 and has direct harvest attributes for farmers looking for an early season canola.


**HYBRID**  
**L234PC**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
This is an early maturing hybrid with a suite of traits (pod-shatter reduction, second generation clubroot resistance and a short growing season) that make it an appealing option in a wide variety of conditions. This hybrid is flexible come harvest and you can choose to straight cut it or let it fully mature to swath.

**PRO TIP**  
*This early maturing hybrid could be seeded first to allow extra time for full maturity and help space out harvest workload.*


**HYBRID**  
**DK 75-45 RR**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
This is one of the earliest hybrids available, but it yields like all the big boys. Be ready to swath, as it finishes fast. This hybrid often kicks off canola harvest and 75-45 fields are safely in the bin long before anything else. This is not a hybrid we would typically recommend for straight cutting.

**PRO TIP**  
*DK 75-45 works well in early frost zones.*

**HYBRID**  
**LR344PC**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
This early to mid-maturity InVigor® hybrid gives you the ability to use Liberty® or Roundup® in-crop to help manage fields with weed challenges, while also offering the InVigor pod shatter trait and first generation clubroot resistance.

**PRO TIP**  
*To take advantage of this hybrid's dual herbicide tolerance, use a first pass glyphosate to tackle overwintered cleavers, and count on Liberty to kill in-season weeds.*

## EARLY MATURING CANOLA HYBRIDS


	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING [INCLINE] SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>DEKALB</b>										
<b>DK 75-42 CR</b>	Std RR	1st gen	BL-R	Early	2.4	1				AB
<b>DK 75-45 RR</b>	Std RR	No	BL-R	Early	2.4	1				AB
<b>DKLL 82 SC</b>	Std LL	No	BL-R	Early	2.1	1		✓		
<b>DKTF 97 CRSC</b>	TruFlex	1st gen	BL-R	Early to mid	1.7	2		✓		OTW
<b>DKTF 98 CR</b>	TruFlex	2nd gen	BL-R	Early to mid	2.1	1				
<b>DKTFLL 21 SC</b>	TruFlex: LL+RR	No	BL-R	Early	2.2	1		✓		*
<b>InVigor</b>										
<b>L230</b>	Std LL	No	BL-R	Early to mid	3.2	3				SK, AB
<b>L234PC</b>	Std LL	2nd gen	BL-R	Early to mid	2.7	3		✓	✓	*
<b>L241C</b>	Std LL	1st gen	BL-R	Early to mid	2	2				ALL
<b>LR344PC</b>	TruFlex: LL+RR	1st gen	BL-R	Early to mid	2	2		✓	✓	
<b>VICTORY</b>										
<b>V25-3T</b>	TruFlex	1st gen	BL-R+	Early to mid	2	2	✓			<b>NEW</b>

See page 14 for rating scales. \*Insufficient data available to provide yield rank.

## BEST FOR WEED MANAGEMENT

All canola hybrids sold by Cargill have herbicide tolerance traits. While we've highlighted four here, you can get more information on how to deal with common problem weeds in canola by checking out our crop protection section, beginning on page 66.


**HYBRID**  
**DKTF 98 CR**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
For canola growers with difficult to control weeds and clubroot concerns, this hybrid is a great choice. It is a high yielder and does well in stressful conditions. The option to use a higher rate of glyphosate means you can manage a lot of weeds in season.

**PRO TIP**  
*Consider growing this hybrid if you have a tricky weed issue like foxtail barley to get under control.*

**HYBRID**  
**BY 6204 TF**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
BY 6204 TF has reliable clubroot genetics and added weed control due to the TruFlex™ system's ability to apply a higher rate of herbicide. This is another one we are watching closely in 2020 and it's looking promising so far.


**PRO TIP**  
*6204 is a good choice for farms that prefer a taller plant but still want the TruFlex weed control benefits.*

**HYBRID**  
**DKTF 96 SC**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
If you're coping with problem weeds in your fields, it's exciting to have a trait with the ability to spray two passes of the high rate of glyphosate as well as spraying at a later stage if needed. High yield TruFlex genetics and the ability to straight cut make this one an easy choice for many farms.

**HYBRID**  
**LR344PC**

**SYSTEM**  


**WHY WE RECOMMEND IT**  
This is the first InVigor® Choice hybrid that gives you the ability to use Liberty® or Roundup® in-crop to help manage fields with weed challenges. This canola is great for growers who like the pod shatter trait for harvest and need a bit extra when it comes to weed control.

**PRO TIP**  
*To get the most out of this product do a first herbicide pass with glyphosate for foxtail barley and cleavers that have overwintered and a second pass with Liberty® to deal with in-season weeds.*

## CANOLA HYBRIDS FOR WEED MANAGEMENT

	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
<b>BY 6204TF</b>	TruFlex	1st gen	BL-R	Mid	2.3	1				*
<b>DEKALB</b>										
<b>DKTF 97 CRSC</b>	TruFlex	1st gen	BL-R	Early to mid	1.7	2		✓		OTW
<b>DKTF 99 SC</b>	TruFlex	No	BL-R	Mid	1.5	2		✓		OTW
<b>DKTF 96 SC</b>	TruFlex	No	BL-R	Mid to long	2.4	1		✓		
<b>DKTF 98 CR</b>	TruFlex	2nd gen	BL-R	Early to mid	2.1	1				
<b>DKTFLL 21 SC</b>	TruFlex: LL+RR	No	BL-R	Early	2.2	1		✓		*
<b>InVigor</b>										
<b>LR344PC</b>	TruFlex: LL+RR	1st gen	BL-R	Early to mid	2	2		✓	✓	
<b>VICTORY</b>										
<b>V25-3T</b>	TruFlex	1st gen	BL-R+	Early to mid	2	2	✓			<b>NEW</b>
<b>V25-5T</b>	TruFlex	1st gen	BL-R+	Mid	2.2	1	✓			<b>NEW</b>

See page 14 for rating scales. \*Insufficient data available to provide yield rank.



BEST FOR  
**HARVEST EASE**

When it comes to harvest, it's important things go smoothly. These hybrids go through your combine easily, meaning you're spending more time putting bushels in the bin and less time dealing with lodging or other issues.

**HYBRID L258HPC**

**WHY WE RECOMMEND IT**  
The benefits of Cargill's Specialty Canola Program paired with strong standability and pod shatter traits make this canola a great choice for canola growers looking for smooth combining. Clubroot and blackleg resistance mean this crop stands ready for the combine.

**SYSTEM**

**HYBRID L345PC**

**WHY WE RECOMMEND IT**  
This canola is part of BASF's new 300 series hybrids. From what we've seen so far, L345PC is a great fit throughout Western Canada with excellent standability and industry leading pod shatter resistance. Cargill's agronomists are excited to see how it weighs out this harvest.

**SYSTEM**

**HYBRID DKTF 96 SC**

**WHY WE RECOMMEND IT**  
This is an overall solid canola hybrid with added weed control, the promise of good yields, the ability to straight cut, and solid pod integrity. We have seen this hybrid over two growing seasons, and it has shown an excellent lean for ease of harvest.

**SYSTEM**

**HYBRID DK 75-65 RR**

**WHY WE RECOMMEND IT**  
This is a great choice for a straight cut option if you prefer the Roundup Ready® trait. It's a taller plant that has the flexibility for either straight cutting or swathing at 80% maturity, and its excellent standability reduces lodging issues making it easy to harvest as well.

**SYSTEM**

This hybrid has proven itself in tough environmental conditions like cool, late springs and cool, wet falls, has built-in blackleg resistance and gives you the days you need to harvest without compromising yield.

**PRO TIP**  
*Allowing the plant to wait until 80% maturity keeps the green count low while ensuring more seeds hit the bin.*

**CANOLA HYBRIDS FOR EXCELLENT THRESHABILITY**

	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>1</sup>	CROP STRUCTURE / TABBING [INCLINE] SCORE	CROP STRUCTURE / TABBING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
<b>BY 5105CL</b>	Std CL	1st gen	BL-R	Mid to long	2					
<b>BY 6074 RR</b>	Std RR	No	BL-R	Mid to long	2.3					SK
<b>BY 6076 CR</b>	Std RR	2nd gen	BL-R	Mid to long	2					AB
<b>BY 6090 RR</b>	Std RR	1st gen	BL-R	Mid to long	1.6					SK
<b>BY 6204TF</b>	TruFlex	1st gen	BL-R	Mid	2.3					*
<b>DEKALB</b>										
<b>DK 74-44 BL</b>	Std RR	No	BL-R+	Mid	2.4					
<b>DK 75-42 CR</b>	Std RR	1st gen	BL-R	Early	2.4					AB
<b>DK 75-45 RR</b>	Std RR	No	BL-R	Early	2.4					AB
<b>DK 75-65 RR</b>	Std RR	No	BL-R	Mid	2.3					
<b>DKLL 81 BL</b>	Std LL	No	BL-R+	Mid	2.4					*

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RATING (1/2 GEN)	DISEASE PACKAGE	MATURITY <sup>a</sup>	CROP STRUCTURE /TABLING (INCLINE) SCORE	CROP STRUCTURE /TABLING FOR HARVEST EASE (RATING)	SPECIALTY	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>DKLL 82 SC</b>	Std LL	No	BL-R	Early	2.1					
<b>DKTF 97 CRSC</b>	TruFlex	1st gen	BL-R	Early to mid	1.7					OTW
<b>DKTF 99 SC</b>	TruFlex	No	BL-R	Mid	1.5					OTW
<b>DKTF 96 SC</b>	TruFlex	No	BL-R	Mid to long	2.4					
<b>DKTF 98 CR</b>	TruFlex	2nd gen	BL-R	Early to mid	2.1					
<b>DKTFLL 21 SC</b>	TruFlex: LL+RR	No	BL-R	Early	2.2					*
<b>InVigor</b>										
<b>L241C</b>	Std LL	1st gen	BL-R	Early to mid	2					ALL
<b>L258HPC</b>	Std LL	1st gen	BL-R	Mid to long	2					*
<b>L340PC</b>	Std LL	1st gen	BL-R	Mid	2					OTW
<b>L345PC</b>	Std LL	1st gen	BL-R	Mid	2.4					
<b>LR344PC</b>	TruFlex: LL+RR	1st gen	BL-R	Early to mid	2					
<b>VICTORY</b>										
<b>V14-1</b>	Std RR	1st gen	BL-R+	Mid	1.8					AB
<b>V24-1</b>	Std RR	1st gen	BL-R+	Mid	1.6					
<b>V25-3T</b>	TruFlex	1st gen	BL-R+	Early to mid	2					<b>NEW</b>
<b>V25-5T</b>	TruFlex	1st gen	BL-R+	Mid	2.2					<b>NEW</b>
<b>V33-1CL</b>	Std CL		BL-R+	Mid to long	2.2					

See page 14 for rating scales. \*Insufficient data available to provide yield rank.

## NOTES

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## Achieving Optimum Seeding Rate in Canola

The latest research from the Canola Council of Canada estimates that making simple improvements to seeding and plant establishment can increase canola yields by up to 3 bushels per acre. **Industry experts recommend targeting a plant population of 5-7 plants per square foot to optimize yield.** That's 5-7 plants after accounting for mortality caused by insect feeding or other environmental factors. This will set up the crop for even maturity and to compete well with weeds. At this density, crops will be healthier and better able to efficiently use moisture, sunlight and other inputs.

This marks an important change. In the past we would have prescribed a set seeding rate – say 5 lbs per acre – but now we recommend calculating seeding rate by taking into account typical plant survivability based on your past experience and expected conditions at germination and establishment to calculate optimum plant density.

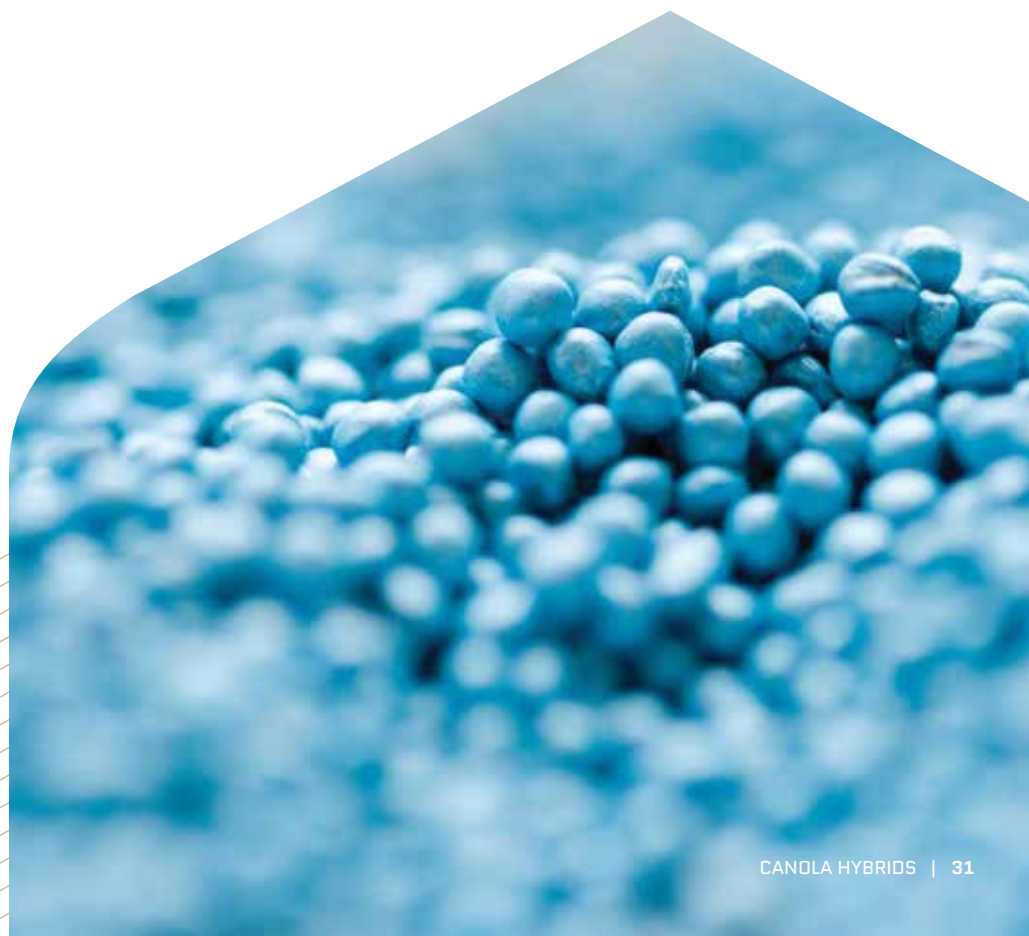
Source: <https://www.canolacouncil.org/canola-encyclopedia/plant-establishment/seeding-rate/#ccc2019>

### The upshot?

Adjust your seeding rate by using the Thousand Seed Weight (TSW) of the seed lot. TSW will be indicated on the seed bag tag. Today many seed suppliers are not only printing TSW on the bag, but they're also adjusting their bag weight to guide farmers to the ideal plant stand to help achieve the hybrid's genetic potential.

## The Latest in Seed Treatment

All canola seed from Cargill comes pre-treated with base seed treatment and the option for add-ons to protect your crop from pest and disease issues. For 2021 we are excited to offer **BUTEO® Start**, a new canola seed treatment from Bayer, available on select DEKALB canola hybrids in 2021. This product gives long lasting protection against crucifer flea beetles, and hard to control striped flea beetles. It contains a powerful insecticide (flupyradifurone) which is a Group 4D insecticide and is an alternative to using neonicotinoid treatment when crops are under high beetle feeding pressure. This product is designed to be mixed with a base fungicide and insecticide treatment such as **Fortenza® Advanced** and cutworm control products such as **Lumiderm®**.



## CARGILL SPECIALTY CANOLA PROGRAM

### A SOLID OPTION FOR OPTIMIZING YOUR RETURN ON INVESTMENT

Cargill is pleased to offer the **Specialty Canola Program** to its customers. Participating in this identity-preserved production contracting program is a great opportunity to grow high-yielding hybrids, capture an attractive premium, provide access to secure markets, all while aligning your delivery months to your cash flow needs and mitigating price risk. It is an excellent complement to a farm’s non-specialty canola, delivering greater diversity in both production and marketing options.

To demonstrate how partnering with Cargill on the Specialty Canola Program can deliver higher returns on your farm, Melissa Cey, Cargill Regional Grain Advisory Leader in Saskatchewan, prepared an analysis based on a real-life **MarketSense**® client in northwestern Saskatchewan using Cargill’s proprietary **Farm Maximizer**® planning software. In this example, we compare a 2019 crop revenue and return scenario for **VICTORY® V14-1** versus a popular non-specialty competitor hybrid, **Pioneer® 45M35**.

In the example shown, the Saskatchewan Crop Insurance Corporation reported that the three-year average yield for both varieties in Saskatchewan Risk Zone 20 was 48 bu per acre, with similar direct expenses (Specialty Program costs are slightly higher at **\$7.45** per acre).

	ACRES	YIELD (BU PER ACRE)*	EXPENSE PER ACRE (TOTAL)	BREAK EVEN PRICE PER BU
<b>Canola: Pioneer® 45M35</b>	500.00	48.00	<b>\$224.57</b>	\$8.85
<b>Canola: VICTORY® V14-1</b>	500.00	48.00	<b>\$232.02</b>	\$9.00

\*Source: 3-year average yield Saskatchewan Crop Insurance

INPUT EXPENSES PER ACRE*		
DESCRIPTION/VARIETY	PIONEER® 45M35	VICTORY 14-1
Seed purchase price**	\$70.00	\$87.02
Fertilizer price	\$95.00	\$95.00
Pre-emergent treatment	\$7.00	\$7.00
Post-emergent treatment	\$9.57	Included in seed
Fungicide	\$35.00	\$35.00
Insecticide	\$8.00	\$8.00
<b>Gross Cost Per Acre</b>	<b>\$224.57</b>	<b>\$232.02</b>

\*Assumes 5 lb seeding rate.

\*\*Pioneer® 45M35 seed price includes Lumiderm® plus Helix® Vibrance®

\*VICTORY V14-1 seed price includes Prosper® EverGol® plus Lumiderm® and 2 applications of Roundup WeatherMAX® at 0.33 litres per acre.

However, the revenue earned through the Specialty Canola Program is **\$38.88 per acre higher**, more than offsetting the comparable costs between the two canola varieties.

	ACRES	REVENUE PER ACRE			CONTRIBUTION MARGIN		RISK
		YIELD (BU PER ACRE)*	PRICE PER BU	REVENUE PER ACRE	CM	NET**	YIELD BREAK EVEN PER ACRE
<b>Canola: Pioneer® 45M35</b>	500.00	48.00	10.42	500.16	\$275.59	\$75.00	40.75
<b>Canola: VICTORY® V14-1</b>	500.00	48.00	11.23	539.04	\$307.02	\$107.00	38.47

To achieve the \$38.88/acre lift in revenue, the advisor and client started to look at pricing opportunities 12-18 months before delivery.

### HERE IS AN OVERVIEW OF THE APPROACH:

This client selected three different delivery periods spaced out to take advantage of higher futures values as well as higher premiums: October, February and June.

- Most MarketSense clients want to pick an Oct-Dec delivery month for some cash flow. Having the periods spaced out allows the farmer to take advantage of higher futures values and Specialty Program premiums.

- The Specialty Program Risk Free Hedge option gives farmers confidence to use price risk management tools through seasonal highs. We know most years Nov canola futures drop as harvest approaches, and the customer opted to take advantage of the good pricing without risk.
- Lastly, this client chose to deliver a portion of their production in June. They always hold canola to deliver in the summer, and working through the Specialty Program offers a higher premium with the added benefit of a longer window to price both the futures and basis. Gains through this program can also be enhanced by use of Cargill Risk Management tools, and having a June delivery period gives them a long time to do that.

Here is a breakdown of the contracting activity (Deferred Delivery):

V14-1 CONTRACT SUMMARY			
DELIVERY MONTH	TONNES CONTRACTED	PRICE PER MT	TOTAL REVENUE
SSO October 2020	72.00	\$490.00	\$35,280.00
SSO October 2020	87.00	\$480.00	\$41,760.00
Flex SSO June 2020	162.00	\$500.00	\$81,000.00
SSO February 2020	72.00	\$475.00	\$34,200.00
SSO February 2020	72.00	\$494.00	\$35,568.00
SSO June 2020	79.00	\$525.00	\$41,475.00
<b>Total</b>			<b>\$269,283.00</b>

PIONEER® 45M35 CONTRACT SUMMARY			
DELIVERY MONTH	TONNES CONTRACTED	PRICE PER MT	TOTAL REVENUE
October 2020	72.00	\$465.00	\$33,480.00
October 2020	87.00	\$455.00	\$39,585.00
February 2020	72.00	\$443.00	\$31,896.00
February 2020	72.00	\$462.00	\$33,264.00
June 2020	79.00	\$480.00	\$37,920.00
June 2020	162.00	\$455.00	\$73,710.00
<b>Total</b>			<b>\$249,855.00</b>

In short, this delivery window spread allowed the client to maximize the returns from both their general and specialty canola production, take advantage of higher futures values and higher premiums, and gave them the opportunity to make a number of pricing decisions over the 12- to 18-month time period.

Chris Kuntz, Senior Grain Marketing Advisor in Clavet, SK sums up the value of the Cargill Specialty Canola program:



**Cargill Specialty Canola has been an increasingly important part of my clientele marketing plan. Several of my clients have increased acreage on the program and made it the specialty canola of choice on their farms. Over the past five years the value proposition of the program has really come together for them.**

**Farmers who choose Cargill’s Specialty Canola Program get:**

- High performing hybrids, with chemical programs that fit well across their crop rotation and field management programs.
- Competitive premiums on those performing varieties.
- The disciplined marketing approach that the program provides, allowing for picking delivery periods that match up with movement and cash flow needs.
- Risk-free pricing which gives them the confidence to forward price at profitable levels without unnecessary risks to the farm.
- The opportunity to attach grain marketing solutions like ProPricing® and Pacer® contracts along with Minimum Price® Puts and Calls offer flexibility to capitalize on the discipline of Cargill’s Specialty Program.

“It really is the whole package for the farm customer with profitability and risk management opportunities on a strong overall production performer.”

For more information about Cargill MarketSense® or the Cargill Specialty Canola Program visit us at [CargillAg.ca](http://CargillAg.ca) or contact your local Cargill representative.

Backed by access to Cargill’s global insights, Cargill MarketSense® has helped thousands of clients unlock greater financial freedom. Our local advisory teams take the time to understand each client’s operation before helping to build and execute a customized marketing plan spanning multiple crop years.

<sup>1</sup>Results and pricing scenarios shared are for information purposes only and are not a prediction of future program offers and results. Please consult your Purchase Contract for the terms and conditions that will govern the sale and purchase of grain. The information is not intended to be, and should not be construed as, trading, financial, legal or tax advice. No warranty is made with regard to the information or results obtained by its use. Cargill Limited, its subsidiaries and affiliates disclaim any liability arising out of your use of, or reliance on, the information.





# SOYBEANS

**Soybeans are tricky. There have been boom years and bust years for this crop.**

Yet farmers in Manitoba have been growing them for a number of years and innovative growers in Saskatchewan and Alberta are honing their skills by keeping a hand in soybeans. Why? Because they are a nice rotational crop, especially if clubroot is limiting your canola acres or *Aphanomyces* has eliminated peas or lentils as a cropping option.

Soybeans are a non-host of *Aphanomyces*, a low-maintenance crop once established, and with year-over year increases in insect and disease pressure for other crops, soybeans can give your rotation a healthy break. There are many other benefits to growing soybeans in addition to rotation, such as low disease pressure, nitrogen fixation and minimal stress from insects. As soybeans become more established on the Prairies, our understanding of what does and does not work continues to grow. The conditions for soybean yield can work as a “hedge” against wheat, peas, and lentils, so you have a crop no matter what weather the season brings (they are more tolerant to excess moisture). If you are concerned about conditions for soybeans next year, keep them as an option. Proper weed control early on, picking the right variety, and seeding at ideal timing can mean getting the bushels that you’re counting on in dry conditions.

\*Always read and follow label directions.

## COMPLETE LIST OF SOYBEAN VARIETIES

SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS [CHUS]	IRON DEFICIENCY CHLOROSIS [IDC] <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT [PRR] RESISTANCE <sup>2</sup>	SOYBEAN CYST NEMATODE [SCN] RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>2</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>Elite® from BrettYoung</b>											
<b>Amirani R2<sup>1</sup></b>	RR2Y	Tall	0005	Very early	2150	1.9	ST	n/a	n/a	2	
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2	ST	1c	S	1	
<b>Akras R2</b>	RR2Y	Med	003	Mid	2375	1.7	T	1k	S	1	SK
<b>Sunna R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
<b>Mani R2X<sup>1</sup></b>	RR2 XTEND	Med	007	Late	2425	2	ST	1c	Y	1	
<b>Vidar<sup>1</sup></b>	RR2 XTEND	Med	008	Late	2500	1.7	T	1c	Y	2	
<b>Renuka R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	n/a	2	
<b>RX Acron</b>	RR2 XTEND	Tall	006	Mid	2450	1.8	ST		n/a	4	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	RR2 XTEND	Med	0005	Very early	2175	1.9	ST	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	RR2 XTEND	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>DKB003-29</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	-	Y R3	4	
<b>DKB005-52</b>	RR2 XTEND	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
<b>24-10</b>	RR2Y	Med/Tall	005	Mid	2425	1.9	ST	1k	S	2	MB
<b>DKB006-29</b>	RR2 XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	
<b>25-10<sup>1</sup></b>	RR2Y	Tall	008	Late	2500	1.8	ST	1c	S	3	

SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>1</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>NK® seeds from Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	1.8	ST	6	S	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Late	2350	2	ST	1c	S	2	MB SK
<b>S003-Z4X<sup>1</sup></b>	RR2 XTEND	Med	003	Mid	2325	2	ST	1c	S	3	
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	S	3	
<b>S0009-F2X</b>	RR2 XTEND	Med	0009	Very early	2275	1.8	ST	1c	S	5	OTW
<b>S001-D8X</b>	RR2 XTEND	Med/Tall	001	Early	2300	2	ST	1c	S	3	OTW
<b>S005-C9X</b>	RR2 XTEND	Med	005	Mid	2350	2.5	S	1c	S	3	OTW
<b>S007-A2XS</b>	RR2 XTEND	Tall	007	Late	2400	1.8	ST	-	-	2	OTW

## LEGEND

### MATURITY

There are a number of different ways to report the maturity of a soybean plant:

**Relative Maturity:** The relative days to maturity grouping assigned by the seed company. Varieties with more zeros in their names (like 0007 and 0009) will be better suited to short seasons. The following is a rough estimate of soybean maturity from the Manitoba Pulse & Soybean Growers Variety Guide:

MATURITY ZONE	MATURITY GROUPING
Very early	<00.2
Early	00.2 to 00.3
Mid	00.4 to 00.6
Long	>00.6

**Relative Maturity Rating** – Reported by zone, very early, early, mid and long; the earlier the variety the fewer days required for the plant to mature.

**Source:** Relevant seed company

**Crop Heat Units** – A measure of thermal time, calculated based on the daily accumulation of heat using temperature data as reported by seed company.\*\* The higher the number, the more heat units required to reach maturity.

\*\***Source:** [agry.purdue.edu/ext/corn/news/timeless/HeatUnits.html](http://agry.purdue.edu/ext/corn/news/timeless/HeatUnits.html)

**OTW** = Varieties we're watching for 2021

### IRON DEFICIENCY CHLOROSIS (IDC) RATING

A rating scale from 1 to 5 where 1 is showing no disease and 5 is severe chlorosis. A rating of 2 or lower is considered good.

**Source:** Manitoba Pulse & Soybean Growers Variety Guide

- |                                    |  |
|------------------------------------|--|
| 1 = green leaves                   | 4 = brown dead tissue between green veins        |
| 2 = yellowish leaves               | 5 = severe chlorosis and a stunted growing point |
| 3 = green veins with yellow leaves |  |

### IDC GROUPING

T = Tolerant, ST = Semi-tolerant, S = Susceptible

**Source:** Manitoba Pulse & Soybean Growers Variety Guide

### PHYTOPHTHORA ROOT ROT RESISTANCE (PRR) RATING

Shows resistance genes for each variety.

### SOYBEAN CYST NEMATODE RESISTANCE

Indicates if variety has resistance to soybean cyst nematode, and where noted shows resistance to Race (1 to 3).

**Source:** Manitoba Pulse & Soybean Growers Variety Guide

**LEGEND**
**WHITE MOULD/SCLEROTINIA RESISTANCE RATING**

1-2 = Excellent	5-6 = Good	9 = Poor
3-4 = Very Good	7-8 = Fair	N/A = Not Available

**Source:** Seed company

<sup>1</sup> Data provided by seed company only

<sup>2</sup> Top third yielder defined as: Yield results in the top 1/3 of all varieties with more than 10,000 acres reported in MASC Crop Insurance for 2017, 2018 and 2019; Source: Manitoba Agricultural Service Crop Variety Yield Data 2017 through 2019  
[http://www.masc.mb.ca/masc.nsf/mmpp\\_browser\\_variety.html](http://www.masc.mb.ca/masc.nsf/mmpp_browser_variety.html)
<sup>3</sup> Top third yielder defined as: Yield results in the top 1/3 of all varieties with more than 2,500 acres reported in SCIC Crop Insurance for 2017, 2018 and 2019; Source: Saskatchewan Crop Insurance, Sask Management Plus Data. [saskcropinsurance.com/resources/smp/smp-data](http://saskcropinsurance.com/resources/smp/smp-data)
<sup>4</sup> Source: Manitoba Pulse and Soybean Growers 2018 Soybean Variety Guide

\* Insufficient data available to rate

<sup>na</sup> Not Currently Available

**BEST FOR  
EARLY MATURITY**
**VARIETY  
S0009-M2**
**SYSTEM**

**WHY WE RECOMMEND IT**

This early maturing variety performs well in every region and is high yielding. This is the go-to variety for growers across Western Canada. With good IDC tolerance and white mould resistance, as well as the potential to perform well under water stress situations, from drought to poorly drained soils, this variety has been consistently selected as the best variety for growers new to soybean production.

**PRO TIP**

*This soybean variety performs well in soils that are high in pH and low in iron.*

**VARIETY  
DKB0005-44**
**SYSTEM**

**WHY WE RECOMMEND IT**

This variety requires fewer heat units, is considered ultra-early and is suitable for the shortest growing season areas. It's also got the Xtend® trait, which means you can spray it with dicamba as well as glyphosate. This is a great option, especially since kochia – even glyphosate-resistant kochia – is such a challenge. This bean is very similar looking to the 22-60 RY but it stands a bit taller.


**PRO TIP**

*If you're looking to keep your field clean and get your crop off earlier, this is a great choice.*

**VARIETY  
NOCOMA R2**
**SYSTEM**

**WHY WE RECOMMEND IT**

This solid early bean from BrettYoung™ is well suited for short season areas, shows good yields for such early maturity and has a well-rounded disease package with excellent resistance to white mould and PRR. What separates Nocoma from other soybean varieties is its tall pod height, which allows the combine header to pick up all the pods and reduce harvest losses.


<b>VARIETY</b> <b>B0009-89</b>	<b>WHY WE RECOMMEND IT</b> This early soybean has great early season vigor and adapts well in different areas. It boasts good standability, strong Phytophthora root rot resistance and good IDC resistance, in addition to its early maturity.
<b>SYSTEM</b> 	


**EARLY MATURING SOYBEAN VARIETIES OFFERED BY CARGILL**


SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>2</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>2</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>6</sup> , SK <sup>3</sup>
<b>Elite from BrettYoung</b>											
<b>Amirani R2<sup>1</sup></b>	RR2Y	Tall	0005	Very early	2150	1.9	ST	n/a	n/a	2	
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2	ST	1c	S	1	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	RR2 XTEND	Med	0005	Very early	2175	1.9	ST	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	RR2 XTEND	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>NK® seeds from Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	1.8	ST	6	S	3	MB
<b>S0009-F2X</b>	RR2 XTEND	Med	0009	Very early	2275	1.8	ST	1c	S	5	OTW
<b>S001-D8X</b>	RR2 XTEND	Med/Tall	001	Early	2300	2	ST	1c	S	3	OTW

See pages 39-40 for rating scales

**BEST FOR**  
**VERSATILITY**

<b>VARIETY</b> <b>DKB0005-44</b>	<b>WHY WE RECOMMEND IT</b> This variety is a consistent performer on various soil types ranging in both carbonate and soluble salt levels. With a maturity zone rating of very early and an exceptional disease package, this variety is a great fit for highly productive soils in Western Canada.
<b>SYSTEM</b> 	
	<b>PRO TIP</b> These beans adapt to various row spacing, but they have also managed to thrive in rows narrower than 22 inches.

<b>VARIETY</b> <b>NOCOMA R2</b>	<b>WHY WE RECOMMEND IT</b> Nocoma R2 is a top pick among our agronomy team for their consistency and reliability when field conditions are not exactly ideal. We have seen this bean mature on time in Western Canada in very early maturity zones under various growing conditions, always producing its first pods at a height that makes for exceptional harvest ease.
<b>SYSTEM</b> 	
	<b>PRO TIP</b> Choose a field with moderate to low levels of carbonate and soluble salts for best results.

<b>VARIETY</b> <b>S0009-M2</b>	<b>WHY WE RECOMMEND IT</b> In northern regions soybeans can be tricky. As this is one of the earliest and highest yielding beans available, it has become the go-to for many soybean growers. Proclaimed a “rock star” by many of our agronomists, this highly adaptive bean works in different maturity areas and has provided consistent performance across the west. These beans have superior IDC tolerance and also have the potential to perform well under water stress situations from drought to poorly drained soils.
<b>SYSTEM</b> 	
	<b>PRO TIP</b> Our agronomists recommend S0009-M2 as the variety for both new and experienced soybean growers as it gives consistent performance across a range of conditions.

SOYBEAN VARIETIES FOR EXCELLENT VERSATILITY




SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>2</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>Elite from BrettYoung</b>											
Nocoma R2	RR2Y	Med	0008	Very early	2250	2	ST	1c	S	1	
Akras R2	RR2Y	Med	003	Mid	2375	1.7	T	1k	S	1	SK
Sunna R2X	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
Renuka R2X	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	n/a	2	
<b>DEKALB</b>											
DKB0005-44 <sup>1</sup>	RR2 XTEND	Med	0005	Very early	2175	1.9	ST	1c	Y R3	1	
DKB0009-89 <sup>1</sup>	RR2 XTEND	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>NK® seeds from Syngenta</b>											
S0009-M2	RR2Y	Med	0009	Very early	2275	1.8	ST	6	S	3	MB
S003-Z4X <sup>1</sup>	RR2 XTEND	Med	003	Mid	2325	2	ST	1c	S	3	
S0009-F2X	RR2 XTEND	Med	0009	Very early	2275	1.8	ST	1c	S	5	OTW
S001-D8X	RR2 XTEND	Med/Tall	001	Early	2300	2	ST	1c	S	3	OTW

See pages 39-40 for rating scales

BEST FOR IDC MANAGEMENT




Soil type has a significant impact on IDC. Be sure to talk to your Cargill representative about recommendations for your specific situation.

**VARIETY**  
DKB003-29

**SYSTEM**  
  
  





**WHY WE RECOMMEND IT**  
 DEKALB®'s replacement for the 23-60 is a medium to tall branchy plant that's well suited for narrow or wide rows. It offers very good tolerance to IDC, along with excellent tolerance to white mould and resistance to soybean cyst nematode. The B003-29 can be grown in a wide variety of conditions and will excel in both low productivity growing conditions and high yield environments.

**VARIETY**  
S0009-M2

**SYSTEM**  
  
  


**WHY WE RECOMMEND IT**  
 S0009-M2 is an early-maturing variety that has good IDC tolerance and responds well to higher pH soils. This consistently high yielding variety is adaptive to different maturity areas and has been proclaimed a "rock star" by some of our agronomists. It is the recommended soybean variety for new soybean growers.

**VARIETY**  
BY SUNNA R2X

**SYSTEM**  
  
  


**WHY WE RECOMMEND IT**  
 We have had Sunna in Cargill Field Tests the last couple of years. This variety consistently performs under IDC pressure and continues to hold its tolerant rating. It competes well with weeds and fills in nicely.



### SOYBEAN VARIETIES FOR EXCELLENT IDC MANAGEMENT

SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>1</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>Elite from BrettYoung</b>											
<b>Amirani R2<sup>1</sup></b>	RR2Y	Tall	0005	Very early	2150	1.9	ST	n/a	n/a	2	
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2	ST	1c	S	1	
<b>Akras R2</b>	RR2Y	Med	003	Mid	2375	1.7	T	1k	S	1	SK
<b>Sunna R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
<b>Mani R2X<sup>1</sup></b>	RR2 XTEND	Med	007	Late	2425	2	ST	1c	Y	1	
<b>Vidar<sup>1</sup></b>	RR2 XTEND	Med	008	Late	2500	1.7	T	1c	Y	2	
<b>Renuka R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	n/a	2	
<b>RX Acron</b>	RR2 XTEND	Tall	006	Mid	2450	1.8	ST		n/a	4	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	RR2 XTEND	Med	0005	Very early	2175	1.9	ST	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	RR2 XTEND	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>DKB003-29</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	-	Y R3	4	
<b>DKB005-52</b>	RR2 XTEND	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
<b>24-10</b>	RR2Y	Med/Tall	005	Mid	2425	1.9	ST	1k	S	2	MB
<b>DKB006-29</b>	RR2 XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	
<b>25-10<sup>1</sup></b>	RR2Y	Tall	008	Late	2500	1.8	ST	1c	S	3	

See pages 39-40 for rating scales

SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>1</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>NK® seeds from Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	1.8	ST	6	S	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Late	2350	2	ST	1c	S	2	MB SK
<b>S003-Z4X<sup>1</sup></b>	RR2 XTEND	Med	003	Mid	2325	2	ST	1c	S	3	
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	S	3	
<b>S0009-F2X</b>	RR2 XTEND	Med	0009	Very early	2275	1.8	ST	1c	S	5	OTW
<b>S001-D8X</b>	RR2 XTEND	Med/Tall	001	Early	2300	2	ST	1c	S	3	OTW
<b>S007-A2XS</b>	RR2 XTEND	Tall	007	Late	2400	1.8	ST	-	-	2	OTW

See pages 40-41 for rating scales

## BEST FOR DISEASE MANAGEMENT

**VARIETY**  
**S007-Y4**

**SYSTEM**  
syngenta  
NK  
ROUNDUP READY 2 YIELD SOYBEANS

**WHY WE RECOMMEND IT**  
The Y4 is a high performing variety, coming in first in several of Cargill's local variety Field Tests over the last year. It produces a thick canopy in the tall/medium height range but also offers a good disease package with strong protection against Phytophthora root rot and IDC. This shorter season variety (2350 CHU) is highly adaptable to a variety of growing conditions and is a high performing soybean that growers love.

**PRO TIP**  
*This a good choice for fields that have a higher pH as they have good tolerance to IDC.*

**VARIETY**  
**DKB0005-44**

**SYSTEM**  
DEKALB  
ROUNDUP READY 2 XTEND SOYBEANS  
SCN

**WHY WE RECOMMEND IT**  
In Cargill Field Tests, DKB0005-44 has performed well in areas with heavy pressure for Phytophthora root rot and white mould. This early variety is an excellent choice for farmers wanting to try soybeans in northern geographies. Dicamba tolerance is helpful if you are dealing with weed resistance.

**VARIETY**  
**DKB0009-89**

**SYSTEM**  
DEKALB  
ROUNDUP READY 2 XTEND SOYBEANS  
SCN

**WHY WE RECOMMEND IT**  
This bushy, medium height soybean branches well and comes with resistance to soybean cyst nematode, very good Phytophthora root rot tolerance and excellent tolerance to white mould. Fairly new to DEKALB's lineup, B0009-89 was a top five performer in local Cargill Field Tests and is an excellent choice if you're looking for a bean on the Xtend® platform that matures a bit earlier.

**PRO TIP**  
*One note of caution: B0009-89 may shorten up on clay soils. Compared to other varieties in our soybean demos, there is a very low presence of white mould.*

## SOYBEAN VARIETIES FOR EXCELLENT DISEASE MANAGEMENT

SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>1</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>Elite from BrettYoung</b>											
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2	ST	1c	S	1	
<b>Akras R2</b>	RR2Y	Med	003	Mid	2375	1.7	T	1k	S	1	SK
<b>Sunna R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
<b>Mani R2X<sup>1</sup></b>	RR2 XTEND	Med	007	Late	2425	2	ST	1c	Y	1	
<b>Vidar<sup>1</sup></b>	RR2 XTEND	Med	008	Late	2500	1.7	T	1c	Y	2	
<b>Renuka R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	n/a	2	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	RR2 XTEND	Med	0005	Very early	2175	1.9	ST	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	RR2 XTEND	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>DKB0005-52</b>	RR2 XTEND	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
<b>24-10</b>	RR2Y	Med/Tall	005	Mid	2425	1.9	ST	1k	S	2	MB
<b>DKB0006-29</b>	RR2 XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	
<b>25-10<sup>1</sup></b>	RR2Y	Tall	008	Late	2500	1.8	ST	1c	S	3	
<b>NK® seeds from Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	1.8	ST	6	S	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Late	2350	2	ST	1c	S	2	MB SK
<b>S003-Z4X<sup>1</sup></b>	RR2 XTEND	Med	003	Mid	2325	2	ST	1c	S	3	
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	S	3	
<b>S001-D8X</b>	RR2 XTEND	Med/Tall	001	Early	2300	2	ST	1c	S	3	OTW
<b>S005-C9X</b>	RR2 XTEND	Med	005	Mid	2350	2.5	S	1c	S	3	OTW

See pages 39-40 for rating scales

## BEST FOR WEED MANAGEMENT

**VARIETY**  
S001-D8X

**SYSTEM**  
syngenta  
NK  
ROUNDUP READY 2 XTEND SOYBEANS

**WHY WE RECOMMEND IT**  
This soybean is one to watch for 2021. It's an earlier variety overall, and the vigor the Cargill team has observed in Field Tests this year has been very promising. The dicamba tolerance offered by the Xtend® system keeps fields clean, even with resistance issues to tackle. This variety should be ready to harvest before the fall rush, buying you extra time.

**VARIETY**  
DKB005-44

**SYSTEM**  
DEKALB  
ROUNDUP READY 2 XTEND SOYBEANS  
SCN

**WHY WE RECOMMEND IT**  
This is an Xtend® soybean variety, which means it can be sprayed not only with glyphosate, but also with dicamba. Having this additional option means controlling Roundup Ready® canola volunteers and glyphosate-resistant kochia should come more easily, providing peace of mind for those concerned about weed resistance. This very early soybean is branchy and stands well, has excellent white mould tolerance, and will do well in areas with tight canola-bean rotations.

**PRO TIP**  
*We typically recommend spraying dicamba as a pre-seed option rather than in-crop to reduce the risk of the herbicide drifting onto neighboring crops.*

**VARIETY**  
SUNNA R2X

**SYSTEM**  
BrettYoung  
ELITE  
ROUNDUP READY 2 XTEND SOYBEANS

**WHY WE RECOMMEND IT**  
The R2X dicamba tank-mix option gives strong control of tough weeds until this vigorous, bushy variety can close the canopy. This soybean has no problem filling in 30" rows, which helps to choke out later season weeds delivering a lot of yield.

**VARIETY**  
DKB003-29

**SYSTEM**  
DEKALB  
ROUNDUP READY 2 XTEND SOYBEANS  
SCN

**WHY WE RECOMMEND IT**  
DKB003-29 has been a very consistent Xtend soybean and the decision to spray dicamba with its Xtend genetics is a no brainer for growers who battle kochia most years.

**PRO TIP**  
*If you have kochia, glyphosate-resistant or not, this is a good variety to grow to get another mode of action on kochia.*

## SOYBEAN VARIETIES FOR EXCELLENT WEED MANAGEMENT

SOYBEAN VARIETIES	WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS (CHUS)	IRON DEFICIENCY CHLOROSIS (IDC) <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>1</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>Elite from BrettYoung</b>											
Sunna R2X	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
Mani R2X <sup>1</sup>	RR2 XTEND	Med	007	Late	2425	2	ST	1c	Y	1	
Vidar <sup>1</sup>	RR2 XTEND	Med	008	Late	2500	1.7	T	1c	Y	2	
Renuka R2X	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	n/a	2	
RX Acron	RR2 XTEND	Tall	006	Mid	2450	1.8	ST		n/a	4	
<b>DEKALB</b>											
DKB0005-44 <sup>1</sup>	RR2 XTEND	Med	0005	Very early	2175	1.9	ST	1c	Y R3	1	
DKB0009-89 <sup>1</sup>	RR2 XTEND	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
DKB003-29	RR2 XTEND	Tall	003	Mid	2375	1.7	T	-	Y R3	4	
DKB005-52	RR2 XTEND	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
DKB006-29	RR2 XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	

See pages 39-40 for rating scales

SOYBEAN VARIETIES		WEED CONTROL	CROP STRUCTURE / HEIGHT <sup>1</sup>	RELATIVE MATURITY	RELATIVE MATURITY RATING	CORN HEAT UNITS [CHUS]	IRON DEFICIENCY CHLOROSIS [IDC] <sup>4</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT [PRR] RESISTANCE <sup>4</sup>	SOYBEAN CYST NEMATODE [SCN] RESISTANCE <sup>4</sup>	WHITE MOULD RESISTANCE <sup>2</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>NK® seeds from Syngenta</b>												
<b>S003-Z4X<sup>1</sup></b>	RR2 XTEND	Med	003	Mid	2325	2	ST	1c	S	3		
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	S	3		
<b>S0009-F2X</b>	RR2 XTEND	Med	0009	Very early	2275	1.8	ST	1c	S	5	OTW	
<b>S001-D8X</b>	RR2 XTEND	Med/Tall	001	Early	2300	2	ST	1c	S	3	OTW	
<b>S005-C9X</b>	RR2 XTEND	Med	005	Mid	2350	2.5	S	1c	S	3	OTW	
<b>S007-A2XS</b>	RR2 XTEND	Tall	007	Late	2400	1.8	ST	-	-	2	OTW	

See pages 39-40 for rating scales

## NOTES

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## Inoculants a must-have for nitrogen hungry soybeans

Did you know soybeans require the largest amount of nitrogen of any Prairie crop? Each bushel that leaves the field takes 4 pounds of N with it, and another 1.7 lbs stay behind in the straw, leaves and pods. That's almost 6 pounds of nitrogen needed to grow each bushel. Fortunately, soybeans can fix most of that N themselves, but not without a little help.

Legume crops like soys need living bacteria in the soil to form nodules on the roots that fix N from the air in the soil. Specifically, soybeans require *Bradyrhizobium japonicum*, which is not native to Prairie soils.

We use inoculant on the seed to supply that critical bacteria. To access a top quality seed treatment go to a commercial seed treater, where they will apply seed treatment, inoculant and an extender to make it last longer.

But that's just the first step. Most soils in Western Canada have little or no history of growing soybeans, which means a second inoculant – liquid or granular – will be necessary to build up the necessary bacteria. Target 7-8 lbs of granular inoculant to supply enough bacteria to get your soys well-nodulated.

The photos of roots below show just how dramatic the difference is between uninoculated seed and inoculated/double inoculated seed on new soybean ground.

### SOYBEAN ROOTS WITH DIFFERENT AMOUNTS OF INOCULANT



Bare seed on virgin soybean ground, no nodules



Treated seed with liquid inoculant, some nodulation



Treated seed with liquid inoculant & 5 lbs granular inoculant, lots of nodulation on lateral roots

We recommend applying 5-10 lbs of inoculant to get enough nodules. Target 7-8 lbs granular inoculant per acre to produce enough nodules to get all the N a hungry soybean plant needs. Roots should have a minimum of 10 healthy nodules (bright pink when cut open) in order to fix enough nitrogen.

## Single inoculation only under rare circumstances

Most of the time a single inoculation will not be enough. If you can meet the following five criteria, then and only then is single inoculation an option.

1. The field has had at least two soybean crops.
2. Your previous soybean crop was within the last four years.
3. The previous crop was well-nodulated.
4. You've experienced no significant drought or excess moisture since the last soybean crop.
5. All of the above conditions have been met.

Very few fields will meet the above criteria. Even seasoned soybean growers whose fields have a history of soy production see a benefit from double inoculation.

A Cargill agronomist can help ensure you have the right products to make your soybean production successful.

### THE DIFFERENCE INOCULANT CAN MAKE



Left to right: Bare seed; liquid inoculant only; liquid and granular inoculant



Over the past several years we have seen strong development in corn genetics and today as you travel outside of the traditional corn growing belt you find this incredible crop throughout the Highway 16 corridor. Corn may give you the ability to expand your crop rotation, helping you manage herbicide resistance, break disease cycles of pulses and canola and give you an opportunity to manage insect pressure. You can approach this opportunity with either grain or silage corn depending on your farm's human resources, logistics and equipment requirements. At Cargill we have learned how important strong nutrient planning, solid crop genetics, and targeting specific plant populations are, so your corn gets the start it needs to reach its genetic potential. Picking a hybrid that's right for your area just got a whole lot simpler.

\*Always read and follow label directions.

## COMPLETE LIST OF CORN HYBRIDS

CORN HYBRIDS	TRAIT	RELATIVE MATURITY	CHU	VIGOR	DROUGHT TOLERANCE	ROOT STRENGTH	STALK STRENGTH	PLANT HEIGHT	DRY DOWN	NORTHERN CORN LEAF BLIGHT	ANTHRACNOSE STALK ROT	SILAGE	TOP 1/3 YIELDER
<b>DEKALB</b>													
<b>DKC21-36RIB</b>	VT2P	71	2025	2	2	2	1	Med	1	3	3		
<b>DKC23-17RIB</b>	VT2P	73	2075	2	2	2	1	Med	1	2	3	2	
<b>DKC24-06RIB</b>	RR2	74	2100	2	2	2	1	Med	1	3	4		
<b>DKC26-40RIB</b>	VT2P	76	2150	1	1	2	1	Med-Tall	1	2	3	1	
<b>DKC29-89RIB</b>	VT2P	79	2275	2	1	1	1	Med-Tall	1	2	3	2	*
<b>DKC30-07RIB</b>	VT2P	80	2350	1	1	2	1	Med-Tall	2	2	3	2	
<b>DKC33-78RIB</b>	VT2P	83	2400	2	3	1	1	Med	1	2	3	3	MB
<b>DKC32-12RIB</b>	VT2P	82	2450	1	1	1	1	Med-Tall	3	2	3	2	
<b>DKC35-88RIB</b>	VT2P	85	2550	1	1	1	2	Med	1	3	3	2	MB
<b>DKC34-57RIB</b>	VT2P	84	2575	1	1	2	2	Tall	3	3	3	1	



## LEGEND

### DISEASE PACKAGE

RR2 = Roundup Ready® Corn 2

RIB = Refuge in the Bag

SS = SmartStax®

RIB Complete® Technology

VT2P = VT Double PRO®

RIB Complete® Technology

OTW = Hybrids we're watching for 2021

### RATING SCALE

- 1 Excellent
- 2 Very good
- 3 Average
- 4 Fair
- 5 Poor

### MATURITY

**Relative Maturity** – The relative days to maturity grouping assigned by the seed company. The lower the number, the shorter the season.

**Crop Heat Units** – A measure of thermal time, calculated based on the daily accumulation of heat using temperature data as reported by seed company.\*\* The higher the number, the more heat units required to reach maturity.

Source: [dekalb.ca/corn/hybrids](http://dekalb.ca/corn/hybrids)

\*\*Source: <https://www.agry.purdue.edu/ext/corn/news/timeless/HeatUnits.html>

MATURITY ZONE	CHU GROUPING
Very early	<2100
Early	2100-2250
Mid	2275-2350
Long	>2400

### RATINGS BASED ON AGRONOMIST OBSERVATIONS

Our agronomists are scouting fields across the country and recording their results. This allows us to make recommendations based on many acres and geographies. The team has provided ratings for: Vigor, Drought Tolerance, Root Strength, Stalk Strength, Plant Height, Dry down, Northern Corn Leaf Blight, Anthracnose Stalk Rot, Silage

### CONSISTENT TOP THIRD YIELDER

MB top third yielder defined as: Yield results in the top 1/3 of all varieties with more than 2,000 acres reported in MASC Crop Insurance for 2017, 2018 and 2019.

Source: Manitoba Agricultural Service Crop Variety Yield Data 2017 through 2019  
[http://www.masc.mb.ca/masc.nsf/mmpp\\_browser\\_variety.html](http://www.masc.mb.ca/masc.nsf/mmpp_browser_variety.html)

## BEST FOR DRY DOWN

### VARIETY DKC33-78RIB

#### SYSTEM



#### WHY WE RECOMMEND IT

33-78 is a hybrid that matures like 80-day hybrids and has high yield potential under good conditions, making it a staple in the Red River Valley. It has strong roots and stalks and excellent tolerance to Goss's wilt. It dries down quickly due to narrow cobs, making it an obvious choice for this category.

#### PRO TIP

*If you are growing other corn hybrids, plant those ahead of 33-78 to allow soil conditions to warm, as this hybrid is less tolerant to cold soil than others.*

### VARIETY DKC35-88RIB

#### SYSTEM



#### WHY WE RECOMMEND IT

This hybrid is notable for its plant health and standability. You can expect this crop to stage right in line with its maturity, including flowering and dry down. It has high tolerance to Goss's wilt. Plant this hybrid early to capture its high yield potential.

#### PRO TIP

*Harvest this hybrid at 22-24% moisture then dry it, as stems can be prone to breaking down if left in the field too long.*

### VARIETY DKC29-89RIB

#### SYSTEM



#### WHY WE RECOMMEND IT

This hybrid performs well in a variety of areas across the west. It may flower later than expected, but not to worry, it dries down very quickly and has high yield potential. Its cobs tend to be long and skinny which contributes to the faster dry down time.

CORN HYBRIDS FOR EXCELLENT DRY DOWN

CORN HYBRIDS		TRAIT	RELATIVE MATURITY	CHU	VIGOR	DROUGHT TOLERANCE	ROOT STRENGTH	STALK STRENGTH	PLANT HEIGHT	DRY DOWN	NORTHERN CORN LEAF BLIGHT	ANTHRACNOSE STALK ROT	SILAGE	TOP 1/3 YIELDER
DEKALB														
DKC21-36RIB	VT2P	71	2025	2	2	2	1	Med	1	3	3			
DKC23-17RIB	VT2P	73	2075	2	2	2	1	Med	1	2	3	2		
DKC24-06RIB	RR2	74	2100	2	2	2	1	Med	1	3	4			
DKC26-40RIB	VT2P	76	2150	1	1	2	1	Med-Tall	1	2	3	1		
DKC29-89RIB	VT2P	79	2275	2	1	1	1	Med-Tall	1	2	3	2	*	
DKC30-07RIB	VT2P	80	2350	1	1	2	1	Med-Tall	2	2	3	2		
DKC35-88RIB	VT2P	85	2550	1	1	1	2	Med	1	3	3	2	MB	

BEST FOR  
EARLY MATURITY

See pages 58 for rating scales


**VARIETY**  
DKC26-40RIB

**WHY WE RECOMMEND IT**  
This hybrid has excellent versatility for silage or grain. Its strong biomass and exceptional stored nutrition are excellent for silage, whereas the quick, consistent dry down allows for quality grain. It matures in 76 days, making it a fit for new corn growers.

**SYSTEM**  



**VARIETY**  
DKC29-89RIB

**WHY WE RECOMMEND IT**  
This is a 79-day corn that has the yield potential of an 83-day corn. This strong looking hybrid is a favorite among grain corn farmers because of its quick dry down.

**SYSTEM**  


**VARIETY**  
DKC23-17RIB

**WHY WE RECOMMEND IT**  
This very early hybrid from DEKALB has great potential for its season length. Early flowering and early maturing, it has excellent stalk strength and dry down to pack in bushels. This hybrid is a good fit for growers just trying corn for the first time and who don't have a dryer.

**SYSTEM**  


CORN HYBRIDS FOR EARLY MATURITY


CORN HYBRIDS		TRAIT	RELATIVE MATURITY	CHU	VIGOR	DROUGHT TOLERANCE	ROOT STRENGTH	STALK STRENGTH	PLANT HEIGHT	DRY DOWN	NORTHERN CORN LEAF BLIGHT	ANTHRACNOSE STALK ROT	SILAGE	TOP 1/3 YIELDER
DEKALB														
DKC21-36RIB	VT2P	71	2025	2	2	2	1	Med	1	3	3			
DKC23-17RIB	VT2P	73	2075	2	2	2	1	Med	1	2	3	2		
DKC24-06RIB	RR2	74	2100	2	2	2	1	Med	1	3	4			
DKC26-40RIB	VT2P	76	2150	1	1	2	1	Med-Tall	1	2	3	1		
DKC29-89RIB	VT2P	79	2275	2	1	1	1	Med-Tall	1	2	3	2	*	

See pages 58 for rating scales

BEST FOR  
SILAGE

**VARIETY**  
**DKC34-57RIB**


**SYSTEM**



**WHY WE RECOMMEND IT**  
This long season hybrid has excellent versatility for silage or grain but really performs well for silage. It thrives in loamy soil and responds with strong yield to a complete nutrition program.

**VARIETY**  
**DKC32-12RIB**

**SYSTEM**




**WHY WE RECOMMEND IT**  
This bullet-proof grain or silage hybrid is best-in-class for drought tolerance and generates high feed efficiency. This is a great dual purpose hybrid.

**PRO TIP**  
*Remember your crop nutrition! It's important to recognize that corn is a high-input crop, especially with silage, so it's possible to mine the soil extremely fast. Make sure you plan to support with the right nutrition.*

**VARIETY**  
**DKC23-17RIB**

**SYSTEM**




**WHY WE RECOMMEND IT**  
23-17 consistently has good feed value as a silage corn and its early maturity fits well in northern areas. The yield is exceptional for its maturity on both grain and silage.


CORN HYBRIDS FOR EXCELLENT SILAGE


CORN HYBRIDS	TRAIT	RELATIVE MATURITY	CHU	VIGOR	DROUGHT TOLERANCE	ROOT STRENGTH	STALK STRENGTH	PLANT HEIGHT	DRY DOWN	NORTHERN CORN LEAF BLIGHT	ANTHRACNOSE STALK ROT	SILAGE	TOP 1/3 YIELDER
<b>DEKALB</b>													
<b>DKC23-17RIB</b>	VT2P	73	2075	2	2	2	1	Med	1	2	3	2	
<b>DKC26-40RIB</b>	VT2P	76	2150	1	1	2	1	Med-Tall	1	2	3	1	
<b>DKC30-07RIB</b>	VT2P	80	2350	1	1	2	1	Med-Tall	2	2	3	2	
<b>DKC32-12RIB</b>	VT2P	82	2450	1	1	1	1	Med-Tall	3	2	3	2	
<b>DKC34-57RIB</b>	VT2P	84	2575	1	1	2	2	Tall	3	3	3	1	

See pages 58 for rating scales

## BEST FOR DISEASE MANAGEMENT

<b>VARIETY</b> <b>DKC29-89RIB</b>	<b>WHY WE RECOMMEND IT</b> This very hardy hybrid has good disease resistance to pair with its strong stalk and root strength. DKC29-89 has best-in-class ratings for northern corn leaf blight, Goss's wilt, eye spot, common rust, Gibberella, and anthracnose.
<b>SYSTEM</b> 	

<b>VARIETY</b> <b>DKC32-12RIB</b>	<b>WHY WE RECOMMEND IT</b> DKC32-12 is notable on this shortlist due to its very good tolerance to Goss's wilt and northern corn leaf blight. It can be used for both grain and silage and has great yield potential.
<b>SYSTEM</b> 	

<b>VARIETY</b> <b>DKC26-40RIB</b>	<b>WHY WE RECOMMEND IT</b> The great disease package on this hybrid protects against Gibberella, anthracnose, rust, eye spot, and northern corn leaf blight with quite good ratings. In addition to the disease package, high ratings for emergence and seedling vigor give it a jumpstart in spring.
<b>SYSTEM</b> 	

## CORN HYBRIDS FOR EXCELLENT DISEASE MANAGEMENT

CORN HYBRIDS	TRAIT	RELATIVE MATURITY	CHU	VIGOR	DROUGHT TOLERANCE	ROOT STRENGTH	STALK STRENGTH	PLANT HEIGHT	DRY DOWN	NORTHERN CORN LEAF BLIGHT	ANTHRACNOSE STALK ROT	SILAGE	TOP 1/3 YIELDER
	DEKALB												
<b>DKC23-17RIB</b>	VT2P	73	2075	2	2	2	1	Med	1	2	3	2	
<b>DKC26-40RIB</b>	VT2P	76	2150	1	1	2	1	Med-Tall	1	2	3	1	
<b>DKC29-89RIB</b>	VT2P	79	2275	2	1	1	1	Med-Tall	1	2	3	2	*
<b>DKC30-07RIB</b>	VT2P	80	2350	1	1	2	1	Med-Tall	2	2	3	2	
<b>DKC33-78RIB</b>	VT2P	83	2400	2	3	1	1	Med	1	2	3	3	MB
<b>DKC32-12RIB</b>	VT2P	82	2450	1	1	1	1	Med-Tall	3	2	3	2	

See pages 58 for rating scales

# CROP PROTECTION

## It all starts with a plan...

Weeds. Insects. Disease. All these factors conspire to rob your crop of important nutrients, health and yield potential. You need solutions to help manage your production risk and work through these challenges to optimize the health of your crop, invest in the right inputs and achieve your goals.

At Cargill, we want to support you in making those decisions. We don't shy away from the tough choices and we're not afraid to say "don't spray because the ROI isn't there," or "wait for the cutworms to finish before you make a re-seed decision." As a true partner, we provide expert analysis based on sound agronomics focused on the long-term success of your operation.

When it comes to protecting your crop, we take an integrated pest management approach. That means we will help you:

- Develop a plan that is grounded in sound crop planning principles such as crop and chemical rotations;
- Consider how to best manage the weeds, diseases and insects that are going to impact your crop and bottom line;
- Take your long-term goals into account;
- Avoid pesticide resistance and herbicide carryover issues; and
- Meet your goals for yield and return on investment.

## Supporting you and your operation throughout the year

Cargill's promise to you is to walk in your shoes when dealing with our network of industry partners to navigate and deeply understand their offerings so you can maximize the benefits from all of them. We are your teammate, helping determine the best possible timing, application and rotations for their products on your farm.

Whether you're challenged to interpret manufacturer programs, specific product information, or just need sound agronomic input, our entire team is here to help.



## Protecting your crop through the critical establishment phase

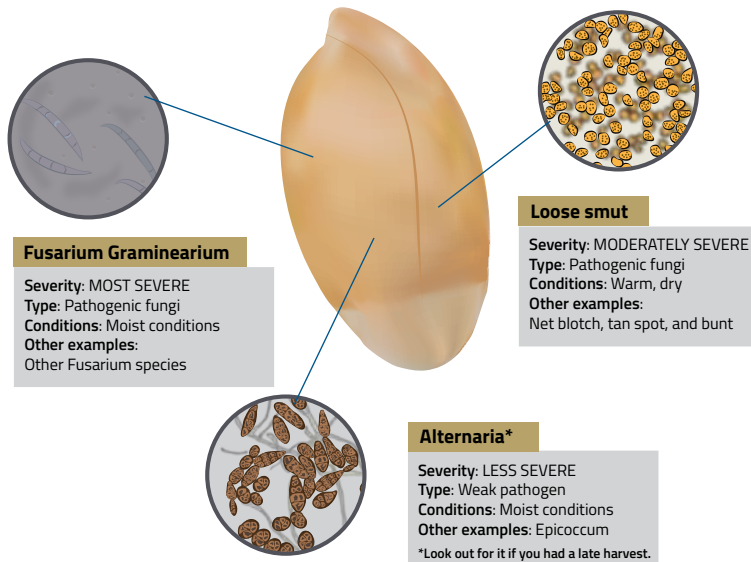
Seed treatments are an important layer of protection for cereals, soybeans and other pulse crops. They guard against seed and soil borne diseases and insects regardless of conditions. Coating seed with a fungicide and in some instances, an insecticide, can benefit your crop in a number of ways. Seed treatments increase the competitiveness of your crop early on, as they are proven to provide improved seedling and plant vigor, germination and faster emergence. They also allow you to seed your crop a little earlier, which can help with time management and capturing greater yield potential.

### BEST PRACTICES FOR TREATING CEREALS



#### WHAT'S HIDING ON YOUR CEREAL SEED?

Most disease spores are living in the cleft of your wheat seed, so the coverage you get from your seed treatment is critical to tackle disease and boost your returns.



**So what:** Send your seed in for a full fungal seed test (the earlier the better). Seed treatment is recommended under all conditions because if you're starting with good seed, it's worth protecting. Cargill has a range of seed treatment options to help you grow your best crop.

You don't know what you don't know – so let Cargill help you find the answers. We recommend lab tests to determine germination quality and detect disease inside your cereal seed kernel.

Invest in both germination and vigor testing to get the whole story on your seed. Ideally, you should test seed twice – once after harvest and again six weeks before seeding. A lot can happen as temperatures and moisture levels fluctuate during the months in storage. Test each seed lot (every 20 tonnes) separately.

- **Germination tests** measure how many seeds will grow in ideal conditions.
- **Vigor tests** measure how well the seed will perform under stressful conditions. You can have 99% germ and 80% vigor, and as soon as the seed faces stress, it underperforms.

#### EXPERT TIP

**Look for a vigor result of at least 85% or look for a new seed source.**

Seed represents potential yield, so it's really important to start with healthy, high-potential seed. You'll also be able to calculate a more accurate seeding rate with germination and vigor test results in hand. Additionally, it underlines the importance of a seed treatment in providing an extra layer of protection and giving your seed the additional vigor required to overcome stressful conditions.

While the elevator looks for fusarium-damaged kernels, seed labs look for the fusarium inside the kernel itself because that's what affects plant growth and the potential spread of seed-borne disease.

Ensure you request a comprehensive germination and disease package from your lab of choice and submit your sample early so you have enough time to find new seed or apply associated seed treatments before seeding.

When reviewing your germination and vigor seed test results, if the maximum difference between these results is greater than 10%, choose another seed source.



### INTERPRETING CEREAL SEED QUALITY TEST RESULTS

DISEASE	DISEASE PRESSURE	RECOMMENDED ACTION
<b>Fusarium graminearum*</b>	0.5-5%	Apply a seed treatment
	>=5%	Choose another seed source
<b>All Fusarium spp.*</b>	0-5%, germ >90%	Apply a seed treatment
	0-5%, germ in 80s	Apply a seed treatment
	5-14%, germ >90%	Apply a seed treatment
	>14%	Choose another seed source

In determining the level of disease pressure from your seed quality tests, add the results for all *Fusarium* spp. *C. Sativus*, *Pyrenophora* spp. and *Septoria* spp. When combined, if the disease pressure is greater than 14% choose another seed source. Remember that *Fusarium graminearum* levels are considered separately from *Fusarium* spp and should not exceed 5%.

\*Note that if you currently farm in an area that doesn't have *Fusarium* head blight, no level of *Fusarium graminearum* is acceptable in your seed source.

### SEED UNDER THREAT NO MATTER WHAT CONDITIONS

TEMP	SOIL MOISTURE		
	Dry	Moist	Wet
<b>Warm</b>	<i>C. Sativus</i> (Common Root, Spot Blotch)	<i>Fusarium</i> <i>C. Sativus</i> <i>Rhizoctonia</i>	<i>Pythium</i>
<b>Cold</b>	<i>Rhizoctonia</i>	<i>Rhizoctonia</i> <i>Fusarium</i>	<i>Pythium</i> <i>Rhizoctonia</i>

Seed borne diseases such as those shown in the chart above show up in plants as seedling blights or stem and root rots.

Whether you are growing cereals, pulses or soybeans, seed and soil borne diseases can threaten the viability of your seed and limit your yield potential. Don't forget to add seed treatment and get your crop off to a strong start.

When treating seed, commercial seed treating equipment, which is used at many Cargill locations, will provide uniform seed coverage at the correct rate. This means you get the full value out of your seed treatment and it will be more effective protection against disease and insects.

Cargill locations in Alberta and Saskatchewan offer on-farm seed treatment services with our fleet of STORM PRO seed treaters. Contact your representative to book an appointment to have your seed treated today.



### BEST PRACTICES FOR TREATING PULSES

Pulse crops often have high nitrogen needs, but with **proper inoculation**, these plants can produce 50-80% of their own nitrogen and can fix nitrogen for future rotational crops. That represents significant savings across a full crop rotation – as long as you get it right.

#### DID YOU KNOW?

**Peas can require up to 3.36 pounds of nitrogen per bushel (bu) of yield. That means an 80 bu pea crop needs 268 lb of actual N.**

### RIGHT FORMULATION

Inoculants come in different shapes and forms, each offering benefits that can fit your farm.

- **Liquid** inoculants offer convenience and better control of application rate eliminating the need for extra tank space. However, these are typically more susceptible to damage from environmental extremes prior to seeding, and you must plant seed inoculated with a liquid formulation into a moist seedbed within six hours (on average) to prevent the bacteria from drying out.
- **Peat or powder** inoculants are more durable and less prone to desiccation compared to liquid and also eliminate the need for extra tank space in the cart. However, these can be messy to work with.
- Although **granular** inoculants require extra space in the tank cart and may not logistically fit for some farming operations, this formulation is the best option for dry or adverse conditions and often contains higher numbers of rhizobia bacteria.

## RIGHT PRODUCT

The second step to successful inoculation is choosing the right strain and product. Different pulses require different strains of rhizobia for maximum N fixation. This is why you can't use the same type of inoculant for peas as for soybeans. Also, prairie soils don't contain all native Bradyrhizobium, which is critical to how your soybean crop will fix nitrogen. That's why we recommend you **double inoculate** soybeans to ensure adequate infection and nitrogen fixation. (See pgs 54-55 for article Inoculants a must-have for nitrogen hungry soybeans).

Once you've found products that contain the appropriate strain of bacteria, there are lots of different options on the market, and understanding each one can be complicated.

You will see products that contain single strains of rhizobium bacteria (Eg: **Cell-Tech™**) which focus solely on fixing nitrogen, alongside products that contain multiple strains of bacteria. Some of these multi-strain inoculants are **Nodulator®** and **LALFIX® DUO**, which provide nitrogen fixation and plant growth benefits.

### PRO TIP

**Remember that the viability of inoculants can be impacted by their compatibility with fungicide and insecticide seed treatments. Applying seed treatment to the seed first and allowing it to dry before inoculant is applied is typically the safest process. If you are treating on-farm, check the label or ask your Cargill representative for assistance.**

Source: [https://saskpulse.com/files/technical\\_documents/190408\\_Inoculant\\_Options\\_for\\_Pulse\\_Crops.pdf](https://saskpulse.com/files/technical_documents/190408_Inoculant_Options_for_Pulse_Crops.pdf)

## RIGHT HANDLING

Once you've made the right choice for your farm, you need to protect your investment and handle your inoculant for maximum rhizobia survivability.

Improper application is the same, if not worse, than improperly applying fertilizer. Seeding is a busy time, but no good will come from inoculating pulses with deceased bacteria. Here are a few things to keep in mind:

- Store inoculants in a cool (0-20 degrees Celsius), dry place.
- Use before the expiry date.
- Be diligent in only filling tanks to 50% capacity or less.
- Do not store inoculant in the tank overnight.
- Keep your inoculant out of direct sunlight and drying winds.
- Always be sure to check the compatibility of your seed treatment and your inoculant before you apply it to the seed.

Make sure to review our insecticide section for information on canola seed treatments on page 122.

## OPTIMUM PLANT DENSITIES

Seed treatment is an important tool to protect your crop establishment and help you achieve optimal plant densities.

CROP	PLANTS PER FT <sup>2</sup>
Canola	5-7
Wheat	30
Barley	20-25
Flax	30-40
Lentils	12
Peas	7-10
Oats	22-32

Like most challenges on the farm, planning ahead helps keep you ahead of the game. Herbicide application and weed management are no different.

## DON'T FORGET MINIMUM RE-ENTRY GUIDELINES

Herbicides are an important tool in crop production and using them safely will help preserve their use. Check the label of each product for application guidelines, one of the most important being the restricted-entry interval (REI) or minimum re-entry restrictions following application. Leaving time between spraying and re-entering a field allows residues and vapors to dissipate to safe levels and can range from 12 hours to several days. As noted by Health Canada, complying with label REI directions is a legal requirement. But don't mix this up with pre-harvest interval, which details the minimum time between spraying a pesticide and harvest.

Source: [www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/restricted-entry-intervals.html](http://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/restricted-entry-intervals.html)

## FIVE STEPS TO SOLID WEED MANAGEMENT



### STEP 1

**Scout** – Start by scouting fields in the fall. If you know what your weed pressure looks like, you'll have a starting point for next year.



### STEP 2

**Plan** – Sit down and work out a plan with your local Cargill retailer. We can work with you to develop strategies to manage your problem weeds. This is your opportunity to put together a list of things you want to accomplish, taking crop rotation, chemical rotation, herbicide carryover and weed resistance into account.



### STEP 3

**Save** – Based on your plan, book the products you know you'll need early to take advantage of manufacturer programming dollars and have a back-up plan ready for the areas you're uncertain about.

- Be sure to use the right product for the weed spectrum and always use the label rate.



### STEP 4

**Start clean** – Start with a clean field in the spring and seed early. If you have a lot of weed pressure, consider a post-harvest burn down using products with multiple modes of action. For example, whenever possible, make sure glyphosate goes down with another herbicide. Also, scout for weeds early in the season and make adjustments to your plan based on weed pressure and weather.



### STEP 5

**Optimize** – Get the most out of your weed control choices and spray for weeds at the right time to avoid yield loss. Remember to use proper water volumes and travel speeds to ensure adequate coverage to minimize weed escapes.

## WEED CONTROL CHALLENGES

### HERBICIDE RESISTANCE

The best way to combat herbicide resistance is to take a walk through your crop. Patches are weeds' biggest tell – they're the first sign that resistance is developing in your field and can be spotted during a close-up inspection. If you see weed patches that survived your in-crop application, you may have resistance. But with careful management, you can stop it from spreading.

**Rotating herbicide groups** is the most effective way to prevent herbicide resistance or slow it down. It's important to note that weeds develop resistance to a herbicide group, and simply changing brands doesn't always mean changing modes of action.

Switching from Simplicity™ to Varro™ may sound like you’re rotating herbicides, but both of these products are Group 2 herbicides. Changing groups as you rotate crops and attempting to stay one step ahead of the weather can be very challenging. Take a long-term view of weed management and think of it as a strategy for your farm.

### USING A PRE-SEED BURN DOWN TO MANAGE FOR HERBICIDE RESISTANT WEEDS

In recent provincial weed management surveys, approximately 50% of cleavers and 30% of narrow-leaved hawk’s beard were found to be resistant to Group 2 chemistry. We’re also seeing glyphosate resistance in kochia. A pre-burn provides the ideal opportunity to use many different herbicide groups and can be a cost effective tool against resistance.

Of all the operations you do on your farm in a season, a pre-burn herbicide application incorporating multiple modes of action is one of the best investments you can make, allowing you to achieve superior, cost-effective weed control.

YEAR 1 BEFORE SPRAYING	YEAR 1 AFTER SPRAYING	3 YEARS LATER BEFORE SPRAYING	AFTER SPRAYING

In year one, there is one resistant plant (shown in green) that survives the herbicide application along with any other misses. During the next two years the one resistant weed reproduces, resulting in 10 times the original population. This demonstrates how quickly a field can be infested with resistant weeds if precautions are not taken. To find more information on managing for herbicide resistance in weeds: [manageresistancenow.ca/weeds/](http://manageresistancenow.ca/weeds/)

## W A M L E G S METHOD

### GETTING THE MIX RIGHT

Proper tank mixing can save you time and money. Here’s a quick cheat sheet on how to correctly and safely mix your next tank.

- To begin, fill sprayer tank 2/3 to 3/4 full with clean water.
- Run agitation.

Add products to the spray tank in the following order\*:

<b>W</b>	<b>Wettable</b> powders and water-dispersible granules (WG, DF, SG, WP, SP) – <i>PrePass™ FLEX, Paradigm™</i>
<b>A</b>	<b>Agitate</b> tank thoroughly (at least 10 minutes)
<b>M</b>	<b>Microcapsul</b> suspension (ME) – <i>Command® ME360</i>
<b>L</b>	<b>Liquid</b> flowables and suspensions (SC, SL, SN, LI, SU, SE) – <i>Stellar™ XL, Sierra® 3.0</i>
<b>E</b>	<b>Emulsifiable</b> concentrate formulations (EC) – <i>Axial®, Prestige™ XC</i>
<b>G</b>	<b>Glyphosate</b> – <i>Roundup WeatherMAX®, R/T540™</i>
<b>S</b>	<b>Surfactants</b> – <i>AgSurf® II, Merge®</i>

- Fill spray tank to nearly full with water.

- Fill tank to full with water. Continue agitation.

\*Note: When tank mixing LIBERTY® 150 SN herbicide and CENTURION® or SELECT®, always add AMIGO® adjuvant to the tank first, then add LIBERTY 150 SN herbicide to the tank followed by the CENTURION or SELECT. Consult the Liberty 150 SN label for complete mixing instructions.

Source: <http://sprayers101.com/tankmix>

## SPRAYING SAFELY

When it comes to spraying, let safety be your ultimate guide and follow these four simple rules:

### 1. Read pesticide labels ahead of time.

Pesticide labels are more than legal jargon and warnings. They offer important tips for application and information about product use.

Read labels before seeding, so you aren't rushed. You may have to refer to soil tests to ensure proper use of certain soil applied products, but the label on your herbicide will confirm the most suitable application.

### 2. Modify your water trailer to match your needs.

You'll be on and off the water trailer countless times throughout the season. Before spraying gets hectic, take the time to modify your water trailer to your liking. Simple things like putting grip tape on slippery areas, ladders and railings, or adding hose storage or direct plumbing into your chemical handler can help prevent falls, chemical spills and wasted time.

### 3. Plan, plan, plan.

A good spray plan can reduce stress and help to ensure you don't forget important details like crop rotations, chemical rotations and disease cycles.

Planning for the spraying season means preparing a spray plan that minimizes clean-out time before the air seeder even pulls into the field. For example, spray your barley with **Axial® Xtreme iPak™**, then spray your CWRS with **Velocity™ m3** – not the other way around. These efficiencies are tough to achieve on-the-fly in the spring. They need to be planned ahead of time.

### 4. Wear personal protective equipment (PPE).

PPE is an important precaution to stay safe in the field. As with any chemical, follow safe-handling procedures to protect the operator and the equipment being used. It's important to have PPE that's easy to wear. Otherwise, operators may not use it during the busy growing season. Gloves, long sleeve shirts and protective eyewear can prevent skin contact while mixing or transporting chemical.

## HERBICIDE CARRYOVER

Some herbicide products are more prone to carry over from season to season, and you don't want last year's weed control to wreak havoc on this year's crop. If you didn't receive at least 4 inches of rain between June 1 and September 1 the previous year, your risk of herbicide carryover increases dramatically.

That's because by September, chemical particles are already bound to the soil, and temperatures cool off, meaning the microorganisms that break down herbicide ingredients are much less active. The same is true in early spring before the soil warms.

Manufacturers do a great job of labelling for re-cropping restrictions, but if you've never had to deal with herbicide carryover, here are some active ingredients to watch closely:

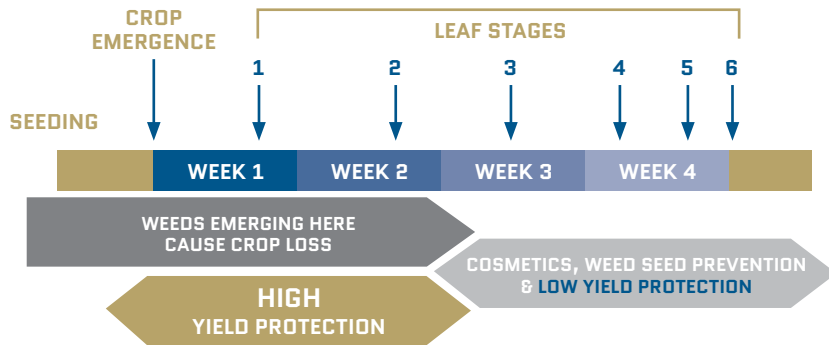
- **Atrazine** (Group 5) – **AAtrex® Liquid 480** – should not have carryover on applications of 0.5 to 0.33 L/ acre (ac) or less. Most tolerant crops for re-cropping are: up to 1.25 L/ac – corn, millet, flax; up to 0.75 L/ac – peas, soybeans, barley, wheat; up to 0.5 L/ac – oats; and up to 0.33 L/ac – dry beans, canola, sunflower and alfalfa.
- **Clopyralid** (Group 4) – **Lontrel™ XC, Cirpreme™ XC, Prestige™ XC, Salute™, Eclipse™ XC** – peas and soybeans are safe to grow in rotation after the use of these products except when less than 5.5 inches of precipitation is received between June 1 and August 31 or less than 7 inches total precipitation is received over the whole year, in the year the product is applied.
- **Flucarbazone** (Group 2) – **Sierra® 3.0, Everest® 3.0 and Inferno™ Duo**, have re-cropping restrictions which can vary by soil zone, rainfall, organic matter and pH. Please work with your agronomist for the best solution for your situation. Remember crops like oats, soybeans, corn, peas and lentils will be very sensitive.
- **Imazamox** and **Imazethapyr** (Group 2) – **Solo® ADV, Viper® ADV** and **Odyssey® NXT** – Imazamox has significantly less residual than Imazethapyr, but non-Clearfield® canola is sensitive to it. Oats are the

most sensitive cereal to Imazamox, especially after drought conditions. It may be best to switch into a pulse crop or even a different cereal if last year's moisture is a concern. Oats, chickpeas, potato, tame mustard, corn and lentils are not registered to be grown the year after application. Field peas and soybeans will be sensitive if rain is less than 4 inches in the 60 days following application, OM is less than 4% and pH is above 7.5.

Other factors to consider that affect herbicide carryover include:

- Soil pH.
- Low soil organic matter.
- Course textured soils.

If in doubt about re-cropping restrictions after use of any of these products consult your agronomist or manufacturer representative for advice.



### CRITICAL WEED-FREE PERIOD

#### KEEP SOYBEANS CLEAN UNTIL THE THIRD TRIFOLIATE

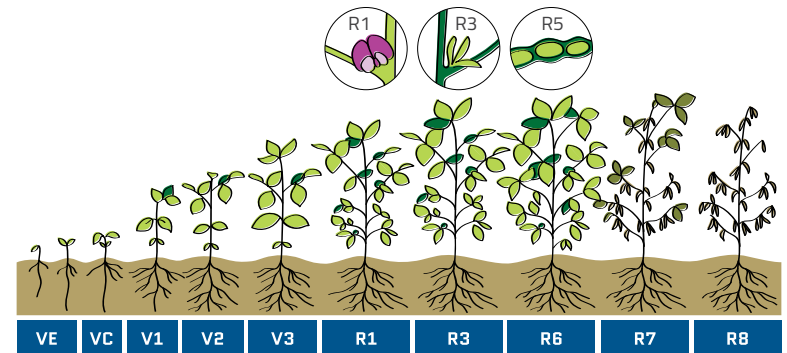
Soybeans are sensitive to early-season weed competition. This means not just managing weeds but managing them early to keep your field clean through the critical weed-free period (up to stage V3). This means it is extremely important to get in a good pre-seed burn before you plant. Products like Heat LQ®, Express SG™, Valtera™ EZ or Fierce® tank mixed with glyphosate can help control Roundup Ready® volunteers.

In-crop, use VIPER® ADV with glyphosate early on (before the V3 stage) to control other glyphosate-resistant weeds and Roundup Ready®

canola. This also provides the added benefit of multiple modes of action to manage herbicide resistance. Controlling weeds early will mean your soybeans have less competition early on for nutrients and precious moisture.

#### GET THE MOST OUT OF ROUNDUP READY 2 XTEND® SOYBEANS

New dicamba products offer exciting opportunities for weed control and resistance management. Once absorbed by the roots, stems or leaves, this Group 4 herbicide moves throughout the plant. And while dicamba can be weak on mustard, velvetleaf and nightshade depending on your spray timing, it's very effective on many broadleaf weeds, such as Canada fleabane (including glyphosate and Group 2 resistant biotypes), wild buckwheat, cleavers, lamb's-quarters, pigweed and ragweed. Used properly, dicamba helps avoid herbicide resistance, but we strongly recommend adhering to the following set of application best practices.



DO

- Always read and follow label directions.
- Use extremely coarse to ultra-coarse droplets at a minimum of 10 gallons per acre.
- Double check that your field is actually Xtend® soybeans.
- Triple rinse your sprayer and use an ammonia-based cleaner.
- Clean out all nozzles, end caps, flush hoses and lines.
- Use a wind meter to confirm that you are spraying in wind speeds between 5 and 15 kilometres per hour. This avoids temperature inversions which move the herbicide into the atmosphere and away from your field.
- Add another mode of action to the tank.
- Call your agronomist or sales representative if you have any more questions about using the herbicide.





**DON'T**

- Use regular air induction tips.
- Continue to use XtendiMax®, Engenia® and FeXapan™ or other dicamba products year-after-year without including a second effective mode of action.
- Add AMS or other nitrogen-based products to the sprayer. This will increase drift possibilities.
- Spray within four hours of a rain event, as spraying within this period decreases the product's efficacy.
- Use old dicamba formulations on your Xtend soybeans.
- Confuse Enlist™ (2-4,D) soybeans with Xtend soybeans. These products are not interchangeable.
- Spray on Roundup Ready® soybeans. Only spray on Roundup Ready 2 Xtend® soybeans.
- Add more than the highest recommended rate for each spray application.

CHEMICAL	HIGH RATE	LOW RATE
XtendiMax® (Bayer)	0.7 L/ac	0.33 L/ac
Engenia® (BASF)	0.4 L/ac	0.195 L/ac
FeXapan™ (Corteva)	0.68 L/ac	0.33 L/ac

## HERBICIDE AND HARVEST MANAGEMENT

### CANOLA

With time at a premium, especially at harvest, many canola growers have eagerly adopted straight cutting canola.

However, straight cutting comes with its own set of challenges when the crop is not properly dried down:

- Combines plugged with green material.
- Too much variability in plant maturity.
- Green weeds and plant material that can cause heating in storage.

A spray isn't always the ticket to straight combining canola. A fully mature, weed-free field can often be straight cut with no need for a dry down application. Ask yourself these questions when determining how you will proceed with canola harvest.

### 1. Is there even crop maturity?

If your crop maturity is uneven and stagey, consider swathing instead of straight cutting. If the minority of plants are in the later stage, with the greatest yield contribution coming from plants in the earliest stage, we recommend swathing. You're better off swathing variable stands as this will allow for improved harvestability.

### 2. Is the field free of weeds?

If your canola crop has a high population of green perennial weeds, manage them before straight cutting. Perennial weeds start to move their sugars down to the roots as harvest approaches, so pre-harvest applications of systemic herbicides can be an effective tool for managing them. **Heat® LQ plus glyphosate** is a great option to help manage your perennial weeds.

### 3. Is the plant mature?

If the seed is mature, but the plant is not (green material), you will want to use a desiccant like **Reglone® Ion**. It will dry down green material, helping the field reach uniformity. It can also be very effective for speeding up harvest and preventing green plant matter from clogging the combine.

Reglone Ion works on contact to rupture plant cell walls, leading to rapid dry down of plant material. It quickly shuts down the plant and stops it from maturing, which can lock in high green seed levels if applied prematurely. The recommended stage to apply Reglone Ion as a harvest aid for canola is when 90% of the seed has turned brown. The entire seed should be brown/black.

Weather can impact the efficacy of Reglone Ion. For best results, spray in the evening with 20 gallons of water when you know the next day will be sunny.

When using Reglone Ion as a dry down agent, it's very important to ensure that you have chosen a shatter-resistant variety. Varieties with traditional genetics are at risk for increased pod shatter and pod drop if harvest is delayed. In this situation, be prepared to combine as soon as green seed and seed moisture have reached suitable levels.

Reglone® Ion is a very effective tool if you're looking to speed up harvest and improve your efficiency. If you have a field of canola that's still a bit green in some areas but mostly ready to harvest, you can apply Reglone Ion and go into harvest as soon as three to four days later. Fields with heavy weed infestations would be better managed with a weed control option like Heat® LQ plus glyphosate.

### REGLONE ION - BEST APPLICATION PRACTICES

- Apply on a cloudy day or in the evening to allow maximum time on the leaf for absorption.
- For best results, apply when it appears and you have five to seven days of good weather in the forecast.
- Ideally the day following application should be warm and sunny as the chemical is activated by photosynthesis and will result in faster activity.
- Good coverage of the plant is essential throughout the canopy.
- To get the best results, use a minimum of 20 gallons per acre of water, keep the application speed slow and steady and the boom at 20 inches from the top of the canopy.

Reglone Ion is registered for use in field peas and lentils as well as canola. Use the information in this chart to help with staging:

CROP	APPLICATION STAGE	HARVEST
<b>Canola</b>	Pods have 90% changed to completely brown Mature seeds are loose and rattle	As soon as the crop has dried down
<b>Field peas</b>	Early onset of color change from green to yellow Top and upper middle pods are shrunken and leathery Lower mid pods are dry and seeds detached	5-7 days after spraying
<b>Lentils</b>	Majority of plants turning yellow Bottom pods are brown and dry – seeds hard and will rattle	4-10 days after spraying

### CEREAL HARVEST MANAGEMENT

You put a lot into growing cereal crops, and you want to ensure you're able to market them without any concerns. As you get closer to harvest, be sure to consult with your grain buyer on the acceptable use of products that can be applied in cereals pre-harvest. There are differences between wheat, barley, malt barley and oats. And because Canada deals with multiple trade partners, there can be different Maximum Residue Limits (MRLs) in place for different trading partners. Remember that just because a product is registered for use in Canada doesn't mean it won't cause trade concerns. Glyphosate applied pre-harvest, whether alone or as part of a tank mix is under increasing scrutiny and following the use guidelines will help preserve this important tool.

#### A few key tips include:

- Check [keepingitclean.ca](http://keepingitclean.ca) for the most up-to-date information on MRLs.
- Always follow the label recommended application rate, crop stage, timing and pre-harvest interval of the most restrictive product to ensure your crop will test within maximum residue limits.
- Check with your Cargill retail or manufacturer representative if you are at all unsure.
- For wheat and barley (feed only), apply glyphosate with a tank-mix partner like Heat® LQ for pre-harvest weed control when grain moisture content is less than 30% in the least mature part of the field, keeping in mind the pre-harvest interval for the most restrictive product you are using.
- Never use pre-harvest products as a desiccant.
- Your grain buyer has the final say. Check your grain contract and with your grain buyer prior to applying any pre-harvest product.
- Malt barley - never use a pre-harvest product like glyphosate (Roundup®) or Saflufenacil (Heat® LQ/Kixor®) in malt barley.
- Oats - most buyers are moving away from oats with pre-harvest glyphosate applied. "Glyphosate free" is the future for oats.

## SOYBEANS

Although green beans might be good for your diet, the elevator can downgrade your load of soybeans or even reject it if the green bean count is too high. Higher levels of green beans occur when plants have been unable to clear chlorophyll from the beans themselves due to hotter, dryer summer conditions.



The solution to green beans is straightforward: **time** and **patience**. Leaving soybeans in the field will dry down immature beans. But what about mature beans that have remained green due to extreme dry conditions?

**Wait.** Check the beans from a few plants to see if they're green inside. If there is earth tag or unthreshed pods in your sample, the straw may not be mature enough to harvest. Wait four to five days and try again. If you're still seeing green beans, wait longer. Have patience, because it could take two to three weeks.

If beans are mature, leave them in the field a bit longer to try to clear some green. Be careful not to let them get too dry though because you don't want to end up with splits in your harvest sample.



## CONTROLLING THE TOUGHEST WEEDS IN YOUR FIELD

For this guide, we've narrowed down the top weed challenges in Western Canada that can have an economic impact on the value of your crop. We've rated how difficult they are to control, highlighted how to find them and given you some ideas on how to control them. Don't see your biggest problem weed here? Let your local Cargill rep know if there's a problem weed we should include next year.

WEED <b>BARNYARD GRASS</b>	
DIFFICULTY RATING ↓ ↓ ↓ ↓ ↓   <b>3/5</b>	

### KEY TRAITS

Barnyard grass loves warm, moist soil and can easily spread by flooding because the seeds float. It can be a challenge to correctly identify as it's often mistaken for green foxtail. Don't be fooled! Not all products that control green foxtail will also control barnyard grass.

### METHODS OF CONTROL

Growing a competitive crop is crucial for keeping barnyard grass at bay. And you'll definitely want to control this weed in the years you grow canola. Scout fields thoroughly because they will show up en masse in low spots on the field when water drains away.

- Spring wheat: Axial® Xtreme iPak™, Rexade™, Velocity m3, Luxxur™, Traxos®, Varro®, Simplicity™ Go-DRI, Horizon® NG
- Barley: Axial Xtreme iPak, Axial
- Canola: Roundup Transorb® HC, Liberty®
- Clearfield® lentils: Odyssey® Ultra and Solo® Advance
- Peas and soybeans: Viper® ADV
- Oats: No control options

### TIMING

Control barnyard grass in-crop. It germinates at temps above 15°C, and most flushes happen late May to early June. It will keep coming back through the summer if conditions are warm and moist.

WEED  
**CANADA THISTLE**

DIFFICULTY RATING



**KEY TRAITS**

A perennial weed with a super strong root system, Canada thistle doesn't emerge in time for a pre-seed burn off. If allowed to mature, it's instantly recognizable with its spiny rosette and trademark purple flowers. It grows in dense patches with many plants sharing the same root system.

**METHODS OF CONTROL**

While it does add cost to your weed control regime, the one-two punch of herbicide application to burn off the top of Canada thistle followed up with a post-harvest application is your best bet for control.

- A high rate of Liberty® (1.6 L) or a two-pass strategy in canola will burn off the top.  
**PRO TIP:** A water rate of 12-15 gallons will take Liberty's control to the next level.
- In Roundup Ready® canola, a two-pass strategy with Roundup Transorb® HC at 0.33 L (twice), then a 1.5 L rate post-harvest is your best bet for control.
- Cirpreme® XC will control Canada thistle in-crop for wheat and barley.

For the brown soil zone, consider products that contain clopyralid, like Curtail™ M in cereals, Lontrel in flax and Eclipse XC in Roundup Ready canola. Other great options include Tridem™ in wheat and Avenza™ in barley.

**WATCH OUT**

*Beware of lentil re-cropping restrictions.*

*OcTain™ XL can have some effect on top growth.*

**TIMING**

It's best to control Canada thistle in the fall, when the plant is moving sugars down to the roots.

WEED  
**CHICKWEED**

DIFFICULTY RATING



**KEY TRAITS**

A low-growing annual plant, chickweed has bright green leaves and tiny white flowers. It spreads rapidly and can be highly competitive. It is shade tolerant, which means it can thrive under a crop canopy. Be sure to deal with chickweed early as it can produce seed five to seven weeks after germination and is very hardy. It can germinate in cool soils as low as 2°C and survive temperatures as low as -10°C. With four generations possible in a growing season, early control is critical.

**METHODS OF CONTROL**

There are control options for chickweed in most crops, but cereals offer the most in-crop management options and the best control of this type of winter annual. Avoid growing specialty crops on fields where you have chickweed concerns.

- Spring wheat: Axial® Xtreme iPak™
- Wheat & Barley:  
Pre-seed use Express® PRO, PrePass™ Flex;  
In-crop use Infinity® FX, Stellar™ XL, Pixxaro™
- Canola:  
Pre-seed use Prospect™ or Edge®;  
In-crop for: LibertyLink® canola use Liberty®  
Round up ready and TruFlex™ use Roundup® Transorb® HC
- Soybeans: For glyphosate-tolerant soybeans use Roundup Transorb HC.

**WATCH OUT**

*Some chickweed plants have shown resistance to Group 2 chemistry.*

**PRO TIP:** A water rate of 12-15 gallons will take Liberty's control to the next level.

**TIMING**

The best time to control this weed is early in the spring with a pre-seed burn-off to get early germinated seedlings, followed by an early in-crop herbicide application (1-6 leaf crop stage in cereals) to manage later flushes.

With more reports of this weed acting as a winter annual, do not overlook post-harvest control options. Most product labels recommend herbicide applications somewhere in chickweed's 1-6 leaf stage.

WEED  
**CLEAVERS**

DIFFICULTY RATING



**KEY TRAITS**

An easily recognizable, twisting and vine-like plant, cleavers are a spring annual that increasingly show up as a winter annual and become a problem partly because each plant produces thousands of seeds that are similar in size to canola seed, making them difficult to separate.

**METHODS OF CONTROL**

Cereals give you the best control opportunity to suppress cleavers for your whole rotation.

There are Group 2-resistant cleavers, therefore our recommendations are:

- Wheat and barley: Pre-seed use PrePass™ Flex, Axial® Xtreme; Pixxaro™
- Canola: Facet® L (quinclorac) – in-crop. Pre-seed use Edge® MicroActiv®

For the brown soil zone, consider tank mixing glyphosate with Command® Charge or Prospect™ as a pre-seed application ahead of canola.

**WATCH OUT**

*Don't be tempted to lower your Liberty® rate to cut costs. BASF's suggested rate is a good recommendation.*

**TIMING**

Cleavers are much easier to control when smaller. As we see less post-harvest weed control and more focus on pre-seed burnoff, cleavers are adapting to overwinter more. Controlling them early in the spring is still your best bet.

WEED  
**DANDELION**

DIFFICULTY RATING



**KEY TRAITS**

A perennial weed with a large tap root, dandelions are sometimes present in early spring in time for pre-seed burnoff. The deep-lobed rosette stage is the most practical stage for control. Dandelion is typically a bigger issue for those in dark brown to black soil zones.

**METHODS OF CONTROL**

- Canola: Use a tank-mix partner with Roundup Transorb® HC (0.5 L) at pre-seed burn. Roundup Ready® canola can help clean up a dandelion issue. In the brown soil zone we recommending including Conquer® II in your tank mix at pre-seed.
- Wheat and Barley: Cirpreme™ XC. In the brown soil zone use Blackhawk® or Express® FX tank mixed with Roundup Transorb HC at pre-seed.
- Pulses: Heat® LQ before pulses, as in peas and lentils in-crop options barely brown dandelion. In the brown soil zone, in addition to Heat LQ you can also use Goldwing® tank mixed with glyphosate prior to lentils.

**TIMING**

You can throw high rates of herbicide at dandelion in the spring, but you'll often need to hit them pre-harvest to really take them out. That's when the plant moves glyphosate down to the roots as it prepares to over-winter.



WEED  
**FIELD HORSETAIL**



DIFFICULTY RATING



**KEY TRAITS**

Field horsetail has become a troublesome weed in North America due to its prolific rhizome and tuber system. It produces spores rather than seeds, and these spores will only germinate in damp soil.

**METHODS OF CONTROL**

There are no herbicide options that will truly control field horsetail, but applications containing MCPA in the formulation can give a top growth burn in wheat, oats, barley, flax and rye.

Thorough pre-plant tillage and a competitive crop is a must for field horsetail management. No matter what you're seeding, you will need an adequate plant stand to compete (think seeding rate, seeding depth and plant available fertility).

**TIMING**

These weeds emerge early in the season, in moist conditions, so your best option is to get out in the field in spring and till the soil to help with drainage and evaporation.

WEED  
**FOXTAIL BARLEY**



DIFFICULTY RATING



**KEY TRAITS**

This grass species can be hard to control and is very competitive in many crops. It has been shown to reduce wheat yields by up to 29%. The leaves are green and hairy with a grey tinge. The seed heads look similar to barley with long awns. It thrives in saline conditions, which can occur when soil dries out after wet conditions. It can also harbor diseases such as wheat rust and barley stripe mosaic virus.

**METHODS OF CONTROL**

High seeding rates in min-till systems with proper fertilizer placement will help the crop to outcompete this saline loving weed.

Shallow tillage is a potential solution that won't eliminate the benefits of min- or zero-till systems.

- Canola: Use 0.5 L per acre Roundup Transorb® HC at pre-seed burnoff to ensure all plants are controlled. In-crop use Liberty® or Assure® II for LibertyLink® canola. For Roundup Ready® or TruFlex™ canola, use a two-pass strategy at the appropriate rate.
- Peas: Use the same rate of Roundup Transorb HC pre-seed, or Assure II in-crop.
- Lentil: Use Roundup Transorb HC mixed with Focus® for pre-seed burnoff or Assure II in crop.
- Wheat: Use Inferno® Duo or Trio pre-seed; in-crop use Everest® 3.0 or Sierra® 3.0.

**TIMING**

Control in the fall with a post-harvest application of Roundup Transorb HC tank mixed with Inferno Duo and Express® Pro. Ideal timing is fall, before plants become over-wintered.

Pre-seed control will be effective with 0.5L per acre of Roundup Transorb HC on seedlings. More mature plants will require higher rates (1 to 1.5 REL per acre). Overwintered plants are harder to kill both pre-seed and in-crop. If plants are still actively growing, apply Roundup Transorb HC pre- or post-harvest.



WEED  
**GREEN FOXTAIL**

DIFFICULTY RATING



**KEY TRAITS**

Commonly referred to as millet or wild millet, the seeds of the green foxtail plant germinate throughout the growing season, making it a real survivor. This weed can reduce yields by 10-15%.

**METHODS OF CONTROL**

No matter what you're seeding you will need adequate plant stands in order to compete. To keep green foxtail at bay over time, you will need to rely on herbicide rotation.

- Wheat: Axial®, Luxxur™, Velocity m3, Traxos®, Everest® 3.0
- Barley: Axial
- Canola: Roundup Transorb® HC, Liberty®
- Peas: Viper® ADV
- Soybean: Viper ADV
- Oats: No control options

**WATCH OUT**

*Green foxtail has shown resistance to Groups 1, 2 and 3, but has also shown resistance to multiple combinations of Groups 1 and 3.*

**TIMING**

You are best to control green foxtail at typical in-crop application timing, because it doesn't readily germinate below 20°C. As a result, most flushes will happen in early June.

WEED  
**HEMP-NETTLE**

DIFFICULTY RATING



**KEY TRAITS**

Covered with small, fuzzy leaves with serrated edges, this annual is tough to control once it's larger. Typically a dark brown or black soil zone weed, it can be found throughout a field and especially around moist or low spots.

**METHODS OF CONTROL**

Relatively simple to control in Roundup Ready® and LibertyLink® canola and in peas. Water volume is key to getting the coverage that will penetrate hemp-nettle's hairy cover.

- Wheat and Barley: Save yourself the spend on more expensive herbicides for hemp-nettle control, and go for a more cost-effective option that also tends to work under sub-optimal conditions (eg: Pixxaro™, Infinity® FX).

**WATCH OUT**

*There have been some instances of Group 2 resistance in hemp-nettle, but it's not widespread.*

**TIMING**

You can generally control hemp-nettle with a pre-seed burnoff, but it grows all season. There's a strong case for a pre-harvest application.

**WEED**  
**KOCHIA**
**DIFFICULTY RATING**

**KEY TRAITS**

Kochia grows tall with many branches and will eventually become tumbleweeds, spreading seeds across the landscape. It grows better than most plants in saline conditions.

**METHODS OF CONTROL**

Use high water volumes when applying herbicide in-crop to penetrate plant hairs and to ensure you get through to every kochia plant in a patch.

Barley, wheat and canola compete well with kochia.

- Wheat and barley: Products with 2, 4-D in the formulation. New products tend to come with it as a co-pack.
- Lentils: Edge® MicroActiv®. Kochia is more difficult to control in Clearfield® lentils and flax due to widespread Group 2 herbicide resistance.
- Peas: Viper® ADV, Authority® Supreme as a soil-applied pre-seed burn before peas.

You can use Authority 480 as pre-seed before spring wheat, durum, peas and soybeans.

**WATCH OUT**

*Assume all kochia is Group 2 resistant, but also watch for Group 9 resistance.*

**TIMING**

Get ahead of emergence by using a soil-applied herbicide that will control the young plants as they emerge. Consider fall applied Fierce™ or Valtera® EZ ahead of pulses, wheat or soybeans as excellent options for managing Group 2,4 and 9 resistant kochia. You can also attack kochia in-crop if plants are missed pre-seed.

**WEED**  
**LAMB'S QUARTERS**
**DIFFICULTY RATING**

**KEY TRAITS**

Common and widespread, lamb's quarters produces 70,000 or more seeds per plant and is ultra-competitive. Flushes early and late in the growing season.

**METHODS OF CONTROL**

Cereals provide the most in-crop options for control.

- Pre-seed or pre-emergent herbicide recommendations for wheat, barley, oats, peas, lentils, soybeans: Heat® LQ.

In-crop herbicide recommendations include:

- Spring wheat: Axial® Xtreme iPak™
- Wheat and barley: Cirpreme™ XC, Paradigm™, Pixxaro™, Prestige™ XC, Stellar™ XL, Infinity® FX, Travallas®, Curtail™ M, Buctril® M
- Canola: Roundup Transorb® HC, Liberty®
- Peas and soybeans: Viper® ADV

**WATCH OUT**

*Lamb's quarters has shown resistance to Group 2 chemistry.*

**TIMING**

Control pre-seed and in-crop. Because its greatest flush occurs at the beginning of the growing season, lamb's quarters is a prime target for pre-seed control.

**WEED**
**NARROW-LEAVED HAWK'S BEARD**
**DIFFICULTY RATING**

**3/5**

**KEY TRAITS**

A winter annual, narrow-leaved hawk's beard can be tough to identify at the rosette stage because it closely resembles dandelion, sow thistle, stinkweed and Canada thistle.

**METHODS OF CONTROL**

Cereals and canola compete most effectively. Controlling narrow-leaved hawk's beard in peas and lentils is tricky in-crop, but there are herbicide options for pre-seed burn.

- Canola: Use 0.5L Roundup Transorb® HC tank mixed with Prospect™ at pre-seed burnoff to ensure all plants are controlled.
- Cereals and pulses: Add a tank-mix partner before cereals (eg: Express® Pro, Paradigm™) and pulses (eg: Heat® LQ). Although narrow-leaved hawk's beard plants grow large in-crop, Paradigm and Luxxur™ are options for use in cereals.

**WATCH OUT**

*There is Group 2 resistance in narrow-leaved hawk's beard.*

**TIMING**

Pre-seed burnoff timing is critical for control. Don't skimp on herbicide rates with this one. If there is a second (or more) flush, be sure to choose a product that will be effective.

**WEED**
**PERENNIAL SOW THISTLE**
**DIFFICULTY RATING**

**5/5**

**KEY TRAITS**

This weed prefers moist, fertile soils. It spreads in two ways: its seeds are carried by the wind and it has a creeping root system that sends up new shoots.

If you attack with tillage, you can strengthen the perennial sow thistle by moving its dormant underground root buds around.

**METHODS OF CONTROL**

Patience is a virtue with perennial sow thistle. A multi-year plan will be your best bet to eradicate this weed.

- Wheat: Axial® Xtreme iPak™ or Velocity m3 + MCPA gives you just enough activity to weaken perennial sow thistle, but keep it active enough to get regrowth for a fall application of Roundup Transorb® HC and a multiple modes of action (MMOA) partner like Distinct®.
- Wheat and barley: Cirpreme™ XC, Prestige™ XC, Curtail™ M
- Oats: Prestige XC
- Canola: Roundup Transorb HC, Liberty® (use a high registered rate for season-long control with enough regrowth to get it again in fall).
- Lentils and peas: Control is best with a pre-seed burn of Heat Complete as in-crop control options are limited

**TIMING**

Don't limit yourself to one time of year, or even one year. Look at pre-seed, in-crop, pre-harvest and post-harvest applications.

WEED  
**REDROOT PIGWEED**



DIFFICULTY RATING



**KEY TRAITS**

A large and fast-growing plant, redroot pigweed can reduce yields significantly. It grows to 3-6 feet tall and features a red-colored lower stem and root. It can lay dormant in your soil for five years plus, then show up when you least expect it.

**METHODS OF CONTROL**

Cereals will give you the most options for controlling redroot pigweed in-crop, but no matter what you're seeding, you will need adequate plant stands to compete (think seeding rate, seeding depth and plant available fertility).

- Spring wheat: Axial® Xtreme iPak™, Rexade™, Velocity m3
- Oats: Stellar™ XL, Prestige™ XC
- Canola: Roundup Transorb® HC, Liberty®
- Peas, Soybeans: Viper® ADV

**WATCH OUT**

*Redroot pigweed has shown resistance to Group 2 chemistry.*

**TIMING**

Control at typical in-crop herbicide timing. This weed doesn't readily germinate below 20°C and most flushes happen in early June and throughout summer, as long as there is adequate moisture.

WEED  
**ROUND-LEAVED MALLOW**



DIFFICULTY RATING



**KEY TRAITS**

This weed is a strong competitor and also acts as host for diseases such as aster yellows. It can grow tall and can clog harvest equipment as it produces a large amount of green growth through to the end of the season. Green material and weed seeds can cause dockage. It is an annual or short-lived perennial with a hard seed coat that enables the seed to remain dormant for many years. Germination generally happens in late spring, and the plant matures through the summer.

**METHODS OF CONTROL**

Cereals and canola are the best choices to out-compete this weed as herbicide options are limited.

- Cereals: At pre-seed, use PrePass™ Flex or Heat® LQ; In-crop, use Prestige™ XC, Stellar™ XL
- Spring wheat: Axial® Xtreme iPak™, Rexade™, Traxos Two
- Wheat and Barley: Cirpreme™ XC, Paradigm™, Pixxaro™
- Peas and Lentils: Use Heat® LQ pre-seed
- TruFlex™ and Roundup Ready® canola: Roundup Transorb® HC
- LibertyLink® canola: Liberty®
- Roundup Ready® soybeans: Roundup Transorb HC

**WATCH OUT**

*Avoid seeding pulses and flax in fields where round-leaved mallow are or you could have a problem.*

**TIMING**

Keep round-leaved mallow controlled during the crop's critical weed-free period. Ideal timing is the crop's 1-3 leaf stage and no later than the 6-leaf stage.

WEED  
**SCENTLESS CHAMOMILE**

DIFFICULTY RATING



**KEY TRAITS**

Scentless chamomile easily spreads from field to field on equipment. It can reduce yields in spring wheat crops anywhere from 30% to 80%. It is classified as a winter annual, but it can also become a simple perennial. It has fine leaves that can be distinguished from similar-looking species because it is odourless, unlike pineapple weed and stinkweed. This weed can rapidly reproduce from its white flowers and can have mature seeds in the seed head even though the head is still in flower.

**METHODS OF CONTROL**

Clopyralid is the best tool to control scentless chamomile. Also use clean seed sources for your crop and ensure you control the weed in sloughs and field edges. Winter wheat and barley compete more successfully with this weed than spring wheat, so may be a better choice if you have an infestation. Barley in particular is a good competitor as it grows rapidly and the tillers help choke out the weed.

- Cereals: Group 4 and some Group 2 chemistry controls this weed best. Use a pre-seed application of Express® PRO, followed by an in-crop application of Prestige™ XC. Ally® Toss-N-Go® may also provide good control.
- Wheat: in-crop use Luxxur®.
- Lentils and flax: Limited control options.

**PRO TIP**

*Ensure equipment is clean prior to coming to the farm from other areas.*

**TIMING**

The earlier the better to prevent flowering and adding to the seed bank. Scentless chamomile is also easier to control at early herbicide timing – at the 2-3 leaf stage in cereals, before the weed gets really competitive.

WEED  
**STORK'S BILL**

DIFFICULTY RATING



**KEY TRAITS**

Classified as a winter annual, stork's bill has leaves similar to those of carrots and produces pink or purplish flowers about ½ inch in size. It can thrive in cool, dry conditions and can tolerate shade. Because it is drought tolerant it can seriously reduce yield in dry years – by up to 20% in peas.

**METHODS OF CONTROL**

2,4-D is your best option to control stork's bill. Talk to your Cargill agronomist about heating up your tank mix with 2,4-D.

- Wheat, barley, oats: Achieve pre-seed suppression with PrePass™ Flex tank mixed with Roundup Transorb® HC.
- Wheat, barley – Your best in-crop choices are: Infinity® FX (tank mixed with 2,4-D and ammonium sulphate), OctTain™ XL, Cirpreme™ XC; or suppress using Axial® Extreme.
- Canola: In Roundup Ready® canola, use Lontrel™ XC; and in LibertyLink® canola, use Liberty® herbicide.

**WATCH OUT**

*This weed quickly moves through its growth stages, making it easy to miss the herbicide application window.*


**TIMING**

Ideal fall control timing is after the plants have germinated. Stork's bill grows quickly and can develop past the recommended herbicide application window. Early scouting is essential. Seed is set early in the summer, and new plants germinate in the fall. Get on top of in-crop control early to catch this weed before it reproduces.




WEED

## VOLUNTEER CANOLA



DIFFICULTY RATING

 | 1/5

### KEY TRAITS

Volunteer canola is simply canola plants growing where and when you don't want them. The challenge is that they maintain their tolerance so they can't be controlled with that active ingredient.

### METHODS OF CONTROL

Canola volunteers are easy to control with almost any herbicide in most crops, but not in crops that share their herbicide tolerance trait.

Use a tank-mix partner with glyphosate to control Roundup Ready® volunteer canola.

- Before cereals: PrePass™ Flex, Paradigm™
- Before pulses: Heat® LQ
- Before canola: Conquer® II

### WATCH OUT

*Watch your canola rotation to ensure you can control Roundup Ready® and LibertyLink® volunteers.*

### TIMING

Control volunteer canola in the spring, to keep canola plants from competing for nutrients and moisture. Use a tank-mix partner.

WEED

## WILD BUCKWHEAT



DIFFICULTY RATING

 | 2.5/5

### KEY TRAITS

With its arrow (or heart-shaped) leaves, wild buckwheat first grows along the soil surface and branches out to make its own canopy until it encounters other plants. Its long, wiry stems can cause havoc at harvest, and its root system is large and fibrous, helping to make it drought-tolerant.

### METHODS OF CONTROL

Wild buckwheat is a definite concern, but there are control options in every commonly-grown crop.

Roundup Transorb® HC alone is not super strong on wild buckwheat. You can't afford to cut the rate if that's your target. Be careful not to assume that more expensive herbicides will control it. Other less expensive herbicides will often be more effective. Ask your agronomist which product will work for you.

- Cereals: Control pre-seed using PrePass™ Flex.
- Canola: Control pre-seed using Conquer® II tank mixed with glyphosate.

### TIMING

Your best bet for controlling wild buckwheat is at emergence with your pre-seed burnoff. The young plants are small and vulnerable, but when they grow large, they are tougher to control.



WEED  
**WILD MUSTARD**

DIFFICULTY RATING



**KEY TRAITS**

Wild mustard is an annual weed from the same family as canola (Brassica), and therefore, highly competitive in canola crops where it can go unnoticed and steal moisture and nutrients, lowering yield and oil content. Impacts to cereal and pulse crops can also be significant. It can carry other Brassica diseases such as clubroot and blackleg.

**METHODS OF CONTROL**

Cereals have the most control options, but you can control wild mustard in both peas and canola.

- Wheat, barley: At pre-seed use PrePass™ Flex, Heat® LQ, Express® Pro or SG; in-crop go for Infinity® FX, OctTain™ XL, or Cirpreme™ XC.
- Peas: At pre-seed use Heat® LQ and in-crop use Viper® ADV.
- Canola: At pre-seed use Conquer® II tank mixed with Roundup Transorb® HC. In-crop for Roundup Ready® canola use Roundup Transorb HC tank mixed with Lontrel™ XC. For LibertyLink® canola use Liberty®.

**WATCH OUT**

*Wild mustard has shown some resistance to Group 2 chemistry.*

**TIMING**

Ideally, control should happen no later than the 2-4 leaf stage. It's relatively easy to control at this stage with 2,4-D, MCPA and most ALS herbicides. After that it becomes more difficult, and the weed may only be suppressed and recover.

WEED  
**WILD OATS**

DIFFICULTY RATING



**KEY TRAITS**

A highly competitive grassy weed, each wild oat plant produces about 1,200 seeds, and they persist in the seed bank for a number of years.

Wild oats can be a particular issue along fence lines or in field corners, where farmers either have been carefully protecting against drift or where boom speed is high when the sprayer is turning.

**METHODS OF CONTROL**

Growing a competitive crop is crucial for wild oats management. No matter what you're seeding, you will need adequate plant stands in order to compete. It's less expensive to control wild oats in a broadleaf crop.

You have a number of options when it comes to wild oats control, but your most important ally is chemistry rotation (eg. Axial®, Sierra®3.0, Simplicity™, Velocity m3).

**WATCH OUT**

*Wild oats have shown resistance to Groups 1, 2 and 8.*

**TIMING**

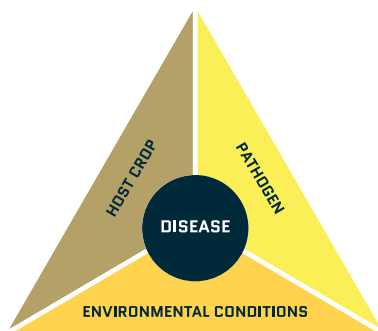
Because wild oats are a spring annual, you must control it in-crop. Second flush can be an issue, unless you get that competitive crop established early and well.

Any farm’s goal is to avoid having disease at all. But even a little disease pressure can stress your crop and reduce yield potential. The challenge comes when you have big yield goals and you need to make a spray decision before you see symptoms in the field.

## FIVE STEPS TO BETTER DISEASE MANAGEMENT

To help with key disease control decisions on the fly, Cargill’s team of agronomists have narrowed it down to five steps.

### 1. USE THE DISEASE TRIANGLE



This tried-and-true diagram is still the number one reference tool for spray decisions. If you have all the points of the triangle (even a small amount) – the host crop, the presence of the disease in your area, and environmental conditions that favour disease – you need to spray.

Some diseases are more affected by the triangle points than others, like *Ascochyta* blight in pulses. If you’ve had the inoculum in your area and you’re growing pulses, there’s a strong likelihood your crop will need the protection of a fungicide.

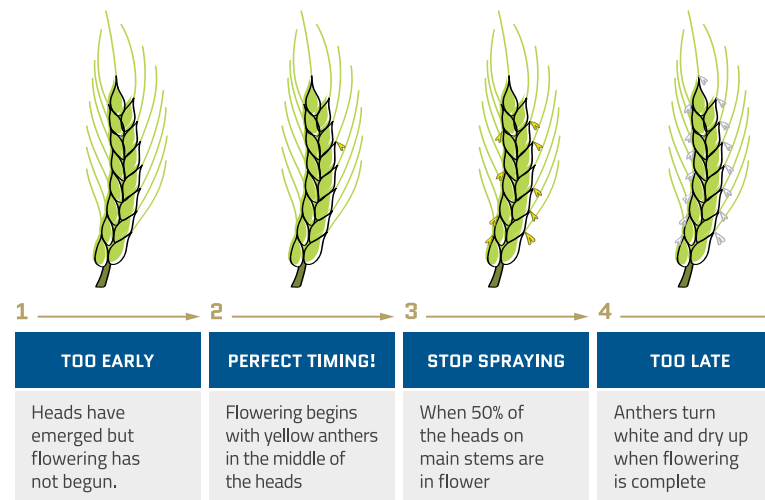
### EXPERT TIP

***Ascochyta* blight can strike even when it’s moderately dry outside.**

**Dyax™, Delaro® and Miravis™ Neo** are products for the pulse market that offer multi-disease control. Talk to an agronomist about *Ascochyta* blight, *Mycosphaerella*, *sclerotinia* and other sneaky diseases that defy the triangle and might threaten your crop.

### 2. KNOW YOUR TIMING

Once you’ve made the decision to spray, timing is everything. Fungicides don’t have much curative action – they’re only effective when you follow the label and spray at the correct stage. Apply products like **Prosaro XTR®**, **Caramba®** and **Miravis®** during the early flowering window – which can be as short as three days – if you want to prevent *Fusarium* head blight in wheat.



If leaf disease is your main concern, spray products like **Nexicor™**, **Trivapro™** and **Quilt®** at the flag leaf stage for maximum benefit.










Know your product labels and what to look for in the field. Get your agronomist to help with staging and prioritizing fields to ensure all acres are sprayed.





### 3. ADJUST EQUIPMENT SETTINGS FOR BETTER COVERAGE

Coverage also affects fungicide efficacy. When the crop canopy closes, or you have big bushy canola plants, take some time to find the perfect sprayer settings. Here are a couple of things to consider:

- Get the correct water volumes for your equipment and the conditions.
- Match nozzles to sprayer machinery and conditions.

**Proline**<sup>®</sup>, **Lance**<sup>®</sup> and **Cotegra**<sup>®</sup> are great products, but you need to do a good job with application (i.e. correct staging and sufficient water volume) to get the best sclerotinia protection. Talk to your equipment dealer for help adjusting your equipment settings.

STAGE 1	STAGE 2			STAGE 3	STAGE 4		STAGE 5	
								
Cotyledon	First Leaf	Third Leaf	Sixth Leaf	Bolt	Early Flower	Mid-flower	Green Pod	Mature

			
<b>10% BLOOM</b>	<b>20% BLOOM</b>	<b>30% BLOOM</b>	<b>50% BLOOM</b>
-10 open flowers on the main stem	-14-16 open flowers on the main stem	-20 open flowers on the main stem	>20 open flowers on the main stem

### 4. MAKE SURE YOUR CROP INPUT LAYERS WORK TOGETHER

Think of each input as another layer of protection for your crop. When you think strategically about applying layers of protection, you'll set yourself up to reap better returns. Your seed treatment gave your crop a strong start, and now your fungicide will continue protecting it.

### 5. CHOOSE THE RIGHT FUNGICIDE FOR THE DISEASE

Not every fungicide controls every disease. Ensure you're choosing the right fungicide to target the right pathogen. There are a lot of options in the market, so even if you choose a good quality product, it might not be the best fit for your farm or field.

### 6. APPLY THE PRODUCT SAFELY

Always stick to re-entry intervals and applicator protection standards listed on the product label when applying fungicides. Applicator safety is everyone's responsibility and is the law. Most products require a minimum of 12 hours before re-entry, some a lot longer.

**Talk with your local agronomist to find out which pathogens are most problematic for your area and which products will fit your yield goals and budget.**

### IS IT TOO DRY FOR DISEASE TO DEVELOP?

In moist years, the decision to use fungicide is a no-brainer. High moisture means bigger yield, but more chance of disease spreading throughout the crop. What about applying fungicides in a dry year? It may not seem so clear, but you can realize several important benefits.

#### INCREASED WATER USE EFFICIENCY

A plant becomes stressed when there is a lack of moisture, which kickstarts their defense mechanisms, including premature ethylene production. This causes the plant to limit unnecessary energy draws such as the development of new buds, flowers or pods.

Applying a fungicide will help a plant overcome drought and heat stress by reducing the amount of ethylene produced and increasing its water use efficiency. When a plant is more effective at using the available water, it keeps the plant from shutting down and aborting pods.

## INCREASED NUTRITIONAL CAPACITY

Fungicide applications reduce moisture stress on the plant. This allows the plant to put more energy into building a larger root system, which in turn enables the uptake of moisture and vital nutrients.

A fungicide helps a plant grow to its full potential, so it doesn't dry down before it has the chance to fill seeds properly. It has also been shown to increase root biomass, which is important in dry conditions. The more robust the roots, the better they are to seek moisture and vital nutrients.

**At the end of a 2016 trial across several farms near Lethbridge, Alberta, some farmers claimed up to an 8 bu/ac increase in yield where they used a fungicide on peas, compared to where they did not.**

In addition to general plant health benefits there is still the potential for the spread of disease in dry conditions. While it is true that most diseases require higher moisture levels, humidity and rainfall to spread through the crop canopy, they may not need as much moisture as we think, because:

- A closed canopy will have a higher humidity level even if it hasn't rained in a few days. The small amount of dew on the plants in the morning is enough to create the perfect environment for disease.
- Some diseases such as powdery mildew will actually break down when there is high rainfall. Fusarium head blight spores can be distributed with the wind and rainfall and only requires high humidity to become activated.

## CANOLA DISEASE MANAGEMENT

### BEST PRACTICES FOR BLACKLEG PREVENTION



*Blackleg leaf lesion*

Given the potential impact to your farm, it's wise to understand blackleg's life cycle, how to identify it and what steps you can take to prevent and/or treat it.

Scouting for blackleg can be tricky. You can see symptoms on cotyledons, stems, leaves and pods. Leaf lesions are usually white or brown and have pycnidia (looks like pepper on the leaves).

Clip and assess enough stems to give you a good representation of the field. A minimum of 50 stems is a good place to start. The blackleg impact on each stem will give you the best idea of what kind of disease pressure is present in a given field.

### USE A MULTI-METHOD APPROACH TO MANAGE BLACKLEG

The pathogens causing blackleg build up in the soil of your fields, especially in tight canola rotations. Most of the blackleg infection is in the lower part of the plant and is often left with standing stubble after the crop has been harvested. Infected stubble produces spores for three seasons (sometimes more) and eventually releases them into the air where they infect new plants.

Airborne spores can travel long distances by wind, or, in wet conditions water can splash spores onto neighboring plants. If these spores land on pods it can result in infected seeds and lead to infected seedlings. Infected seedlings have low survival rates. While a seed treatment on commercial seed can control seedling infections, it won't control infections to seedlings or plants by airborne spores – this is where a fungicide could come into play.

### CONSIDER AN EARLY FUNGICIDE APPLICATION

If there is high blackleg pressure in your area, you will want to take action to preserve your crop. Right now, fungicides for blackleg are limited to **Nexicor™** and **Quilt®**, but we may see more on the market

soon. Recommended timing for spraying blackleg fungicide is the 2-6 leaf stage or with your second herbicide pass on canola.

## BEST PRACTICES FOR CONTROLLING CLUBROOT



Clubroot galls

Clubroot is a reality in some parts of Western Canada. But don't panic. There are many actions you can take to stop the spread of clubroot and mitigate its effects.

- **Scout fields!** Catching clubroot early is key to managing the spread of the disease. In your canola crop, look for thin areas, areas with premature ripening and scout areas near field entrances and other high traffic spots. Also look for plants with gall formations on the roots.
- **Rotation is critical.** The Canola Council of Canada suggests a minimum two-year break between canola and best practice is canola once in four years. Tight rotations increase the spore load, which increases the severity of infection.
- **Manage canola volunteers** and crucifer family weeds that can host spores.
- **Reduce tillage** to prevent spread of clubroot by reducing the movement of soil.
- **Clean equipment** between fields to prevent dirt tag (movement).
- If disease has been confirmed on your farm, use **resistant cultivars** as your first and MOST effective line of defense.

Note, if you are growing a canola hybrid with clubroot resistance for the first time, in addition to following good management practices, choose one with first generation genetics. This will help prevent the loss of effective resistance in clubroot hybrids. After two cycles of growing first generation clubroot-resistant hybrids or when you notice clubroot symptoms when growing first generation hybrids, we recommend switching to second generation hybrids.

If you are concerned about clubroot in your farming community or have confirmed clubroot on your farm, grow a clubroot-resistant hybrid. If you are not concerned about clubroot but a clubroot hybrid has an agronomic package you desire such as potential straight cut, standability or oil profile you can grow the hybrid that best fits the needs of your operation, whether or not it is clubroot resistant.

Finally, while time and practicality may prevent you from following these protocols exactly, it still helps to know these two best practices.

1. Wear booties and properly dispose of them at the edge of the field after use, or sanitize footwear by removing any loose soil and soaking in a 2% bleach solution (20-minute soak).
2. Avoid taking trucks/equipment into the field for scouting. If you do need to use equipment in the field, rough clean (remove soil material using a broom, brush, air compressor, shovel or by hand). Next, spray with a 2% bleach solution, soak for 20 minutes and rinse, or pressure wash between fields.

## CONSIDER FUNGICIDE TO DEFEND AGAINST SCLEROTINIA



Sclerotinia stem rot in canola

Do you struggle with deciding whether or not to spray fungicide to manage sclerotinia on your farm? This yield-robbing disease isn't easy to manage in the field or financially, but as canola is showing up more frequently in rotations, it's important to think about how to proactively control sclerotinia.

		ENVIRONMENTAL FACTORS								
		RAIN IN LAST 2 WEEKS AT ONSET OF FLOWERING			FORECASTED BAROMETRIC PRESSURE			REGIONAL RISK FOR APOTHECIA DEVELOPMENT		
AGRONOMIC FACTORS		< 10mm	10-30 mm	> 30 mm	High	Variable	Low	None	Low	High
Canola rotation years	> 6 years	Low	Low	Med	Low	Med	Med	Low	Low	Med
	3-6 Years	Low	Med	Med	Low	Med	High	Low	Med	Med
	< 2 years	Med	Med	High	Med	High	V High	Med	Med	High
Sclerotinia Incidence in last host crop	None	Low	Low	Med	Low	Med	Med	Low	Low	Med
	Low	Low	Med	Med	Low	Med	High	Low	Med	Med
	Moderate	Med	Med	High	Med	High	V High	Med	Med	High
	High	Med	High	V High	Med	V High	V High	Med	High	High
Crop Density	Low	Low	Low	Med	Low	Med	Med	Low	Low	Med
	Average	Low	Med	Med	Low	Med	High	Med	Med	Med
	Above average	Med	Med	V High	Med	High	V High	Med	Med	High

## FUNGICIDE IS YOUR BEST DEFENSE AGAINST IN-SEASON DISEASES.

Canola diseases have the potential to significantly reduce yield if not managed. Yield loss from sclerotinia in canola is typically associated with a lack of moisture and nutrients reaching the pods. This causes premature ripening and uneven maturity of the field. The toughest part about managing sclerotinia is that you usually have to apply fungicide before any symptoms appear.

Spraying for sclerotinia doesn't seem to provide the same economic return as other fungicide applications such as for cereals and pulses, but when it does infect, sclerotinia can cause yield loss that makes you rethink your spray decision.

## TO SPRAY OR NOT TO SPRAY? ASK YOURSELF THESE QUESTIONS.

- **Have you seen evidence of disease in the past?** Going into this growing season, think about past canola crops on this year's canola fields. If there is a history of disease, you can expect to have a disease issue in the coming year.
- **How are this year's growing conditions shaping up?** Great growing conditions plus high disease pressure typically result in yield loss.

### EXPERT TIP

**What are the moisture levels in your crop?** When your crop is at about 10% bloom, usually in June or July, walk your fields. If your pants are still wet from dew in the afternoon, that suggests conditions are perfect for the development of sclerotinia.

- **Timing and location are important.** If you find evidence of sclerotinia, the location of the disease on the plant and the timing of the infection will dictate the losses it will cause. The earlier in the season and the closer to the base of the plant, the higher the potential for loss.
- **What is your potential yield impact?** Yield loss is variable dependent on the time of year and severity of infection. It can be 50% or higher



under extreme cases of infection. To calculate potential yield loss, simply take the percentage of infection and multiply it by 0.5.

### SPRAYING FOR SCLEROTINIA

The majority of sclerotinia infection occurs from ascospores settling on canola petals, which drop onto the branches of the plant. As the petals fall off, they brush the stem and branches on their way to the ground, infecting on contact. The slightest moisture can lead to the infection of those branches. This is why you apply fungicide to as many canola flowers as possible.

- Ideal timing for a one-pass application of fungicide is 30-40% bloom. That's typically when petals start to drop off and can get fungicide on the most petals possible.
- In a two-pass fungicide system, aim for 20-50% bloom to maximize the number of petals hit with fungicide and help you get the best control of the disease.
- Fungicides available to manage sclerotinia include: **Proline®**, **Cotegra™** and **Lance®**.
- If you're not sure what kind of sclerotinia pressure is in your area, or want to see what kind of impact a fungicide application will make, try spraying and leaving a test strip to see the difference for yourself.

### FUNGICIDE APPLICATIONS IN CANOLA CAN INCREASE HARVEST EASE

Because sclerotinia can cause uneven maturity in the field, a fungicide application can not only help reduce yield loss, but it can also make those swathing or pre-harvesting decisions easier, while reducing the risk of shattering caused by overripe plants.

## NOTES

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## INSECTICIDE

### What's bugging you?

Insect populations can be so variable from year to year that the only thing you can guarantee is that sooner or later, you'll have an issue with one insect or another.

We also know that as with any type of pest, it's important to take an Integrated Pest Management approach to insect control. Before you face the decision to spray, you can combat insects with your crop rotation, field selection, crop residue management, the specific cultivar and/or variety you're growing, and your seeding date. Once it looks like an insecticide will be necessary, ensure the damage done by the insect exceeds your economic threshold, verify that the insecticide is registered for the crop and insect you're dealing with, ensure that you will not exceed the preharvest interval dates, and consider the hazard rating on beneficial insects in your cropping mix.

\*Always read and follow label directions.

Insect pressures vary from season to season, but a strong scouting routine can help you stay on top of things, no matter what might be eating your crops.

### SPRAY SAFELY

Post-spray minimum field re-entry guidelines are important no matter which crop protection product you use. Remember to check the label for safety guidelines. Guidelines for some of the more common insecticides include a minimum of 24 hours for Lorsban® and Matador® and a minimum of 12 hours for Coragen®.

### FLEA BEETLES



*Crucifer, striped and hop flea beetles*

These beetles can inflict serious damage on canola crops causing an uneven plant stand, which makes fungicide and harvest timing more difficult, and can lead to green seed and a lower grade at the elevator. While damage typically looks like buckshot holes on canola

leaves, in severe cases, flea beetle feeding can cause total defoliation of the plant. However, canola is only susceptible to flea beetle feeding until the 3-4 leaf stage.

Seeding early and allowing plants to grow larger can reduce their susceptibility to flea beetle feeding. There are three species in Western Canada:

- the hop flea beetle
- the striped flea beetle, and
- the crucifer flea beetle.

The hop flea beetle emerges first and mostly feeds on cruciferous weeds like stinkweed. The striped flea beetle emerges one to four weeks later. Striped flea beetle populations have become more prominent over recent years due to their prolific and flexible feeding habits. When soil temperatures are above 14 °C, the crucifer flea beetle emerges.

Flea beetles are typically a risk to the crop from the cotyledon to 4-leaf stage, so this is when you have to monitor crops closely. If the canola stage is 4-leaf or greater, you likely don't need to spray. At this stage,

there is usually enough leaf tissue to support flea beetles feeding on the plant. If your canola is unevenly staged, keep scouting to make sure smaller plants are no more than 25% defoliated.

Economic thresholds are based on ideal plant stands (7-10 plants per square foot). Any stresses like frost or excessive rain can reduce the plant's ability to bounce back after defoliation by flea beetles. If this is the case, an insecticide application may be warranted. If the plant stand is thinner, the economic threshold decreases, and you should spray sooner.

The best defense against flea beetles is with a targeted seed treatment. This strategy will help keep numbers below economic thresholds during the critical establishment stages. It will also minimize the risk of having to apply a foliar insecticide, which is an added expense and can be detrimental to non-target, beneficial species.

Standard seed treatments are **Prosper® EverGol®** or **Helix® Vibrance®**. Added control of striped flea beetles, which can be a more aggressive and damaging species, can be achieved using **Fortenza® Advanced**, which also controls cutworms.

## CUTWORM



*Pale western cutworm larvae*



*Redbacked cutworm larvae*

Photo credit:  
Canola Council of Canada

These pests hide under trash and in the top few inches of loose soil. They like hiding at the base of their host plant. To find them, go to the suspected area and scrape back the dirt little by little. You may find a cutworm ball up in a "c" shape when exposed.

Determine which species it is, and if it's a more aggressive feeding species like the redback or the pale western cutworm, consider spraying if numbers are at threshold. If most of the worms found are from defoliating species, it may not be necessary to spray, unless they are skeletonizing the plant.

## SIZE MATTERS

Take note of the average larval stage of the cutworms you find. If most of the worms are about half an inch long, they have the potential to cause more damage because they are actively feeding.

If worms are over 1 inch long, they have probably done as much damage as they're going to do and will stop eating to pupate.

If most of them are large, a chemical application may not be necessary. Track the number you're seeing per metre and compare that to the nominal economic threshold value in the crop protection guide, keeping in mind it's different for every crop. For canola, the Canola Council recommendation is 25-30% stand reduction.

## KNOW YOUR CONTROL OPTIONS

Fields that have seen cutworm activity in the past often see it return. In these cases, it's a good idea to use an insecticidal seed treatment like **Lumiderm®** or **Fortenza® Advanced** (in canola). Cereal crops have no registered seed treatment to control cutworms, but their growing point is below the soil, so feeding may delay maturity but not kill the plant.

If you feel an insecticide application is warranted, it may only need to be in areas with cutworm activity. Products like **Coragen®** and **Pounce®** will control most cutworm species, but application timing can be tricky.

For best results, spray in the evening when the worms are above the soil and actively feeding. If worms are about to molt, they may stop eating. To check this, see if there is green material in the digestive system. If they have stopped feeding, it may be a good idea to delay chemical application by a few days.

If you're concerned about cutworms, keep these management tips in mind:

- Know which species is present on your farm and if it's dangerous to the crop.
- Scout places where they will likely show up first.
- If you continually have cutworm problems, seed treatments are great insurance.
- If you have to spray, only spray where the worms are and do it in the evening.

## DIAMONDBACK MOTH



*Diamondback moth larvae*

The diamondback moth feeds on Brassica crops like canola and mustard and can feed on the plant at any time. If this pest is present, feeding on buds and flowers is directly related to yield loss. However, early plants can withstand 25-35% defoliation and the plant may try to compensate by increasing root growth where water and nutrients allow.

Past year infestations are **not** a sign that there will be significant populations in the upcoming year, as most do not survive the winter. Instead watch for strong south winds that carry the insect. Early arrival of the diamondback moth results in higher risk of feeding damage.

Diamondback moths can be somewhat controlled by beneficial insects like wasps, lacewings, spiders and carabid beetles. Scout for diamondback moths and beneficials to determine whether or not action needs to be taken. Pre-seed weed control on Brassica type weeds is an important cultural control method.

**Coragen**<sup>®</sup>, **Matador**<sup>®</sup> and **Decis**<sup>®</sup> are all options for diamondback moth control. Be sure to use high water volumes and if you are spraying later in the season, don't forget to keep the pre-harvest interval in mind. The economic threshold for diamondback moths varies by plant stage.

For immature to flowering plants, spray if counts exceed 100-150 larvae per m<sup>2</sup> or 1-2 larvae per plant.

If your plants are in the flowering to podding stages, it is 200-300 larvae per m<sup>2</sup> or 2-3 larvae per plant.

For plants in the seedling stage, consider spraying at 25-30% defoliation.

## GRASSHOPPER



*Grasshopper*

There are 80 species of grasshopper in Canada, but only four are considered a threat to crops in Western Canada\*, so be sure that you are dealing with a problem species before taking control steps. Cereals are most likely to be affected, followed by lentils, canola, forages and flax. Fields that are at highest risk are those

next to pastureland or where there have been past infestations. Feeding damage from grasshoppers is most severe under hot dry conditions as the weather contributes to increased feeding activity, development, egg laying and egg development before winter.

To determine if you have a grasshopper issue, look for chewing damage on leaves, pods, heads or bolls hanging from the stem, including holes in pods of canola or lentils, stripped canola pods or clipped heads and bolls. Getting an accurate count of grasshoppers can be difficult so try counting the number of grasshoppers that jump per step. Forecast maps published by the provinces are a great tool to predict grasshopper outbreaks.

The economic spray threshold is reached when you have evidence of hatching, feeding is apparent and you are able to observe densities of 8-to-13 grasshoppers per m<sup>2</sup> in cereals, 7-to-12 per m<sup>2</sup> in canola or 2 per m<sup>2</sup> in lentils.

If you feel your crop has sufficient yield potential to protect it and an insecticide application is needed, spray at the third to fourth instar (middle stage of growth) as adult (winged) grasshoppers are more difficult to control. Try to wait until the complete hatch to spray.

Products like **Coragen**<sup>®</sup>, **Matador**<sup>®</sup> and **Decis**<sup>®</sup> are potential spray options. Coragen has the added benefit of only killing what eats it, making it less harmful to beneficials and not being a neonicotinoid. When applying insecticide, keep the following tips in mind:

- Spray field edges and margins to prevent further spread.
- Good coverage is important for control, so use sufficient water volumes.
- Spray in the evenings when grasshoppers typically feed and beneficials are less active.

- Grasshoppers metabolize insecticide quickly when temperatures are above 25°C.
- Finally, leaving a trap strip can allow you to economically control grasshoppers with insecticide without having to spray the whole field.

**Also try:**

- Avoiding seeding cereals onto stubble heavily infested with grasshoppers.
- Seeding early as older plants can withstand more grasshopper feeding.
- Tilling or chem fallow to eliminate green plants that attract young grasshoppers.
- Removing weeds early in spring to help starve young grasshoppers.

## LYGUS BUG



Lygus Bug

Lygus bugs are referred to as sap or fluid feeders and feed on canola buds and seeds before the seeds turn yellow or brown. Typical damage from lygus at the flowering stage appears as buds that are shrunken and bleached white; at the seed development stage, canola seeds will have a dark brown appearance with one side of the seed shriveled or dented.

**Decis®** and **Matador®** are registered to control lygus bug in canola. Monitor your canola field from bolting through to late podding. If you see signs of the bug, use a sweep net to determine if it is present at five different locations within the field, where **one sample consists of one.**

\*Source: Grasshopper Identification and Control Methods, Agriculture and AgriFood Canada.

## PEA LEAF WEEVIL



Foliar damage from pea leaf weevil

Pea leaf weevil damage will appear between the first and sixth node stage in your pea crop. You'll initially see damage on your fields' margins, but pea leaf weevil can fly inward to the middle of a field. Scout for notches resembling a hole punch on the leaves.

The **economic threshold is when 3 of 10 plants have notched holes** in the clam leaf. But foliar feeding from adults shouldn't be your main concern as damage from pea leaf weevil comes from the larvae feeding on nitrogen-fixing nodules on the roots of the plant.

After they hatch, the larvae begin feeding. A high population can eat 90% of root nodules, greatly reducing the nitrogen the pea plant can fix and leading to a significant drop in yield.

**Dig up the plant and look at the nodules. Be gentle – pulling up a plant will rip the larvae and the nodules off the root. Larvae appear as small c-shapes with brown heads and will hollow out nodules, leaving them as empty shells.**

(Source: Montana State University)

Adults will overwinter, then lay their eggs the following spring. Females can lay 1,000 - 1,600 eggs, which hatch after two to three weeks (about the two- to three-node growth stage on peas). The larvae feed on the nodules for six weeks, pupate, then emerge as adults in late July to mid-August.

You can spray adults to reduce feeding, but by the time you notice, they will have already laid eggs in the soil. This is why we recommend seed treatment. You won't get adequate control without it at this stage.

Include **Cruiser® 5FS** or **Stress Shield® 600** with other seed treatments you're applying to pea seed or use a complete seed treatment which contains an insecticide such as **Trilex® EverGol® SHIELD**. If you've applied these insecticides to control wireworms in the past, you'll have to increase the rate to control pea leaf weevil.

If you seed early and experience a colder spring, adult pea leaf weevils won't be as active, and peas will get larger before adults are able to lay eggs. Hopefully the peas will have enough nodules that the plant will be able to withstand yield loss due to larvae feeding. But remember, spring seeding dates can be unpredictable, so it's safer to go with an insecticide.



## MAKING THE SPRAY DECISION – ECONOMIC THRESHOLD

Economic threshold as it relates to spraying a crop for insects can be described as the population level of an insect, or the level of crop damage where the value of the crop being damaged exceeds the cost of controlling the pest. These thresholds are often represented as number of insects per square metre or per plant, or the proportion of a leaf's surface that has been damaged.

In addition to identifying the insect you're dealing with, there are a number of factors such as moisture, temperature conditions, stage of crop growth, type of insect, potential impact to the crop, and economic value of the crop that need to be taken into consideration prior to making a spray decision.

For the most current information on economic threshold, check the Western Forum on Pest Management WCCP Guidelines at [westernforum.org](http://westernforum.org).

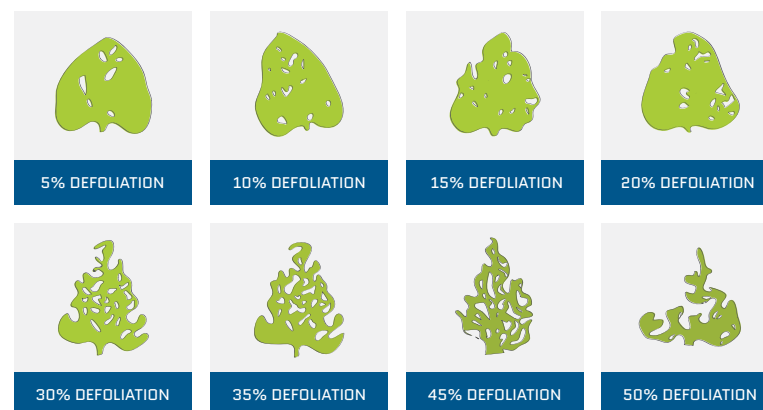
Make an objective decision based on thorough monitoring, correct pest identification and making a plan of action that is appropriate to the issue, taking into consideration cultural, biological and chemical controls.

The following chart provides an estimate of the economic threshold at which it may make sense to spray for crop damaging insects. Be sure to check the label for best application timing and practices prior to spraying. In addition to safety protocols, keep current Maximum Residue Limits in mind ahead of making the spray decision.

CROP	INSECT	THRESHOLD
<b>Canola</b>	Flea beetles	25% of leaf surface destroyed and/or stem feeding
	Cutworms	25% reduction in plant stand
	Diamondback moth	100-150 larvae/m <sup>2</sup> in plants prior to flowering (1-2 larvae per plant at 10 plants per ft <sup>2</sup> )
	Bertha armyworm	200-300 larvae/m <sup>2</sup> in plants in flowering/podding 10-34 larvae/m <sup>2</sup>
	Lygus bug	10-18 per 10 sweeps from flowering to pod development; 15-25 per 10 sweeps in early pod development
<b>Cereals</b>	Grasshoppers	8-13 per m <sup>2</sup>
	Aphids	12-15 per stem prior to soft dough stage
	Bertha armyworm	10 or more larvae/m <sup>2</sup>
<b>Lentils</b>	Grasshoppers	2 per m <sup>2</sup> at flowering and pod set stage
<b>Peas</b>	Pea leaf weevil	30% of the plants showing feeding damage to the clam leaf
<b>Soybean</b>	Soybean aphid	250 aphids per plant from flowering to pod set
<b>Wheat</b>	Wheat midge	1 adult for 4-5 heads for yield or 8-10 heads for grade

If leaf defoliation is the best method of estimating economic threshold in your situation, use the following image to help with estimating defoliation for many crops:

### % DEFOLIATION ESTIMATION





# FERTILIZER

Fertilizer purchases can be complex and represent a significant investment in your crop. We're here to **reduce any confusion and help you make the best crop nutrition choices** for your farm.

Cargill is a proud participant in the 4R Nutrient Stewardship program and farmers can obtain a customized fertilizer plan that meets 4R designation requirements at any of our locations in Western Canada. We not only believe strongly in the environmental benefits of 4R Nutrient Stewardship, but we also hear from our end use customers about the growing importance of sourcing ingredients from farms that incorporate practices that protect or build healthy soil.

Cargill is so convinced about the importance of this program to farmers, that we have invested in building our team's knowledge and capabilities around 4R fertility planning. And we were honored to be awarded the Canadian Association of Agri-Retailers 4R Nutrient Stewardship Award for 2019.

Not sure if 4R is for you? Many farms are already 4R compliant or can be with minor adjustments to current practices. Be sure to ask us how the program can benefit your farm.



## CROP NUTRITION DECISION FACTORS

### AGRONOMICS

- What's left in the soil
- Yield goal / crop needs
- Application practices

### LOGISTICS

- Storage
- Application timing
- Equipment

### COST

- Cost per acre or tonne
- Opportunities to connect your purchases with cash flow
- Potential return on investment



## FIGURING OUT FERTILIZER

### 1. PLAN EARLY

Determine what you will need next year as early as possible so you can make fertilizer purchases when it makes the most sense from a cash flow, return on investment and logistical standpoint.

### 2. START WITH AGRONOMICS

What are the agronomic challenges or opportunities you're trying to address? The goal is to create your crop nutrition plan with long-term goals in mind.

Work with your Cargill rep to:

- Arrange for soil sampling to determine what's left in your soil. Remember you can typically start soil sampling as soon as the crop is off, up until the ground freezes (typically mid-November).
- If a soil sample isn't in the cards because you're renting land or you've run out of time because of a delayed harvest, we can create a plan based on crop requirements / net removal.
- Build a plan that will help meet the needs of your crop and logistical capabilities, using the 4R principles of **right source at the right rate, right place, and right time**. *Cargill's fertilizer planning process ensures that you receive a 4R designated plan, no matter what your application capability.*

### 3. BE FLEXIBLE WITH PURCHASE TIMING AND TAKE OWNERSHIP OF YOUR FERTILIZER

The five-year average retail price (by month) for urea, monoammonium phosphate (MAP), ammonium sulphate (AMS) and urea ammonium nitrate (UAN) shows that prices are typically highest February through April and tend to be lowest in the summer months. The difference in price can be substantial. For example, the price differential on urea between the five-year high in April and the low is \$121/tonne. Urea purchased at the best price and applied at 260 lbs per acre on a 160-acre section would save you almost \$2,300.

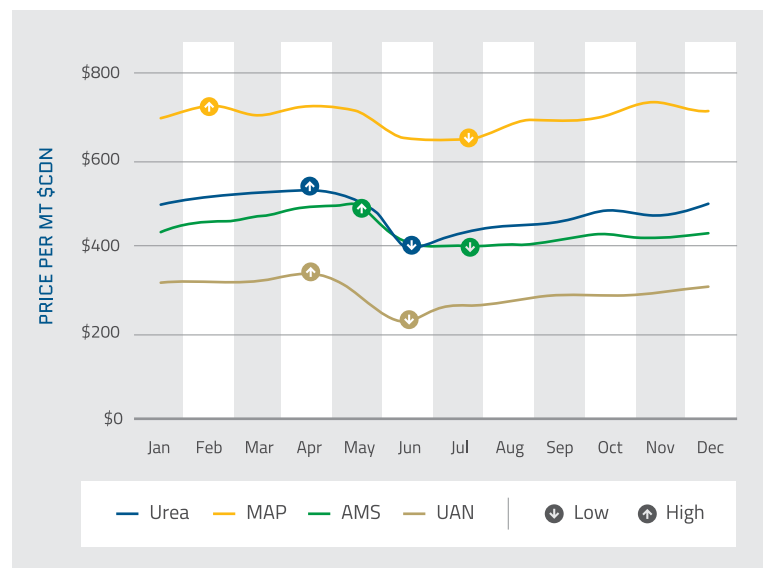
In short, you can save by purchasing at least a portion of your fertilizer from summer through to fall. There are going to be instances where this pattern varies, but using a targeted return-on-investment based approach can help you lock-in prices that make the most sense for your farm.

The more flexible you are, the less exposed you will be to market fluctuations. Purchasing early pays off most years as it's rare for fertilizer to be cheaper in the spring than in the fall.

PRODUCT	DIFFERENCE IN PRICE PER MT CDN 5-YEAR HIGH – 5-YEAR LOW
Urea	\$121
MAP	\$57
AMS	\$74
UAM	\$74

### FERTILIZER PRICING TRENDS [FIVE-YEAR AVERAGE RETAIL PRICE PER MONTH]

June 2015 through May 2020\*



\* 5-year average is represented by June, July, August, September, October, November and December 2015 through 2018; January, February, March, April and May 2016 through 2020. Source: Cargill Limited

- Having a **nutrient plan** in place early will help you to develop a buying plan and make purchases that meet all your needs.
- **Knowing your needs** will also allow you to take advantage of the pricing opportunities that the market provides and work towards your targeted return on investment.
- Look for ways to **line up your grain marketing and fertilizer decisions**. Cargill has tools that can help you hedge futures prices to ensure you meet a minimum return on investment and offset potential fertilizer pricing inversions.
- **Stay in touch** with your Cargill team. They can help you navigate the factors that can impact fertilizer prices, like foreign exchange, commodity swings, production issues and political turmoil in foreign countries.

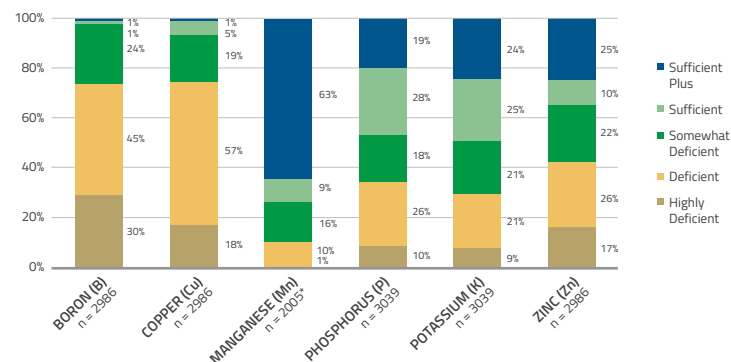
#### 4. BUY THE PRODUCTS THAT WILL HELP MEET YOUR CROP'S GENETIC POTENTIAL

Using the right product, source and rate will not only limit your environmental impact, but it will also ensure an efficient and effective use of your crop nutrition dollars.

- Use products that offer uniform nutrient distribution, balanced nutrition, or slow release coatings to reduce volatilization.
- Consider both micro and macronutrients. A balanced crop nutrition blend or application plan can get your crop off to a strong start and combat pests and diseases that can limit yield.



#### WESTERN CANADA % OF FALL 2019 SOIL SAMPLES SHOWING RELATIVE LEVEL OF SUFFICIENCY/DEFICIENCY BY KEY NUTRIENT



Base: Soil samples taken by Cargill Western Canada - Fall 2019. \*Soil tests for manganese in Manitoba and Alberta only.

Soil sampling around Western Canadian Cargill locations in the fall of 2019 showed moderate to severe nutrient deficiencies on a number of farms (as noted by the chart above). With different soil textures, environments and pH levels, every farm and field is unique. Consider soil sampling ahead of the 2021 crop to be sure that you have the right balance of nutrients to meet your needs.

#### FERTILIZER PRODUCTS TO GIVE YOUR CROP AN EDGE

Now that you have your crop nutrition plan in hand, rest assured that Cargill can meet your fertilizer needs. We carry all the core products, plus a full range of enhanced fertilizer products that deliver improved nutrient uptake, healthier plants, easier logistics and enhanced yields.

The **MicroEssentials**<sup>®</sup> line of products from Mosaic offers balanced crop nutrition through uniform nutrient distribution and season long sulphur availability.

We also carry **YaraVita**<sup>®</sup> **PROCOTE**<sup>®</sup> micronutrient coatings that bring essential micronutrients to your crop through application onto granular fertilizers, with the added bonus of improved fertilizer conditioning and uniform nutrient distribution.

**YaraVita foliar** products give you safe, in-season application of nutrients when you need to give your crop that extra boost.

## MACRONUTRIENTS

Macronutrients provide the core nutritional elements that your crops need to grow and play a major role in optimizing yield and a plant's ability to stay healthy throughout the growing season. There are three key macronutrients: nitrogen (N), phosphorus (P) and potassium (K) and a number of secondary macronutrients such as sulphur (S) and calcium (Ca). Macronutrients come in a number of forms, including granular and liquid products for soil application as well as foliar applied products.

### Nitrogen

### MACRONUTRIENTS

N

Nitrogen (N) is the main constituent of protein and is essential for growth and development in plants. A plant's supply of nitrogen determines its growth, vigor, color and yield.

In addition to standard nitrogen products like urea and urea ammonium nitrate, we also carry a number of foliar products and nitrogen stabilizers. Using stabilizer products to reduce N losses is considered a 4R Best Management Practice (BMP) by Fertilizer Canada, as it helps to achieve greater fertilizer use efficiency, higher yields and returns.



#### AGROTAIN® ULTRA

Agrotain Ultra is a nitrogen stabilizer applied to urea or UAN as a liquid or dry formulation. It's a proven urease inhibitor that reduces nitrogen loss due to volatilization. With untreated urea, up to 40% of nitrogen can be lost this way, in warm or dry conditions. Applying Agrotain Ultra is one way of both protecting your investment and reducing the environmental impact of fertilizer volatilization. You can use Agrotain Ultra on urea or UAN for all major crops.



#### AGROTAIN® ADVANCED

Cargill carries the full Agrotain product line including Agrotain Advanced 1.0 which has been optimized for cold-weather handling and quicker drying time when applied to urea.

### Nitrogen

### MACRONUTRIENTS



#### ESN® [44-0-0]

ESN is a Smart Nitrogen urea granule made up of 44% nitrogen, contained within a flexible polymer coating, designed to protect the N and allow it to release over 50-80 days. Usable on most major crops, the coating slows the release of nitrogen in response to soil temperature, more closely matching nitrogen availability with crop needs throughout the season.

#### PRO TIP

*If you plan to store fertilizer on farm, mix in 10-20% ESN to ensure it will remain dry and flowable. Check with your Cargill retailer for a ratio to meet your needs.*



#### TRIBUNE®

Another new nitrogen stabilizer from Koch, Tribune can be used to protect UAN from nitrogen loss. With dual active ingredients of Pronitridine and NBPT, it has been shown to extend protection from ammonia volatilization up to three times longer than without an inhibitor, as well as from denitrification and leaching, protecting your fertilizer investment and the environment.



#### YARAVITA LAST N™ [25-0-0]

YaraVita LAST N is a foliar applied nitrogen product designed to complement your macronutrient fertilizer program, ensure sufficiency and allow your crop to finish strong. This product is commonly used on cereals at 2L per acre and is typically applied at the flag leaf stage to post anthesis (similar to Fusarium head blight fungicide timing). It can play a role in improving both yield and protein levels in wheat.

Wheat must have sufficient available N as it grows through its vegetative and reproductive stages; if the plant has enough available N to meet its growth and yield requirements, the extra N from the foliar application will contribute to protein.

Nitrogen

MACRONUTRIENTS



PRO TIP

Nitrogen plays an important role in increasing protein levels in wheat. In Cargill's experience, the market will pay premiums for protein levels up to 14.5% on Canadian Western Red Spring wheat, while protein levels over 14.0% provide marginal, if any, additional premiums. Your Cargill representative will work with you to discuss potential return on investment if you are seeking higher protein premiums.

Potassium

MACRONUTRIENTS

K

**Potassium (K) is central to the translocation of photosynthesis within plants and for high-yielding crops. It helps improve resistance to lodging, disease and drought.**

In addition to standard potash (0-0-60) Cargill also carries premium and foliar applied potassium products.



**AGRIPOTASH™ [0-5-32]**

A fast acting, foliar applied product, Agri-Potash is ideal for use when soil application isn't possible. Formulated for use on a number of crops, application timing for cereals is at the early tillering to 2nd node detectable stage, the 4-6 leaf stage in canola and before flowering in pulses. This product is fast acting, highly mobile in the plant and widely tank mixable. Check [www.tankmix.com](http://www.tankmix.com) for details.



**ASPIRE® [0-0-58-0.5% B]**

For use in a number of crops, Aspire is a potassium product from Mosaic with the addition of two forms of boron allowing for even nutrient distribution at the root level across the field and ensuring season long B availability. Boron in the form of sodium borate is available immediately to the plant, while calcium borate releases slowly throughout the growing season.

Phosphorus

MACRONUTRIENTS

P

Phosphorus (P) is vital for adequate root development and helps the plant resist drought. It's also important for plant growth and development, such as the ripening of seed and fruit.

**MICROESSENTIALS® PRODUCTS**

In addition to standard MAP, Cargill carries three MicroEssentials products to meet the needs of your crop. This market leading, sulphur-enhanced phosphorus product line combines key nutrients into a single, nutritionally balanced granule, ensuring uniform nutrient distribution across the field and at the plant level.

MicroEssentials products have proven yield advantages relative to MAP and MAP+AMS blends and can reduce the number of times you need to fill your tanks, saving you time.



**MICROESSENTIALS S10® [12-40-0-10% S]**

A balanced nutrition product from Mosaic, MicroEssentials S10 can be used on a number of crops and has shown substantial yield advantages over MAP.<sup>1</sup>

Cargill has a number of years of in-field experience and related data from working with MicroEssentials products. Consult your Cargill representative to assist you in developing a plan that is safe for your farm.

PRO TIP

Fertilizer must be applied at safe rates to avoid seed damage.



**MICROESSENTIALS S15® [13-33-0-15% S]**

For use on a number of crops, this product has shown a yield advantage of up to 4 bu per acre<sup>1</sup> over MAP or MAP+AMS when used in canola production and can be better for seed safety.



**MICROESSENTIALS SZ® [12-40-0-10% S-1% Zn]**

This balanced nutrition product containing zinc is used on a number of crops, with yield advantages documented in wheat, corn and soybeans.

<sup>1</sup> Source: MicroEssentials.com

## Phosphorous

## MACRONUTRIENTS



### YARAVITA FLEX™

[3-15-7- 0.7% B + 0.75% ZN +0.4% MO]

A comprehensive foliar nutrient product, including phosphorus. This product can be tank mixed with most commonly used pesticides (see tankmix.com for details). It is typically applied at 1L per acre to maximize yield and relieve stress in canola, cereals and pulses.

#### PRO TIP

*This product's liquid formulation is very easy to use and sprayer friendly.*



### YARAVITA HYDROPHOS™ [0-29-5-4% Mg]

This fast acting **foliar** phosphate product can be used on canola, cereals and pulses, providing an energy boost to your crop in-season.

#### PRO TIP

*Always apply YaraVita Hydrophos alone for best results.*

## Sulphur

## MACRONUTRIENTS

# S

Sulphur (S) is essential to the formation of plant proteins, amino acids, some vitamins and enzymes. Deficiencies are seen on new growth and include yellowing, purpling and cupping of leaves.

Cargill carries standard products like ammonium sulphate (AMS) and foliar applied S products. In addition the MicroEssentials product line from Mosaic offers a combination of sulphate sulphur and elemental sulphur to ensure your crop has season-long availability of this important nutrient in a single, nutritionally balanced granule.



### YARAVERA® AMIDAS® [40-0-0-5.5% S]

This all-in-one granular fertilizer provides crops with nitrogen and sulphate sulphur providing effectively balanced N plus S nutrition and readily available S. This product from Yara is proven to increase nutrient uptake, offers better handling over blends and optimal crop nutrition, especially in canola.



### YARAVITA THIOTRAC™ 300 [15-0-0-22.8% S]

Thiotrac is a **foliar** applied, soluble sulphur product used to prevent and treat sulphur deficiency in cereals and canola that can be applied at the stem elongation to grain fill growth stage. This product features rapid uptake by the plant, and the formulation ensures that the correct ratio of nitrogen to sulphur is maintained at critical stages. The recommended application rate is 2L per acre. Speak to your Cargill representative for a recommendation for your specific needs.



MICRONUTRIENTS



Fertilizer treated with Procote Copper

Although micronutrients (boron, copper, zinc, etc.) are needed in smaller amounts than macronutrients, they can be the key to unlocking additional yield and grain quality. As crop yields push higher, micronutrient levels are impacted. Soil samples give you the best indication of how your fields are doing.

Boron

MICRONUTRIENTS

B

Boron (B) is used in the formation and strengthening of cell walls. Boron deficiency results in short, thick cell walls, while root and pollen tube elongation is inhibited. Flowers can fail to set seeds. Research also shows boron is important for nitrogen fixation and nodulation in legumes.

**CROPS MOST AFFECTED:** Canola, flax, peas.

Copper

MICRONUTRIENTS

Cu

Copper (Cu) is necessary for carbohydrate and nitrogen metabolism. Inadequate copper results in stunted plants. Copper is immobile in the plant, and you may see pig tailing in new plant growth when copper is deficient.

**CROPS MOST AFFECTED:** Wheat, oats, barley.

Manganese

MICRONUTRIENTS

Mn

Manganese (Mn) is essential for phosphorus uptake and assimilates CO<sub>2</sub> used by the plant during photosynthesis. You will often see deficiency first as yellowing or grey speckling in crops most sensitive to the deficiency, such as oats. Manganese deficiency is linked to alkaline soils, in fields with high organic matter, and worsens during cold, wet seasons.

**CROPS MOST AFFECTED:** Oats, wheat, peas.

Zinc

MICRONUTRIENTS

Zn

Zinc (Zn) is a catalyst in many of the enzyme systems used to regulate the early growth stages of plants. It is vital for fruit, seed and root system development, formation of plant growth regulators and helping to manage crop stress.

**CROPS MOST AFFECTED:** Corn, dry beans, flax.

Cargill offers micronutrients in granular form, liquid coatings for granular products, foliar applied products, and zinc in MicroEssentials SZ®.

Boron, Copper, Manganese, Zinc

MICRONUTRIENTS

Cargill has several years experience applying YaraVita Procote micronutrient fertilizer coatings to granular fertilizer. As a leader in bringing this innovative technology to farmers in Western Canada, we know how to help you get the most from this product. Whether it's working toward yield goals, choosing the right product combinations or ensuring your blend comes out just right, we have the experience to help make this product work on your farm.



YARAVITA® PROCOTE® PRODUCTS

Procote granular fertilizer coatings come in the form of a singular nutrient or multi-nutrient format. Apply these to a single product, like urea, or as part of a full blend. These coatings allow for even distribution of micronutrients throughout your crop, which means you need less nutrient than a standard granular product.

It's easy to use (just ask for it to be applied to your usual granular fertilizer) and, as an added bonus, customers report improved fertilizer conditioning for a better overall experience.

PROCOTE SINGLE ELEMENTS – CAN BE USED ALONE OR IN COMBINATION:

**Boron:** (B) 7.1%

**Copper:** (Cu) 31.3%

**Zinc:** (Zn) 42.6%

**Manganese:** (Mn) 29%

PROCOTE MULTI-ELEMENT COATINGS TO PROVIDE A COMBINATION OF KEY MICRONUTRIENTS:

**BCMZ:** B 3.6% + Cu 6% + Mn 6% + Zn 12%

Boron, Copper, Manganese, Zinc

MICRONUTRIENTS



**YARAVITA® FOLIAR PRODUCTS**

The YaraVita foliar line of micronutrients provides a simple to use, high concentration product to give crops access to key nutrients during periods of high nutrient demand. Check the label and ask your Cargill representative for application rates, timing and other tips to make these products work best for your situation.

**MULTI-NUTRIENT PRODUCTS**

**YARAVITA FLEX™ [3-15-7- 0.7% B + 0.75% ZN + 0.4% MO]**

A comprehensive foliar nutrient product, typically applied at 1L per acre to maximize yield and relieve stress in canola, cereals and pulses.

**YARAVITA GLYTREL™ MNP [0-6-0-7.0% MN]**

Targeted for foliar application on soybeans, typically applied with glyphosate at 0.8L per acre early in the plant's growth cycle (as soon as there is sufficient leaf to cover). This product helps plants overcome metabolism issues.

**YARAVITA GLYTREL™ ZNP [0-7-0-7.5% ZN]**

A fast acting foliar phosphate with zinc, Glytrel can be applied with a herbicide early (as soon as there is adequate leaf to cover) at 0.8L per acre in canola, cereals and pulses.

**SINGLE NUTRIENT PRODUCTS**

**YARAVITA BORTRAC™ [10.9% B]**

A foliar applied product to prevent or address boron deficiency, this product is typically used in canola at 0.4L per acre, up to 10% flower.

**YARAVITA COPTRAC™ [33.0% Cu]**

Used in cereals to address copper deficiency, this foliar applied product is commonly applied at 0.2L per acre at tillering until 2<sup>nd</sup> node is detectable.

**PRO TIP**

*Make sure you have good agitation when adding this product to your tank to avoid problems with gelling.*

THE IMPORTANCE OF SOIL SAMPLING



It's simple. Soil sampling pays.

The cost of a soil sampling program is small when you look at the cost per acre over your whole farm. It's money well spent – as long as you take good, representative soil samples and use appropriate soil tests for your land.

A proper soil test accurately identifies which nutrients should be available to your crop in the upcoming year. **So choose the right extraction method.** When testing for copper, zinc, iron and manganese, the wrong extraction methods can actually pull out too much of these key micronutrients, resulting in levels appearing two to three times higher than they really are. This will mask a true micronutrient deficiency and you could lose the opportunity to get those micros to your crops this season.

Your local Cargill representative will be able to help determine the most appropriate soil test for your farm, as well as interpret what the results mean for your crop nutrition plan.

## 4R – BEST PRACTICES FOR FERTILIZER APPLICATION



4R is both a philosophy based on scientific principles and a program managed by Fertilizer Canada that recommends best management practices for applying fertilizer at the farm level with the goal of reducing environmental impact.

The 4R process identifies sound practices that can help you:

- meet the crop nutrition needs of your farm,
- optimize your fertilizer spend, and
- meet the goals of reducing greenhouse gas emissions, movement of nitrogen to groundwater, and movement of nitrogen and phosphorus to surface water. *(Source: Fertilizer Canada)*

### HOW HARD IS IT TO BE A 4R FARM?

Not hard at all. Many farms in Western Canada are already applying fertilizer using 4R principles or would need to make only minor changes to have a 4R designated fertilizer plan.

Once you're in, 4R becomes about continuous improvement, which is not only good for the environment, but in many cases means better fertilizer use efficiency on your farm. What's critical is that you start the journey and look for ways to fine tune your processes over time.

Three different levels of plan allow you to be involved in the 4R designation program: basic, intermediate, and advanced.

### 4R-FRIENDLY PRODUCTS

While most fertilizer products sold in Western Canada can be used under a 4R plan, especially when applied using best practices, Cargill carries a number of products that can help your farm do an even better job under the 4R program (see our product lineup on page 92).

### SALT INDEX

The following chart shows the salt index values of a number of macronutrient fertilizer products. Because fertilizers are salts, and

those salts are absorbed into the plant through the water they take in, a fertilizer can burn a seedling and damage the root hair around the seedling.

Most nitrogen and potassium fertilizers have higher relative salt index values, while phosphorus fertilizers tend to have relatively lower index values. The tolerance of the crop, the salinity of the soil, moisture conditions, fertilizer application equipment and fertilizer placement in the seed bed all impact the potential for your fertilizer to cause seedling stress or injury. Be sure to watch salt index and adjust your blend, application timing and placement based on the potential to cause seedling damage. Canola seed in particular is sensitive to fertilizers applied at the time of seeding and MicroEssentials S15 can be a safer option given its low salt index.

Source: <http://anz.ipni.net/article/ANZ-3076>

SALT INDEX BY KEY PRODUCTS / NUTRIENTS		
NUTRIENT	PRODUCT	SALT INDEX
Nitrogen	Urea Ammonium Nitrate (28-0-0)	63.0
	Urea (46-0-0)	75.4
Potassium	Potash (0-0-60)	116.3
	Aspire (0-0-58-0.5% B)	112.3
Phosphorus	Mono Ammonium Phosphate (11-52-0)	29.9
	MicroEssentials S10 (12-40-0-10% S)	22.9
Phosphorus + Sulphur	MicroEssentials S15 (13-33-0-15% S)	21.1
	MicroEssentials SZ (12-40-0-10%-S 1% Z)	22.6
	Ammonium Sulphate (21-0-0-24% S)	69.0
Sulphur	YaraVera Amidas (40-0-0-5.5% S)	49.0

Sources: The Mosaic Company; Yara Intl.

## NUTRIENTS REQUIRED BY CROP

The following are examples of nutrient requirements by crop in Western Canada. For a fertilizer recommendation that meets the specific needs of your farm by crop or field, talk with a Cargill representative. Using our state-of-the-art software Greenlight Grower Management®, we will build a program that takes into account nutrient uptake and removal for your specific crop according to soil zone and your yield goals.

CROP	NUTRIENTS REQUIRED BY CROP						
	POUNDS PER BUSHEL, PER ACRE*				GRAMS PER BUSHEL, PER ACRE		
	N	P	K	S	B	CU	ZN
<b>Barley (feed)</b>	1.6	0.38	0.14	0.15	1.34	0.38	1.24
<b>Barley (malt)</b>	1.4	0.38	0.14	0.15	1.34	0.38	1.24
<b>Beans (dry)**</b>	0	0.83	2.36	0.2	1.41	0.204	1.41
<b>Canola</b>	3.2	0.63	0.38	0.49	3.7	0.6	3.58
<b>Corn**</b>	1.53	0.63	1.28	0.15	0.47	0.2	0.99
<b>Durum wheat</b>	2.4	0.44	0.39	0.2	1.67	0.53	3.48
<b>Flax</b>	2.88	0.83	0.38	0.56	3.03	0.88	3.15
<b>Lentils**</b>	0	0.92	0.64	0.2	1.6	0.4	4.6
<b>Oats (spring)</b>	0.96	0.29	0.14	0.12	1.04	0.36	0.99
<b>Spring wheat</b>	2.4	0.6	0.39	0.2	1.67	0.53	3.48
<b>Peas (field)**</b>	0	0.62	0.64	0.3	1.58	0.34	4.54
<b>Soybeans**</b>	0	0.6	0.39	0.2	1.6	0.43	0.675
<b>Sunflowers</b>	1.12	0.39	0.59	0.14	3.84	1.02	1.62

\* Important - macronutrient requirements are listed as pounds, per bushel, per acre, while micronutrient requirements are listed as grams per bushel, per acre.

\*\*Legumes such as peas and lentils make their own nitrogen through nodulation therefore do not require it be applied directly.

### Sources:

<https://www.smartnitrogen.com/stopping-n-loss/esn-stops-n-loss>  
<https://www.yaracanada.ca/crop-nutrition/fertilizer-products/yaravita>

## NOTES

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