



— Decision Guide 2019-2020 —

# KNOWLEDGE TO GROW

GROWING SERIES

SEED

CROP PROTECTION

FERTILIZER





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## WELCOME TO THE DECISION GUIDE

In your years of experience on the farm, you've likely received a product catalogue or two in your mailbox. Typically, these publications lay out a manufacturer's new seed varieties and extol the features of each one along with the associated crop protection products and their label directions.

This is not one of those.

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 translate all that into a set of recommendations.

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

At Cargill, we believe that sharing knowledge and insights leads to higher growth potential on your farm, which is why we're excited to introduce the **Cargill Decision Guide** – a brand new publication loaded with locally relevant analysis paired with agronomic tools and resources, designed to help you successfully navigate next year's growing season and the unique challenges it will no doubt bring.

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 might use the well-researched and considered opinions included in this guide alongside our individual agronomists' Top 5 Seed Picks (available at [CargillGrows.ca](http://CargillGrows.ca)) and make decisions for your farm according to the crop characteristics that are 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 [CargillGrows.ca](http://CargillGrows.ca) for more information. Enjoy our 2020 Decision Guide, stay safe, and grow well next season.

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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 this guide's information and knowledge, 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 suggested 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 to farmers in Manitoba. Although not included in this guide, you can find our Manitoba agronomists' top corn picks at [CargillGrows.ca](http://CargillGrows.ca).



## 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				
✦ Days to maturity				
✦ Harvest ease				
✦ Targeted return on investment				
✦ Threshability				
✦ Versatility				



### 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.

## COMPLETE LIST OF CANOLA HYBRIDS

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING [INCLINE] SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE [RATING]	THRESHABILITY [RATING]	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
BY 4187 RR	Std RR	✓	BL-R	Mid-long	2	4	4			
BY 5105 CL	Std CL	✓	BL-R	Mid-long	2	4	4			NEW
BY 6074 RR	Std RR		BL-R,S-IT	Mid-long	2.3	5	4			SK,AB
BY 6076 CR	Std RR	✓+	BL-R,S-IT	Mid-long	2	4	4			AB
BY 6090 RR	Std RR	✓	BL-R	Mid-long	2.6	5	4	✓		
BY 6204 TF	TruFlex	✓	BL-R	Mid	2.3	5	4			NEW
BY 5545 CL	Std CL		BL-R	Early	2.3	5	4	✓		
DK 74-44 BL	Std RR		BL-R+	Mid	2.4	5	4			
DK 75-42 CR	Std RR	✓	BL-R	Early	2.4	5	4			AB
DK 75-45 RR	Std RR		BL-R	Early	2.4	5	4			AB
DK 75-65 RR	Std RR		BL-R	Mid	2.3	5	4	✓		
DKLL 81 BL	Std LL		BL-R+	Mid	2.4	5	4			
DKLL 82 SC	Std LL		BL-R+	Mid	2.1	5	4	✓		NEW
DKTF 96 SC	TruFlex		BL-R+	Mid	2.4	5	4	✓		NEW
DKTF 98 CR	TruFlex	✓	BL-R+	Mid	2.1	5	4			NEW
DKTFLL 21 SC	TruFlex LL+RR		BL-R+	Mid	2.2	5	4	✓		NEW
L230	Std LL		BL-R	Early-mid	1.5	3	3			SK
L233P	Std LL		BL-R	Early-mid	2	4	4	✓	✓	MB
L234PC	Std LL	✓	BL-R	Early-mid	1.5	3	3	✓	✓	
L241C	Std LL	✓	BL-R	Early-mid	2	4	4			ALL
L252	Std LL		BL-R	Mid-long	1.5	3	3			ALL
L255PC	Std LL	✓	BL-R	Mid-long	1	4	4	✓	✓	
L352C	Std LL	✓	BL-R	Mid-long	1.5	3	3			NEW
L345PC	Std LL	✓	BL-R	Mid	1.5	3	3	✓	✓	NEW
LR344PC	TruFlex LL+RR	✓	BL-R	Early-mid	2	4	4	✓	✓	NEW

### LEGEND

#### DISEASE PACKAGE

BL = Blackleg  
 SC = Sclerotinia  
 R = Resistant  
 R+ = Enhanced resistance  
 IT = Improved tolerance

#### RATING SCALE

5 Excellent      2 Fair  
 4 Very good      1 Poor  
 3 Average

#### MATURITY

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

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

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

#### THRESHABILITY

Cargill agronomy team rating based on lodging, height, straw stiffness (wiry), straw strength, stand uniformity, pod dispersion, tendency to clump (beaver dam), flowability, feeding and speed of operation, keeping in mind that crop conditions, weather and time of day can affect the threshability of a hybrid.

#### 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% colour change or better).

#### CONSISTENT TOP THIRD YIELDER RATING

Consistent Top Third Yielder Rating – based on reported crop insurance data in each province for the 2016, 2017 and 2018 crop years. Yield data must be available for at least two years and 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.

#### Data Sources:

Manitoba Agricultural Service Corporation: Variety Yield Data Browser  
[https://www.masc.mb.ca/masc.nsf/mmpp\\_browser\\_variety.html](https://www.masc.mb.ca/masc.nsf/mmpp_browser_variety.html)  
 Saskatchewan Crop Insurance Corporation, Sask Management Plus, Online SMP Data:  
[https://www.scic.ca/resources/smp/smp-data?utm\\_source=saskcropinsurance.com&utm\\_medium=301](https://www.scic.ca/resources/smp/smp-data?utm_source=saskcropinsurance.com&utm_medium=301)  
 Agriculture Financial Services Corporation:  
 Yield Alberta <https://afsc.ca/crop-insurance/annual-crop-insurance/>

## BEST FOR STRAIGHT CUTTING

**HYBRID L233P**

**SYSTEM**  
InVigor®  
LIBERTY LINK

**WHY WE RECOMMEND IT**  
This hybrid offers a great combination of yield performance and harvest flexibility. Our agronomists report seeing L233P withstand tough conditions like wind and hail, and still deliver impressive yields.

**PRO TIP**  
*One of the safest bets for growers who would like to try straight cutting canola for the first time.*

**HYBRID DKTF 96 SC**

**SYSTEM**  
DEKALB  
TruFlex

**WHY WE RECOMMEND IT**  
This is an overall solid canola hybrid with added weed control and the promise of good yields and the ability to straight cut. We recommend using this product in fields with persistent hard to control weeds. In a side-by-side comparison with a non-TruFlex™ canola this past year, we saw superior quackgrass control due to the flexibility provided by an in-season glyphosate application. The field remained quackgrass free while the quackgrass had returned in the non-TruFlex field by the end of flowering.

**HYBRID L345PC**

**SYSTEM**  
InVigor®  
LIBERTY LINK

**WHY WE RECOMMEND IT**  
Our team is very excited to see this new InVigor® hybrid hit fields 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 clubroot resistance.

**PRO TIP**  
*As with all InVigor varieties, the InVigor RATE bagging system, coming in 2020, will help ensure you're seeding at the right rate to achieve a targeted plant stand of 5-7 plants per square foot.*

**HYBRID DK 75-65 RR**

**SYSTEM**  
DEKALB  
Roundup Ready

**WHY WE RECOMMEND IT**  
With the flexibility to either straight cut or swath at 80% maturity, this hybrid is a great choice in fields where there might be a few more tough-to-kill weeds. It is a little taller than its counterparts, which makes it a little easier to harvest, and it also has blackleg resistance. Our agronomists have seen this hybrid stand up to tough growing conditions (hot/dry or wet/cool) and still deliver consistently good yields.

## STRAIGHT CUT CANOLA HYBRIDS OFFERED BY CARGILL

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	THRESHABILITY (RATING)	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
BY 6090 RR	Std RR	✓	BL-R	Mid-long	2.6	5	4	✓		
BY 5545 CL	Std CL		BL-R	Early	2.3	5	4	✓		
<b>DEKALB</b>										
DK 75-65 RR	Std RR		BL-R	Mid	2.3	5	4	✓		
DKLL 82 SC	Std LL		BL-R+	Mid	2.1	5	4	✓		NEW
DKTF 96 SC	TruFlex		BL-R+	Mid	2.4	5	4	✓		NEW
DKTFL 21 SC	TruFlex LL+RR		BL-R+	Mid	2.2	5	4	✓		NEW
<b>InVigor</b>										
L233P	Std LL		BL-R	Early-mid	2	4	4	✓	✓	MB
L234PC	Std LL	✓	BL-R	Early-mid	1.5	3	3	✓	✓	
L255PC	Std LL	✓	BL-R	Mid-long	1	4	4	✓	✓	
L345PC	Std LL	✓	BL-R	Mid	1.5	3	3	✓	✓	NEW
LR344PC	TruFlex LL+RR	✓	BL-R	Early-mid	2	4	4	✓	✓	NEW

See page 11 for rating scales

## BEST FOR DISEASE MANAGEMENT

**HYBRID BY 6076 CR**

**SYSTEM**

**WHY WE RECOMMEND IT**  
This taller Roundup Ready® canola stands well and yields while delivering a whole package of disease management traits. With its triple layered DefendR® clubroot, sclerotinia and blackleg disease package, along with resistance to multiple clubroot pathotypes, this hybrid offers one of the best disease resistance packages on the market and should be used on fields with clubroot infestation.

**PRO TIP**  
*This is a later maturing canola hybrid and could be used to spread the harvest workload.*

**HYBRID L234PC**

**SYSTEM**

**WHY WE RECOMMEND IT**  
L234PC combines a pod shatter-resistant hybrid with a clubroot package to create a plant growers will be familiar with. With similar yield and maturity to L233P, you'll feel comfortable with this hybrid from the time it comes out of the ground.

**PRO TIP**  
*L234PC will come in 3-5 days earlier than L255PC, with similar results in the hopper.*

**HYBRID DKTF 98 CR**

**SYSTEM**

**WHY WE RECOMMEND IT**  
This new hybrid holds a lot of promise for this coming season. In plots, it has shown really good standability for a taller hybrid. 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 to clean up dirty quarters. 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.*

**HYBRID DK 75-42 CR**

**SYSTEM**

**WHY WE RECOMMEND IT**  
This is a very versatile hybrid. DK 75-42 CR offers big yields and clubroot genetics to boot. This hybrid is short and bushy in stature and one of the earliest Roundup Ready clubroot varieties available. It can grow well in any clubroot zone.

**HYBRID BY 5105 CL**

**SYSTEM**

**WHY WE RECOMMEND IT**  
New this year from BrettYoung™, 5105 CL is the first clubroot resistant Clearfield® canola on the market. For those looking to grow a Clearfield canola who have concerns about clubroot in their area, this hybrid offers resistance to clubroot and blackleg, and improved yield over 5545 CL.

## CANOLA HYBRIDS FOR DISEASE MANAGEMENT

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	THRESHABILITY (RATING)	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
<b>BY 4187 RR</b>	Std RR	✓	BL-R	Mid-long	2	4	4			
<b>BY 5105 CL</b>	Std CL	✓	BL-R	Mid-long	2	4	4			<b>NEW</b>
<b>BY 6074 RR</b>	Std RR		BL-R, S-IT	Mid-long	2.3	5	4			SK, AB
<b>BY 6076 CR</b>	Std RR	✓+	BL-R, S-IT	Mid-long	2	4	4			AB
<b>BY 6090 RR</b>	Std RR	✓	BL-R	Mid-long	2.6	5	4	✓		
<b>BY 6204 TF</b>	TruFlex	✓	BL-R	Mid	2.3	5	4			<b>NEW</b>
<b>DEKALB</b>										
<b>DK 74-44 BL</b>	Std RR		BL-R+	Mid	2.4	5	4			
<b>DK 75-42 CR</b>	Std RR	✓	BL-R	Early	2.4	5	4			AB
<b>DKLL 81 BL</b>	Std LL		BL-R+	Mid	2.4	5	4			
<b>DKLL 82 SC</b>	Std LL		BL-R+	Mid	2.1	5	4	✓		<b>NEW</b>
<b>DKTF 96 SC</b>	TruFlex		BL-R+	Mid	2.4	5	4	✓		<b>NEW</b>
<b>DKTF 98 CR</b>	TruFlex	✓	BL-R+	Mid	2.1	5	4			<b>NEW</b>
<b>DKTFLL 21 SC</b>	TruFlex LL+RR		BL-R+	Mid	2.2	5	4	✓		<b>NEW</b>

See page 11 for rating scales

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	THRESHABILITY (RATING)	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>InVigor</b>										
L234PC	Std LL	✓	BL-R	Early-mid	1.5	3	3	✓	✓	
L241C	Std LL	✓	BL-R	Early-mid	2	4	4			ALL
L255PC	Std LL	✓	BL-R	Mid-long	1	4	4	✓	✓	
L352C	Std LL	✓	BL-R	Mid-long	1.5	3	3			NEW
L345PC	Std LL	✓	BL-R	Mid	1.5	3	3	✓	✓	NEW
LR344PC	TruFlex LL+RR	✓	BL-R	Early-mid	2	4	4	✓	✓	NEW

See page 11 for rating scales

BEST FOR  
**EARLY MATURITY**

**HYBRID L234PC**

**WHY WE RECOMMEND IT**  
This is an early maturing hybrid with a suite of traits (pod shatter reduction, clubroot resistance and a short growing season) that make it an appealing option in a wide variety of conditions.

**SYSTEM**  
InVigor

**LIBERTY LINK**

**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**

**WHY WE RECOMMEND IT**  
This is one of the earliest varieties 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.

**SYSTEM**  
DEKALB

**Roundup Ready**

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

**HYBRID LR344PC**

**WHY WE RECOMMEND IT**  
New for 2020, 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. Stay tuned to learn more.

**SYSTEM**  
InVigor TruFlex

**LIBERTY LINK**

**EARLY MATURING CANOLA HYBRIDS**

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	THRESHABILITY (RATING)	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER MB, SK, AB
<b>BrettYoung</b>										
BY 5545 CL	Std CL		BL-R	Early	2.3	5	4	✓		
<b>DEKALB</b>										
DK 75-42 CR	Std RR	✓	BL-R	Early	2.4	5	4			AB
DK 75-45 RR	Std RR		BL-R	Early	2.4	5	4			AB
<b>InVigor</b>										
L230	Std LL		BL-R	Early-mid	1.5	3	3			SK
L233P	Std LL		BL-R	Early-mid	2	4	4	✓	✓	MB
L234PC	Std LL	✓	BL-R	Early-mid	1.5	3	3	✓	✓	
L241C	Std LL	✓	BL-R	Early-mid	2	4	4			ALL
LR344PC	TruFlex LL+RR	✓	BL-R	Early-mid	2	4	4	✓	✓	NEW

See page 11 for rating scales

## 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 42.

**HYBRID  
DK 75-65 RR**

SYSTEM

**WHY WE RECOMMEND IT**

If you're looking for a hybrid for fields with higher weed pressure, this is the one for you. It has excellent standability and fast dry down. It's also a great choice for those who want to swath late or just wait for straight-cut timing.

Often, growers will use 75-65 in fields that have more problem weeds so they can rely on the glyphosate chemistry to clean up the field a bit better than they can with Liberty®.

**PRO TIP**

*DK 75-65 will help you spread out your harvest, but be careful: you have to monitor it and combine it when its ready, as it's a straight-cut hybrid that may start to shell out if ignored.*

**HYBRID  
LR344PC**

SYSTEM

**WHY WE RECOMMEND IT**

New for 2020, 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. Stay tuned to learn more.

**HYBRID  
DKTFLL 21 SC**

SYSTEM

**WHY WE RECOMMEND IT**

DKTFLL 21SC is the first stacked trait canola from DEKALB that gives you the opportunity to use either Roundup or Liberty depending on the weed spectrum you're trying to control. It also provides you with greater flexibility on herbicide application rates and timing.

## CANOLA HYBRIDS FOR WEED MANAGEMENT

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	THRESHABILITY (RATING)	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER (M, B, SK, AB)
<b>BrettYoung</b>										
<b>BY 6204 TF</b>	TruFlex	✓	BL-R	Mid	2.3	5	4			<b>NEW</b>
<b>DEKALB</b>										
<b>DK 75-65 RR</b>	Std RR		BL-R	Mid	2.3	5	4	✓		
<b>DKLL 82 SC</b>	Std LL		BL-R+	Mid	2.1	5	4	✓		<b>NEW</b>
<b>DKTF 96 SC</b>	TruFlex		BL-R+	Mid	2.4	5	4	✓		<b>NEW</b>
<b>DKTF 98 CR</b>	TruFlex	✓	BL-R+	Mid	2.1	5	4			<b>NEW</b>
<b>DKTFLL 21 SC</b>	TruFlex LL+RR		BL-R+	Mid	2.2	5	4	✓		<b>NEW</b>
<b>InVigor</b>										
<b>LR344PC</b>	TruFlex LL+RR	✓	BL-R	Early-mid	2	4	4	✓	✓	<b>NEW</b>

See page 11 for rating scales

## BEST FOR HARVEST EASE / THRESHABILITY

Lately there's been a lot of talk about harvest ease and threshability and how it affects the satisfaction of growing a particular canola hybrid. That's why we've devised our own "threshability" rating which gives you an indication of how easy or hard it will be to get that canola through your equipment.

<b>HYBRID DKTF 96 SC</b>	<b>WHY WE RECOMMEND IT</b> This is an overall solid canola hybrid with added weed control, the promise of good yields and the ability to straight cut, and improved pod integrity over DKTF 92 SC. We have seen this hybrid in plots this year and it has shown an excellent lean for ease of harvest.
SYSTEM 	

<b>HYBRID L345PC</b>	<b>WHY WE RECOMMEND IT</b> L345PC features InVigor's pod shatter reduction technology, and from what we've seen so far, this mid-maturity hybrid is mid-height and has shown very good tabling, making it easy to harvest. High yield potential along with first generation clubroot resistance rounds out the package. We are looking forward to seeing this on fields in 2020.
SYSTEM 	

<b>HYBRID DK 75-65 RR</b>	<b>WHY WE RECOMMEND IT</b> 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.
	<b>PRO TIP</b> <i>Allowing the plant to wait until 80% maturity keeps the green count low while ensuring more seeds hit the bin.</i>

## CANOLA HYBRIDS FOR EXCELLENT THRESHABILITY

CANOLA HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	CROP STRUCTURE / TABLING (INCLINE) SCORE	CROP STRUCTURE / TABLING FOR HARVEST EASE (RATING)	THRESHABILITY (RATING)	WORKS FOR STRAIGHT CUT / DIRECT HARVEST	POD SHATTER TRAIT	CONSISTENT TOP THIRD YIELDER (MB, SK, AB)
<b>BrettYoung</b>										
<b>BY 4187 RR</b>	Std RR	✓	BL-R	Mid-long	2	4	4			
<b>BY 5105 CL</b>	Std CL	✓	BL-R	Mid-long	2	4	4			NEW
<b>BY 6074 RR</b>	Std RR		BL-R,S-IT	Mid-long	2.3	5	4			SK, AB
<b>BY 6076 CR</b>	Std RR	✓+	BL-R,S-IT	Mid-long	2	4	4			AB
<b>BY 6090 RR</b>	Std RR	✓	BL-R	Mid-long	2.6	5	4	✓		
<b>BY 6204 TF</b>	TruFlex	✓	BL-R	Mid	2.3	5	4			NEW
<b>BY 5545 CL</b>	Std CL		BL-R	Early	2.3	5	4	✓		
<b>DEKALB</b>										
<b>DK 74-44 BL</b>	Std RR		BL-R+	Mid	2.4	5	4			
<b>DK 75-42 CR</b>	Std RR	✓	BL-R	Early	2.4	5	4			AB
<b>DK 75-45 RR</b>	Std RR		BL-R	Early	2.4	5	4			AB
<b>DK 75-65 RR</b>	Std RR		BL-R	Mid	2.3	5	4	✓		
<b>DKLL 81 BL</b>	Std LL		BL-R+	Mid	2.4	5	4			
<b>DKLL 82 SC</b>	Std LL		BL-R+	Mid	2.1	5	4	✓		NEW
<b>DKTF 96 SC</b>	TruFlex		BL-R+	Mid	2.4	5	4	✓		NEW
<b>DKTF 98 CR</b>	TruFlex	✓	BL-R+	Mid	2.1	5	4			NEW
<b>DKTFLL 21 SC</b>	TruFlex LL+RR		BL-R+	Mid	2.2	5	4	✓		NEW
<b>InVigor</b>										
<b>L233P</b>	Std LL		BL-R	Early-mid	2	4	4	✓	✓	MB
<b>L234PC</b>	Std LL	✓	BL-R	Early-mid	1.5	3	3	✓	✓	
<b>L241C</b>	Std LL	✓	BL-R	Early-mid	2	4	4			ALL
<b>L255PC</b>	Std LL	✓	BL-R	Mid-long	1	4	4	✓	✓	
<b>L345PC</b>	Std LL	✓	BL-R	Mid	1.5	3	3	✓	✓	NEW
<b>LR344PC</b>	TruFlex LL+RR	✓	BL-R	Early-mid	2	4	4	✓	✓	NEW

See page 11 for rating scales

## 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 if you think back to high school statistics.

### SO WHAT DOES THIS MEAN?

First, all hybrids are good. Differences in yield only start to get 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 that 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.

## CARGILL SPECIALTY CANOLA PROGRAM



Optimize your operation by teaming up with VICTORY® canola.

Our high-yielding hybrids offer superior agronomics, polygenic blackleg resistance and resistance to the most common clubroot pathotypes, helping you reduce risk while maximizing profits and yield.

VICTORY HYBRIDS	WEED CONTROL	CLUBROOT RESISTANT	DISEASE PACKAGE	MATURITY	GROWING ZONE	STANDABILITY	POD SHATTER TRAIT	GROSS RETURN OVER COMPETITOR*
V14-1	RR			Mid-late	All zones	Exc	No	High gross returns
V24-1	RR			Mid-late	All zones	Exc	No	High gross returns
V25-1T	TF			Mid-late	All zones	Exc	No	High gross returns
V12-3	RR			Mid	All zones	Exc	No	High gross returns
V33-1CL	CL			Late	Full season	Exc	No	High gross returns
V12-1	RR			Mid	All zones	Exc	No	High gross returns
L258HPC InVigor® Health	LL	Yes	BL-R	Mid-late	Mid-long zones	Exc	Yes	High gross returns

\*VICTORY Performance Trials are calculated based on: \$500 futures, -\$10 commodity basis. \$50 premium on 35 bu fixed tonnage.



## BEST FOR DISEASE MANAGEMENT

When it comes to minimizing blackleg risk, it pays to choose the right canola hybrids. All VICTORY® hybrids come equipped with a durable, polygenic blackleg resistance package which consists of multiple genes, with combinations of major and minor genes, providing protection from seedling to maturity.

On top of polygenic blackleg resistance, the VICTORY lineup also offers clubroot resistance to the most common clubroot pathotypes in four high-performing hybrids.

### HYBRID V14-1

#### SYSTEM



#### 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 variety like V14-1 is one component of a good clubroot management strategy to help reduce the spread of the disease.*

### HYBRID V24-1

#### SYSTEM



#### WHY WE RECOMMEND IT

For farmers in Manitoba or southern Alberta, V24-1 can offer peace of mind with both polygenic blackleg protection and clubroot resistance. Its impressive disease resistance contributes to its high gross returns.

#### PRO TIP

*When it comes to blackleg resistance, both major genes AND minor genes are critical for durable blackleg resistance. When choosing your blackleg resistant variety, ensure it is equipped with both major and minor resistance genes so your crop is safeguarded from seedling to adult.*

BEST FOR  
**STRAIGHT CUT**

The Cargill Specialty Canola program lets you manage your harvest your way. If you prefer to swath, there are a variety of options in the VICTORY® lineup to choose from. If you prefer to straight cut or would like the flexibility to delay swathing, the InVigor Health hybrid L258HPC could be a great choice for you.

HYBRID  
**L258HPC**

SYSTEM

 InVigor<sup>health</sup>

 LIBERTY LINK

**WHY WE RECOMMEND IT**

This is a great option if you are looking for a specialty canola hybrid to straight cut or delay swathing. On top of the built-in pod shatter trait, this hybrid is also blackleg and clubroot resistant.

**PRO TIP**

*Having a hybrid mix with varying maturities, and harvest timing / types can help you to spread out harvest timing and manage risk on your farm. Pair L258HPC with an earlier maturing hybrid or a hybrid that you would swath so you can spread out harvest timing and risk.*

BEST FOR  
**WEED MANAGEMENT**

The Cargill Specialty Canola Program is the only identity preserved canola program that offers hybrid options across all four major herbicide systems: Roundup Ready®, TruFlex™ with Roundup Ready technology, LibertyLink® and Clearfield®. This gives you more options and allows you to rotate herbicide systems, while still being able to take advantage of the high returns with the Cargill Specialty Canola Program.

HYBRID  
**V14-1**

SYSTEM

 VICTORY<sup>HYBRID CANOLA</sup>

 Roundup Ready<sup>CANOLA</sup>

**WHY WE RECOMMEND IT**

You can put this Roundup Ready variety in fields with tough weeds without sacrificing yield and return. It can also provide some peace of mind with its clubroot and polygenic blackleg resistance.

**PRO TIP**

*Worried about glyphosate resistant weeds or volunteer canola in your Roundup Ready soybeans but still want to grow specialty canola? Consider adding tank mixes that can be tossed in the tank with glyphosate:*

- Viper® ADV on soybeans adds in Groups 2 and 6
- Atrazine and Armezon® on corn adds Groups 5 and 27
- Lontrel™ XC on canola adds Group 4

HYBRID  
**V25-1T**

SYSTEM

 VICTORY<sup>HYBRID CANOLA</sup>

 TruFlex<sup>CANOLA</sup>

**WHY WE RECOMMEND IT**

If you have harder-to-kill weeds like cleavers, foxtail barley and wild buckwheat, V25-1T and the flexibility of the TruFlex canola system can help you get the job done. On top of the benefits of the TruFlex canola system, V25-1T also has clubroot resistance and polygenic blackleg resistance.

We will have limited quantity of this product available for the 2020 season. To learn more about how it has performed near you, contact your Cargill Sales Representative.

BEST FOR  
**MAXIMIZING ROI**

The Cargill Specialty Canola Program delivers higher financial returns through high-yielding hybrids, attractive premiums over commodity, and program simplicity. The VICTORY® and InVigor Health lineup offer various agronomic qualities and disease packages so you can further optimize production on your farm. Below are three of our top returning hybrids compared to their commodity checks.

**HYBRID V14-1**

**WHY WE RECOMMEND IT**  
Last year in VICTORY Performance Trials, V14-1 returned \$38/acre over 75-65 RR\*. It also has both clubroot and polygenic blackleg resistance. This is a top selling VICTORY hybrid for a reason.

**SYSTEM**  
VICTORY HYBRID CANOLA  
Roundup Ready CANOLA

**PRO TIP**  
*Diversify your hybrid mix across our specialty varieties with varying agronomic qualities to optimize production on different land and to spread out production risk and harvest management. V12-3 is a great companion to V14-1 as it's a little bit earlier and can help you spread out harvest.*

**HYBRID V24-1**

**WHY WE RECOMMEND IT**  
V24-1 is available in Manitoba and southern Alberta. With a huge ROI advantage over commodity checks, clubroot and blackleg resistance, this hybrid has a lot to offer.

**SYSTEM**  
VICTORY HYBRID CANOLA  
Roundup Ready CANOLA

Make sure you are taking advantage of all the benefits of the Cargill Specialty Canola Program to maximize your returns! Sign up early to participate in the early sign-up incentive and an instant seed discount. Ask your Cargill Sales Representative for more information.

**HYBRID V33-1CL**

**WHY WE RECOMMEND IT**  
For farmers wanting a Clearfield® option but also wanting to maximize their returns, V33-1CL could be an excellent option. It also comes equipped with polygenic blackleg resistance.

**SYSTEM**  
VICTORY HYBRID CANOLA  
Clearfield Production System for Canola

**PRO TIP**  
*To maximize performance of V33-1CL, position in mid- and long-season zones and avoid short season zones.*

\*VICTORY Performance Trials are calculated based on: \$500 futures, -\$10 commodity basis, \$50 premium on 35 bu fixed tonnage

**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>BrettYoung</b>											
Amirani R2 <sup>1</sup>	RR2Y	Tall	0005	Very early	2150	n/a	n/a	n/a	n/a	2	NEW
Nocoma R2	RR2Y	Med	0008	Very early	2250	2.1	ST	1c	n/a	1	
Notus R2	RR2Y	Med/Short	001	Early	2300	1.6	T	1c	n/a	2	
Karpo R2 <sup>1</sup>	RR2Y	Tall	002	Early	2350		ST	1c	n/a	1	
Akras R2	RR2Y	Med	003	Mid	2375	1.7	T	1k	n/a	1	SK
Sunna R2X	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
RX Cedo	RR2 XTEND	Tall	003	Mid	2375	1.8	ST		n/a	2	NEW
Mani R2X <sup>1</sup>	RR2 XTEND	Med	004	Mid	2425		ST	1c	Y	1	
Vidar R2X <sup>1</sup>	RR2 XTEND	Med	008	Late	2500	1.8	ST	1c	Y	2	
<b>DEKALB</b>											
DKB0005-44 <sup>1</sup>	XTEND/SCN	Med	0005	Very early	2175	1.7	T	1c	Y R3	1	
DKB0009-89 <sup>1</sup>	XTEND/SCN	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
23-60 RY	RR2Y	Tall	002	Early	2350	1.7	T		Y R3	2	
DKB003-29	XTEND/SCN	Med/Tall	003	Mid	2375	1.7	T		Y R3	2	
DKB005-52	XTEND/SCN	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
24-10 RY	RR2Y	Med/Tall	005	Mid	2425	1.9	ST	1k	S	2	MB
DKB006-29	XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	
DKB006-99	XTEND/SCN	Med	006	Mid	2450	1.8	ST	3a	Y R3	4	
25-10 RY <sup>1</sup>	RR2Y	Tall	008	Late	2500	3.0	S	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>2</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	2.0	ST	6	n/a	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Mid	2350	2.0	ST	1c	n/a	2	MB SK
<b>S006-W5</b>	RR2Y	Med	005	Mid	2350	2.5	S	1a,3a	n/a	4	
<b>S0007-B7X</b>	RR2 XTEND	Med/Short	0007	Very early	2225	1.7	T	1c	n/a	3	
<b>S003-Z4X<sup>1</sup></b>	RR2 XTEND	Med	003	Mid	2325	3.0	S	1c	n/a	3	<b>NEW</b>
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	n/a	3	

**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

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

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

**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, where noted shows resistance to Race (1 to 3).

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

**WHITE MOULD/SCLEROTINIA RESISTANCE RATING**

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

**Source:** Seed company

**CONSISTENT TOP THIRD YIELDER**

MB 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 2016, 2017 and 2018.

**Source:** Manitoba Agricultural Service Crop Variety Yield Data 2016 through 2018 [https://www.masc.mb.ca/masc.nsf/mmpp\\_browser\\_variety.html](https://www.masc.mb.ca/masc.nsf/mmpp_browser_variety.html)

SK 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 2016, 2017 and 2018.

**Source:** Saskatchewan Crop Insurance, Sask Management Plus Data <https://www.saskcropinsurance.com/resources/smp/smp-data>

<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 2016, 2017 and 2018; **Source:** Manitoba Agricultural Service Crop Variety Yield Data 2016 through 2018 [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 2016, 2017 and 2018; **Source:** Saskatchewan Crop Insurance, Sask Management Plus Data

<sup>4</sup> **Source:** Manitoba Pulse and Soybean Growers 2018 Soybean Variety Guide

\*Insufficient data available to rate

<sup>n/a</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.

**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>5</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>6</sup>	WHITE MOULD RESISTANCE <sup>1</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>BrettYoung</b>											
<b>Amirani R2<sup>1</sup></b>	RR2Y	Tall	0005	Very early	2150	n/a	n/a	n/a	n/a	2	<b>NEW</b>
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2.1	ST	1c	n/a	1	
<b>Notus R2</b>	RR2Y	Med/Short	001	Early	2300	1.6	T	1c	n/a	2	
<b>Karpo R2<sup>1</sup></b>	RR2Y	Tall	002	Early	2350		ST	1c	n/a	1	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	XTEND/SCN	Med	0005	Very early	2175	1.7	T	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	XTEND/SCN	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>23-60 RY</b>	RR2Y	Tall	002	Early	2350	1.7	T		Y R3	2	
<b>Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	2.0	ST	6	n/a	3	MB
<b>S0007-B7X</b>	RR2 XTEND	Med/Short	0007	Very early	2225	1.7	T	1c	n/a	3	

See pages 30-31 for rating scales

## BEST FOR VERSATILITY

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

**SYSTEM**




**WHY WE RECOMMEND IT**

Y4's are always top picks among our agronomy team for their consistency and reliability. We have seen this variety perform on a wide range of soil types (from sandy soils to heavy clays), under a wide range of growing conditions (wet and dry) and different row spacings. It's a good choice for fields that have a higher pH, as they have good tolerance to IDC. This variety also has a CHU of 2350, making it flexible for different geographies and spacing out harvest. With drought conditions many soybean fields suffered, but the Y4's still seemed to perform and pull off some good yields.

**PRO TIP**

*Keep S007-Y4 to row spacings less than 30" as it didn't quite close the rows with less-than-average moisture. (It was still a top yielder.) The plants are medium height and moderately branchy, so it does very well on spacing of 22" or less.*

**VARIETY**  
**S0009-M2**

**SYSTEM**




**WHY WE RECOMMEND IT**

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.

**PRO TIP**

*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.*

**VARIETY**  
**DKB005-52**

**SYSTEM**





**WHY WE RECOMMEND IT**

This strong variety is a consistent performer that will thrive under many different seeding and growing conditions. It's suitable for all soil types and row widths, even 30" spacing. It has excellent tolerance to IDC, making it a good fit for fields with high pH soil. As an Xtend® variety, it offers flexibility with herbicide active ingredients. With a CHU of 2425, this variety is in the mid-maturity range and produces a medium height plant with good standability.

**PRO TIP**

*If you are in a long season area, this variety is able to use every rain, so late season rains can help it reach high yields.*

### 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>2</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>4</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>BrettYoung</b>											
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2.1	ST	1c	n/a	1	
<b>DEKALB</b>											
<b>DKB003-29</b>	XTEND/SCN	Med/Tall	003	Mid	2375	1.7	T		Y R3	2	
<b>DKB005-52</b>	XTEND/SCN	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
<b>Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	2.0	ST	6	n/a	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Mid	2350	2.0	ST	1c	n/a	2	MB SK

See pages 30-31 for rating scales

## BEST FOR IDC MANAGEMENT

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

**VARIETY**  
**S0009-M2**

**WHY WE RECOMMEND IT**

The M2's belong to an early-maturing variety that have good IDC tolerance that respond 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.

**SYSTEM**

**syngenta**



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

**WHY WE RECOMMEND IT**

Y4's are known for their consistency and reliability. We have seen this variety perform on a wide range of soil types (from sandy soils to heavy clays), under a wide range of growing conditions (wet and dry) and different row spacings. It is a good choice for fields that have a higher pH, as it has good tolerance to IDC. This variety also has a CHU of 2350, making it flexible for different geographies and spacing out harvest. With drought conditions in 2018, many soybean fields suffered, but the Y4's still seemed to perform and pull off some good yields.

**PRO TIP**

*Keep S007-Y4 to row spacings less than 30" as it didn't quite close the rows with less-than-average moisture. (It was still a top yielder.) The plants are medium height and moderately branchy, so it does very well on spacing of 22" or less.*

**SYSTEM**

**syngenta**



**VARIETY**  
**DKB003-29**

**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. It placed in the top 5 in one of our local variety Field Tests last year.

**SYSTEM**





## 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>2</sup>	IDC GROUPING <sup>4</sup>	PHYTOPHTHORA ROOT ROT (PRR) RESISTANCE <sup>5</sup>	SOYBEAN CYST NEMATODE (SCN) RESISTANCE <sup>6</sup>	WHITE MOULD RESISTANCE <sup>7</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>8</sup> , SK <sup>3</sup>
<b>BrettYoung</b>											
<b>Notus R2</b>	RR2Y	Med/Short	001	Early	2300	1.6	T	1c	n/a	2	
<b>Akras R2</b>	RR2Y	Med	003	Mid	2375	1.7	T	1k	n/a	1	SK
<b>Sunna R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
<b>RX Cedo</b>	RR2 XTEND	Tall	003	Mid	2375	1.8	ST		n/a	2	<b>NEW</b>
<b>Vidar R2X<sup>1</sup></b>	RR2 XTEND	Med	008	Late	2500	1.8	ST	1c	Y	2	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	XTEND/SCN	Med	0005	Very early	2175	1.7	T	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	XTEND/SCN	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>23-60 RY</b>	RR2Y	Tall	002	Early	2350	1.7	T	-	Y R3	2	
<b>DKB003-29</b>	XTEND/SCN	Med/Tall	003	Mid	2375	1.7	T	-	Y R3	2	
<b>DKB005-52</b>	XTEND/SCN	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
<b>24-10 RY</b>	RR2Y	Med/Tall	005	Mid	2425	1.9	ST	1k	S	2	MB
<b>DKB006-29</b>	XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	
<b>DKB006-99</b>	XTEND/SCN	Med	006	Mid	2450	1.8	ST	3a	Y R3	4	
<b>Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	2.0	ST	6	n/a	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Mid	2350	2.0	ST	1c	n/a	2	MB SK
<b>S0007-B7X</b>	RR2 XTEND	Med/Short	0007	Very early	2225	1.7	T	1c	n/a	3	
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	n/a	3	

See pages 30-31 for rating scales

## BEST FOR DISEASE MANAGEMENT

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

**SYSTEM**  
  


**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**  
**S0009-M2**

**SYSTEM**  
  


**WHY WE RECOMMEND IT**  
This tried and true soybean is an early maturing variety that grows thin to medium in width and medium height. M2's have very good tolerance to Phytophthora root rot and white mould, meaning they can grow successfully on narrower seed rows. Good IDC tolerance means these varieties fit well on soils that have a high pH and are low in iron.

**PRO TIP**  
*S0009-M2s are the tried-and-true soybean in a number of areas. For a grower just starting out with soybeans, many of our agronomists suggest starting with M2's.*

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

**SYSTEM**  
  
  


**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 5 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 demo, 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>2</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>4</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>BrettYoung</b>											
<b>Nocoma R2</b>	RR2Y	Med	0008	Very early	2250	2.1	ST	1c	n/a	1	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	XTEND/SCN	Med	0005	Very early	2175	1.7	T	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	XTEND/SCN	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>DKB003-29</b>	XTEND/SCN	Med/Tall	003	Mid	2375	1.7	T	-	Y R3	2	
<b>Syngenta</b>											
<b>S0009-M2</b>	RR2Y	Med	0009	Very early	2275	2.0	ST	6	n/a	3	MB
<b>S007-Y4</b>	RR2Y	Med/Short	005	Mid	2350	2.0	ST	1c	n/a	2	MB SK

See pages 30-31 for rating scales

## BEST FOR WEED MANAGEMENT

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

**SYSTEM**



**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 neighbouring crops.*

**VARIETY**  
**S006-M4X**

**SYSTEM**



**WHY WE RECOMMEND IT**

The M4X is a great option for growers looking for beans on the Xtend platform to better control tough weeds. It's a medium height, branchy plant that excels on narrow row spacings, placing second in one of our local variety Field Tests last year. It has average IDC and Phytophthora ratings as well as soybean cyst nematode suppression.

**PRO TIP**

*Keep an eye on your soil pH, as this variety is more sensitive to high pH soils.*

**VARIETY**  
**DKB003-29**

**SYSTEM**



**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>4</sup>	CONSISTENT TOP THIRD YIELDER MB <sup>2</sup> , SK <sup>3</sup>
<b>BrettYoung</b>											
<b>Sunna R2X</b>	RR2 XTEND	Tall	003	Mid	2375	1.7	T	1c	Y	3	
<b>RX Cedo</b>	RR2 XTEND	Tall	003	Mid	2375	1.8	ST		n/a	2	<b>NEW</b>
<b>Mani R2X<sup>1</sup></b>	RR2 XTEND	Med	004	Mid	2425		ST	1c	Y	1	
<b>Vidar R2X<sup>1</sup></b>	RR2 XTEND	Med	008	Late	2500	1.8	ST	1c	Y	2	
<b>DEKALB</b>											
<b>DKB0005-44<sup>1</sup></b>	XTEND/SCN	Med	0005	Very early	2175	1.7	T	1c	Y R3	1	
<b>DKB0009-89<sup>1</sup></b>	XTEND/SCN	Med	0009	Very early	2275	1.7	T	1c & 1k	Y R3	1	
<b>DKB003-29</b>	XTEND/SCN	Med/Tall	003	Mid	2375	1.7	T		Y R3	2	
<b>DKB005-52</b>	XTEND/SCN	Med/Tall	005	Mid	2425	1.9	ST	1c	Y R3	2	
<b>DKB006-29</b>	XTEND	Med/Tall	006	Mid	2450	1.6	T	1k	S	2	
<b>DKB006-99</b>	XTEND/SCN	Med	006	Mid	2450	1.8	ST	3a	Y R3	4	
<b>Syngenta</b>											
<b>S0007-B7X</b>	RR2 XTEND	Med/Short	0007	Very early	2225	1.7	T	1c	n/a	3	
<b>S003-Z4X<sup>1</sup></b>	RR2 XTEND	Med	003	Mid	2325	3.0	S	1c	n/a	3	<b>NEW</b>
<b>S006-M4X</b>	RR2 XTEND	Med	006	Mid	2375	1.9	ST	1c	n/a	3	

See pages 30-31 for rating scales

# CROP PROTECTION

## It all starts with a plan...

Weeds. Insects. Disease. All these factors, out of your control, conspiring 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 understand and 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 sit down and 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.

Working with our network of industry partners, we're here to make sure you're maximizing the benefits from all of them. For example, we work with our partners to help you with aspects of your operation such as timing, application and rotation. This is something we continue to make a high priority as the unpredictability of growing conditions increases.

Whether you're having trouble navigating various manufacturer programs, specific product information or just need some sound agronomic input, our entire team is here to help.



## Protecting your crop through the critical establishment phase

### BEST PRACTICES FOR TREATING CEREALS

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

Invest in both germination and vigour 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.
- **Vigour tests** measure how well the seed will perform under stressful conditions. You can have 99% germ and 80% vigour, and as soon as the seed faces stress, it underperforms.

#### EXPERT TIP

**Look for a vigour 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 vigour 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 vigour 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 germ 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.

### 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

### SEED UNDER THREAT NO MATTER WHAT CONDITIONS

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

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.

### 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 also be a nitrogen fixer 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.
- **Granular.** 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 or chickpeas. Also, prairie soils don't contain all native Bradyrhizobium, which is critical to how your soybean crop will fixate nitrogen. That's why we recommend you double inoculate soybeans to ensure adequate infection and nitrogen fixation.

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 **TagTeam® LCO** and **Nodulator®**, which provide nitrogen fixation and plant growth benefits.

**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 to 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.

**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	7-10
Wheat	30
Barley	20-25
Flax	30-40
Lentils	12
Peas	7-10
Oats	22-32

Adapted from [https://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex81/\\$file/100\\_22-1.pdf](https://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex81/$file/100_22-1.pdf)

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

## 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 factors.



### 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.

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.

Add products to the spray tank in the following order:

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

<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.

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 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® – 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 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 along with the amount of precipitation received include:

- soil pH.
- low soil organic matter.
- course textured soils.

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

It's not every day that crop protection manufacturers release new products, but Canadian soybean growers have had access to dicamba-based herbicides for just a few years now. 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 representatives 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
<b>XtendiMax® (Monsanto)</b>	0.7 L/ac	0.33 L/ac
<b>Engenia® (BASF)</b>	0.4 L/ac	0.195 L/ac
<b>FeXapan™ (Corteva)</b>	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, you will want to 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.

The efficacy of Reglone Ion is impacted by weather. For best results, spray at night 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.

## 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're looking to deliver at about 14% moisture.



## 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 give 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

### BARNYARD GRASS



DIFFICULTY RATING

3/5

#### 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®
- 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

5/5

#### 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.

#### TIMING

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

WEED  
CLEAVERS

DIFFICULTY RATING  


4/5



#### 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:

- Cereals: Axial® Xtreme; Pixxaro™
- Canola: Facet® L (quinclorac) – in-crop

#### 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  


4.5/5



#### 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.
- Cereals: Cirpreme™ XC.
- Pulses: Heat® LQ before pulses, as in peas and lentils in-crop options barely brown dandelion.

#### 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 a MCPA 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  
**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  


3/5



WEED  
KOCHIA

DIFFICULTY RATING  


3/5



#### 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.

- Cereals: 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.

#### 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.

- Cereals: Products with 2, 4-D in the formulation. New products tend to come with it as a co-pack.
- Lentils: Edge®. 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.

#### 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. You can also attack kochia in-crop if plants are missed pre-seed.

WEED

## LAMB'S QUARTERS

DIFFICULTY RATING

🌿
🌿
🌿
🌿
🌿
| 3/5



### 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 0.5 L Roundup Transorb® HC pre-seed to ensure all plants are controlled.
- Cereals and pulses: Add a tank-mix partner before cereals (eg: Express®, 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



**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: Avoid completely

**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-coloured 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  
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.

#### 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 OATS

DIFFICULTY RATING  


2/5



#### 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®, 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.

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™ XC, Paradigm™
- Before pulses: Heat® LQ
- Before canola: Conquer®

#### WATCH OUT

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

#### TIMING

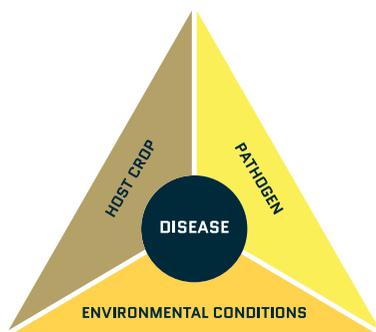
Control volunteer canola in the spring, to keep canola plants from competing for nutrients and moisture. Use a tank-mix partner.

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®, Priaxor® and Miravis™ Neo** (new this year from Syngenta) are products for the pulse market that offer multi-disease control. Talk to an agronomist about *Ascochyta* blight 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™ Ace** 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.

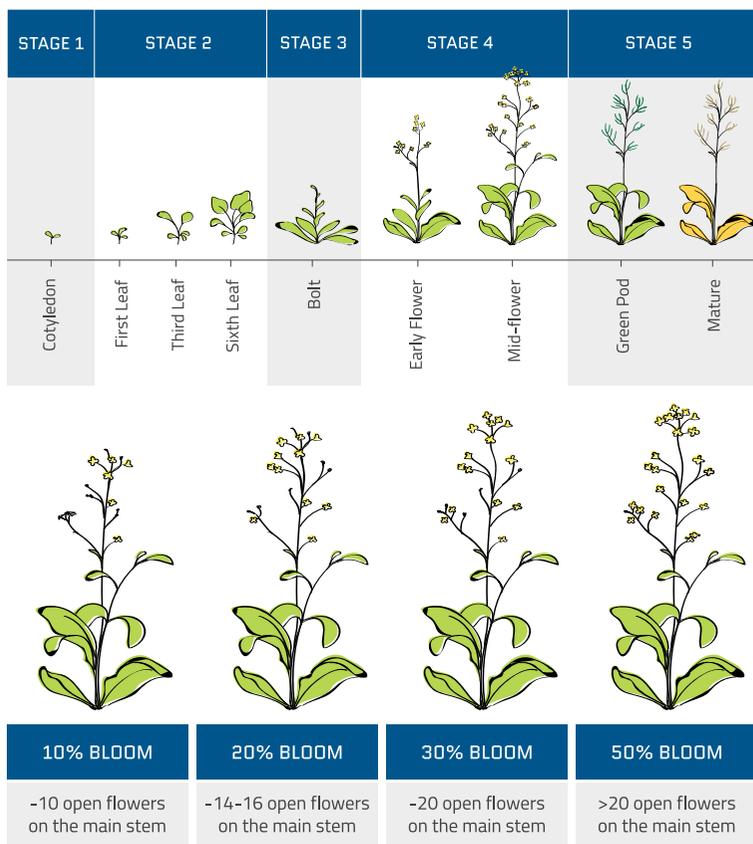
Know your product labels and what to look for in the field. Get your agronomist to help with staging and prioritizing fields to ensure all acres are sprayed.

### 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®, Lance® and Cotegra®** 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.



#### 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.

**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.

**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.**

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.

### NOT ALL DISEASES SPREAD THROUGH RAINFALL

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.

### 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 neighbouring 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™**, **Priaxor®** 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 crops and best practice is that canola should be planted 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 to 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, 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 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.

### 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 between 20% and 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 shattering caused by overripe plants.

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.

## 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*

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.

Photo credit: Canola Council of Canada

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 **Lorsban™**, **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.

## 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.



Foliar damage from pea leaf weevil

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 – 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.

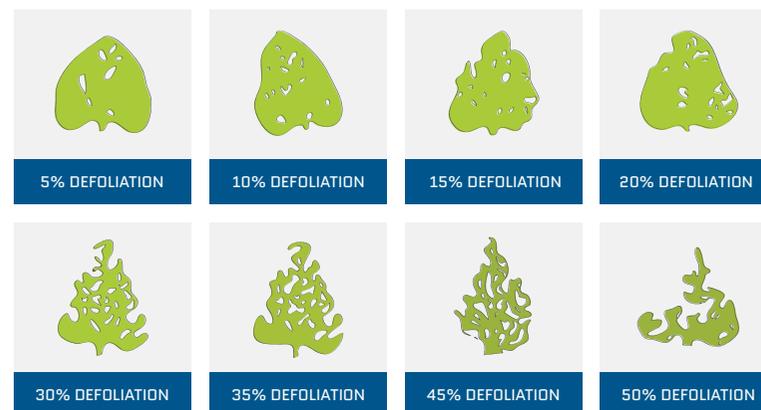
In addition to identifying the insect you're dealing with, there are a number of factors such as moisture, temperature conditions, stage of crop growth, type of insect, potential impact to the crop and economic value of the crop that need to be taken into consideration prior to making a spray decision.

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.

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.



## CROP NUTRITION DECISION FACTORS

### AGRONOMICS

- What's left in the soil
- 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, right rate, right place, and right time**. *Cargill's fertilizer planning process ensures that you will receive a 4R certified plan, no matter what your application capability.*

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

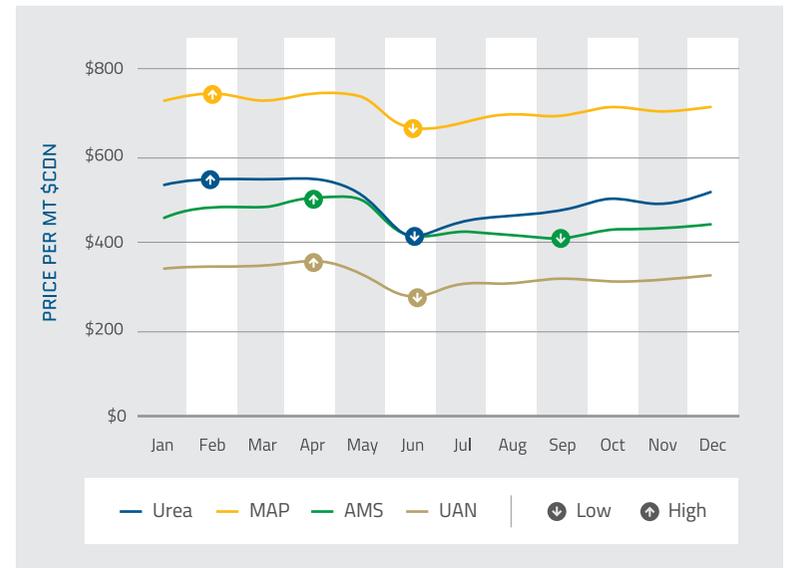
The five-year average retail price (by month) for urea, monoammonium phosphate (MAP), ammonium sulphate (AMS) and urea ammonium nitrate (UAN) shows that prices are typically highest February through April and tend to be lowest in the summer months. The difference in price can be substantial. For example, the price differential on urea between the five-year high in April and the low is \$135/tonne. Urea purchased at the best price and applied at 260 lbs per acre on a 160-acre section would save you almost \$2,500.

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 to lock-in prices that make the most sense for your farm.

PRODUCT	DIFFERENCE IN PRICE PER MT CDN 5-YEAR HIGH – 5-YEAR LOW
Urea	\$ 135
MAP	\$ 77
AMS	\$ 90
UAN	\$ 92

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

June 2014 through May 2019\*



\* 5-year average is represented by June, July, August, September, October, November and December 2014 through 2018; January, February, March, April and May 2015 through 2019. Source: Cargill Limited

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.

- 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.

## 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®** line of products from Mosaic offers balanced crop nutrition through uniform nutrient distribution and season long sulphur availability.

We also carry **YaraVita® PROCOTE®** 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, vigour, colour 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.



AGROTAIN®

Agrotain 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 is one way of both protecting your investment and reducing the environmental impact of fertilizer volatilization. Use Agrotain for urea or UAN being used on all major crops



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.*

Nitrogen

MACRONUTRIENTS



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.

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 crop resistance to lodging, disease and drought.

Cargill carries standard potash (0-0-60).

Phosphorous

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, sulfur-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. Its combination of sulphate sulphur and elemental sulphur ensure your crop has season-long availability of this important nutrient.

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 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.



MICROESSENTIALS S10® [12-40-0-10% S]

Another 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 any seed damage.

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

Phosphorous

MACRONUTRIENTS



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. Application timing in canola is the 4-leaf to early bolt stage, in cereals is up to and including the flag leaf and in pulses/soybeans is when the crop is 15 cm tall; all typically at 0.8L per acre.

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.

In addition to standard products like ammonium sulphate (AMS) and MicroEssentials products, Cargill also offers foliar applied S products.



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



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.

**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 2nd node is detectable.

**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).

**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.

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 be 4R certified.

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 certification 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).

### 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 targeted yield goals.

CROP	NUTRIENTS REQUIRED BY CROP						
	POUNDS PER BUSHEL, PER ACRE*				POUNDS PER ACRE*		
	N	P	K	S	B	CU	ZN
<b>Barley (feed)</b>	1.6	0.38	0.14	0.15	0.5	3	0.5
<b>Barley (malt)</b>	1.4	0.38	0.14	0.15	0.5	3	0.5
<b>Beans (dry)**</b>	0	0.83	2.36	0.2	0.5	0.5	1
<b>Canola</b>	3.2	0.63	0.38	0.49	1	2	0.5
<b>Corn**</b>	1.53	0.63	1.28	0.15	1	1.5	1
<b>Durum wheat</b>	2.4	0.44	0.39	0.2	0.5	3	0.5
<b>Flax</b>	2.88	0.83	0.38	0.56	0.25	0.25	0.5
<b>Lentils**</b>	0	0.92	0.64	0.2	0.25	0.25	0.5
<b>Oats (spring)</b>	0.96	0.29	0.14	0.12	0.5	2	0.5
<b>Spring wheat</b>	2.4	0.6	0.39	0.2	0.5	3	0.5
<b>Peas (field)**</b>	0	0.62	0.64	0.3	0.5	0.5	0.5
<b>Soybeans**</b>	0	0.6	0.39	0.2	0.5	2	0.5
<b>Sunflowers</b>	1.12	0.39	0.59	0.14	0.5	0.5	0.5

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



## HELPING YOU CUT THROUGH THE NOISE

# CARGILL'S APPROACH TO DECISION MAKING

*We recently sat down with four leaders from Cargill's North American Agricultural Supply Chain business to discuss the changing agricultural landscape and how the decision making process for both Cargill and our farm customers continues to evolve.*

*The participants were: Joe Christianson, Canadian Merchandising Leader; Glenn Houser, Managing Director of Crop Inputs; Sharon Spies, Sustainability Manager; and Roger Watchorn, President. The following is an excerpt from that conversation.*

**Decision Guide:** *This guide is all about decisions, so let's start there. Can you share with us your take on how Cargill makes decisions?*

**Joe:** When I think of our approach to decision making there's always priorities we're trying to balance and the first priority is making sure we're staying true to our values. Most importantly, our word is our bond, and if we're making a decision we can stand behind it. We have a long history of over 150 years that we're trying to uphold and we certainly don't want to be doing anything that would jeopardize that or our integrity.

**Glenn:** What comes to mind for me is four words: explore, discover, create, deliver. That means taking a consultative approach when uncovering the needs of our farm customers and matching those needs with solutions that we have to offer. We've got a team of people who live this out on a daily basis who truly have the farmer's best interests in mind. We try to understand their unique farm and situation and connect them with solutions.

**Sharon:** We have a unique position because we not only have a global perspective and view, but because we sit in the middle of the supply chain and we're serving customers at both ends, I think that gives us some unique insights to see what's changing across the landscape. One area where we see the landscape changing dramatically is in the sustainability space, and with that global view we try to assess the risks and opportunities that creates not only for our business but for our customers.

**Roger:** The only thing I would add is that I think we bring a unique perspective in the sense of a very forward looking, long-term focus. We've been around for 154 years, and our goal is to be a leader 154 years from now, and in order to do that we take a very forward looking – not a backward looking – approach.

**Decision Guide:** *At the heart of it, Cargill is trying to help farmers make decisions to solve the challenges that are unique to their farms. What should folks know about how we do that?*

**Joe:** I don't think it's any secret that Cargill knows and completely understands that for our long term success we need to grow with our farmer customers.



**We're trying to harness all the knowledge from operating on-the-ground in 67 countries, from our destination offices and the segments where we participate. We're trying to refine that down to what it means for a farmer."**

We try to take that 154 years of experience and maybe some of the mistakes or learnings we've had along the way and share them with customers to help them avoid mistakes and get to the right solution.

**Sharon:** From our position, we see a growing demand from consumers for increasing transparency about how their food is produced, where it comes from, and what are the values around the system that stands behind a brand. I call out sustainability as an example where we see those trends taking shape and where we want to be working with farmers to help them prepare for a more sustainable future. In our crop inputs business we're working on programs like 4R (See page 99), to help optimize farmers' results and returns on their business, and also create benefits that downstream customers and consumers care about from an environmental standpoint.

**Roger:** That's a good point. I think we have a unique set of customer insights. From farming to food, from food to bio-industrial, from working with retailers to dairy producers, working with anyone from bankers to palm producers. It's extremely broad, and I don't think any other company in the world has that kind of breadth. I also think of our unique set of assets

and capabilities. From the information we glean from our grain elevator systems and our crop inputs system to our cocoa and chocolate plants, to our palm plantations, our fish feeding businesses, our inland barges, and ocean vessel trading. Finally, I would say we have a unique set of talents, whether that be agronomists or data analysts, technology developers, food innovators, global traders, or meteorologists. All this uniqueness gives us the ability to deliver solutions and insights that help farmers make decisions.

**Glenn:** I agree. We need to not only help a customer make a decision but also provide a solution that fits with where the market is going. Think of Cargill's specialty canola program and how that's integrated right from the seed sale to the marketing program and handling the grain processing and refining, and ultimately moving it to our end use customers.

**Decision Guide:** *What role does risk management play in decision making when we think about our business or a farm customer's business?*

**Roger:** I think every decision we make is about managing risk to some degree. More effectively executing our decisions and controlling the outcomes and eliminating surprises is what we're aiming for. We've built a lot of capabilities around understanding potential outcomes, forward looking modelling, using data to predict potential outcomes, and then we do a lot around building capabilities to help us control how we execute decisions and follow through on that execution to eliminate the unknown variables.

**Sharon:** With a sustainability lens, again, we're looking out to the future trying to identify what are the key issues and risks that face our business and our customers. We're trying to influence effective policies that maintain freedom to operate but also move us in the right direction. But we're also identifying new technologies, tools or expertise that we can bring to farmers that help ensure their resiliency to

help them deal with growing risks. We've started focusing on soil health and how we work with farmers in adopting best management practices around nutrient management, or crop diversification, or using new technologies that not only drive productivity and yield performance but also create more resiliency to withstand weather volatility and the extremes that we seem to be facing today.

**Glenn:** I like where Roger first started. He said we take risk into consideration in every decision. I see our role as working closely with farmers to ask questions about their operation and unique situation and then matching up the solution or risk management plan or product.



**Every farmer is in a unique situation and has a different appetite for risk. Our job is to understand that and help them move forward with the decision that's right for them."**

**Joe:** Being from an ag family, I think we all know the cycles we go through in agriculture, the ups and downs. If you think about the macro environment today and how globally integrated the agriculture industry is, it's incredible how we can be impacted here in Canada by a policy decision being made in Brazil or a tariff decision being made in India. These are coming back and directly impacting farmers. In ag, oftentimes we're operating on a very thin margin structure and the risk management you have in place becomes very important. As Glenn says, we're trying to harness our know-how at Cargill to support growers in this.

**Sharon:** I hear from farmers that they're constantly bombarded with challenges in their business. We go from drought to too much rain, or we have trade issues that impact their ability to seek good profitable markets and returns. I think one of the great examples of how we help is the certification program for canola that we've been working on with growers to make sure we can access European markets. Given all the dynamic

changes around trade, putting the capabilities in place and bringing that program to growers has enabled them to continue to access a diverse set of markets and customers.

**Roger:** If I look at my own background growing up on the farm and how things have changed to where they are today, I think that need for trust has changed dramatically. If you go back 15, 20, 25 years, farmers looked to companies like ourselves and they trusted us to bring them relevant information because there was a lack of information. Now it's gone from a lack of information and how to get it to being overloaded with it. There is so much happening, whether it be geopolitical events, food trends, farm practices or different types of products available to farmers. Now what farmers are looking for is help to sort through information, help to find ways to use it more effectively, and partners they can trust to do that as opposed to being the information source.

**Glenn:** I was just out on farm calls and heard something similar. We sat down with a group of farmers – there were three of them, all from one farm – and they told us about the information they had, or just thoughts and ideas bouncing around as it related to fertilizer, margins and pricing, new product considerations and placement alternatives, and where they were getting this information from. What they were really looking for was someone to narrow it in and help them understand what really is legit and what's good for their farm.

**Decision Guide** *So put yourself in a farmer's shoes. What would you be paying attention to for the next three to five years?*

**Sharon:** We've touched on a lot of it, but two things have stood out for me. One is the importance of market access and market diversification and how important those are to top line revenue. I would make sure I have an eye on the broader marketplace and how it's changing and the trends that are shaping the markets. I would think about who I want to partner with who will help me navigate the changing

landscape. That might mean new products to consider adopting in a crop production plan, or it might be certifications or sharing information that allows me to access certain markets.

**Roger:** There's three things that I think farmers should be paying attention to. One is food trends, opportunities or risks out there on the horizon, what they should be producing and how they should be producing it. The second is farm practices they need to be paying attention to. The increasing competitiveness of farms around the world means that farms need to be world class or operationally excellent. I think there's going to be opportunities for farms to differentiate themselves from a perspective of sustainability as consumers look to supply chains that align with their social responsibility views. Number three is data and information capabilities.



**The opportunity for farms to manage in unique and exciting ways, moving to more data driven and technology-enabled decisions is growing exponentially, and those who can use those kind of tools to become better operators and marketers are going to separate themselves."**

**Joe:** I think it's very easy to jump to the conclusion that you want to know everything and be on top of everything. It's very easy to get overwhelmed with trying to balance all of these competing interests, whether it's consumer trends, the macro political environment or whatever else you could be doing in terms of farm practices. Even at Cargill we have a lot of people working on this every single day. It's a little bit of a scary, new environment we're moving into where we see tariffs used as a negotiating tool and currency thrown in the mix. All of that is coming back to impact grower profitability. How can you make a game plan to navigate these change forces that are on the horizon in the next three to five years?

**Glenn:** You might need to decide what you're going to own and go after. Surround yourself with people who can provide insights and relate them to what it means on your farm. How can you improve your farming practices to make your farm more efficient and ultimately sustainable over the long term? What products are you using? How do you increase the use efficiency so that for the dollars you're spending you're getting a better return? For example, pick out the micronutrients that are in short supply in your soil and address those. It's not a shotgun approach. You can be really specific in digging into areas that not only check the box of improving efficiency and sustainability on your farm, but also put more dollars and yield in the bin.

**Sharon:** In that regard, I think we can't underestimate the importance of a trusted advisor who can help a farmer sit down and develop that customized plan and set of goals that fit their needs. I have learned that what works on one farm might not work on another. What the solution or the plan is for one farmer may look very different from another, so it's key to have that advisor who can sit down and help you figure out your goals. Of course those goals should be economic and sustain the farm for future generations and lead to good environmental outcomes. Then you set a customized plan that you're going to work toward in your operation to meet those goals. We're for sure looking for win-wins.

**Decision Guide** *Thanks everyone. You've done a great job of describing Cargill's approach to decision making. You've explained how Cargill uses all available resources to stay informed about what customers at each end of the supply chain want and how we combine this knowledge with market insights to effectively manage risk. But you also spoke about the importance of staying true to our core values. This is what farmers should expect when they look to Cargill to help them manage their own unique risks and strive for success.*

# NOTES



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