AGRICULTURAL SOLUTIONS GUIDE

Western Canada 2021

BASF

We create chemistry

We've got your back. And your future.

Canadians everywhere faced a challenging year in 2020—and growers across Western Canada were no exception. Thanks to a strong agricultural community and the resilient Canadian spirit, these unique times have only served to highlight the resourcefulness of growers. And with the proper tools, they can continue to face these obstacles head-on.

The 2021 Agricultural Solutions Guide is one example of support, providing relevant solutions, tools and agronomic knowledge. You'll find all the latest information to guide you in your decision-making from seed to harvest. Discover the resources you need to scout and manage weeds, insects and disease in your fields. For convenient online access to the guide, visit **agsolutions.ca**.

And remember, whatever the 2021 season brings, you can count on continued support from BASF.

High-performance crop. High-performance solutions.

Seed

Weed Management

Disease Management

Harvest Management

Crop Management Resources

Additional Resources

Table of Contents

Innovation is at the root of everything we do.

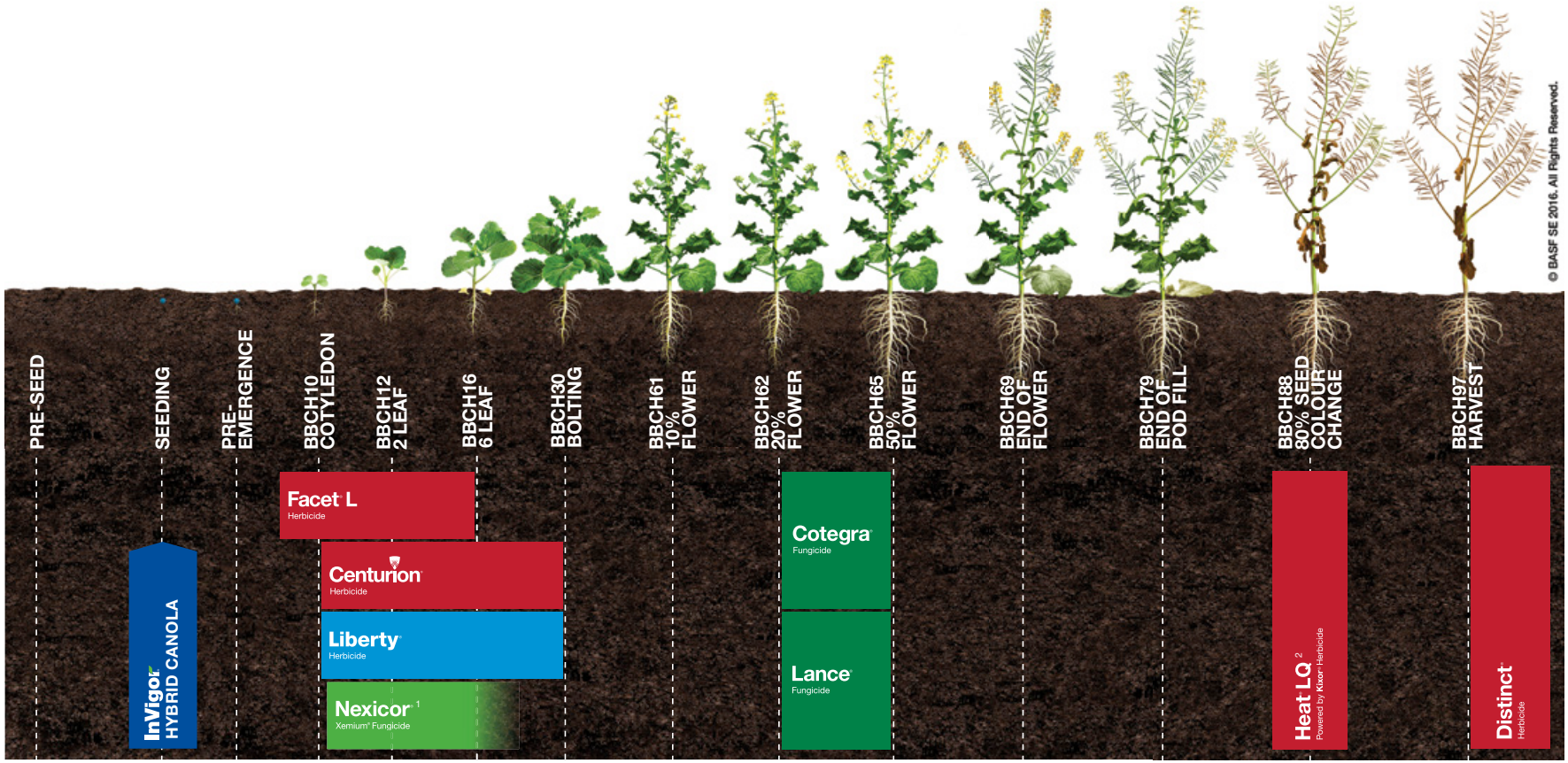
Canola is a crop rooted in innovation—and BASF has been there with solutions at every turn. In 2021, innovation from BASF comes in many shapes and sizes.

The InVigor® hybrid canola 300 series grows with two new hybrids that truly encompass what it means to be a 300 series InVigor hybrid. Learn more.

We're also proud to introduce Certitude® herbicide[1]. Applied as a pre-seed burnoff, Certitude is the first Group 27 chemistry to be used in your canola production. Learn more.

[1] This product is currently being assessed for registration under the *Pest Control Products Act*. The information presented here is for research purposes only. This product cannot be manufactured, imported, distributed or used in Canada at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

Solutions for canola.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] For blackleg control, Nexicor® fungicide may be tank mixed with herbicide application.
[2] Apply when the crop has reached 80% seed colour change.

The 300 series grows.

Last year we introduced a whole new series of InVigor hybrids: the 300 series. These hybrids demonstrated such unprecedented levels of performance that they deserved a whole new series. This year, we're introducing two new hybrids that encompass what it means to be a 300 series InVigor hybrid from BASF. Welcome InVigor L340PC and InVigor L357P to the InVigor family.

NEW

InVigor L340PC

Exciting new Pod Shatter Reduction hybrid with clubroot resistance plus strong standability.

An exciting 300 series hybrid for growers that want it all. A high-yielding, mid-maturing, Pod Shatter Reduction hybrid that offers first generation clubroot resistance[1] and strong standability.

NEW

InVigor L357P

Thrilling new Pod Shatter Reduction hybrid that features high yields and very strong standability with exceptional blackleg resistance.

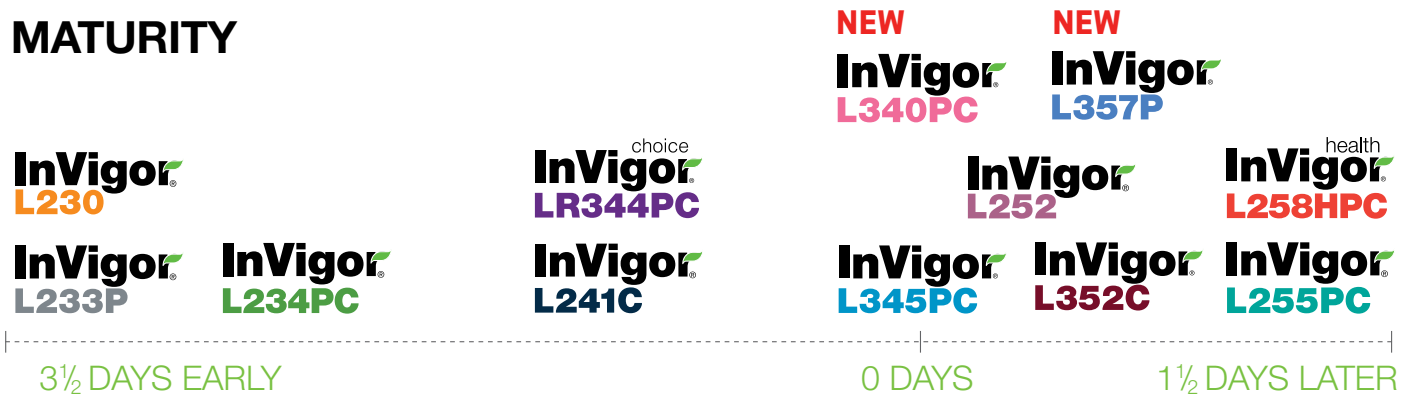
A thrilling addition to the 300 series. A Pod Shatter Reduction hybrid built for growers looking to push higher yields in non-clubroot affected areas and offers very strong standability. This hybrid also features the added benefit of exceptional blackleg resistance.

[1] To predominant pathotypes found in Canada at the time of registration. InVigor L340PC, InVigor L345PC, InVigor L352C, InVigor Choice LR344PC, InVigor L255PC, InVigor L241C and InVigor Health L258HPC share the same first generation clubroot resistance profile. InVigor L234PC has this resistance profile, plus it contains second generation multigenic clubroot resistance to additional clubroot pathotypes to help combat evolving clubroot pathogens.

A fit for every field.

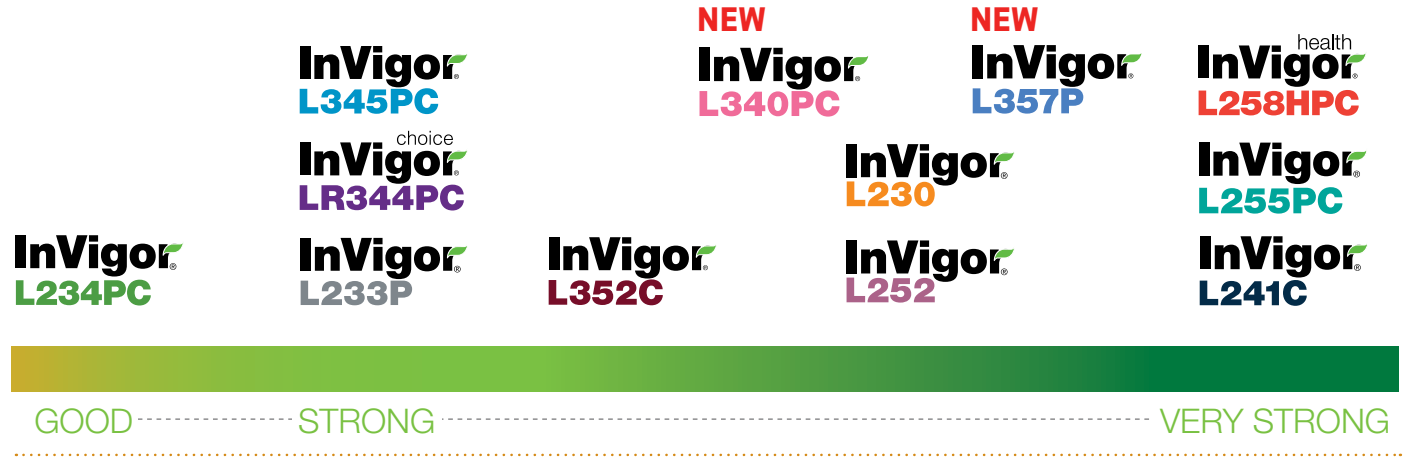
No two fields are the same. That's why InVigor hybrids are designed to address a wide range of challenges across the broadest spectrum of growing conditions. Multiple options mean multiple solutions for the challenges you face as a Western Canadian grower.

MATURITY



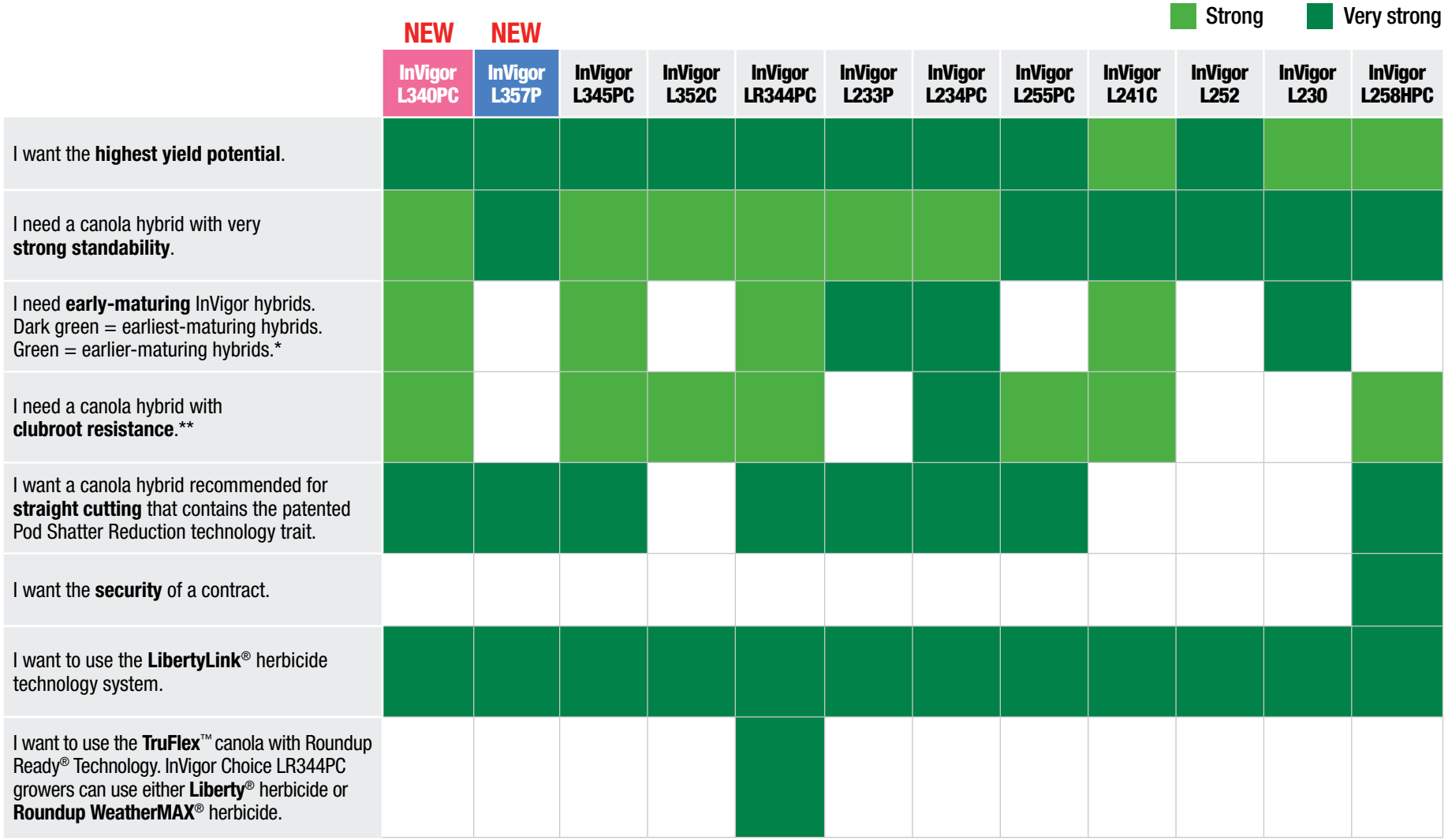
Average maturity in days versus the average maturity in days of InVigor 5440 from InVigor internal trials.

STANDABILITY



Please note: Information displayed on this chart is based on performance ratings and data compiled from several InVigor internal trials over multiple years. Results may vary on your farm due to environmental factors and preferred management practices.

Identifying your needs.



*Note: Maturity and standability ratings are based on performance and data compiled from several InVigor internal trials over multiple years. Results may vary on your farm due to environmental factors and preferred management practices.

**All contain the same clubroot resistance to predominant clubroot pathotypes found in Canada at the time of registration. InVigor L234PC has this resistance profile plus contains second generation multigenic clubroot resistance to additional clubroot pathotypes to help combat evolving clubroot pathogens.

	Description	Yield % of Checks	Growing Zones /Maturity	Blackleg Rating	Agronomic trait
NEW InVigor L340PC	An exciting 300 series hybrid for growers that want it all. A high-yielding, mid-maturing, Pod Shatter Reduction hybrid that offers first generation clubroot resistance and strong standability.	**108.9%** of the new checks (InVigor L233P and Pioneer® 45H33) in 2019 WCC/RRC[1] trials **107.8%** of InVigor L233P (n=16 trials, 2019)	All growing zones 1 day earlier than InVigor L252	**R** (Resistant)	Pod Shatter Reduction First generation clubroot resistance
NEW InVigor L357P	InVigor L357P is a thrilling addition to the 300 series for growers looking to push higher yields in non-clubroot affected areas. As an added bonus, this hybrid also features patented Pod Shatter Reduction technology, very strong standability and exceptional blackleg resistance.	**112.9%** of the new checks (InVigor L233P and Pioneer® 45H33) in 2018/2019 WCC/RRC trials **109.7%** of InVigor L233P (n=39 trials, 2018/2019)	Mid to long growing zones ½ day later than InVigor L252	**R** (Resistant)	Pod Shatter Reduction
InVigor L345PC	InVigor L345PC offers a significant jump in yield potential over InVigor L233P and features our patented Pod Shatter Reduction technology plus first generation clubroot resistance. This hybrid is suitable for all growing zones.	**111.9%** of the checks (InVigor 5440 and Pioneer® 45H29) in 2017/2018 WCC/RRC trials **111.4%** of InVigor L233P (n=28 trials, 2018)	All growing zones 1 day earlier than InVigor L252	**R** (Resistant)	Pod Shatter Reduction First generation clubroot resistance
InVigor L352C	InVigor L352C has a similar maturity to InVigor L252 with higher yields and features first generation clubroot resistance. This hybrid is a strong replacement for InVigor L252, since it's the ideal hybrid for growers who prefer to swath their canola.	**108.6%** of the checks (InVigor 5440 and Pioneer® 45H29) in 2017/2018 WCC/RRC trials **104%** of InVigor L252 (n=28 trials, 2018)	All growing zones ½ day later than InVigor L252	**R** (Resistant)	First generation clubroot resistance
choice InVigor LR344PC	The first-of-its-kind InVigor Choice canola hybrid features both the LibertyLink® technology system and TruFlex™ canola with Roundup Ready® Technology. As if that isn't enough, you'll also have the benefits of patented Pod Shatter Reduction technology and first generation clubroot resistance from InVigor. This hybrid is perfect for growers looking to combine high-yielding InVigor genetics with the flexibility of Liberty® herbicide or Roundup® herbicide applications.	**104.1%** of the new checks (InVigor L233P and Pioneer® 45H33) in 2018 WCC/RRC trials **103.6%** of InVigor L233P (n=12 trials, 2018)	All growing zones Over 1 day earlier than InVigor L252	**R** (Resistant)	Pod Shatter Reduction First generation clubroot resistance LibertyLink® technology system and TruFlex™ canola with Roundup Ready® Technology
InVigor L233P	A strong performer, InVigor L233P was grown on more acres in Western Canada than any other canola hybrid in 2019 and 2020.[2] Featuring patented Pod Shatter Reduction technology, this very early-maturing, high-yielding hybrid provides the harvest flexibility you can count on.	**108.8%** of checks (InVigor 5440 and Pioneer® 45H29) in 2014/2015 WCC/RRC trials	All growing zones Over 3 days earlier than the average of checks	**R** (Resistant)	Pod Shatter Reduction

	Description	Yield % of Checks	Growing Zones /Maturity	Blackleg Rating	Agronomic trait
InVigor L234PC	Featuring Pod Shatter Reduction technology and second generation clubroot resistance, this hybrid is a great fit for growers in known clubroot-affected areas. We recommend growing InVigor L234PC with second generation clubroot resistance after two cycles of growing first generation clubroot-resistant hybrids in clubroot-affected areas or when clubroot symptoms are noticed in first generation clubroot-resistant hybrids (whichever comes first).	**104%** of the checks (InVigor 5440 and Pioneer® 45H29) in 2017 WCC/RRC trials	All growing zones 3 days earlier than the average of checks	**R** (Resistant)	Pod Shatter Reduction Second generation multigenic clubroot resistance
InVigor L255PC	InVigor L255PC offers Pod Shatter Reduction and first generation clubroot resistance and separates itself from other hybrids due to its very impressive standability. A great fit for growers in the mid to long growing zones.	**109%** of checks (InVigor 5440 and Pioneer® 45H29) in 2016 WCC/RRC trials	Mid to long growing zones 3 days earlier than the average of checks	**R** (Resistant)	Pod Shatter Reduction First generation clubroot resistance
InVigor L241C	You can expect strong standability and high yields from this mid-maturing hybrid with first generation clubroot resistance. InVigor L241C is well suited for growers who prefer to swath in all clubroot-affected regions of Western Canada.	**102%** of checks (InVigor 5440 and Pioneer® 45H29) in 2012/2013 WCC/RRC trials	All growing zones 1 day earlier than the average of checks	**R** (Resistant)	First generation clubroot resistance
InVigor L252	A consistent top performer, InVigor L252 continues to offer incredible yield performance and strong standability with mid-season maturity for growers that prefer to swath.	**110%** of checks (InVigor 5440 and Pioneer® 45H29) in 2011/2012 WCC/RRC trial	All growing zones 1 day earlier than the average of checks	**R** (Resistant)	
InVigor L230	Early-maturing InVigor L230 displays outstanding yield potential with excellent standability. This hybrid is ideal for growers who prefer to swath.	**103.9%** of checks (InVigor 5440 and Pioneer® 45H29) in 2014/2015 WCC/RRC trials	All growing zones 3 days earlier than the average of checks	**R** (Resistant)	
InVigor health L258HPC	InVigor Health L258HPC offers the security of a contract premium. This high-yielding hybrid is suitable for all mid to long growing zones and offers patented Pod Shatter Reduction technology as well as first generation clubroot resistance. InVigor Health L258HPC produces a specialty oil profile that is more heat stable and higher in oleic acid.	**104.9%** of the checks (InVigor 5440 and Pioneer® 45H29) in 2017 WCC/RRC trials	Mid to long growing zones 1 ½ days later than the average of checks	**R** (Resistant)	Pod Shatter Reduction First generation clubroot resistance Specialty oil

[1] Western Canadian Canola/Rapeseed Recommending Committee.
[2] 2019 and 2020 BPI (Business Planning Information) Data.

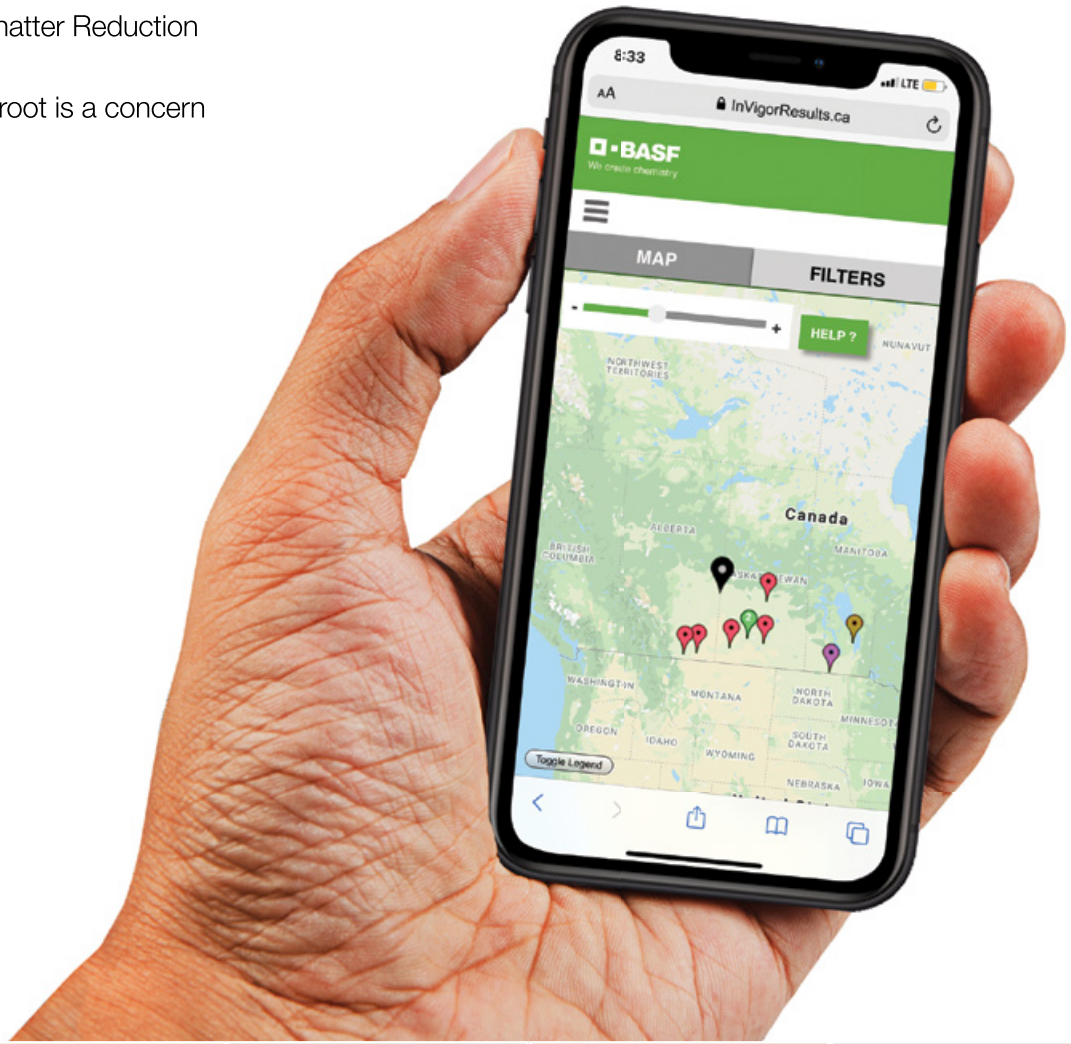
Results that speak for themselves.

Every year across Western Canada, BASF conducts numerous Demonstration Strip Trials (DSTs) where InVigor hybrids are compared to the leading competitive hybrids in replicated, third party verified trials. Growers can access the InVigor DST data at **InVigorResults.ca**. The site features a DST map that showcases localized trial results and compares the performance of InVigor hybrid canola versus the competition.

The InVigor DST results website provides:

- Localized trial results from your area
- Access to information on straight cut results for InVigor Pod Shatter Reduction canola hybrids
- Comparisons of clubroot-resistant hybrids in areas where clubroot is a concern
- Access via smartphones and all Internet-enabled devices
- The ability to save and/or share trial data

*New this year, Agronomic Excellence trial results will be available along with the Demonstration Strip Trial results on **InVigorResults.ca** to give you the most comprehensive results we've ever had.*



30 million acres later.

The patented Pod Shatter Reduction trait is unique in that it naturally strengthens pod seams and stems to give the plants excellent pod shatter characteristics and safely retain the seeds in the pod until you are ready to harvest. These yield-enhancing properties can result in a fuller pod, larger seeds and lower green seed counts. Pod Shatter Reduction hybrids continue to prove that they stand up to the elements.

Want to see the Pod Shatter Reduction difference? Check out these videos at **agsolutions.ca/WillitShatter.**

The Pod Shatter Reduction advantage.

- Helps protect your yield
- Harvest flexibility to delay swath or straight cut
- Reduces harvest loss from late fall harvests and overwintered canola
- Minimize the impact of late-season wind, hail and snow
- Longer pod fill resulting in larger seeds and maximizing yield
- Reduces volunteer canola

Pod shatter:
Refers to the pre-harvest release of seeds, when the pod seam and connective tissue break apart and release seeds.

Pod drop:
Indicates the loss of an entire pod from a weakened stem.

InVigor keeps yield in the bin.

See the difference the patented Pod Shatter Reduction trait makes during adverse conditions for yourself. Below is a visual tool for how our Pod Shatter Reduction hybrids performed during hail, and high winds compared to leading competitors' hybrids.

InVigor L233P

InVigor L345PC

Dekalb® DKTF 92 SC with "excellent pod integrity"

Pioneer® brand 45CM39 with Pioneer Protector® HarvestMax trait suitable for late harvest

NEW InVigor L340PC

NEW InVigor L357P

InVigor L345PC

InVigor choice LR344PC

InVigor L233P

InVigor L234PC

InVigor L255PC

InVigor health L258HPC

Note: Results may vary depending on the type of equipment used (including settings), environmental factors and/or preferred management practices. The trial experienced adverse weather conditions. Yield data was not used for this comparison. The photos above demonstrate the differences in trait performance only. For more information on yield results, visit **InVigorResults.ca**.

The campaign against clubroot.

Clubroot is a constantly evolving disease in canola. As such, management practices need to evolve alongside the disease to minimize its impact today, as well as in the future. Sustainability of the Canadian canola industry guides our position on how to best manage clubroot and how we recommend deploying clubroot-resistant genetics. With all of this in mind, growers should implement an integrated pest management (IPM) strategy that includes:

- Canola **rotation** of a minimum of once every three years
- Taking **sanitation** steps to limit the movement of infected soil
- Control volunteer canola and other **brassica weeds** that can act as hosts for the disease
- Utilize **patch management** to limit the movement of clubroot on your farm
- **Scouting** to identify the presence of the disease
- Clubroot-resistant **genetics** are only effective as a sustainable practice if deployed as part of an IPM strategy and should not be relied upon as a single strategy to manage clubroot

Galls on infected roots

Source: Image provided by Dr. Sheau-Fang Hwang, Alberta Agriculture and Rural Development

Keep up with the ever-evolving conversation surrounding clubroot with the Put the Boot to Clubroot Webinar, hosted by BASF at agsolutions.ca/webinar.

Learn more on how to manage clubroot.

First generation clubroot-resistant hybrids.

NEW

InVigor L340PC

InVigor L345PC

InVigor L352C

InVigor choice LR344PC

InVigor L255PC

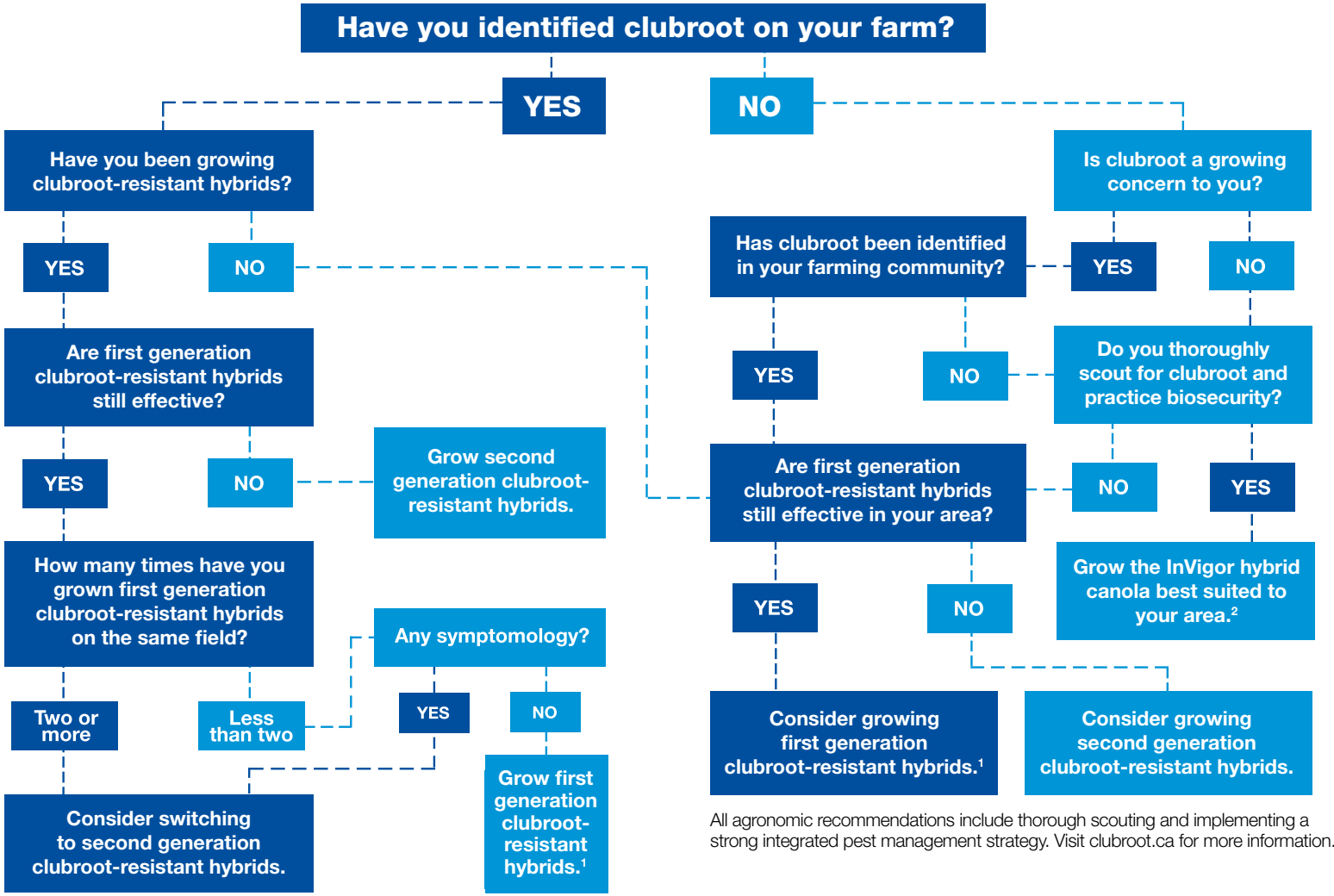
InVigor L241C

InVigor health L258HPC

Second generation clubroot-resistant hybrid.

InVigor L234PC

Selecting a clubroot-resistant option for your InVigor hybrid canola.



All agronomic recommendations include thorough scouting and implementing a strong integrated pest management strategy. Visit clubroot.ca for more information.

[1] When growing clubroot-resistant hybrids, we recommend using first generation clubroot-resistant hybrids for two cycles OR until clubroot symptoms appear, whichever comes first, then consider switching to second generation clubroot-resistant hybrids. All InVigor clubroot-resistant hybrids have been developed to be resistant to the most predominant clubroot pathotypes found in Canada at the time of their registration.

[2] For more information on clubroot-resistant options from BASF, visit **agsolutions.ca/clubroot** or call **AgSolutions®** Customer Care at 1-877-371-BASF (2273).

Results may vary on your farm due to environmental factors and preferred management practices.

A better bag of seed.

InVigor seed count packaging makes it easier to achieve 5 to 7 plants/ft^2 and features four different thousand seed weight (TSW) ranges and recommended seeding rates for seeding approximately 10 acres per bag. Make sure you calibrate your seeding equipment according to the TSW range listed on your seed bag.

Five advantages of InVigor RATE.

- **Optimized yield:** Targeting an optimal plant population that will allow InVigor hybrids to perform more consistently
- **Simplicity:** Seeding rate recommendations make it easier to achieve 5 to 7 plants/ft^2
- **Planning:** Easier to predict the number of bags needed and cost, since each bag will seed the same number of acres
- **Consistency:** Each bag contains a similar number of seeds
- **Easy to understand:** The TSW ranges and recommended seeding rates are clearly marked on the bag, making it simple to calibrate your drill

Seeding as simple as A, B, C, D.

BAG RANGE		A	B	C	D
RECOMMENDED SEEDING RATE* LBS/AC		**4.2 LBS/AC** (~10 SEEDS/FT^2)	**4.7 LBS/AC** (~10 SEEDS/FT^2)	**5.2 LBS/AC** (~10 SEEDS/FT^2)	**5.7 LBS/AC** (~10 SEEDS/FT^2)
TSW RANGE (GRAMS)		**4.0–4.4**	**4.5–4.9**	**5.0–5.4**	**5.5–5.9**
BAG WEIGHT	LBS	42.2	47.0	51.8	56.7
	KG	19.1	21.3	23.5	25.7
# OF SEEDS/BAG		MINIMUM 4.25 MILLION SEEDS			
SEEDS APPROXIMATELY 10 ACRES PER BAG					

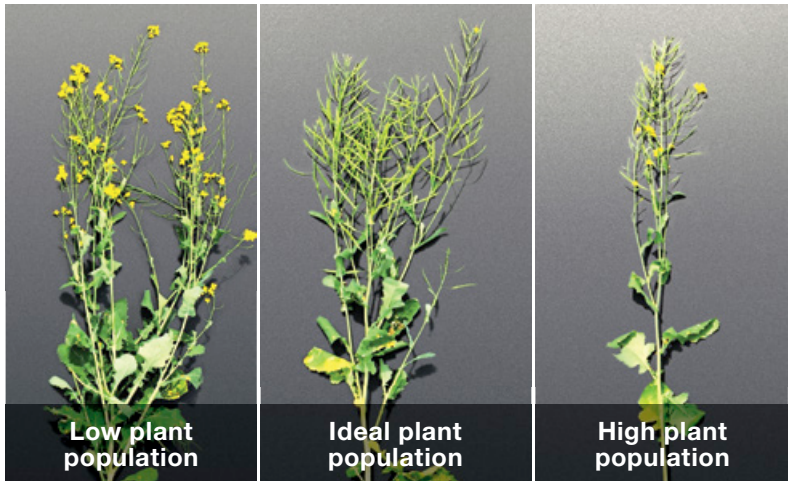
*Recommended seeding rates are calculated according to seeding approximately 10 seeds/ft^2 and an average survivability of 60% to achieve 6 plants/ft^2. Results may vary on your farm due to environmental factors and preferred management practices.

InVigor RATE packaging offers growers more seeds per bag for all TSWs greater than 5.0 g than traditional 50 lb bags.

The benefits of a targeted plant population.

Extensive research trials conducted by the BASF Agronomic Excellence team show that a target plant population (TPP) of **5 to 7 plants/ft²** helps optimize the yield, consistency and performance of InVigor® hybrid canola.

Effect of seeding rate on plant populations



Agronomic Excellence Trial, Carman, MB
Results may vary on your farm due to environmental factors and preferred management practices.

Accurate seeder calibration is critical to achieving desired seeding rates. For detailed instructions on how to calibrate your seeding equipment, contact the manufacturer.

*For more information on InVigor RATE and seed count packaging, visit **agsolutions.ca/InVigorRATE.***

InVigor® RATE

Liberty & Trait Agreement.

The Liberty & Trait Agreement (LTA) is a contract between BASF and a grower customer which grants the grower with a limited license to possess and use certain innovative traits and technologies which include LibertyLink® certified canola seed, LibertyLink certified soybean seed, Liberty® herbicide and InVigor® Choice (which contains LibertyLink trait technologies and TruFlex™ canola with Roundup Ready® Technology).[1]

LTA facts.

- All growers must sign the LTA prior to their first purchase
- The LTA remains valid from the date of sign-up until the grower or BASF terminates the LTA
- Growers signing the LTA agree to use these products strictly in accordance with certain terms and conditions; by way of example:
  - Seed can only be used by the grower to plant one commercial crop in Canada. The resulting harvested crop can only be sold into the commercial grain system;
  - Growers are not permitted to plant or grow a crop from the harvested grain, nor use the crop, grain or these products for breeding or research;
  - Liberty herbicide can only be used on permitted or authorized crops
- Growers signing the LTA consent to the use of transactional information to assist in the administration and enforcement of the LTA. This includes procedures for monitoring and safeguarding the intellectual property of BASF, such as audit rights.

Access to innovation.

The LTA is more than just a contract. Ultimately, it is how growers help support our breeding research and development, which amplifies our ability to bring new hybrids to market with innovative trait technologies and yield enhancements.

How to obtain an LTA.

1. Contact your authorized LibertyLink seed and/or Liberty herbicide retailer;
2. Contact your your local BASF **AgSolutions®** Grower or Retail Representative; or
3. Call **AgSolutions** Customer Care at 1-877-371-2273 for further details

[1] Growers who purchase InVigor Choice must have a valid LTA and a valid Technology Stewardship Agreement.

Volunteers aren’t always welcome.

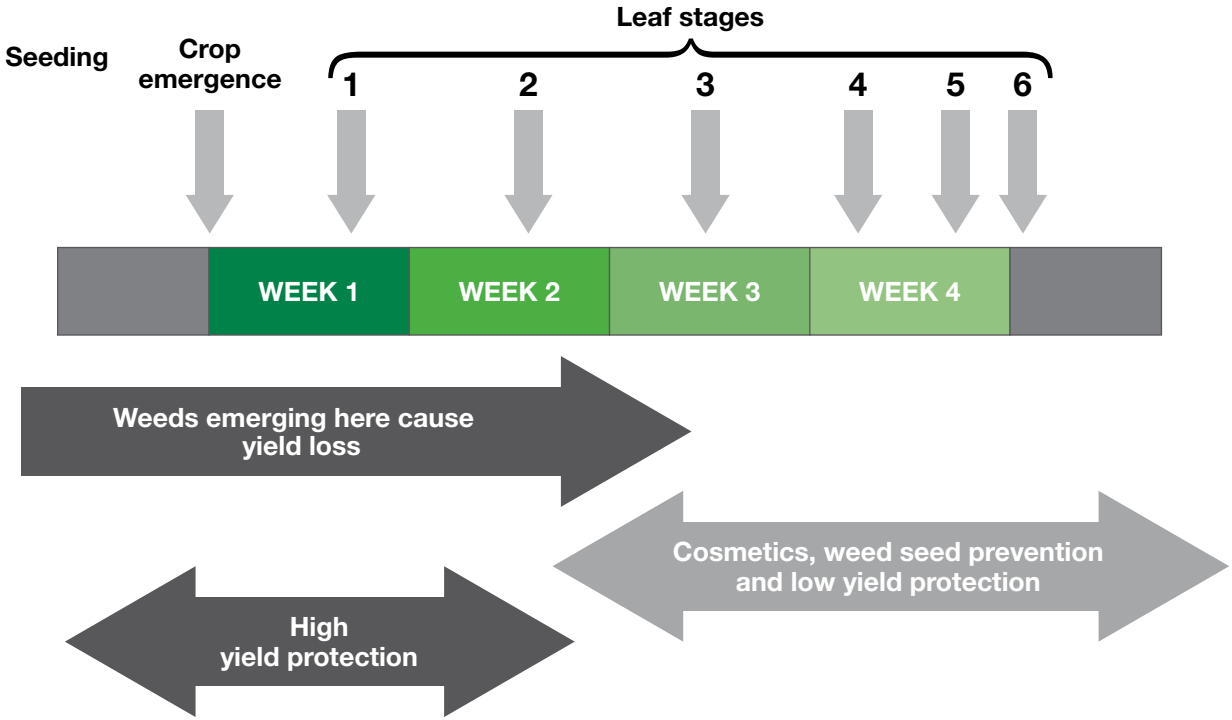
Volunteer canola creates a number of problems in the field. They lower your crop’s yield potential and also act as a host for insects and diseases (including clubroot and blackleg). This is because volunteers don’t have the same genetic resistance profiles to key pests as your hybrids.

Volunteers also add to the plant population in your canola if you don’t control them early. This makes it difficult to achieve the optimal target plant population of 5 to 7 plants/ft^2. Higher plant populations result in a taller, thinner crop that is less productive.

Volunteers from herbicide-tolerant systems require a management plan that includes rotating herbicidal modes of action. Using an effective pre-seed herbicide helps to control these volunteers so that they don’t present management, pest and yield issues later in the season—or subsequent seasons.

Take control at the right time.

For effective management of weeds, a grower should understand the weeds that are present in the field, their staging and how they impact yield/harvest.



Source: Canola Council of Canada

RESEARCH UPDATE

Certitude® Herbicide

Maximize canola yield potential by controlling key weeds at a critical time of the year.

- Certitude® herbicide delivers control of herbicide resistant kochia (Group 2, 4 and 9) and volunteer canola
- Improved sustainability with it being the first Group 27 herbicide developed for pre-seed use in canola production
- Consistent control with both contact and systemic activity

RESEARCH UPDATE

This product is currently being assessed for registration under the *Pest Control Products Act*. The information presented here is for research purposes only. This product cannot be manufactured, imported, distributed or used in Canada at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

Liberty®
Herbicide

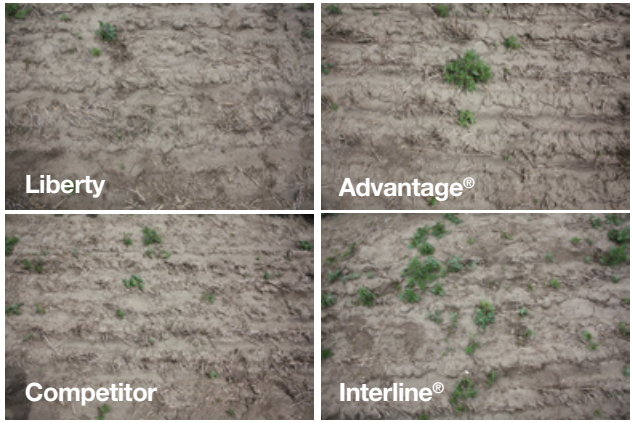
Check out our handy herbicide decision tree to see how you can effectively manage the challenges you face in your canola.

Battle herbicide resistance while effectively controlling weeds.

- Dependable, fast, broad-spectrum control of grassy and broadleaf weeds
- Group 10 mode of action provides an exceptional rotation chemistry
- Versatile rate range and no follow-crop restrictions
- The option to make two applications in a single season

Liberty and Trait Agreement (LTA)

First time purchasers of LibertyLink® canola or Liberty® herbicide need to sign an LTA at your local retailer. Click here for more information on LTAs.



Active ingredient	Glufosinate ammonium – Group 10
Formulation	Solution
Concentration	150 g/L
One case contains	2 x 13.5 L jugs Also available in 108 L shuttle and 432 L tote

Crop staging
Cotyledon, prior to bolting

Weeds controlled

Broadleafs

Canada thistle[1], cleavers[2], common chickweed, cow cockle, dandelion, flixweed, hemp-nettle, jimsonweed, kochia, lady's thumb, lamb's quarters, perennial sow thistle, redroot pigweed, round-leaved mallow, Russian thistle, scentless chamomile, shepherd's-purse, smartweed, stinkweed, stork's bill, volunteer flax, wild buckwheat, wild mustard

Grasses

Barnyard grass, brome grass (downy, Japanese)[3,4], foxtail barley[4], green foxtail, quackgrass[5], volunteer barley[6], volunteer wheat, wild oats

Application rates
At the recommended rate of 1.35 L/ac, one case treats 20 acres. One shuttle treats 80 acres. One tote treats 320 acres.

Liberty	One pass	Two passes
	1.35 or 1.62 L/ac (3.33 to 4.00 L/ha)[7,8]	1) 1.35 L/ac (3.34 L/ha) or 1.62 L/ac (4.00 L/ha)[7,8] 2) 1.35 L/ac (3.34 L/ha) or 1.62 L/ac (4.00 L/ha)[7,8]

Water volume

Ground application	45 L/ac (10 gal/ac)
Aerial application	22 L/ac (6 gal/ac)

Pre-harvest interval
60 days after application for canola.

Follow crops
70 days after application: Barley, buckwheat, millet, oats, rye, sorghum, triticale, wheat
120 days after application for all other crops except: Alfalfa, canola, dry common beans (not grown for seed), field corn, potato

[1] Suppression only. [2] Tank mix with Facet® L herbicide for control up to 6 whorls. [3] Spring-germinated brome only; best results are obtained after a pre-seed or burndown application with a glyphosate herbicide. [4] When tank mixed with Centurion® herbicide at 77 ml/ac. [5] When tank mixed with Centurion at 154 ml/ac. [6] Suppression only. Tank mix with Centurion herbicide for control. [7] Early timing of first pass at 1.35 to 1.62 L/ac is critical. A second pass of 1.35 to 1.62 L/ac may be applied 10 to 14 days after the first application for flushing weeds. [8] No more than 4.86 L/ac of Liberty herbicide can be applied in a single season.

Operation Liberty – spray tips.

Follow these steps to effectively manage broadleaf and grassy weeds in your canola:

1. Know your enemy – tank-mix options.
- a. Facet® L herbicide: Provides enhanced, consistent control of cleavers in a unique liquid formulation.
- b. Centurion® herbicide: Control wild oats, foxtail barley, volunteer barley and other tough grassy weeds.

2. Sprayer setup.
- a. Use medium to coarse droplets (250-350 microns).
- b. Avoid spraying under pressure.
- c. Stay between 40 and 80 psi.

3. Spray speed.
- a. Don't spray too fast (15 mph max).

4. Water volume.
- a. Minimum 10 gallons per acre.
- b. Don't cut water volumes - even with tank-mix partners.

5. Multiple applications.
- a. Reverse direction on second pass.

6. Application conditions.
- a. Avoid:
  - i. Windy conditions.
  - ii. Excessive moisture (rainfast period is 4 hours).
  - iii. Cool, cloudy or dry conditions that reduce herbicide absorption.
- b. Ideal conditions:
  - i. 10°C or higher and sunny.

*To see Operation Liberty in action, visit **agsolutions.ca/OperationLiberty.***

Centurion®
Herbicide

Post-emergent control of the toughest grassy weeds in canola.

- Wide window of application
- Tank-mix flexibility for enhanced weed control
- No follow-crop restrictions
- Complements Liberty® herbicide for enhanced control of grassy weeds
- Can also be applied in other crops; for a complete list, visit **agsolutions.ca/Centurion**

Effective control of grassy weeds with Centurion® herbicide

Source: BASF internal trials, 2019

Active ingredient	Clethodim – Group 1
Formulation	Emulsifiable concentrate
One case contains	3 L jug of Centurion herbicide 9 L jug of Amigo adjuvant

Crop staging
Post-emergence (apply to actively growing weeds)

Weeds controlled

Grasses

Barnyard grass
Downy brome grass[1]
Japanese brome grass[1]
Fall panicum
Foxtail barley[1]
Green foxtail
Large crabgrass
Persian darnel
Proso millet
Quackgrass[2,3]
Smooth crabgrass
Volunteer barley
Volunteer canary seed
Volunteer corn
Volunteer oats
Volunteer wheat
Wild oats
Witchgrass
Yellow foxtail

Application rates
One case treats 20 to 60 acres.

Centurion[4]	50 to 154 ml/ac (125 to 380 ml/ha)
Amigo[4]	0.5 to 1.0% v/v (e.g. 0.5 to 1.0 L per 100 L spray solution)

Water volume

Ground application	22 L/ac (6 gal/ac) minimum
Aerial application	11.3 L/ac (3 gal/ac) minimum

Pre-harvest interval
60 days after application for canola.

Check out our handy herbicide decision tree to see how you can effectively manage the challenges you face in your canola.

[1] When tank mixed with Liberty herbicide.
[2] Apply at 154 ml/ac (380 ml/ha) for season-long control.
[3] Suppressed at 77 ml/ac (190 ml/ha). Follow-up with a fall application of glyphosate for clean fields next season.
[4] Use Amigo adjuvant at 0.5% v/v for the 40 and 60 acre/case application rates (50 and 75 ml/ac) of Centurion. Use at 1.0% v/v for the 20 acre/case application rate (154 ml/ac) of Centurion.

Facet® L

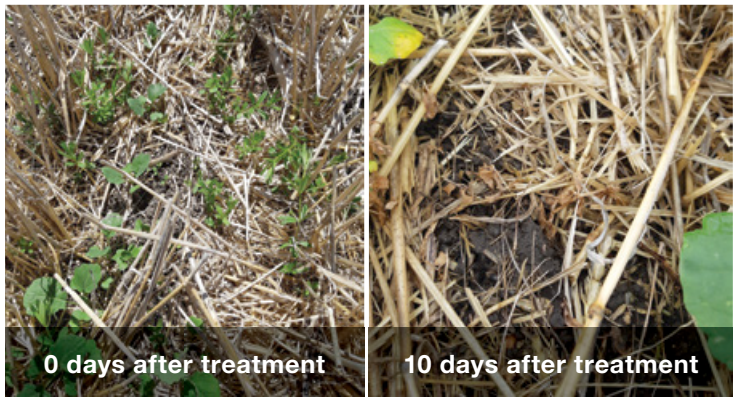
Herbicide

Check out our handy herbicide decision tree to see how you can effectively manage the challenges you face in your canola.

Superior control of cleavers in a unique liquid formulation.

- Complements Liberty® herbicide for enhanced control of cleavers
- Easy-to-use liquid formulation
- Consistent control with both contact and systemic activity[1]

Liberty + Facet® L herbicide cleavers control



Source: 2020 Demonstration Strip Trial, Provost, AB

Active ingredient	Quinclorac – Group 4
Formulation	Soluble liquid
One case contains	2 x 9.07 L jugs

Crop staging
Pre-seed/pre-emergence to 6 leaf

Weeds controlled

Broadleafs
Annual sow thistle[2]
Cleavers[3]
Perennial sow thistle[2]
Volunteer flax

Grasses
Barnyard grass
Green foxtail[4]

Application rates
One case treats 160 acres at the recommended in-crop rate of 113 ml/ac.

Pre-seed/pre-emergence application

Facet L	227 to 279 ml/ac (560 to 690 ml/ha)

In-crop tank mix application

Facet L	113 ml/ac (279 ml/ha)
Merge® adjuvant[5]	0.5% v/v (e.g. 500 ml per 100 L spray solution)

Water volume
Ground application only 40 L/ac (10 gal/ac)

Pre-harvest interval
60 days after application for canola.

Follow crops
0 months (same season): Barley (spring), canola, wheat (spring, durum)
10 months after application: Field peas, sunflowers, oats
22 months after application: Flax, lentils, soybeans

[1] When tank mixed with Liberty herbicide.
[2] Suppression only.
[3] For control of secondary flushes, apply pre-seed at a higher application rate of 279 ml/ac (690 ml/ha).
[4] For suppression of secondary flushes, use higher application rate of 227 ml/ac (560 ml/ha).
[5] Merge adjuvant may be required and is not included in the case. For additional information and tank mixes, see product label.

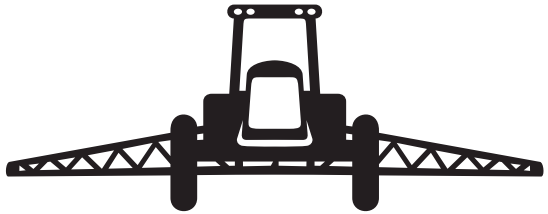
Two spray or not two spray.

Take action against weeds and other pests in your canola crop by choosing the products that best fit the needs of your operation. Start by identifying whether you need to do one or two passes of Liberty® herbicide. With newly registered application rate practices, you can now apply Liberty up to 1.62 L/ac on your InVigor® canola twice a season. In situations where you have a high pressure of troublesome weeds, it is recommended you apply Liberty at 1.62 L/ac for optimal control.

1 or 2 passes of Liberty?

1 PASS

- 1.35 L/ac or 1.62 L/ac
- Low weed pressure
- Excellent spraying conditions
- Small weeds



2 PASS

- 1.35 L/ac or 1.62 L/ac
- Medium to high weed pressure
- Marginal spraying conditions
- Multiple flushes

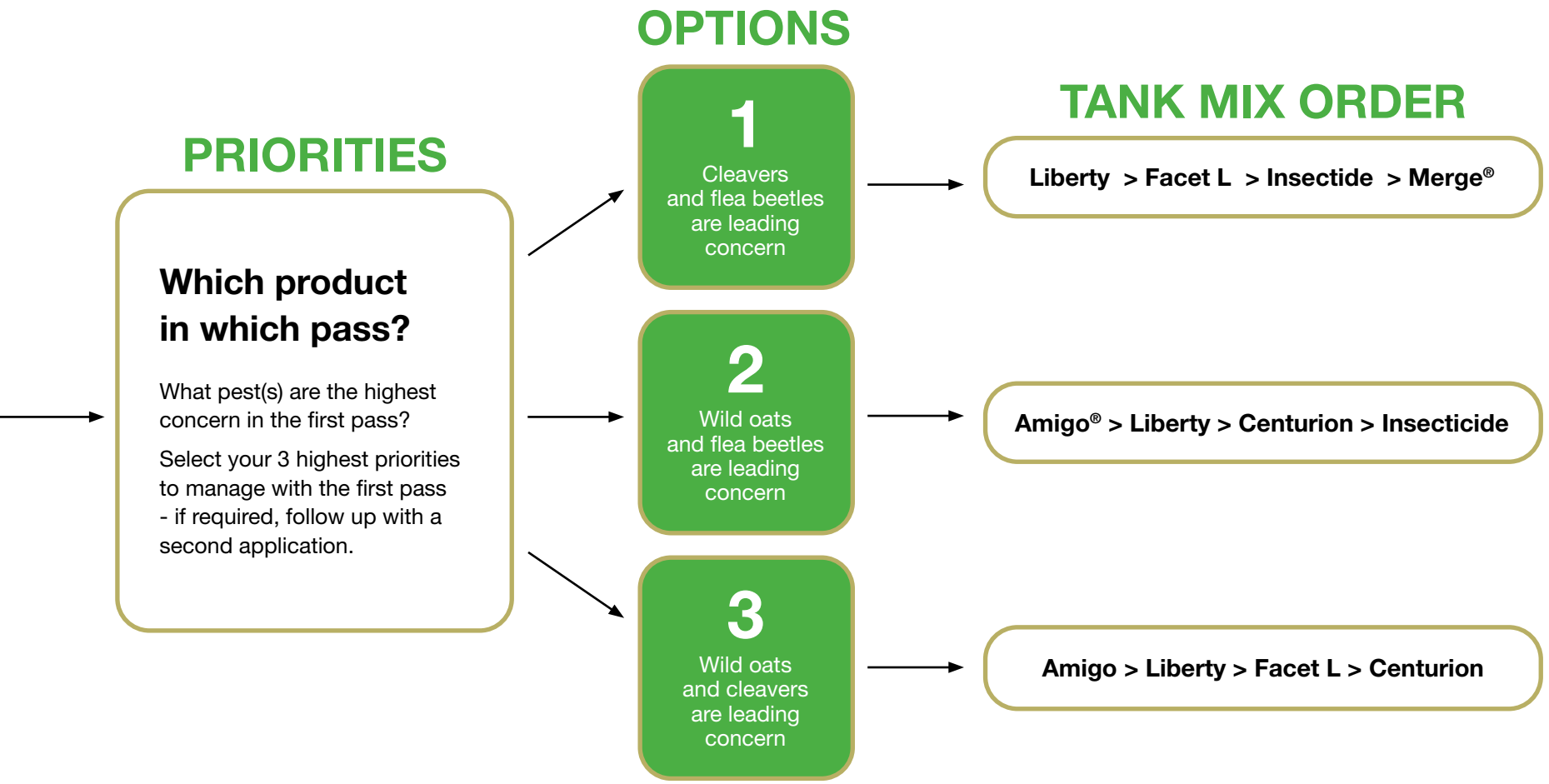
TANK-MIX PARTNERS

Facet® L herbicide (cleavers)
Centurion® herbicide (grasses)
Insecticide
Nexicor® fungicide (blackleg)

There can be a total of 3 products in the spray tank at one time.

Split apply if more than 3 are needed.

Once you've determined if you need one or two passes of Liberty, identify what pest(s) are your highest concerns to determine which products should be tank mixed and applied to your canola.



Nexicor fungicide is safe to tank mix with Liberty, Facet L, Centurion and an insecticide – however it is recommended that you only tank mix three of these products at one time to avoid potential crop tolerance issues and residue in your spray tank.

Your best strategy for dealing with disease in canola? Prevention.

Blackleg, sclerotinia and clubroot are three of the most important diseases affecting canola yield potential in Western Canada. The table below provides greater insight into these damaging diseases.

	Blackleg	Sclerotinia	Clubroot
Pathogen	*Leptosphaeria maculans*	*Sclerotinia sclerotiorum*	*Plasmodiophora brassicae*
Visual symptoms	Lesions on cotyledons, leaves, stems and pods.	Soft, watery rot on leaves or stems.	Irregular club-like galls on roots.
	Leaf spots are dirty-white, roundish and spotted with pepper-like pycnidia.	Split stems reveal round or cylindrical, seed-like black sclerotia bodies.	Early-season infection: plants appear heat- or drought-stressed.
	Dry rot or cankers at base of stem.	Bleached stems with whitish appearance.	
Crop symptoms	Severe cankers at stem base can girdle stem after flowering, and sever, resulting in lodging.	Severely infected, girdled stems wilt, ripen early and are straw-coloured in a crop that is otherwise green.	Wilting, stunted growth, yellowing or premature ripening and shriveled seed.
Fungicide application	Before symptoms appear. 2 to 6 leaf.	Before symptoms appear. 20% to 50% flowering.	No fungicide registered for control of clubroot.
BASF solution	Nexicor® fungicide (202 ml/ac)	Cotegra® fungicide (240 ml/ac)	InVigor clubroot-resistant hybrids
Scouting	Begin scouting at cotyledon to determine if a problem exists and a fungicide is necessary. The best time to scout is immediately after cutting because you can get into the field easily. Scouting at flowering is great but offers no time for in-season adjustments since the fungicide application window has passed. Scouting and making notes at harvest provides a clearer picture for next season.	Scout for moist conditions within the crop canopy and soil surface. Assess the crop's yield potential and moisture level in the canopy. If the yield potential is above 35 bu/ac and moist conditions are present at flowering, a fungicide application is recommended.	Scout for areas of premature ripening or thin canola. Pull plants in potentially infected areas to look for characteristic gall formations.

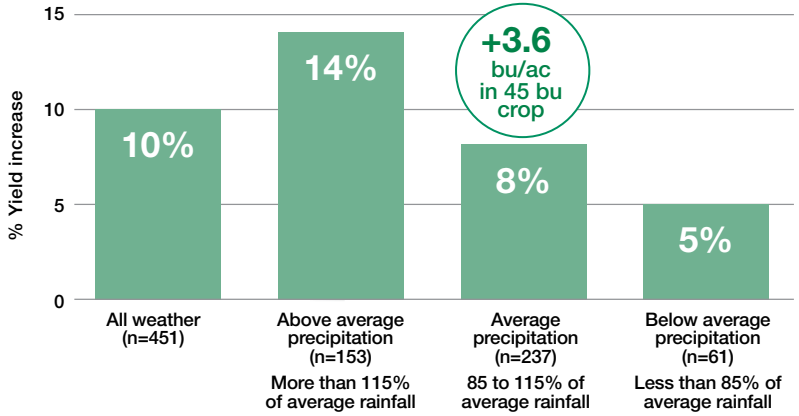
Don’t let sclerotinia run wild. Stay in control.

Sclerotinia can be very destructive, causing yield reductions of up to 50% or more. The disease can survive in the soil for five years or more, building up year after year, and waiting to germinate in ideal conditions. Even in drier weather it can be a problem, as improved canola genetics have led to thicker canopies, which create the ideal microclimate for the pathogen to infect.

Infection results in premature ripening, leading to smaller and fewer seeds, pod shatter and loss of lighter seed during combining. Plus, excessive lodging can spread infection through stems that contact one another and hamper efficient harvesting.

A sclerotinia fungicide protects yield potential in canola under all weather conditions, with its most pronounced benefits being in above average precipitation environments—when disease development is at its highest risk.

Yield increase with application of a sclerotinia fungicide



Under average precipitation, a sclerotinia fungicide provides 8% yield increase. In a 45-bushel canola crop, this is 3.6+ bushel/acre.

Source: 2007-2017 randomized complete block design (RCBD) Research and Commercial Development (RCD) trials, BASF Canada, n=451[1]

[1] Percent yield increase over untreated at each site.

Timing is critical for a fungicide application. Ideal fungicide application timing is between 20% and 50% flowering or prior to significant petal drop. This is because the largest number of flowers will be open and the greatest number of petals will be covered by the fungicide application. Part of the fungicide application will penetrate the canopy to help protect other infection sites, including leaf axils.

10% flowering
(10 open flowers on main stem)

20-50% flowering
(15-20 open flowers on the main stem)

60% flowering
lower petals are dropping
(>30 open flowers on main stem)

To determine what stage the canola crop is at, count the number of flowers and pods on the main stem. The main stem is where the majority of yield potential is coming from and is the most important to protect.

20% flowering	50% flowering
• Approximately 15 open flowers and pods on the main stem • Fungicide applications should begin	• Number of open flowers and pods on the main stem exceeds 20 • Canola field will be at its most yellow • Optimal fungicide application window is closing

*With xarvio™ FIELD MANAGER and Zone Spray you can optimize your fungicide application and avoid treating areas with no economic benefit, saving you time and money. Download the free app at **xarvio.ca**.*

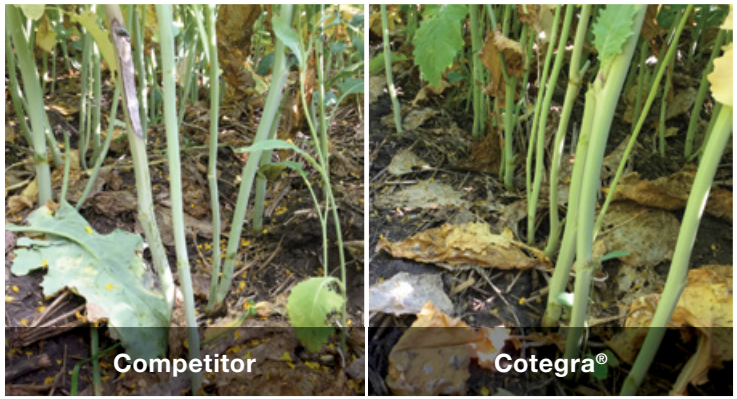
Cotegra®

Fungicide

The new standard for sclerotinia management.

- Delivers industry-leading disease management
- Combines two leading active ingredients in a convenient liquid premix
- Provides significant yield improvements in canola, lentils, chickpeas, soybean and dry beans
- Can also be applied in peas, lentils and soybeans; for a complete list of crops, visit **agsolutions.ca/Cotegra**

Sclerotinia management in canola



Source: BASF Research Authorization trials, Bruno, SK, 2016

Active ingredients	Boscalid – Group 7 Prothioconazole – Group 3
Formulation	Suspension concentrate (SC) liquid pre-mix
One case contains	2 x 9.8 L jugs

Crop staging

20 to 50% flowering

Diseases controlled

Sclerotinia stem rot (*Sclerotinia sclerotiorum*)

Application rates

One case treats 80 acres at the recommended rate.

Cotegra	240 to 280 ml/ac (0.6 to 0.7 L/ha)[1]

Water volume

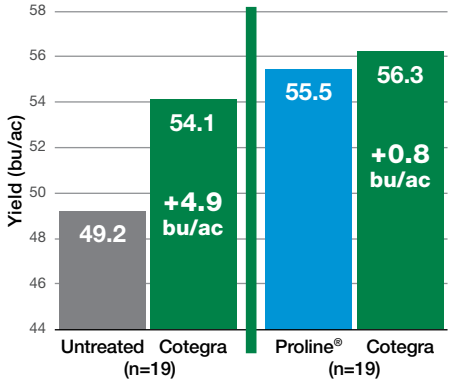
Ground application[2]	40 to 80 L/ac (10 to 20 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval

36 days after application for canola, oriental mustard and rapeseed.

The Cotegra advantage

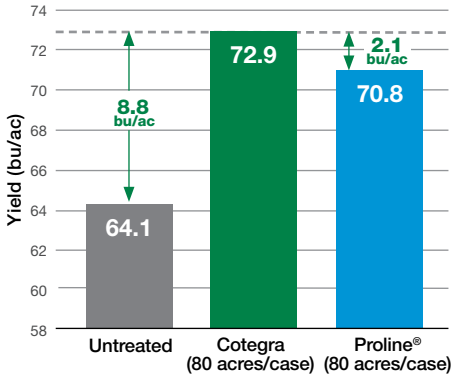
2016-2019 AgSolutions® Performance Trials



Trials comparing Cotegra to typical application procedures on the farm.[3]

Source: Yield comparisons of 2016-19 **AgSolutions** Performance Trials (grower-applied)

Cotegra: Performance when it matters



Average incidence over 16 trials was 80.4% with 16 of 16 trials having >50% incidence.

Source: 16 RCBD Research and Commercial Development (RCD) trials, 2016-2017, 2019[4,5]

[1] Use the high rate if weather conditions are favourable for disease development (i.e. high humidity/moisture) and/or when risk for disease development is high (i.e. narrow host rotation with disease history and high potential for inoculum).
[2] Higher water volumes recommended for optimal coverage.
[3] For all trials, Cotegra was applied at the 240 g ai/ha (80 ac/case) rate.
[4] Trials were conducted under conditions favourable to the onset of disease to test product performance under high disease pressure.
[5] Average sclerotinia incidence was 80.4% with all trials having over 50% disease incidence (50%+ of plants in field being infected).

Lance®

Fungicide

A proactive approach to disease control in canola.

- Preventative protection against diseases including sclerotinia and alternaria
- Works on sprayed areas and moves systemically to protect treated areas as they expand
- For a complete list of crops, visit **agsolutions.ca/Lance**

Control of sclerotinia stem rot with Lance® fungicide

Source: **AgSolutions®** Performance Trials, AB, 2012

Active ingredient	Boscalid – Group 7
Formulation	Wettable granules
One case contains	2 x 2.83 kg jugs

Crop staging
20 to 50% flowering[1]

Diseases controlled
Alternaria black spot *(Alternaria brassicae* and *raphani)*
Sclerotinia stem rot (*Sclerotinia sclerotiorum*)

Application rates
One case treats 40 acres.

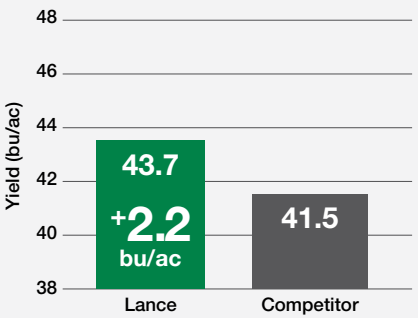
Lance	142 g/ac (350 g/ha)

Water volume

Ground application	40 L/ac (10 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval
21 days after application for canola

Increased yield with Lance fungicide vs competitor on canola



Source: **AgSolutions** Performance Trials, 2008-2012, n=27

Increase yield with Lance fungicide

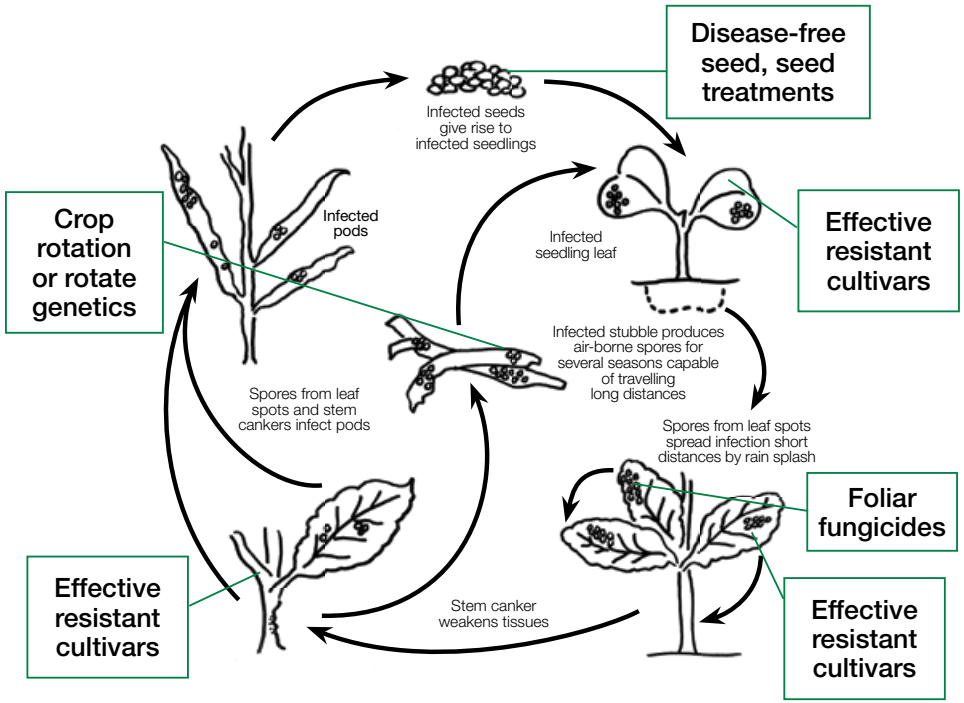
Source: Lance trial, Moose Jaw, SK, 2012

[1] To control sclerotinia stem rot and suppress alternaria black spot. Apply at late flowering to early green pod to control alternaria black spot.

Blueprints for managing blackleg.

Blackleg is a fungal disease that can infect canola from the seedling stage onward. As the season progresses, it will restrict moisture and nutrient uptake through the stem, leading to yield loss.

Blackleg disease cycle



Source: Canola Council of Canada

*To calculate yield loss from blackleg in your canola, visit **agsolutions.ca/blackleg_calculator.***

With the rise in canola demand and shortened rotations, blackleg is shifting towards increasingly virulent blackleg pathotypes. In order to manage these shifting populations, growers need to integrate multiple industry best practices.

1. Scout for blackleg.

If blackleg has not been an issue on your farm, continue to use the hybrid that has the best agronomic fit for your field and ensure you actively scout your fields to monitor for infection.

2. Lengthen rotations.

Maintain a break between canola crops to allow time for crop residue to decompose. If blackleg becomes established in the field, a minimum break of two to three years is recommended in addition to other management strategies.

3. Adopt newest R-rated hybrids.

If blackleg becomes established in the field, grow hybrids (i.e. the newest InVigor hybrids) that have been tested against the latest blackleg populations for robust protection.

4. Use a foliar fungicide for blackleg.

Apply a blackleg fungicide in the spring if blackleg is a concern. Chemistry can be an excellent resistance management tool to support genetics.

Blackleg protection.

To stay ahead of blackleg in Western Canada, an integrated pest management plan needs to be implemented to have a meaningful impact on blackleg levels. Our breeders recognize the importance genetics can play in managing blackleg by ensuring InVigor hybrids contain both minor and major gene resistance. Major gene resistance is very effective against blackleg when matched against the corresponding race. Minor gene resistance not only helps to protect the longevity of major gene resistance but is also generally effective across multiple blackleg races, as found in any field population. By delivering a minor and major gene resistance approach, our breeders ensure InVigor contains robust and effective blackleg resistance.

All InVigor hybrids are rated "R" for resistant to blackleg.

Nexicor®

Xemium® Fungicide

See the difference Nexicor can make.

Once infected, fungicides cannot completely eradicate disease. An early, preventative blackleg fungicide application has been shown to reduce the incidence and severity of infection.

Nexicor® fungicide combines three powerful modes of action to deliver a new level of blackleg management. It builds on the proven benefits[1] of **AgCelence®** to increase growth efficiency and to help better manage minor stress, leading to greater yield potential and improved profitability.[2] It's the ideal addition to any integrated disease management plan when necessary.

Source: **AgSolutions** Performance Trials, 2016

Active ingredients	Pyraclostrobin – Group 11 Fluxapyroxad – Group 7 Propiconazole – Group 3
Formulation	Emulsifiable concentrate
One case contains	2 x 8.0 L jugs
Storage	Store above 0˚C
Application rate	202 ml/ac (80 ac/case)

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.

The dirt on clubroot.

Clubroot is a serious soil-borne disease in canola. Infected roots develop galls that impede water and nutrient uptake. This can hasten growth and development, leading to lower yields.

The best way to confirm the presence of clubroot is to dig up plants that appear to be dying or prematurely ripening. Infection leads to galls on the roots, ranging from tiny nodules to large club-shaped outgrowths. Galls are firm and white but become soft and greyish-brown as they mature and decay. Infected plants show signs of wilting, stunting and yellowing, but considerable damage can be done below ground before symptoms aboveground begin to appear. The crop may also ripen prematurely and lead to shriveled seeds.

Galls on infected roots

Source: Image provided by Dr. Sheau-Fang Hwang, Alberta Agriculture and Rural Development

Patches of prematurely ripened canola could be a sign of clubroot

Source: Strelkov, S., 2015, "Found in clubroot disease of canola and mustard", Agri-Facts, Alberta Agriculture and Rural Development

Click here for more information on integrated clubroot management practices and how to effectively deploy clubroot-resistant genetics in your field.

Steps to a better straight cut.

If you are planning to straight cut your canola this upcoming season, below are some factors you should consider:

Consider a straight cutting suitable hybrid.

InVigor Pod Shatter Reduction (PSR) hybrids contain the patented PSR trait, and a reduced propensity for pod drop. This combination provides the ideal hybrid for straight cutting. These hybrids deliver high yield potential even when left standing in the field during challenging weather conditions.

Manage disease preventatively.

Diseases (e.g. blackleg, clubroot, sclerotinia) can cause uneven maturity, premature ripening, pod drop and shatter loss. Lodging reduces standability, hindering the straight cutting process. Take a preventative approach that includes crop rotation, hybrid selection and foliar fungicides.

Monitor seeding rate to achieve desired target plant population.

Growers should strive for a target plant population of 5 to 7 plants/ft^2 to ensure a uniform stand, which in turn allows the field to mature evenly.

Eliminate weeds.

Clean fields are easier to straight cut. Weeds, when still green, can cause both harvest and storage issues.

Look out for green plant material.

Monitor your harvested canola seed, even if it comes off dry, as there is a greater chance of plant material making it into the sample.

Consider a pre-harvest herbicide.

Heat® LQ herbicide tank mixed with glyphosate provides a complete crop and weed dry down for an easier harvest.

Maintain appropriate combine settings and reel speeds.

You must re-evaluate all of your combine settings when straight cutting, which could involve slower harvest speeds. If you are using a reel, ensure the speed of the reel matches the speed of your combine.

*Need a few more things straightened out? Visit **agsolutions.ca/straightcutguide** for more information.*

Harvest Management

Heat® LQ

Powered by **Kixor®** Herbicide

PRE-HARVEST

Have an easier harvest with Heat® LQ herbicide.

- Complete crop and weed dry down
- Easier crop cutting to reduce operator stress
- Harvest more bushels per hour and cover more acres per liter of fuel[1]
- Improves dry down of InVigor Pod Shatter Reduction hybrids to finish the season strong and complete harvest quicker
- Can also be applies in cereals, peas and lentils, and soybeans; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Canola, 16 days after an application

Source: **AgSolutions®** Performance Trials, Swan River, MB, 2015

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 2 x 8.1 L jugs of Merge adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Crop staging[2]

Apply when the canola crop has reached 80% seed-colour change on the main stem.

Application rates

One case treats 40 acres.
One tote treats 1,000 acres.

Heat LQ	43 ml/ac (106 ml/ha)
Glyphosate[3] (360 g ae/L)	1.0 L/ac (2.5 L/ha)
Merge adjuvant[4]	200 to 400 ml/ac (0.5 to 1 L/ha)

(Heat LQ should always be tank mixed with glyphosate when applied pre-harvest on canola.)
(Use all Merge included in the case or tote of Heat LQ.)

Water volume

Ground application — 40 L/ac (10 gal/ac) minimum
(BASF recommends using higher water volumes for best results, specifically on canola.)

Aerial application[5] — 20 L/ac (5 gal/ac)

Pre-harvest interval

3 days after application for canola.

Follow crops

In the spring following a fall application

Barley (spring, malt, winter), canary seed, canola, chickpeas, corn (field and sweet), field peas, flax, lentils, oats, soybeans, wheat (incl. **Clearfield®** wheat, spring, winter, durum)

Note: Consult glyphosate label for more information including pre-harvest interval.

[1] PAMI, 2017, Research Report. Straight cutting canola in Manitoba: Comparison of pre-harvest aids.
[2] Heat LQ herbicide must be applied after physiological maturity (less than 30% seed moisture).
[3] Glyphosate is not included in the case.
[4] Merge adjuvant is required and is included with Heat LQ herbicide. Use all Merge included in the case.
[5] Heat LQ is registered for aerial applications. Some glyphosate formulations are also registered for aerial applications; therefore, Heat LQ plus glyphosate can be applied through aerial applications when both products have aerial registrations.

There’s nothing more exciting than a dry harvest.

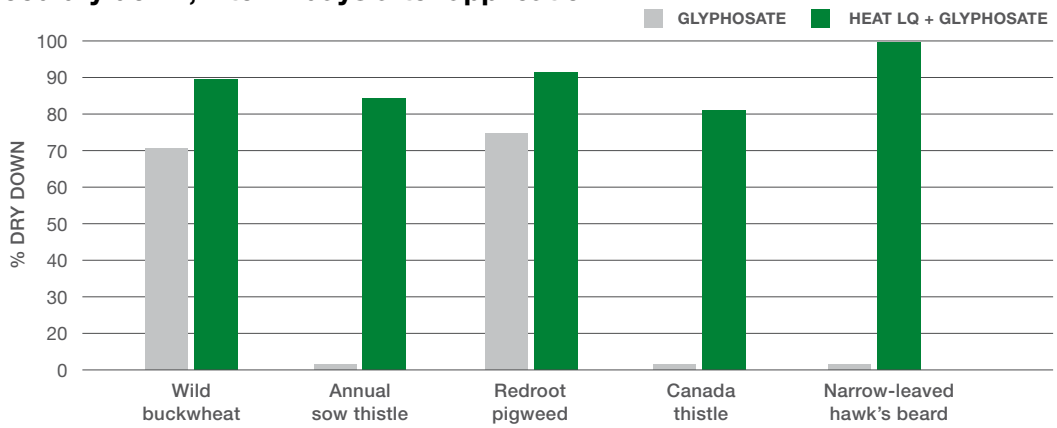
A pre-harvest herbicide speeds up the rate of dry down but doesn’t help the crop mature. That’s why a well-timed application is critical to maximizing your yield and quality at harvest.

Apply a pre-harvest herbicide when 80% of seeds within the pods have changed colour. Pods must be opened to determine seed colour. Seeds on the bottom 3/4 or more of the main raceme will have started to change colour to dark brown or black.

Too early for application

Optimal timing for application

Weed dry down, 4 to 22 days after application

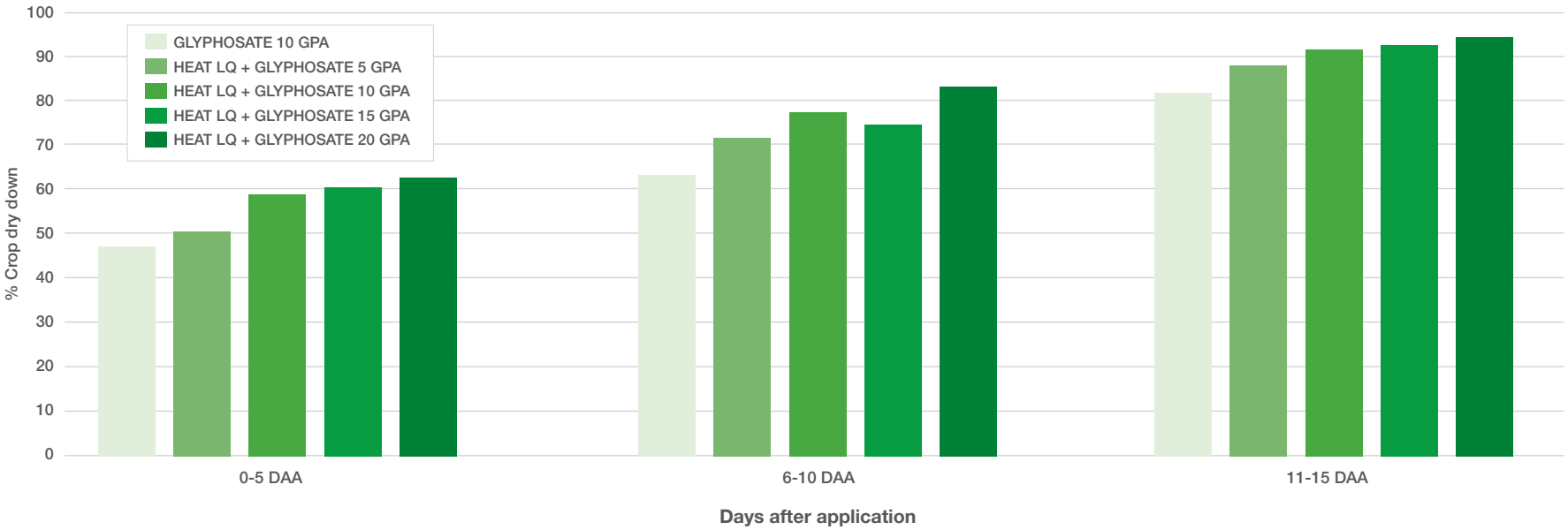


Source: **AgSolutions** Performance Trials, Western Canada, 2013-2014

When it comes to water, turn up the volume.

Canola can have very dense canopies, especially at harvest. To dry down green stems and weeds, your pre-harvest herbicide must first penetrate the canopy by using the recommended water volumes.

The impact of water volume on dry down efficiency



Source: BASF Performance Trials, Western Canada, 2016, n=3

"Are we trying to get the spray to the lower part of the canopy? Perhaps to desiccate some stems? Perhaps even to do some pre-harvest weed control? To do that, we need more water."

Tom Wolf,
Agrimetrix Research & Training

Fine tune your pre-harvest herbicide application timing with the help of our staging guide, which you can find at agsolutions.ca/heatlq/stagingguide.

A fine crop like yours? Everything wants a bite of it.

Be cautious of beneficial pollinators.

Provide nearby beekeepers 48 hours' notice before applying an insecticide. Spray at dawn or dusk when honeybees are not foraging. Communicate with beekeepers through the BeeConnected® app at **croplife.ca/beeconnected-app**. Pay attention to any non-pest insects during scouting to assess the level of natural pest predators to determine the need for a foliar insecticide.

Scouting schedule by plant growth stage

Pre-seed/ Seedling	Seedling	Rosette	Budding	Flowering	Ripening
				Bertha armyworm m²	
	Cabbage root maggot				
		Cabbage seedpod weevil			
Cutworms					
	Diamondback moth				
Flea beetles					Flea beetles
		Grasshopper m²			
			Lygus bug		

Plant counts – The number of insects per canola plant

m² **Area insect count** – The number of insects/metre²

Sweep net count – Using a 38 cm diameter net, sweep a full 180° arc 10 times/100 acres

Root zone inspection – Look for insects near roots or on plants

Percentage defoliation – Percentage of area eaten away

Source: Canola Council of Canada, Canola Insect Scouting Guide

Bertha armyworm economic threshold table

Expected Seed Value ($/bushel)											
Spraying cost ($/acre)	6	7	8	9	10	11	12	13	14	15	16
Number of larvae per square metre											
7	20	17	15	13	12	11	10	9	9	8	8
8	23	20	17	15	14	13	11	11	10	9	9
9	26	22	19	17	16	14	13	12	11	10	10
10	29	25	22	19	17	16	14	13	12	11	11
11	32	27	24	21	19	17	16	15	14	13	12
12	34	30	26	23	21	19	17	16	15	14	13
13	37	32	28	25	22	20	19	17	16	15	14
14	40	35	31	27	24	22	20	19	17	16	15
15	43	37	32	29	26	23	22	20	19	17	16

BERTHA ARMYWORM

Larvae

Source: Manitoba Agriculture

Pupa

Source: Canola Council of Canada

Adult

Source: Manitoba Agriculture

Economic threshold: provided by government websites and depend on insecticide cost and canola value.

Lygus bug economic threshold table

Lygus bug thresholds in canola at end of flowering							
Application cost		**End of flowering (Canola crop stages 4.4 to 5.1)**					
%/ha	**$/ac**	**Economic injury level (Number of lygus bug/10 sweeps)**					
22	8.00	11	8	7	5	5	4
25	10.00	13	10	8	7	6	5
27	12.00	16	12	10	8	7	6
30	14.00	19	14	11	9	8	7
32	16.00	22	16	13	11	9	8
35	18.00	24	18	15	12	10	9
Canola price ($/bu)		6.00	8.00	10.00	12.00	14.00	16.00

Lygus bug thresholds in canola at pod ripening							
Application cost		**Pod ripening (Canola crop stages 5.2)**					
%/ha	**$/ac**	**Economic injury level (Number of lygus bug/10 sweeps)**					
22	8.00	15	12	9	8	7	6
25	10.00	19	14	11	10	8	7
27	12.00	23	17	14	11	10	9
30	14.00	27	20	16	13	11	10
32	16.00	30	23	18	15	13	11
35	18.00	34	26	20	17	15	13
Canola price ($/bu)		6.00	8.00	10.00	12.00	14.00	16.00

LYGUS BUG

Nymph

Source: Canola Council of Canada

Adult

Source: Clark, J.K., University of California

Economic threshold: provided by government websites and depend on insecticide cost and canola value.

Insect identification.

CABBAGE SEEDPOD WEEVIL

Larva

Adult

Source: Canola Council of Canada

Economic threshold: 3 to 4 adults/sweep.

CUTWORM

Pale western cutworm larva

Redbacked cutworm larvae

Source: Left: Peairs, F., Colorado State University, Bugwood.org.
Right: Gavloski, J., Manitoba Agriculture, Food and Rural Development

Economic threshold: A stand reduction of 25 to 30% appears to be the nominal threshold. Damage tends to be in specific regions on the field.

SWEDE MIDGE

Larvae

Adult

Source: Cheung, D., Swede Midge Identification & Hallett, R., Swede Midge Damage, School of Environmental Sciences, University of Guelph

Economic threshold: Currently no established economic threshold. Thresholds possible in future as collection and research continues.

ROOT MAGGOT

Larva and damage

Source: Canola Council of Canada

Adult

Source: Canola Council of Canada

Economic threshold: No established thresholds.

DIAMONDBACK MOTH

Mature larva

Adult moth

Source: Government of Australia, Department of Agriculture and Food

Economic threshold: 100 to 150 larvae/m^2 in immature and flowering canola. 200 to 300 larvae/m^2 in podded canola.

FLEA BEETLES

Larva

Source: Cranshaw, W., Colorado State University, Bugwood.org

Crucifer beetle

Source: Agriculture and AgriFood Canada

Striped beetle

Source: Saskatchewan Ministry of Agriculture

Economic threshold: Consider a foliar insecticide when 25% of cotyledon leaves are damaged. Threshold is typically lower under drought conditions. No current threshold for stem feeding, look for damage on small plants that likely won't survive stem feeding.


Gain ground
on healthy grain.

Crop Establishment

- Seed testing, seed treating and troubleshooting
- Managing wireworms
- Teraxxa® F4 seed treatment
- Insure® Cereal FX4 seed treatment
- Seed treatment comparison

Weed Management

- Heat® LQ pre-seed herbicide
- Altitude FX® 3 herbicide

Disease Management

- Choosing a fungicide
- Cereal leaf diseases
- Nexicor® fungicide
- Fusarium management
- Caramba® fungicide

Pre- and Post-Harvest Management

- Heat LQ pre-harvest herbicide
- Distinct® herbicide

Crop Management Resources

- **Clearfield®** Production System for wheat
- **Clearfield** Commitment for wheat

Additional Resources

- Challenging weeds - identification and control
- Mixing order
- Bulk available products

Cereals. A familiar landscape.

Eliminate wireworms with a novel insecticide.

Cereals are a familiar landscape to generations of farmers in Western Canada. Perhaps just as familiar are the growing populations of wireworms in crops such as wheat, barley, oats and rye.

Agriotes Lineatus Larva

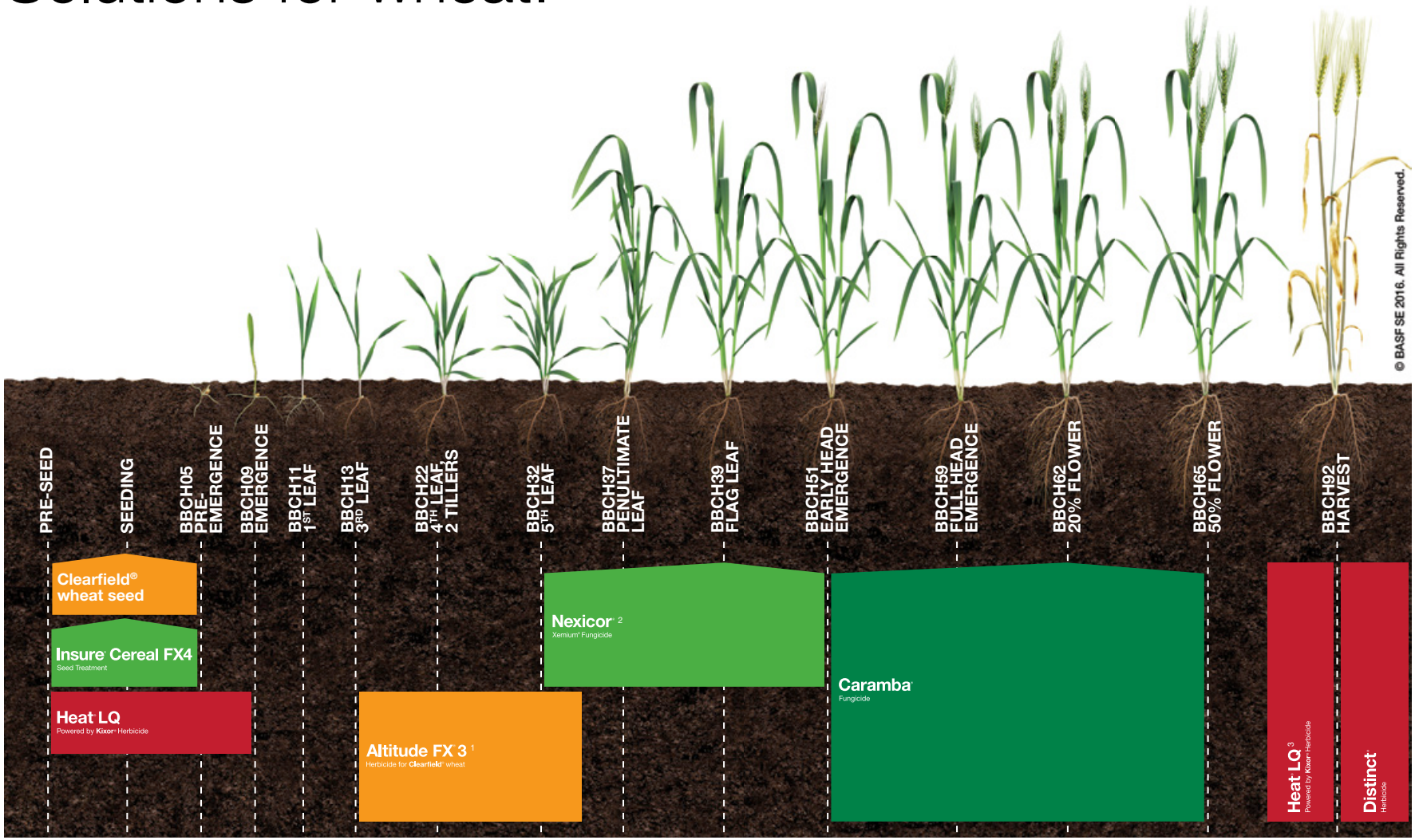
Wireworms can survive the long winters and live for up to six years without intervention. That's why it's important to intervene with management practices such as scouting, trapping, seed treatments, seeding rates, longer rotations and grassy weed control.

With the introduction of a novel insecticide mode of action, there's a new standard of control coming. Teraxxa® F4 seed treatment[1] will help reduce populations by eliminating the pest upon contact. Learn more.

Lined Click Beetle
Agriotes Lineatus Adult

[1] This product is currently being assessed for registration under the *Pest Control Products Act*. It cannot be manufactured, imported, distributed, or used in Canada at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

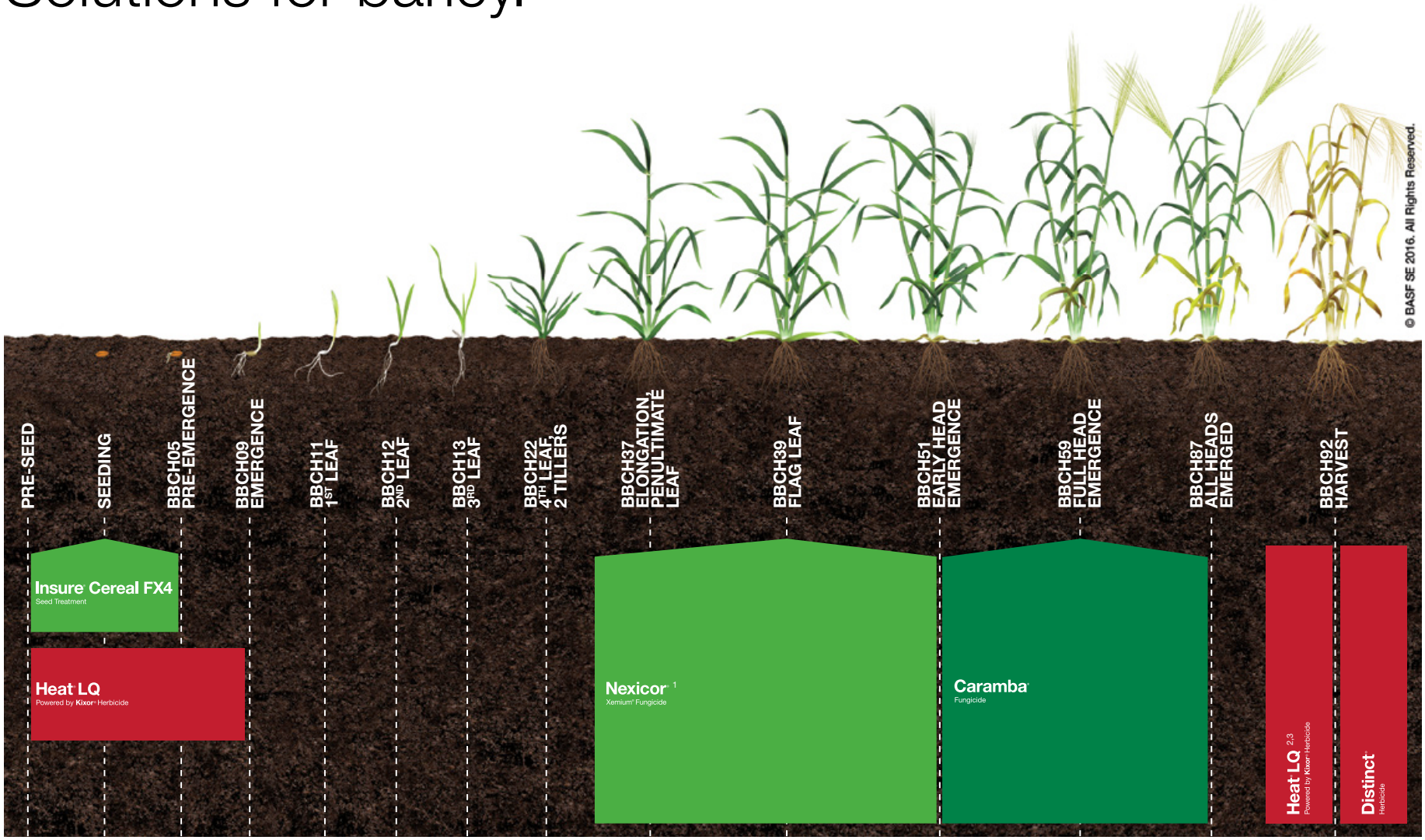
Solutions for wheat.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] Registered for use on **Clearfield®** wheat varieties only.
[2] **AgCelence®** benefits are obtained with Nexicor® fungicide application at flag-leaf. While Nexicor can be applied between stem elongation and early head emergence (GS 31-55), research suggests that applying at flag-leaf (GS 37-39) helps maximize yield potential in cereals.
[3] Apply at the hard dough stage with less than 30% moisture. A thumbnail impression should remain on seed.

Solutions for barley.



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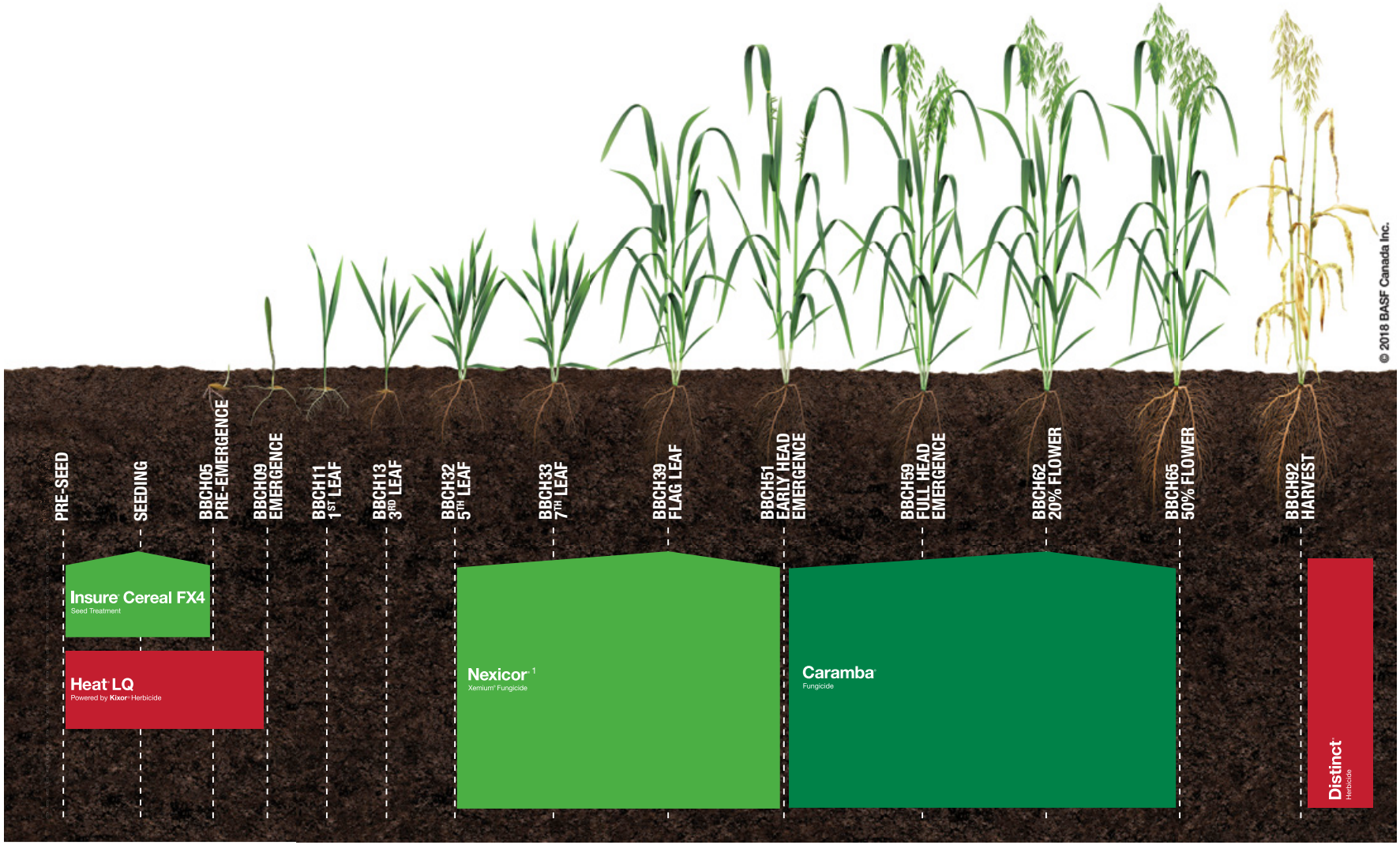
[1] **AgCelence®** benefits are obtained with Nexicor® fungicide application at flag-leaf. While Nexicor can be applied between stem elongation and early head emergence (GS 31-55), research suggests that applying at flag-leaf (GS 37-39) helps maximize yield potential in cereals.
[2] Apply at the hard dough stage with less than 30% moisture. A thumbnail impression should remain on seed.
[3] At this time, BASF supports the use of Heat® LQ herbicide for pre-harvest on feed barley only. Please check with your maltster prior to the pre-harvest application of Heat LQ on malt barley.

Solutions for oats.



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Success. It starts with the seed.

Strategies for a healthy cereal crop start at the beginning of the season—with the seed. Understanding what to look for with a seed test, knowing the benefits of various seed treating systems as well as common watch-outs when seed treating can simplify management decisions and set your crop up for success.

Ready. Set. Seed test.

A successful cereal crop starts with a seed test at an accredited seed laboratory. The primary tests conducted on a seed lot include:

Germination test – Assesses the percentage of seeds likely to germinate under optimal growing conditions.

Vigour test – Measures the ability of the seed to germinate and produce normal seedlings under adverse conditions. The vigour test better reflects the conditions at seeding time and provides a stronger indication of the seed's ability to create healthy seedlings.

Pathogen analyses – Determines how many seeds in a seed lot contain spores of a specific pathogen on the seed surface.

General guideline for seed-borne disease threshold

Major Pathogen	Acceptable Levels
Cochliobolus sativus	<10%
Fusarium graminearum	0-2% (zero tolerance if none in the area)
Total *Fusarium*	<14%

Note: Total *Fusarium* + *Cochliobolus* should not exceed 14%.

Viable seeds can have disease spores on their surface, but not cause significant infection if conditions are not favourable. If acceptable pathogen levels are exceeded, growers should err on the side of caution and use a different seed source, as even premium seed treatments will not have enough activity to manage disease and growers could risk introducing a new pathogen into healthy soils.

Total fusarium		
Crop	**Treat Seed**	**Discard Seed**
Barley	0-15%	>15%
Wheat	0-15%	>15%
Durum	0-15%	>15%

Regardless of the type of cereal, the line between treating and discarding seed is quite rigid along the 15 per cent mark.

Source: Russell Trischuk, BASF, "Seed & Seedling Diseases and their Management with Fungicidal Seed Treatments", 2017

Results from the pathogen analyses, together with germination and vigour, are needed when deciding which seed lot should be used.

When analyzing a seed test, you want seed with high germination and vigour—with minimal spread between the two values.

Common types of seed treaters.

Drip/gravity seed treaters.

These use gravity pressure flow and lack any means of chemical flow control outside of auger speed. Gravity drip treaters are the least accurate seed treater system, but they are small, inexpensive and convenient for growers with minimal seed treatment application.

Graham seed treaters (G3, G40).

These use a transfer auger to regulate grain flow to the treater. Grain flow is somewhat regulated by the small transfer auger but is still manually controlled by the operator. Graham seed treaters use nozzles to apply the seed treatment, which allows for increased accuracy and better distribution of the seed treatment.

STORM® (Seed Treatment Optimized Rate Metering).

Ag Growth International (AGI) utilizes an all-in-one process that includes volumetric conveyance of grain and a systolic flow rate of product through an atomizer chamber. The conveyor system accurately measures untreated seed directly from the bin and is precisely metered to the atomizer chamber where the seed treatment is applied. The ability to calibrate the system with their software and the systolic flow rate of the seed treatment ensures the proper rate is applied. The grain is then mixed for consistent and even coverage.

USC treaters.

The USC uses a scale to measure the amount of grain per batch and meters the grain into the atomizer chamber in a cone formation that then fans out. The seed is treated as it enters the atomizer chamber and tumbled in a drum for optimal mixing and coverage with minimal mechanical damage. The control panel regulates the rate of seed treatment, making it one of the most accurate and easy-to-use commercial treaters.

*If you have any questions during the seed treating process, please reach out to your BASF **AgSolutions**® Grower Representative.*

Treat it right: Common seed treatment watch-outs.

MIX/AGITATE
Mix/agitate the product well before applying.

BE CAUTIOUS
Be cautious of weather and temperature of seed and seed treatment while treating. Keep seed treatment in a warm storage area and avoid treating seed that is colder than 0°C.

FLOW RATE
Find the right flow rate to avoid plugging. Don't start treating with the seed treater running at 100% capacity.

BLOCKAGE
If seed is dry, it can cause issues such as cracked hulls building up and plugging the metering roller/auger.

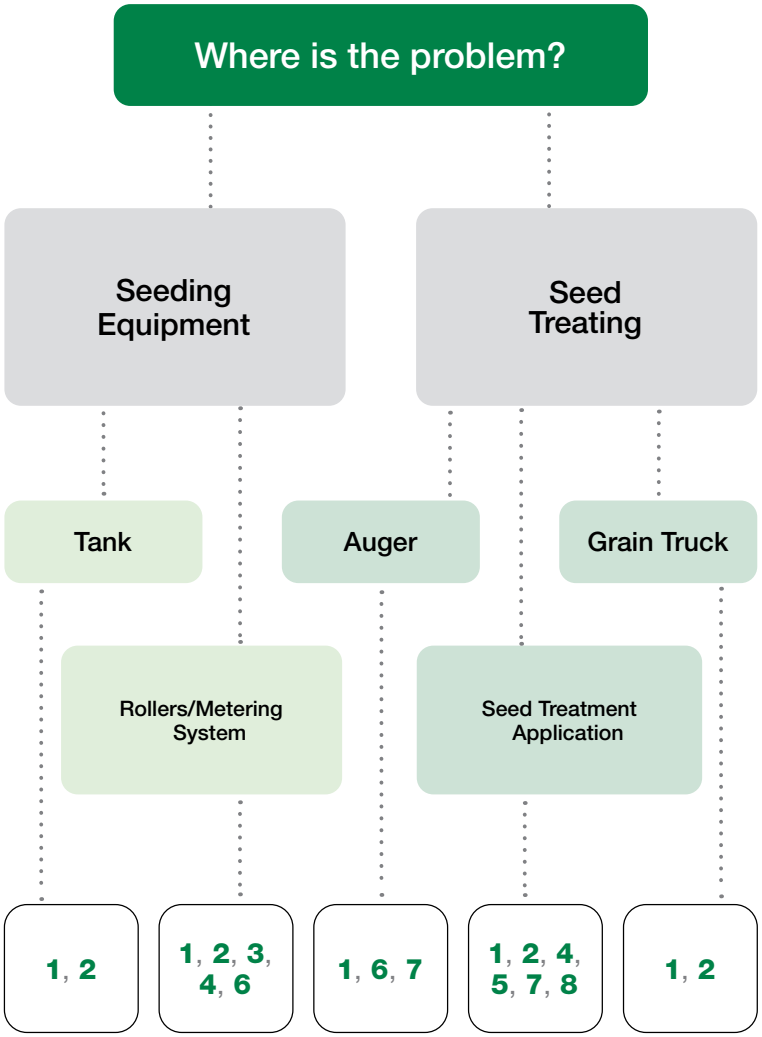
DO NOT LEAVE UNATTENDED
Do not leave your seed treater alone when it's running as many things can quickly affect seed treating quality.

BE ATTENTIVE
Be attentive to factors that can cause changes to nozzle pressure, including the power source to the pump, an object blocking the filter or the hose not reaching deep enough into the product.

FACTORS THAT AFFECT DRYING TIMES
Be cautious of drying times and factors that can lengthen them, such as weather (air temperature, wind speed, relative humidity), seed temperature, seed moisture levels, seed type and water being added during treating.

Troubleshooting seed treating problems.

No matter how good your seed, seed treatment and treater are, there can be problems that arise during that early-season rush. When it comes to seed treating, a major part of dealing with a problem is first finding where the problem lies.



Identify which numbers correspond to the problem you're having and review the possible solutions in the following list.

1

Overtreating.

Overtreating can have a negative impact from both an economic and application standpoint. If grain is not flowing properly before the operator turns on the seed treatment applicator, it can result in "wet grain". "Wet grain" can increase the risk of plugging, lead to buildup of product and debris in equipment and other issues that can cause problems with the seed treater or drill metering system.

Solution: Ensure grain is flowing properly before treating.

2

Cold temperatures.

When temperatures warm up considerably between the morning and afternoon or when there's significant changes in humidity, it can affect the seed treating process. Treating cold seed can also cause issues with the seed treatment "freeze drying" on the seed. As the seed warms up, condensation can form on the outside of the seed causing the treated seed to remain tacky and not dry properly.

Solution: Recalibrate during large temperature fluctuations and store your seed treatments in a warm area with temperatures above freezing and below 30°C.

3

Dirty/cracked seed.

When treating dirty and cracked seed, a buildup of seed treatment with dust, dirt and/or hull combinations can occur.

Solution: Ensure your grain is cleaned prior to treating and be aware of mechanical damage caused by factors such as combining, auguring and long drops into a bin. In years where dry seed may be an issue, add a bit of water to the seed treatment.

4

Improper agitation of product prior to treating.

Proper agitation can lead to a more uniform product and more accurate application.

Solution: Mix the product well prior to use to reach any product that has potentially settled.

5

Improper calibration/re-calibration of seed treating equipment.

Proper calibration will help ensure an accurate rate of seed treatment and proper coverage of seed while reducing the problems that can evolve from over- or under-treated grain.

Solution: Calibrate intermittently throughout the seed treating process.

6

Varying physical characteristics of seed.

Seeds come in many different shapes, sizes and properties. Crops such as soybean can be more difficult to treat due to their mucilaginous seed coat which can prevent certain seed treatments from adhering as readily as others or can take longer to dry in cool, damp conditions. Seed coats with divots and cracks can also affect the ease of treating, as higher water volumes may be required to obtain optimal coverage.

Solution: Be aware of the type of seed you're treating so you can ensure proper coverage.

7

Running the seed treater at 100% capacity.

Because treated grain does not flow as easily through an auger as untreated grain, running the treater at full capacity can cause plugging issues.

Solution: Take the time to adjust and find the best flow rate to optimize seed coverage, knowing that it will vary between old and new equipment due to the flighting in new equipment not being as worn as older augers.

8

Inability to get product flowing properly.

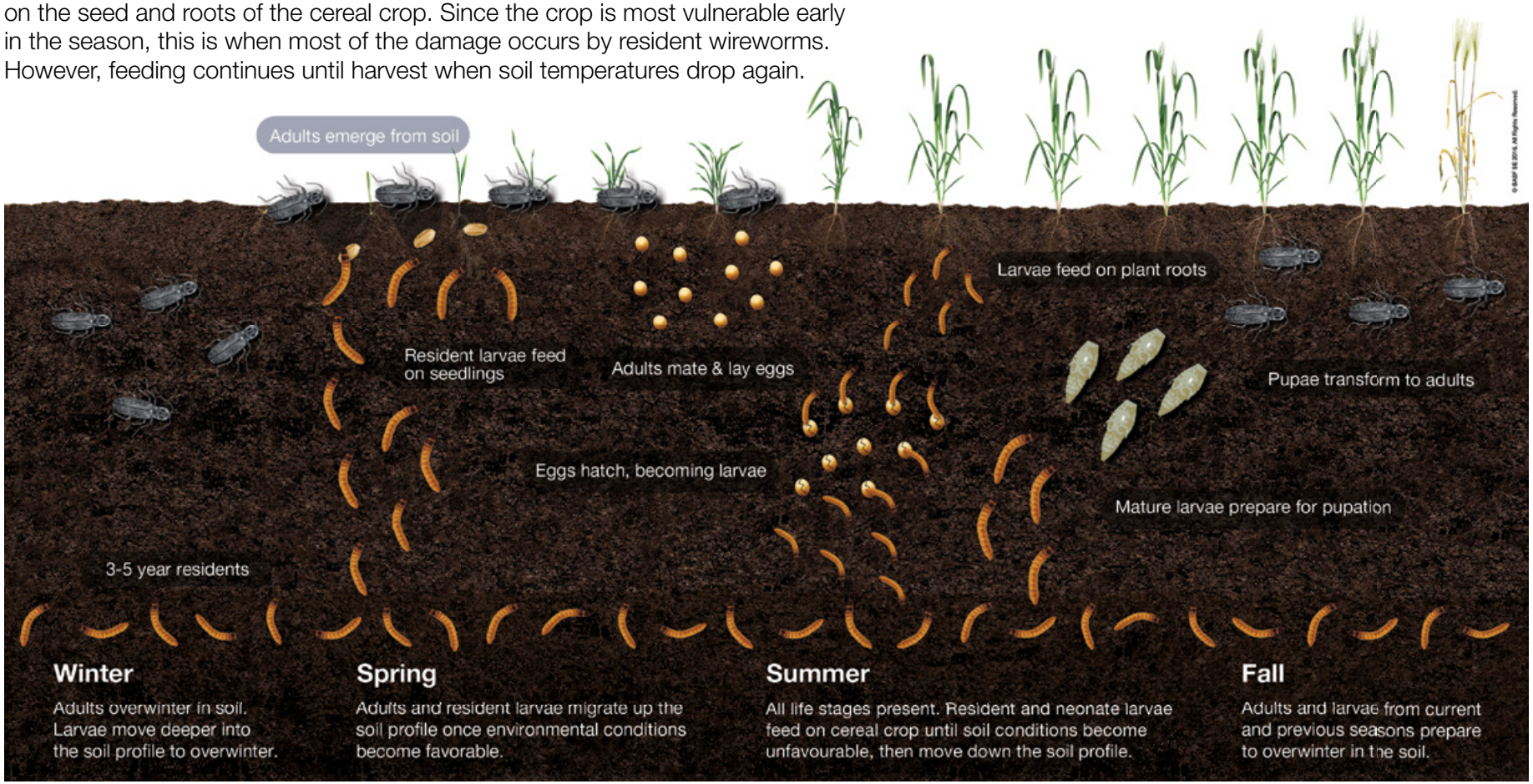
Solution: Always check that there's consistent power to the pump. Avoid extension cords that are longer than 50 feet, have been run over by vehicles or that have breaks and tears. Also make sure the hose is deep enough in the product when running low and that the pumping system is airtight as you do not want to suck air into the lines. One way to improve a seal is to wrap Teflon tape around all the pump's joints.

Wireworms. The underground threat.

In the last decade, wireworm populations have been growing throughout the Prairies and pose a major problem to cereal growers. With a lifecycle of up to six years, wireworms can survive without food during long winters and persist through rotations on non-host crops. Aside from their heartiness, the popularity of reduced tillage practices may also allow them to thrive longer without intervention.

The lifecycle of wireworms.

Adult click beetles overwinter in the soil and lay eggs that eventually become larvae—or wireworms. Once soil temperatures reach around 10°C, wireworms begin feeding on the seed and roots of the cereal crop. Since the crop is most vulnerable early in the season, this is when most of the damage occurs by resident wireworms. However, feeding continues until harvest when soil temperatures drop again.



Face wireworms with an IPM strategy.

It takes more than one strategy to manage wireworm infestations and reduce crop damage. It takes an integrated pest management (IPM) approach:

Scouting – Keep field maps and be aware of areas in your field that yield less than others. Perform root digs early in the season to assess root masses for wireworm larvae feeding or look for yellowing leaves above ground that can indicate wireworm damage below. If you see patches across your field, that's also a good indication of wireworm feeding.

Trapping – Use trapping methods such as bait balls to determine the presence of wireworms.

Seeding rates – Increase your seeding rate to make up for lost plant stand from wireworm feeding and avoid seeding too deep.

Rotation – Rotate to non-host crops such as canola or peas and lentils.

Weed control – Manage grassy weeds in your field since wireworms also feed on them.

Chemical solutions – Use insecticidal seed treatments for wireworm control.

Wireworm
Larva of click beetle

Click Beetle
Selatosomus cruciatus

To learn more about managing wireworms, visit agsolutions.ca/WirewormIPM.

Root clipping/root mass destruction.

Yellowing leaves from feeding on or around seed/roots.

Patches and plant height reduction from wireworm feeding.

Teraxxa® F4 Seed Treatment

Introducing a cereal seed treatment that can help eliminate wireworms in cereal crops, including wheat (all types), barley, oats, canary seed and rye.

- Powered by a novel insecticide mode of action, Teraxxa® F4 seed treatment delivers a new standard for wireworm control
- Teraxxa F4 seed treatment helps to rapidly eliminate wireworms upon contact and reduces resident populations for in-season control
- Includes four fungicide active ingredients in a convenient pre-mix for premium broad-spectrum protection against key seed- and soil-borne diseases, including fusarium
- Optimized formulation for reduced viscosity and improved usability

Healthier cereal crop with Teraxxa F4 seed treatment

Source: BASF internal research trials, 2017

Follow #OpenSeasonBASF and @BASFAgSolutions for updates.

RESEARCH UPDATE

This product is currently being assessed for registration under the *Pest Control Products Act*. The information presented here is for research purposes only. This product cannot be manufactured, imported, distributed or used in Canada at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

AgCelence® Expect more | BASF We create chemistry

Insure® Cereal FX4

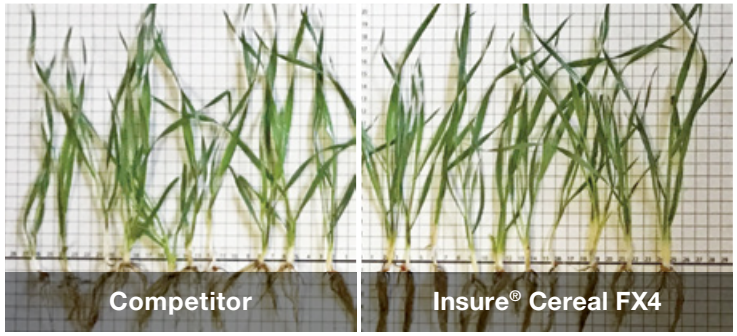
Seed Treatment

NEW

Even stronger broad-spectrum protection with the benefits[1] of **AgCelence®**.

- Four modes of effective action to deliver a new standard of broad-spectrum protection against key seed- and soil-borne diseases, including three active ingredients targeting fusarium
- The addition of Xemium® delivers unique mobility and translocation characteristics for more consistent and continuous disease protection[2]
- **AgCelence** offers greater germination for improved emergence and enhanced seedling vigour, including under minor stress events such as cold conditions[2]
- New formulation for reduced viscosity and optimized usability

Increased seedling vigour in wheat, 28 days after seeding



Source: BASF Research Authorization Trials, Camrose, AB, 2018

Active ingredients	Triticonazole – Group 3 Metalaxyl – Group 4 Fluxapyroxad – Group 7 Pyraclostrobin – Group 11
Formulation	Water-based suspension
One case contains	2 x 9.8 L jugs, also available in 120 L drum or 450 L tote

Crop treatment

Standard slurry, gravity flow or mist-type seed treatment.

Diseases controlled

Refer to the comparison chart here for a comprehensive list of controlled diseases.

Application rates

One case of Insure Cereal FX4 seed treatment will treat 6,533 kg of seed (14,386 lb), one drum treats 39,998 kg (88,180 lb), and one tote treats 149,992 kg (330,676 lb), all at 300 ml/100 kg (220 lb) of seed.

Crop	Bushels (bu) per case	Bushels (bu) per 120 L drum	Bushels (bu) per 450 L tote
Barley	300 bu	1,837 bu	6,888 bu
Canary seed[3]	288 bu	1,764 bu	6,614 bu
Oats	422 bu	2,584 bu	9,689 bu
Rye, triticale	256 bu	1,567 bu	5,878 bu
Wheat	240 bu	1,470 bu	5,510 bu

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.
[3] Including food use.

See how your seed treatments measure up.

Wheat, barley and oat diseases controlled or suppressed by Insure® Cereal FX4 and/ or Insure Cereal	Insure Cereal FX4			Insure Cereal			Raxil® PRO			Vibrance® Quattro		
***Fusarium* spp.**	**Wheat**	**Barley**	**Oats**	**Wheat**	**Barley**	**Oats**	**Wheat**	**Barley**	**Oats**	**Wheat**	**Barley**	**Oats**
Seed rot	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Damping-off (pre)	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Damping-off (post)	**C**	**C**	**C**				**C**	**C**	**C**	**C**	**C**	**C**
Seedling blight	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Root rot	**C**	**C**	**C**	**C**	**C**	**C**	S	S	S	**C**	**C**	**C**
Crown rot	S	S	S	S[1]	S[1]	S[1]	S	S	S	S	S	
Foot rot	S[1]	S[1]	S[1]	S[1]	S[1]	S[1]				S	S	
Cochliobolus sativus												
Seed rot	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**			
Damping-off (pre)	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**			
Damping-off (post)							**C**	**C**	**C**			
Seedling blight	S	S	S	S	S	S	**C**	**C**	**C**			
Root rot	S	S	S	S	S	S	S	S	S	S	S	S
Seed-borne *Cochliobolus*										S	S	S
Rhizoctonia solani												
Seed rot	**C**	**C**	**C**	**C**[2]	**C**[2]	**C**[2]	S	S	S	**C**	**C**	**C**
Damping-off (pre)	**C**	**C**	**C**	**C**[2]	**C**[2]	**C**[2]	S	S	S	**C**	**C**	**C**
Damping-off (post)	**C**	**C**	**C**	**C**[2]	**C**[2]	**C**[2]				**C**	**C**	**C**
Seedling blight	**C**	**C**	**C**	**C**[2]	**C**[2]	**C**[2]				**C**	**C**	**C**
Root rot	**C**	**C**	**C**				S	S	S	**C**	**C**	**C**
***Pythium* spp.**												
Seed rot	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Damping-off (pre)	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Damping-off (post)	**C**	**C**	**C**	**C**	**C**	**C**				**C**	**C**	**C**
Seedling blight	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Root rot	**C**	**C**	**C**	**C**	**C**	**C**				**C**	**C**	**C**
Smuts/bunts												
Loose smut *(U. avenae* & *U. tritici)*	**C**		**C**	**C**		**C**	**C**			**C**		**C**
Common bunt	**C**			**C**			**C**			**C**		
True loose smut		**C**			**C**			**C**			**C**	
Covered smut *(U. hordei* & *U. kolleri)*		**C**	**C**		**C**	**C**		**C**	**C**		**C**	**C**
False loose smut		**C**			**C**			**C**			**C**	

[1] Suppression, commercially supported but not on the label.
[2] Control, commercially supported but not on the label.

C= Controlled, S= Suppressed

Heat® LQ

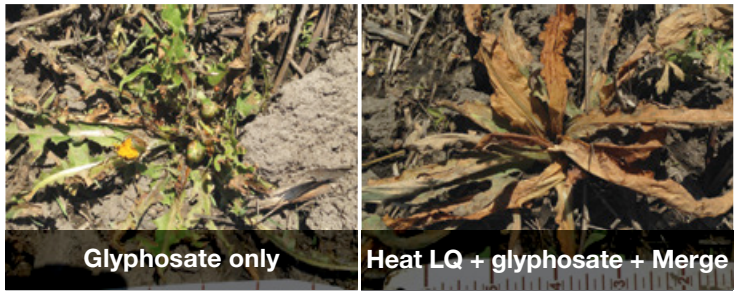
Powered by **Kixor®** Herbicide

PRE-SEED/PRE-EMERGENT BURNDOWN CHEMFALLOW

The ultimate pre-seed/pre-emergent burndown in a new, easy-to-use liquid formulation.

- Rainfast and quickly absorbed for fast, complete weed control even under cool conditions with broadleaf weed control in as few as 3 to 5 days[1]
- Heat® LQ herbicide complements and improves your glyphosate application
- Group 14 chemistry for control of Group 2- and glyphosate-resistant weeds
- Can also be applied in corn, peas and lentils, and soybeans; for complete list of crops, visit **agsolutions.ca/heat-lq**

Comparison of dandelion after a pre-seed application of Heat LQ plus glyphosate plus Merge® adjuvant



Source: BASF Research Authorization trial, Stoughton, SK, 2014

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 2 x 8.1 L jugs of Merge adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Crop staging

Pre-seed, pre-emergence (before ground crack)

Weeds controlled

Broadleafs

Canada fleabane[2]
Cleavers[3]
Dandelion[4]
Flixweed
Kochia[2]
Lady's thumb[5]
Lamb's quarters
Narrow-leaved hawk's beard
Perennial sow-thistle[5,6]
Prickly lettuce[5,6]
Ragweed (common, giant)[5]
Redroot pigweed[3]
Round-leaved mallow
Shepherd's-purse[5]
Stinkweed[3]
Volunteer canola[3,7]
Wild buckwheat[3]
Wild mustard[3]

Application rates

One case treats 30 to 80 acres, depending on rate. One tote treats 730 to 2,000 acres.

Heat LQ	21.5 to 59 ml/ac (53 to 146 ml/ha)
Glyphosate[8] (360 g ae/L)	0.5 to 1 L/ac (1.25 to 2.5 L/ha)
Merge adjuvant[9,10]	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume

Ground application
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

60 days for all pre-seed and pre-emergent applications.

Follow crops

1 year after application

All crops, 1 year after a spring, pre-seed or pre-emergent application.

[1] Depending on growing conditions. [2] Includes Group 2-resistant and glyphosate-resistant biotypes. [3] For suppression of secondary flushes, use higher application rate of 59 ml/ac (146 ml/ha). [4] Top growth burndown control only of perennial plants, control of spring germinating plants. [5] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha). [6] Top growth burndown control only. [7] All herbicide-tolerant canola systems including glyphosate-tolerant canola. [8] Glyphosate (required for optimum activity) is not included in the case. [9] Merge adjuvant is required and is included with Heat LQ herbicide. [10] At the higher Heat LQ application rates (30 or 40 acres per case), BASF recommends using Merge at the higher rate (400 ml/ac). Use both Merge jugs included in the case regardless of the Heat LQ rate. Use all Merge in the tote when applying at 2,000 acres per tote.

Clearfield® Production System for Wheat

BASF We create chemistry

Altitude FX® 3

Herbicide for **Clearfield®** wheat

The best weed control for the **Clearfield®** Production System for wheat, with added flexibility.

- High-level control of grasses, including volunteer barley and Group 1-resistant wild oats
- Choice of tank-mix partners for broadleaf control flexibility

Active ingredients	(a) Imazamox – Group 2 (b) Fluroxypyr – Group 4
Formulation	(a) Solution (b) Emulsifiable concentrate
One case contains	(a) 2.68 L jug (b) 5 L jug of Starane® II

Crop treatment

3 to 6 leaf[1]

Weeds controlled

Broadleafs

Cleavers
Cow cockle
Green smartweed
Kochia[2]
Lamb's quarters[3]
Redroot pigweed
Round-leaved mallow[3]
Russian thistle[3]
Shepherd's-purse
Stinkweed
Stork's-bill[3]
Volunteer canola[4]
Volunteer flax
Wild buckwheat[3]
Wild mustard

Grasses

Barnyard grass
Foxtail (green, yellow)
Japanese brome grass[3]
Persian darnel
Volunteer cereals[6]
Wild oats

Broadleaf weeds controlled with specific, specialty tank-mix partners[5]

MCPA Ester (northern broadleaf weeds):

Chickweed
Cow cockle
Hemp-nettle
Wild buckwheat

2,4-D Ester (southern broadleafs):

Russian thistle
Round-leaved mallow

Curtail® (thistles and perennials):

Canada thistle
Sow thistle
Dandelion

[1] Crop staging can change depending on tank-mix partner. See label for details.
[2] Control of Group 2-resistant biotypes.
[3] Suppression only. Refer to product label for control with specific tank-mix partner.
[4] Non-**Clearfield** canola varieties only.
[5] See application rate section for individual tank-mix rates.
[6] Barley, canary seed, oats, durum, non-**Clearfield** wheat.

Application rates

One case will treat 40 acres. Two separate tank-mix components are included. One of the following broadleaf specialty tank-mix partners[7] must be chosen.

Northern broadleafs	Imazamox (a) Fluroxypyr (b) MCPA Ester 600[7] Non-ionic surfactant[7]	67 ml/ac (167 ml/ha) 126 ml/ac (310 ml/ha) 375 ml/ac (927 ml/ha) 0.25% v/v (e.g. 250 ml per 100 L solution)
Southern broadleafs	Imazamox (a) Fluroxypyr (b) 2,4-D Ethylhexyl Ester 700[7] Non-ionic surfactant[7]	67 ml/ac (167 ml/ha) 126 ml/ac (310 ml/ha) 320 ml/ac (791 ml/ha) 0.25% v/v (e.g. 250 ml per 100 L solution)
Thistles and perennials	Imazamox (a) Fluroxypyr (b) Curtail M[7] Non-ionic surfactant[7]	67 ml/ac (167 ml/ha) 126 ml/ac (310 ml/ha) 610 to 810 ml/ac (1.5 to 2 L/ha) 0.25% v/v (e.g. 250 ml per 100 L solution)

Water volume

Ground application 20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

79 days after application for wheat grain and straw.

Follow crops

3 months after application

Winter wheat

1 year after application

Canary seed
Canola (all types)
Chickpeas
Durum wheat
Field peas[8]
Field corn
Flax
Lentils (incl. **Clearfield** lentils)
Spring wheat (incl. **Clearfield** wheat)
Spring barley
Sunflowers (incl. **Clearfield** sunflowers)
Tame oats

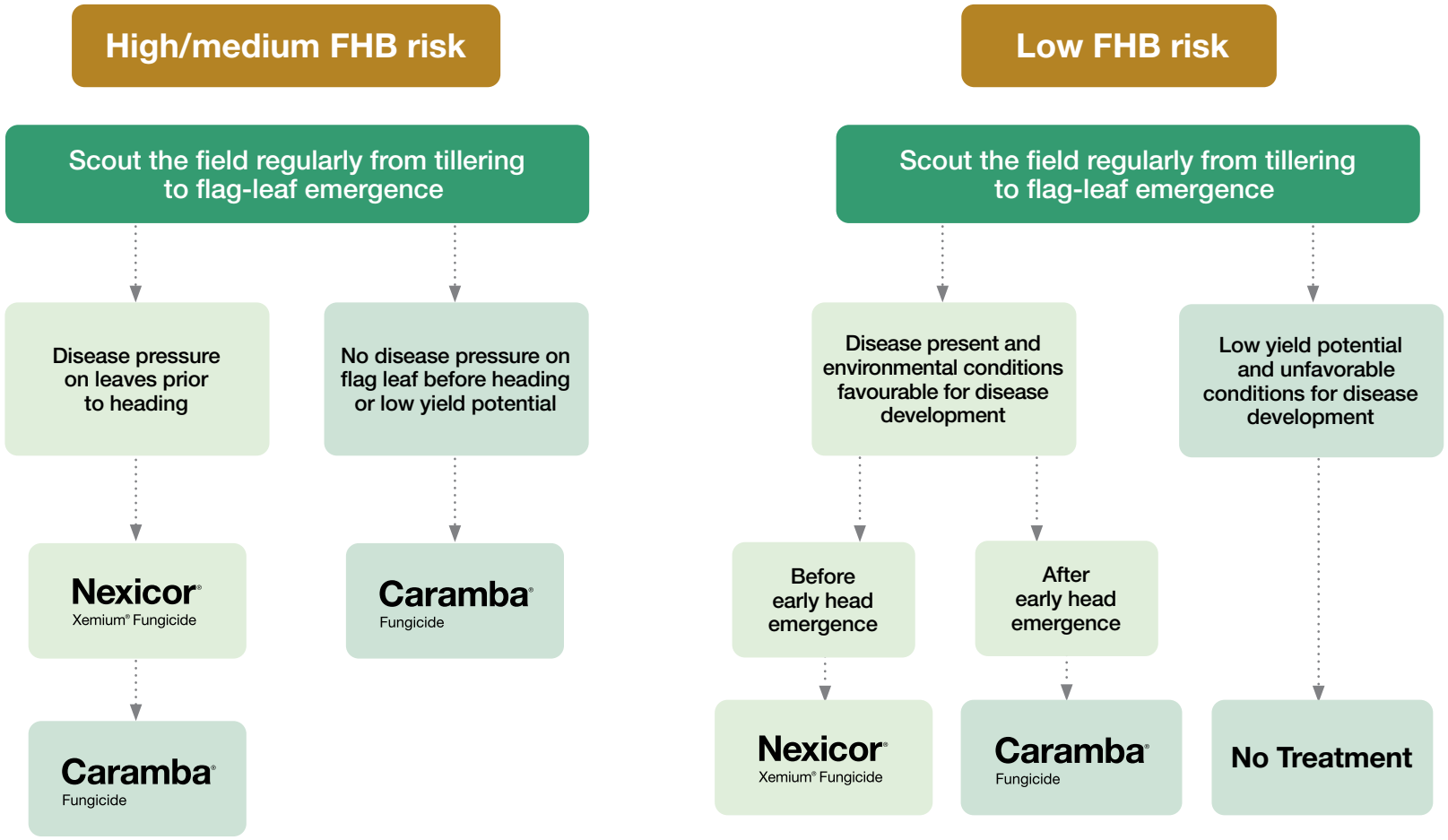
2 years after application

Mustard (condiment-type only)
Refer to tank-mix partner's label for any additional follow-crop restrictions.

[7] Non-ionic surfactant and optional broadleaf partners are not included in the case.
[8] Follow re-crop restrictions on Curtail M label if used as a tank-mix partner.

Follow the path to healthier fields.

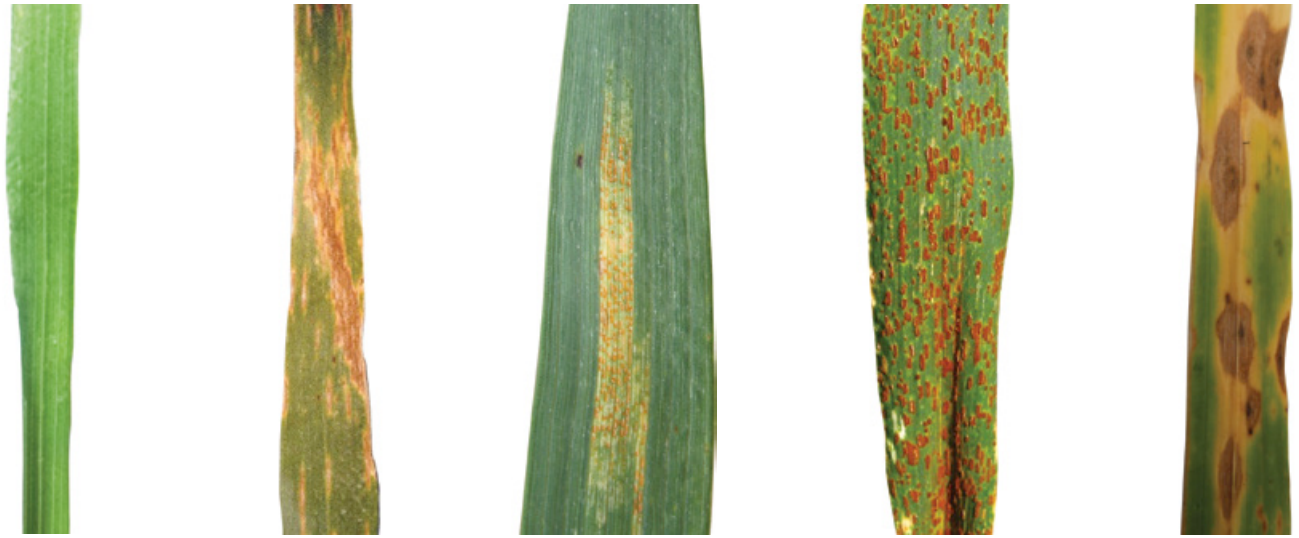
Choosing the proper fungicide is an important part of managing disease effectively. Start by recognizing your degree of risk for fusarium head blight (FHB).* Then, ensure you understand the condition of your crop and the surrounding environment.



* For more information on how to assess your risk for fusarium, click here.

Common cereal diseases in Western Canada.

Whether it's a wet or dry year, leaf diseases are the most consistent threat to yield in cereals. Making an application at flag-leaf can help manage disease before it has a chance to take over leaf area and cause significant damage to yield and grain quality.



HEALTHY | **SEPTORIA[1]** | **STRIPE RUST[1]** | **LEAF RUST[1]** | **TAN SPOT[1]**

NOTE THE DEVELOPMENT OF CHLOROSIS (YELLOWING) AROUND WELL DEVELOPED SYMPTOMS.

Source: BASF Canada

[1] Common wheat leaf diseases, BASF Canada.

AgCelence® Expect more | BASF We create chemistry

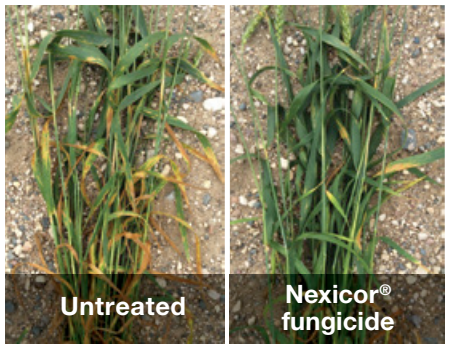
Nexicor®

Xemium® Fungicide

For high-level disease control, and the most consistent return on investment for growers.

- Enhanced, broad-spectrum control of key cereal leaf diseases, including rust, septoria and tan spot
- Builds on the proven benefits[1] of **AgCelence®** to increase growth efficiency and better manage minor stress, leading to greater yield potential[2]
- Combines three powerful modes of action, including the unique mobility of Xemium®, for more consistent and continuous control
- Can also be applied in canola

For a greener and healthier cereal crop



Source: **AgSolutions®** Performance Trials, Swan River, MB, 2015

Active ingredients	Pyraclostrobin – Group 11 Fluxapyroxad – Group 7 Propiconazole – Group 3
Formulation	Emulsifiable concentrate
One case contains	2 x 8.0 L jugs Also available in 128 L shuttle

Crop staging

Stem elongation to early head emergence[3]

Diseases controlled

In barley.
Net blotch *(Pyrenophora teres)*
Stripe rust *(Puccinia striiformis)*

In oats.
Crown rust *(Puccinia coronata)*

In rye.
Leaf rust *(Puccinia recondita)*

In wheat (all types) and triticale.
Leaf rust *(Puccinia recondita)*
Septoria leaf spot *(Septoria tritici or Leptosphaeria nodorum)*
Stripe rust *(Puccinia striiformis)*
Tan spot *(Pyrenophora tritici-repentis)*

Application rates

One case of Nexicor fungicide will treat 80 acres.
One shuttle treats 640 acres.

Nexicor	202 ml/ac (500 ml/ha)

Water volume

Ground application	40 L/ac (10 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval

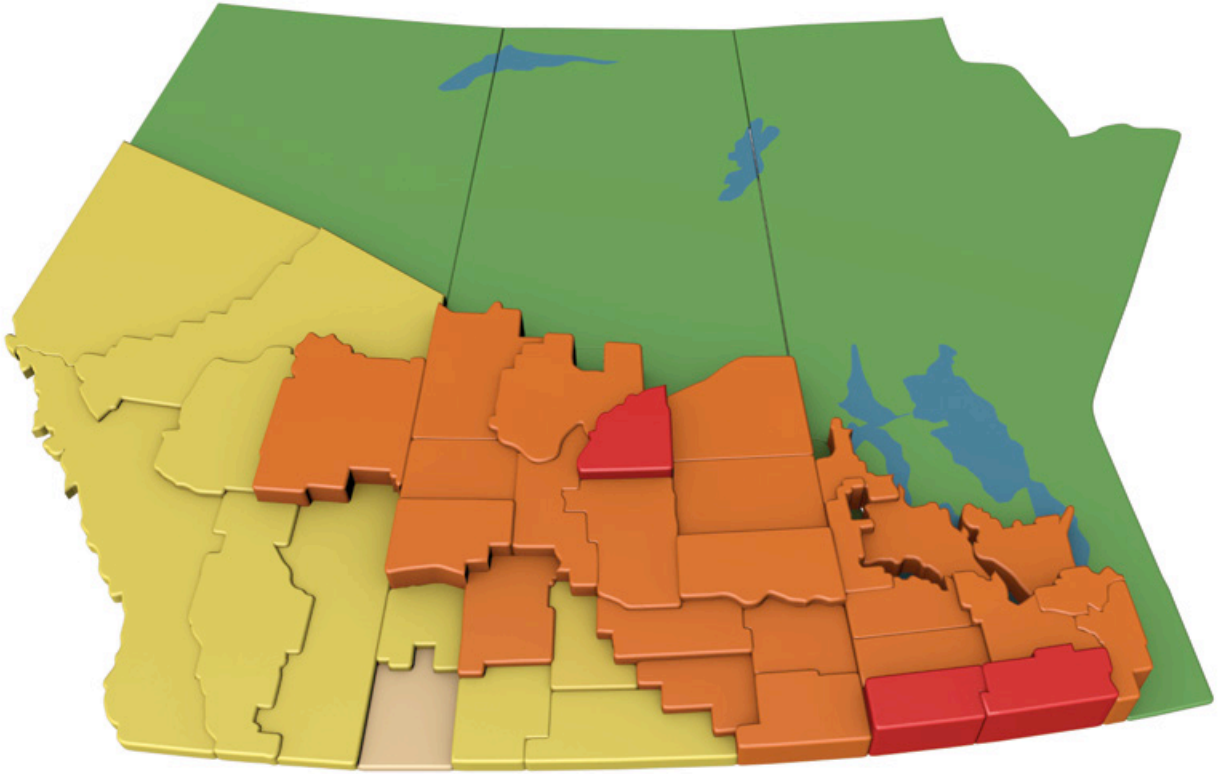
45 days after application.

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.
[3] While Nexicor fungicide can be applied between stem elongation and early head emergence (GS 31-55), research suggests that applying at flag-leaf (GS 37-39) helps maximize yield potential in cereals.

The spread and frequency of fusarium across Western Canada.

The first step to managing fusarium head blight (FHB) is to recognise the risk in your region and across Western Canada. A significant rise in this disease can result in lower quality grain and lost revenue. Despite lower incidence in some years, the fusarium pathogen persists in the soil and on crop residues. In other words, the risk of disease is always present.

Fusarium head blight frequency across crop districts.



Five-year average
(2015 - 2019)

FHB incidence.

- 0-5%
- 6-20%
- 21-50%
- 51% +

Source: Canadian Grain Commission – Percentage of fusarium damaged kernels (FDK) and severity of fusarium damage observed in Canada Western Red Spring (CWRS)

The cost of fusarium.

Fusarium can negatively impact kernel quality and, ultimately, your bottom line. Downgrades of Grade #1 to Grade #3 due to FHB can lead to losses of $35 to $101 per acre.[1]

[1] Zoia Komirenko (Richard Heikkila), Government of Alberta, "Economic Cost of Fusarium: Farm-level and Regional Economic Impact of Fusarium in Alberta", 2018

A case example of the cost of a fusarium outbreak

Initial grade	#1 CWRS (13.5% protein)		
Yield (bu/ac)[a]	55.5		
Average price ($/t)[b]	231.8		
Grade impact	**#1 - #2**	**#1 - #3**	**#1 - Feed**
Disease severity	0.5%	1.2%	2.2%
Price spread ($/t)[c]	7.5	22.8	66.0
Yield loss (bu/ac)	0.06	0.13	0.24
Value of grade loss ($/t)	7.49	22.75	66.04
Revenue loss ($/ac)	**11.66**	**35.11**	**100.85**

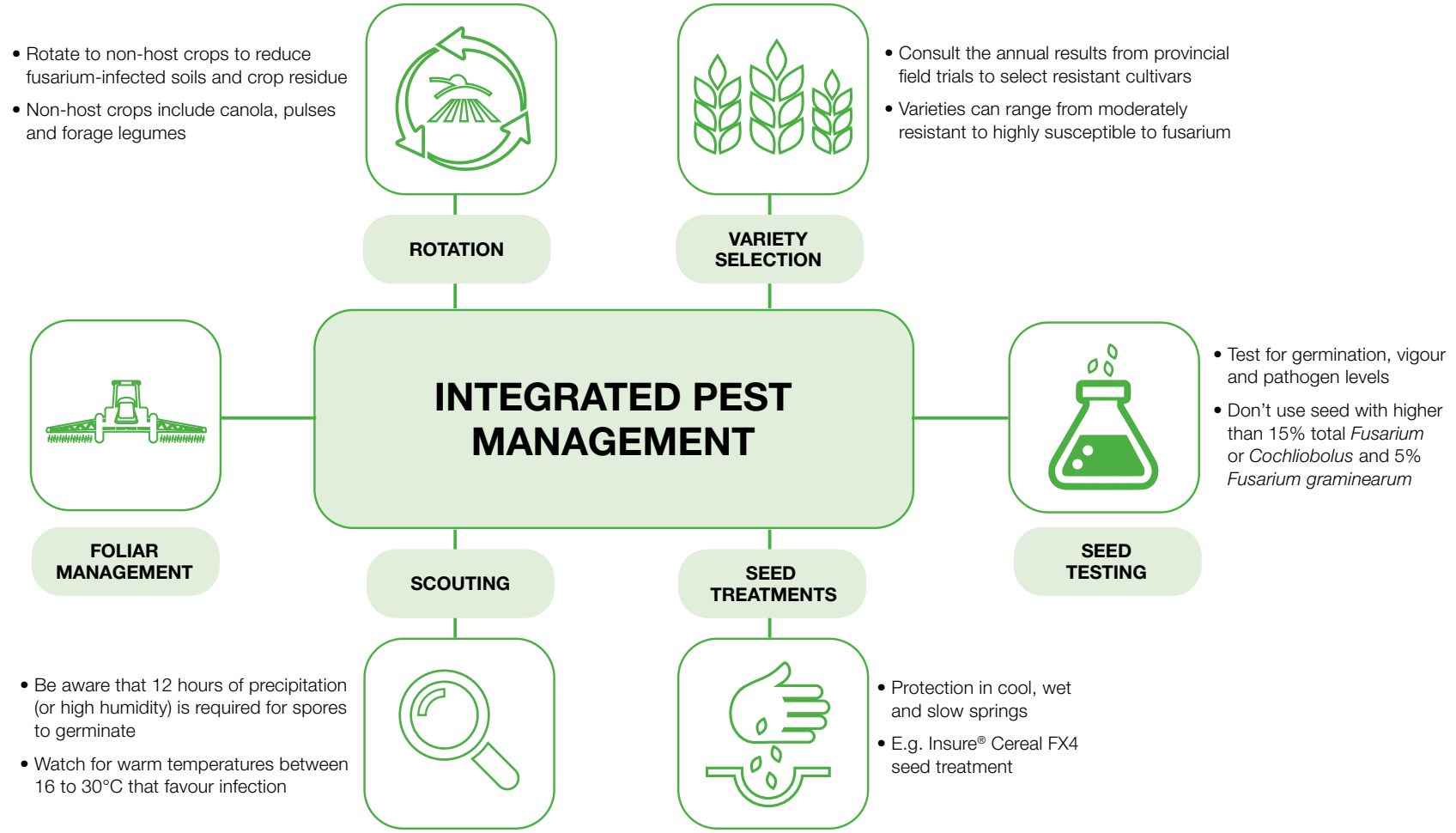
Yield, per tonne and per bushel losses resulting from quality downgrades in Canadian Western Red Spring wheat.
Please note: Revenue loss may vary depending on price of commodities and price spread.

Source: Richard Heikkila, Alberta Agriculture and Forestry, "The Economic Cost of Fusarium", 2018

[a] Average yield 2016 (Statistics Canada, Table 32-10-0359-01)
[b] Average annual #1 CWRS price, Agriculture Financial Services Corporation (AFSC)
[c] CWRS price spread between #1-#2, #1-#3 – Feed, AFSC and Alberta Agriculture and Forestry (AF), 2016

Meet fusarium with a multi-faceted approach.

A seed- and soil-borne disease such as fusarium must be met with an integrated pest management (IPM) plan. Strategizing against fusarium through multiple agronomic components, including seed testing, seed treatments, variety selection, rotation, foliar management and scouting helps to keep the disease in check.



Assessing fusarium head blight risk		Lower risk	Medium risk	Higher risk
Step 1 **Predict Pathogen** Is fusarium established here?	• Has wheat produced in this field been downgraded due to fusarium damaged kernels • Has >5% *F. graminearum* been isolated from wheat seed produced in this field? • Has >10% other *Fusarium* species been isolated from seed produced in this field? • Have any crops produced in this field experienced root rots due to *Fusarium* spp.	No No No No	By a grade > 4 years ago > 2 years ago > 2 years ago	By >1 grade Within 4 years Within 2 years Within 2 years
Step 2 **Stage Crop** When will crop be susceptible?	Stage crop at least 1 week before expected flowering date. Use experience or estimate GDD from seeding date. Anticipate Day 0, when 75% of the heads on main stems to be fully emerged, to be 1-2 days before flowering. Also consider susceptibility of crop. Seeding Date + 807 to 901 GGD°C or 1484 to 1653 GGD°F = Expected Flowering Date	Even crop, FHB rating G or VG	Uneven crop, more tillers, FHB rating F	Uneven crop, many tillers, FHB rating P or VP
Step 3 **Watch Weather** Check FHB map.	Select the FHB forecast map for the estimated head emergence date (Day 0), and determine risk for the area. At least 12 hours of precipitation or high humidity (above 80%) is required for fusarium spore germination and infection, as well as favouring temperatures ranging from 16 to 30°C (F. *graminearum optimum* is 25 to 28°C).	Low	Moderate	High
Step 4 **Crunch Numbers**	Estimated Yield (unit/acre) x Estimated Yield Savings (%) x Selling Price ($/unit) MINUS the Fungicide Application Cost ($/acre) = Expected Net Return ($/acre)	Negative net return	Net return $0	Positive net return
Step 5 **Make a Decision**	Note that foliar fungicides are registered for the suppression of FHB on wheat, rather than control. Flowering may be variable, but aim for when at least 75% of the heads on main stems are fully emerged to 50% of the heads on main stems are in flower. Ensure adequate water volumes and spray coverage to get the most benefit from application.	Mostly low risk? Do not spray.	Medium risk? Pencil it in; reassess risk before spray day.	Mostly high risk? Likely to see a benefit from a FHB fungicide.

Assessing risk factors can vary from province to province. This chart displays the factors to be considered in Saskatchewan.[1]

Dig into the details of managing FHB with the Fusarium Management Guide, easily accessible at agsolutions.ca/FHBguide.

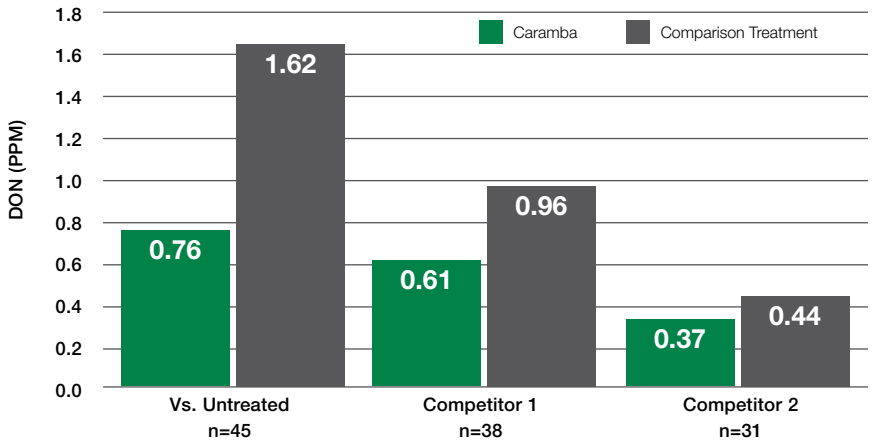
[1] Government of Saskatchewan, "Fusarium Head Blight (Disease)".

Foliar management.

An application of a foliar fungicide is another key management component that can be beneficial to quality and yield, protecting against FHB along with leaf diseases such as rust. That said, the spray window for a fungicide application is short (approximately seven days). Once the symptoms appear, the damage has been done. That's why scouting for conditions and planning the timing of a fungicide application are so important. Fungicides should be applied from when first anthers are visible to when the heads are at 50% flowering.

When considering a foliar fungicide that protects against fusarium and other late leaf diseases, Caramba® is a proven and trusted solution. In addition to a preventative measure for fusarium, it also reduces DON contamination and helps preserve grade quality. Based on twelve years of research, Caramba has led to an average yield increase of over 15% compared to untreated.

Lower DON levels vs. competitors

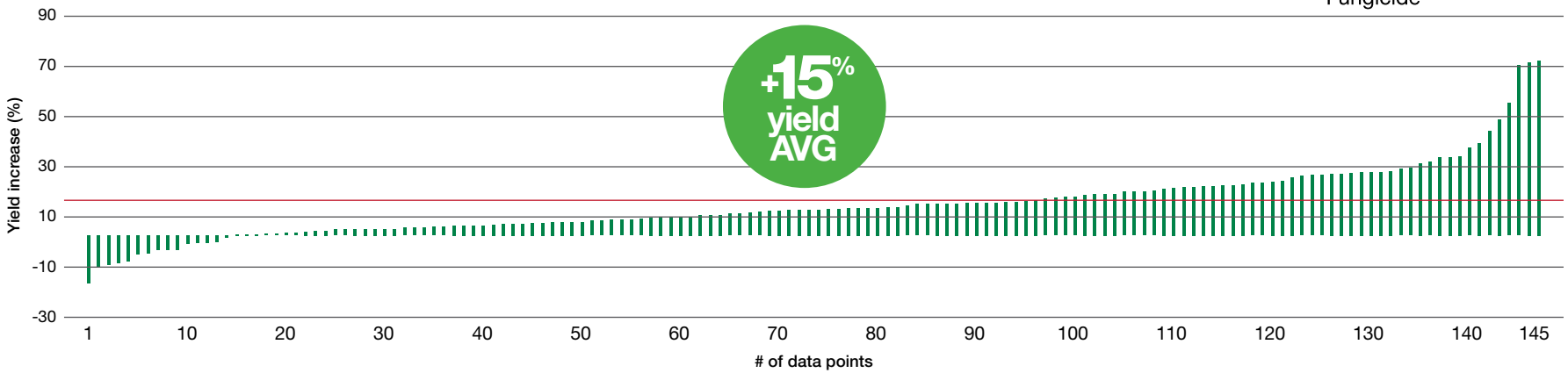


Source: **AgSolutions**® Performance Trials (grower-applied), Western Canada, 2008-2017

*Whether you're tackling leaf disease issues, fusarium or simply trying to maximize yield and quality, the BASF ROI Calculator can help you estimate your return on investment for a fungicide. Visit **agsolutions.ca/cereal/roi.***

Proven yield results for over a decade

Caramba®
Fungicide



Source: Yield comparisons of Caramba against Untreated, Research and Commercial Development RCBD trials, Western Canada, 2006-2017

Take some tips: best application practices for fusarium head blight (FHB).

When you're managing FHB with a fungicide, there are some application practices that can help ensure it works as effectively as possible.

1. Scout to ensure all the heads are at the same stage.

- Ensure consistent germination for more uniformity at fungicide application timing
- Increase your seeding rates for less tillering, leading to a shorter and more uniform flowering period
- If some heads are at a different stage, scout to know where and when to spray each section
- Apply at a time when you can protect the majority

2. Have the sprayer ready.

- Ensure your sprayer is cleaned out from previous applications since leftover herbicide can severely damage flag leaves and affect kernel development

3. Use the sprayer effectively.

- Ensure you cover the whole head for the best protection possible against FHB
- Use the recommended water volume on the fungicide label (10 gal/ac minimum for Caramba fungicide)
- Angle the nozzles forward or use a double nozzle (forward and back)[1]
- Be aware that greater angles are best[1]
- Use coarse sprays[1]
- Maintain a low boom height[1]

Identify leaf diseases, leaf damage and weeds in seconds using cutting-edge image recognition technology with the xarvio™ SCOUTING app. Download the free app at www.xarvio.ca.

[1] Tom Wolf, AgriMetrix Research & Training

Optimal application timing for fusarium head blight (FHB)

		FIRST SPIKELET VISIBLE			75 - 100% OF HEADS EMERGED	FIRST ANTHERS VISIBLE	20% FLOWER	30% FLOWER	40% FLOWER	50% FLOWER	END OF FLOWER	
DAYS	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7
BBCH		51			59	61	62	63	64	65	69	
						SPRAY TIME FOR BEST RESULTS						
						APPLICATION WINDOW						

FHB RISK MONITORING

Monitor for FHB risk factors including warm, wet conditions and uneven crop uniformity. Consider history of fusarium in field.

Source: agriculture.gov.sk.ca

PLAN TO SPRAY

Scout to determine when heads have fully emerged.

FHB INFECTION WINDOW

Precipitation or high humidity is required for spore germination and infection. Temperatures favouring infection range from 16 to 30°C, with the optimum range for *Fusarium graminearum* being 25 to 28°C.

Source: agriculture.gov.sk.ca

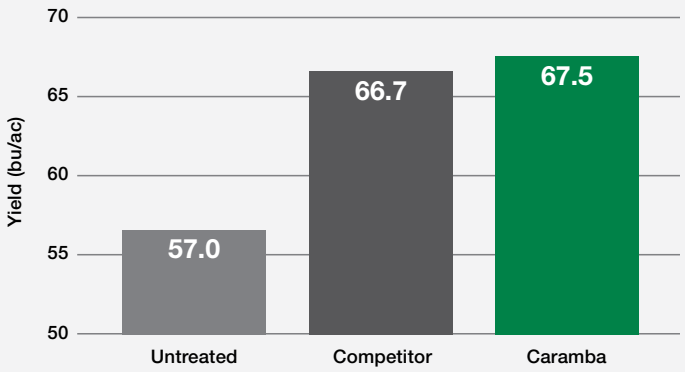
Caramba®

Fungicide

Preventative protection against fusarium and late-season leaf diseases

- Proven protection against fusarium
- Effective control of later-season foliar diseases
- Reduces deoxynivalenol (DON) contamination to preserve grade quality
- For a complete list of crops, visit **agsolutions.ca/caramba**

Increased wheat yield with Caramba® fungicide



Source: BASF field trials, 2010-2017, n=55

Active ingredient	Metconazole – Group 3
Formulation	Liquid
One case contains	2 x 8.1 L jugs Also available in 128 L shuttle and 400 L tote

Crop staging

Oats, rye, tritcale, wheat (all types): 20% flower[1,2]

Barley: Full head to 3 days after full emergence[1]

Diseases controlled

In wheat (all types incl. durum wheat) and triticale.
Fusarium head blight *(Fusarium graminearum)*[3,4]
Leaf rust *(Puccinia recondita)*
Powdery mildew *(Erysiphe graminis* f. sp. *tritici)*
Septoria glume blotch *(Stagonospora nodorum)*
Septoria leaf spot *(Septoria tritici* or *Stagonospora nodorum)*
Spot blotch *(Cochliobolus sativus)*[3]
Stem rust *(Puccinia graminis)*
Stripe rust *(Puccinia striiformis)*
Tan spot *(Pyrenophora tritici-repentis)*

In barley.
Fusarium head blight *(Fusarium graminearum)*[3]
Leaf rust *(Puccinia hordei)*
Net blotch *(Pyrenophora teres)*
Powdery mildew *(Erysiphe graminis)*
Scald *(Rhynchosporium secalis)*
Spot blotch *(Cochliobolus sativus)*[3]
Stripe rust *(Puccinia striiformis)*

In oats.
Crown rust *(Puccinia coronata)*
Fusarium head blight *(Fusarium graminearum)*[3]
Septoria leaf blotch *(Septoria avenae)*

In rye.
Fusarium head blight *(Fusarium graminearum)*[3]
Leaf rust *(Puccinia recondita)*
Powdery mildew *(Erysiphe graminis)*
Stripe rust *(Puccinia striiformis)*

Application rates

One case will treat 40 acres at the fusarium rate and 60 to 80 acres[5] at the cereal leaf disease rate. One shuttle treats 320 acres at the fusarium rate. One tote treats 1,000 acres at the fusarium rate.

For fusarium head blight	405 ml/ac (1 L/ha)
For cereal leaf diseases	202 to 283 ml/ac (500 to 700 ml/ha)[5]

Water volume

Ground application	40 L/ac (10 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval

30 days after application.

[1] For suppression of fusarium head blight and leaf disease control at heading. For leaf disease control prior to heading, apply before the appearance of symptoms. [2] This is BBCH stage GS 61-63. [3] Suppression only. [4] Not suppressed or controlled in triticale. Wheat only. [5] These rates should be used only for leaf disease control prior to heading. They are not recommended for applications targeting fusarium head blight.

Heat® LQ

Powered by **Kixor®** Herbicide

PRE-HARVEST

Faster harvest. Better weed control.

- Easy-to-use liquid formulation for fast dry down of broadleaf weeds
- Improved crop harvestability
- Tank mixed with glyphosate for fast broadleaf weed dry down and cleaner fields next season
- Can also be applied in canola, soybeans, and peas and lentils; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat® LQ herbicide 2 x 8.1 L jugs of Merge® adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Registered crops

Wheat (all types), feed barley

Crop staging

Hard dough stage with less than 30% moisture. A thumbnail impression remains on seed.

Application rates

One case of Heat LQ will treat 40 to 60 acres tank mixed with glyphosate. One tote treats 1,000 to 1,460 acres tank mixed with glyphosate, depending on rate.

Heat LQ tank mixed with glyphosate rate	29.6 to 42.9 ml/ac (73 to 106 ml/ha)
Glyphosate[1,2] (360 g ae/L)	1.0 L/ac (2.5 L/ha)
Merge adjuvant[3,4]	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume

Ground application tank mixed with glyphosate rate	40 L/ac (10 gal/ac) minimum
Aerial application[5]	20 L/ac (5 gal/ac)

Pre-harvest interval

3 days after application.

Follow crops

In the spring following a fall application

Barley (spring, malt, winter), canary seed, canola, chickpeas, corn (field and sweet), field peas, flax, lentils, oats, soybeans, wheat (incl. **Clearfield®** wheat, spring, winter, durum)

Note: BASF supports the use of Heat LQ herbicide for pre-harvest on feed barley only.

[1] Glyphosate is not included in the case.

[2] Heat LQ should always be tank mixed with glyphosate.

[3] Merge adjuvant is required and is included with Heat LQ herbicide. Use all Merge included in the case.

[4] BASF recommends using Merge at the higher rate (400 ml/ac) when tank mixed with glyphosate. Use both Merge jugs included in the case when applying Heat LQ at 40 acres per case. Use all Merge in the tote when applying at 1,000 acres per tote.

[5] Heat LQ is registered for aerial applications. Some glyphosate formulations are also registered for aerial applications; therefore, Heat LQ plus glyphosate can be applied through aerial applications when both products have aerial registrations.

Distinct®

Herbicide

Complements glyphosate for superior chemfallow and post-harvest control.

- Controls annual broadleaf weeds in post-emergent corn
- Multiple modes of action with glyphosate to control resistant biotypes in chemfallow and post-harvest
- Keeps fields cleaner to set them up for success the next season
- Excellent follow-crop flexibility that includes pulses and canola

Weed control in spring, following previous September application

Source: BASF research trials

Active ingredient	Dicamba – Group 4 Diflufenzopyr – Group 19
Formulation	Water dispersible granular
One case contains	2 x 2.32 kg jugs

Crop staging

Chemfallow: July to August
Post-harvest: prior to first significant frost

Weeds controlled

Apply to actively growing weeds (except where indicated).

Distinct at 58 g/ac tank mixed with glyphosate will control:

Dandelion[1]
Redroot pigweed
Kochia
Round-leaved mallow
Lamb's quarters
Spiny annual sow thistle
Narrow-leaved hawk's beard
Wild buckwheat

Distinct at 115 g/ac tank mixed with glyphosate will control:

Biennial wormwood (2 to 8 leaf)
Lamb's quarters
Canada thistle[1]
Perennial sow thistle[2] (2 to 10 leaf)
Common cocklebur (cotyledon to 6 leaf)
Redroot pigweed
Common ragweed
Tall waterhemp
Dandelion
Velvetleaf
Kochia[3] (up to 15 cm height)
Volunteer canola (cotyledon to 4 leaf)
Lady's thumb
Wild buckwheat

Application rates

One case will treat 40 to 80 acres, depending on rate.

Distinct	58 to 115 g/ac (143 to 285 g/ha)
(Opt.1) Glyphosate[4] (360 g ae/L)	0.5 to 1 L/ac (1.25 to 2.5 L/ha)
(Opt.2) Glyphosate[4] (540 g ae/L)	0.33 to 0.66 L/ac (0.83 to 1.67 L/ha)
Merge[4]	200 ml/ac (500 ml/ha)

Water volume

Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Rainfastness

4 hours.

Follow crops

If Distinct is applied prior to September 1
Wheat, barley, oats, canary seed, corn, canola, lentils, soybeans, chickpeas, flax, field peas and sunflowers

If Distinct is applied[5] prior to October 1
Wheat, barley, oats, canary seed, corn, canola, lentils, field peas and soybeans

If Distinct is applied[5] prior to October 15
Wheat, barley, oats, canary seed and corn

[1] Top growth in summer application, control in a post-harvest application. [2] Suppression only. [3] Includes glyphosate-resistant biotypes at 115 g/ac (285 g/ha) application rate. [4] Non-ionic surfactant, 28% UAN, glyphosate and Merge adjuvant (required for optimum activity) are not included in the case. [5] Distinct applied at 58 g/ac (143 g/ha). If higher rates are used, rotate to cereal or corn crops only.

CEREALS

Pre- and Post-Harvest Management

Combines top genetics with customizable weed control for the cleanest fields possible.

The **Clearfield®** Production System for wheat is the only herbicide-tolerant wheat system that delivers complete control of volunteer barley and cereal off-types. It features varieties with high yield potential, reduced lodging and disease resistance while providing a weed control solution specifically designed for use on **Clearfield** wheat.

Clearfield wheat varieties

- Top-yielding genetics from high-performance wheat varieties
- Herbicide-tolerant traits help you maximize weed control
- Choose from varieties bred for early maturity, short stature, good standability and resistance to fusarium head blight

Clearfield® Production System for Wheat | BASF We create chemistry

Clearfield Production System for wheat herbicide	
Altitude FX® 3 herbicide	Offers high-level control of grasses including volunteer barley and Group 1-resistant wild oats, plus your choice of tank-mix partner for customizable broadleaf weed control.

Compatible seed treatments	
Insure® Cereal FX4 seed treatment	Formulated with Xemium®, Insure Cereal FX4 combines four modes of action with the benefits[1] of **AgCelence®** to deliver a new standard of effective broad-spectrum protection against seed- and soil-borne diseases.

Compatible herbicides	
Heat® LQ herbicide	Applied pre-seed or pre-emergent with glyphosate for rapid burndown of tough broadleaf weeds, with residual activity (at higher rates) on key flushing weeds. Applied **pre-harvest** with glyphosate for fast, complete dry down of tough broadleaf weeds and improved harvest efficiency.
Distinct® herbicide	Complements glyphosate for superior chemfallow and post-harvest control of broadleaf weeds, including resistant biotypes.

Compatible fungicides	
Nexicor® fungicide	Three modes of action with the proven benefits[1] of **AgCelence** for broad-spectrum control of key cereal leaf diseases, including rust, septoria and tan spot.
Caramba® fungicide	Proven, preventative protection against fusarium head blight and other late-season diseases to preserve your crop's quality and grade.

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.

Clearfield Commitment for wheat.

Why is it important to register **Clearfield**® wheat acres?

- The **Clearfield** Commitment upholds the use of products used with the **Clearfield** Production System for wheat, ensures the integrity of the **Clearfield** trait and maintains the level of germination and vigour that growers have come to expect from the **Clearfield** system
- It provides ongoing support for research and development of new **Clearfield** wheat varieties with the Crop Development Centre (CDC)
- Acreage reported for **Clearfield** wheat along with the purchase of **Clearfield** wheat herbicide counts toward additional BASF Ag Rewards

Clearfield® Production System for Wheat

BASF We create chemistry

To complete the Commitment, you will be required to provide:

1. Seed varieties, number of acres (exact or estimate) or amount of seed in pounds
2. Your information (name, farm name, address, telephone number, province)
3. Your signature and that of a witness

Complete a Commitment with these easy steps:

When you order certified **Clearfield** wheat seed, you must sign a **Clearfield** Commitment form for wheat, which can be initiated or attained via the steps below. Dedicated to improving its processes, BASF updated the **Clearfield** Commitment to an evergreen Commitment in 2015. That means if you signed a Commitment in 2015 - 2020, you will not be required to sign again. However, if you did not purchase **Clearfield** wheat in the listed years, you will need to sign a Commitment for the 2021 season.

1. Contact **AgSolutions®** Customer Care at 1-877-371-BASF (2273) to initiate a **Clearfield** Commitment for wheat.

   OR

2. Speak to your **Clearfield** wheat retailer or seed seller.
3. Print two (2) copies of the initiated evergreen **Clearfield** Commitment form for wheat:
   a. One (1) for you to keep for reference
   b. One (1) copy to submit to BASF
4. Submit completed Commitment forms to BASF throughout the season in one of three ways:
   a. Fax: 1-800-354-7144
   b. Mail: 500–90 Burnhamthorpe Road West, Mississauga, ON, L5B 3C3
   c. Email: Scan and email to **basf@basf-agsolutions.ca**

Clearfield-Confirm Testing

Prior to using your own farm-saved seed or selling it to others, you must first have it **Clearfield**-Confirm® tested to ensure it has not been contaminated with non-**Clearfield** seed.

Send samples to one of the SGS Canada Inc. seed labs below:

- 280 Portage Close, Unit 310, Sherwood Park, AB T8H 2R6 (1-800-952-5407)
- 10136128 Ave, Unit 106, Grand Prairie, AB T8V 4H3 (1-877-532-8889)
- 167 Lombard Ave, 930, Winnipeg, MB R3B 0V3 (1-204-942-8557)


Healthy peas and lentils don't
happen without innovation.
See for yourself.

Crop Establishment

- **Clearfield®** Production System for lentils
- **Clearfield** lentil varieties
- **Clearfield** Commitment
- **Clearfield** lentil Seed Quality Offer form
- Inoculant formulations
- Seeding equipment
- Nodulator® Duo SCG inoculant
- Nodulator XL inoculant
- Insure® Pulse seed treatment
- Seed treatment comparison
- Heat® Complete herbicide
- Heat LQ pre-seed herbicide

Weed Management

- Advanced Weed Control Program
- Pea and lentil staging
- Odyssey® Ultra NXT herbicide
- Solo® Ultra herbicide
- Viper® ADV herbicide
- Basagran® Forté herbicide
- Pre-seed herbicide comparison
- In-crop herbicide comparison

Disease Management

- Disease staging
- Choosing a fungicide
- Dyax® fungicide
- Cotegra® fungicide

Harvest Management

- Heat LQ pre-harvest herbicide staging for pulses
- Heat LQ pre-harvest herbicide

Crop Management Resources

- **Clearfield** Production System for lentils – compatible products

Additional Resources

- Solutions for chickpeas
- Solutions for faba beans
- Solutions for flax
- Solutions for dry beans
- Inoculant compatibility information
- Handling, storing and applying inoculants
- Challenging weeds - identification and control
- Mixing order
- Bulk available products

Peas and lentils. Consistent performance.

ADVANCED WEED CONTROL

Healthier and more productive peas and lentils come with a well-rounded management plan—and the Advanced Weed Control Program is a key part of that. Learn more.

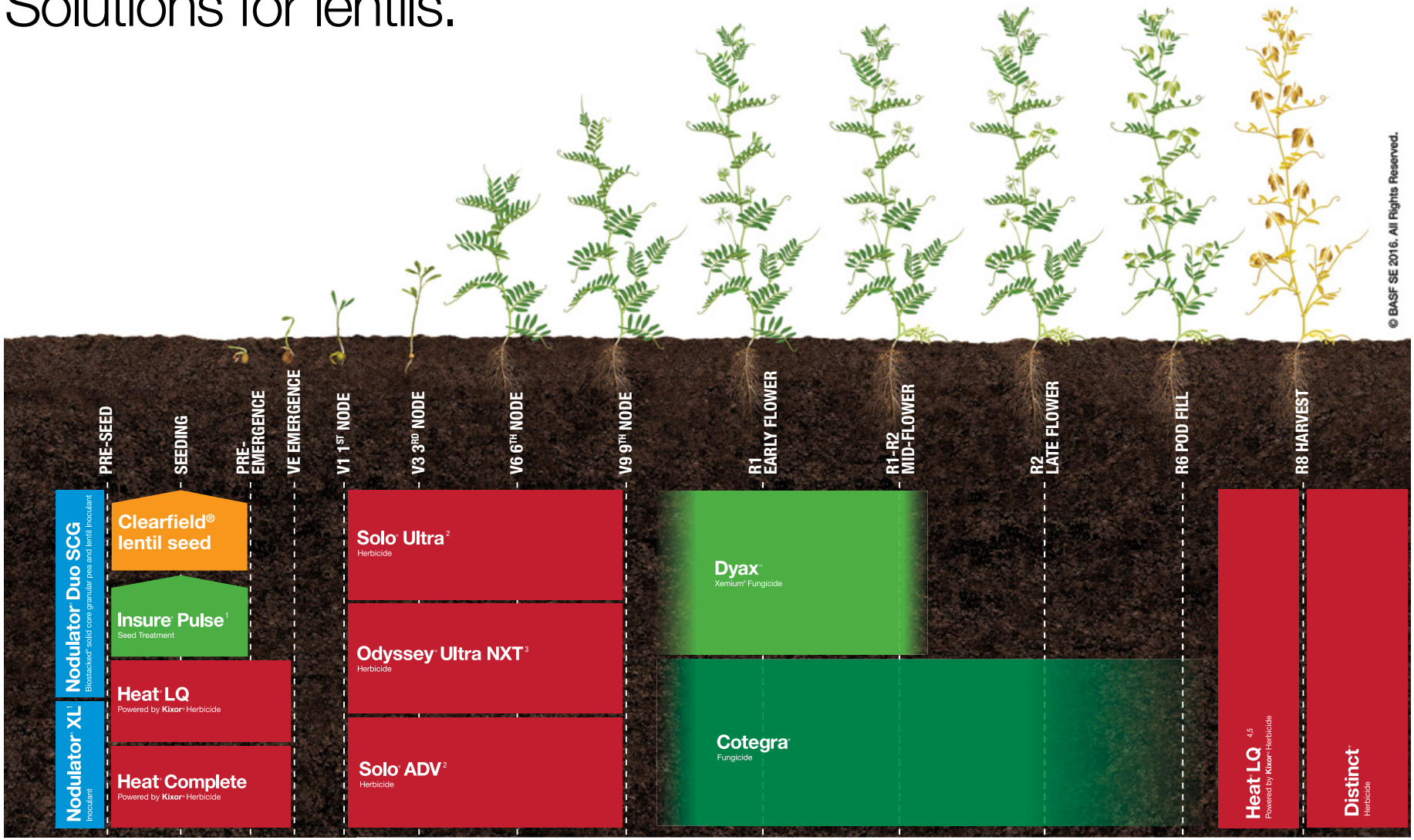
One of the cornerstones of the program is Heat® Complete herbicide, providing broad-spectrum burndown with extended residual activity. Learn more.

For improved disease control, add Dyax® to your program, a premium fungicide with increased levels of Xemium®. Learn more.

Dyax®
Xemium® Fungicide

Protect your peas and lentils all season long.

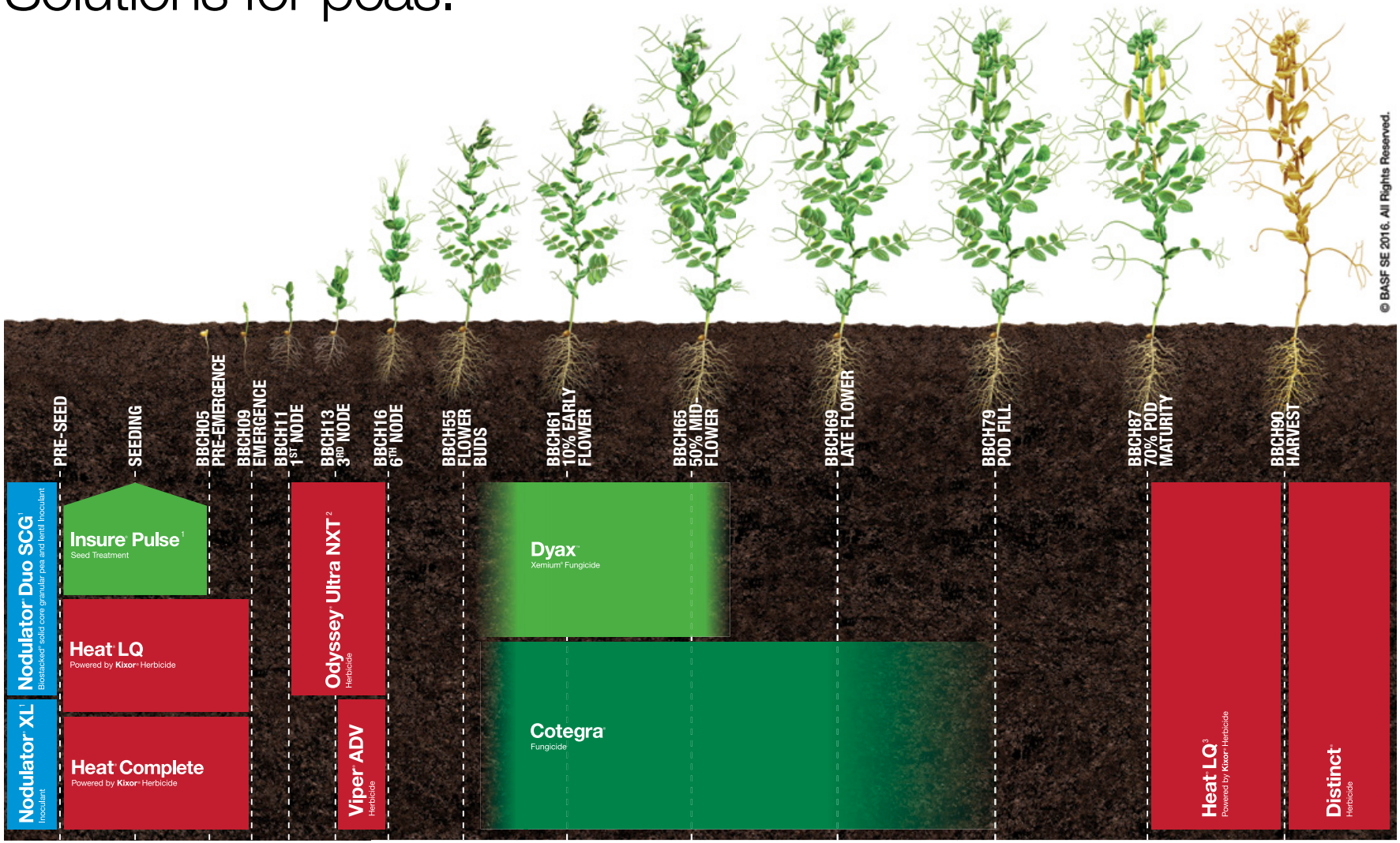
Solutions for lentils.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] For details on compatibility between seed treatments and inoculants, see the Lentil Seed Applied Pesticide Compatibility Information document available on **agsolutions.ca**, call **AgSolutions** Customer Care at 1-877-371-BASF (2273) or contact your BASF **AgSolutions** Grower Representative.
[2] Registered for use on **Clearfield** lentils in the Prairie Provinces and Peace River area of British Columbia only.
[3] Registered for use on **Clearfield** lentils and only in the Prairie Provinces.
[4] Apply when bottom 15% of pods are mature and brown with ripened seeds.
[5] BASF supports the use of Heat® LQ herbicide for pre-harvest for red lentils, however we are still in the process of aligning the Maximum Residue Limit (MRL) in the European Union with other trade jurisdictions.
Note: Heat LQ is supported for pre-harvest use on red lentil varieties only. DO NOT apply Heat LQ pre-harvest to green lentils. Please check with your grain buyer prior to the pre-harvest application of Heat LQ in red lentils.

Solutions for peas.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] For details on compatibility between seed treatments and inoculants, see the Pea Seed Applied Pesticide Compatibility Information document available on **agsolutions.ca**, call **AgSolutions** Customer Care at 1-877-371-BASF (2273) or contact your BASF **AgSolutions** Grower Representative.
[2] Registered for use only in the Prairie Provinces.
[3] Apply when majority of pods are brown (70 to 80%).

High-performing genetics. Innovative solutions. A superior system.

The **Clearfield®** Production System is the best way to grow lentils, combining superior genetics across all major red and green lentil market classes with an unrivalled portfolio of crop solutions. BASF has worked with the Crop Development Centre (CDC) to develop herbicide-tolerant varieties, leading to the release of CDC Impact and CDC Imperial, the first herbicide-tolerant lentil varieties on the market. To date, there are 18 **Clearfield** varieties developed across all major lentil classes. These varieties are designed for maximum yield and quality with the option to choose from different height, maturity or disease resistance traits to suit your operation.

Clearfield® Production System for Lentils

BASF We create chemistry

		Yield % CDC Maxim		Resistance to[1]:	
Market class	**Variety**	**Area 1 & 2**	**Area 3 & 4**	**Ascochyta blight**	**Anthracnose race 1**
Extra small red	CDC Imp	95	95	MR	MR
	CDC Impala	80	90	MR	MR
	CDC Imperial	84	79	MR	MR
Small red	CDC Maxim	100	100	MR	MR
	CDC Dazil	97	93	MR	I
	CDC Imax	92	78	MR	I
	CDC Impact	80	76	MR	MS
	CDC Impulse	108	95	MR	MR
	CDC Nimble	108	108	MR	MR
	CDC Proclaim	105	102	MR	MR
Large red	CDC KR-2	102	90	MR	MR
Small green	CDC Invincible	92	80	MR	MR
Medium green	CDC Impress	78	71	MR	S
	CDC Imigreen	87	71	MR	MS
Large green	CDC Lima	89	86	MR	MR
	CDC Impower	79	63	MR	S
French green	CDC Peridot	84	94	I	MS
Green cotyledon	CDC QG-3	73	63	I	MR
	CDC QG-4	91	91	I	MR
Spanish brown	CDC SB-3	88	87	I	MR
	CDC SB-4	105	106	I	MR

Source: Saskatchewan Pulse Crops Seeding and Variety Guide 2019 and University of Saskatchewan - Crop Development Centre (CDC)

[1] Resistance ratings: R=Resistant; MR=Moderately Resistant; I=Intermediate Resistance; MS=Moderately Susceptible; S=Susceptible.

Commit to growing a better future.

Our seed partners are dedicated to the integrity of the **Clearfield** trait and understand the demand for **Clearfield** lentil varieties to tackle the challenges of production. That's why a portion of BASF herbicide sales are reinvested into the CDC breeding program to support ongoing research and development of new **Clearfield** lentil varieties. When you sign the evergreen **Clearfield** Commitment for lentils and register your acres in subsequent years, you gain access to technology and maintain the integrity of the system by committing to match the **Clearfield** trait with compatible BASF chemistries.

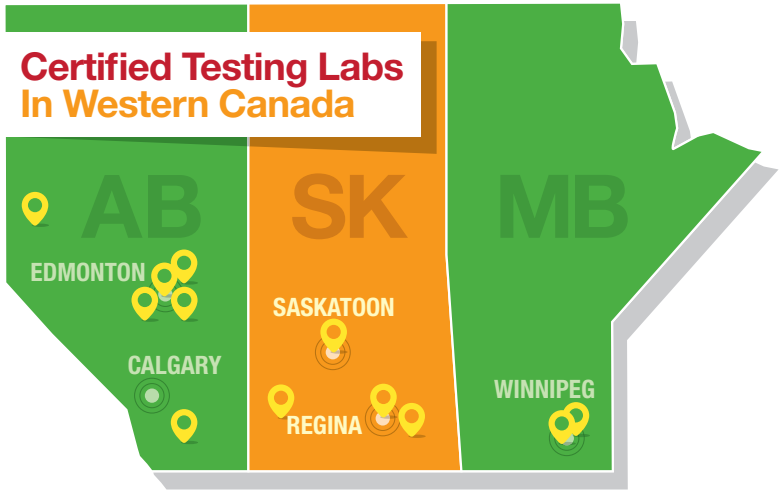
CDC breeding objectives:

- Improving disease resistance, with a focus on ascochyta, anthracnose and stemphylium blight
- Herbicide tolerance for improved weed management
- Higher yields for improved economic returns

4 easy steps to complete your **Clearfield** Commitment.

1

Get your **Clearfield** lentils **Clearfield**-Confirm® tested. Free of charge through the **Clearfield** lentil Seed Quality Offer. See **agsolutions.ca/clearfieldlentils** for labs.



2

Sign the **Clearfield** Commitment in 1 of 3 ways:

Speak to your **Clearfield** lentil retailer or seed seller.

OR

Call **AgSolutions**® Customer Care at 1-877-371-BASF (2273).

OR

Speak to your BASF **AgSolutions** Grower Representative.

3

Purchase matching compatible BASF IMI herbicides for **Clearfield** lentils and a portion of the sale will be reinvested into the Crop Development Centre.

4

Report seeded acres and variety annually.

Report seeded acres with your BASF **AgSolutions** Grower Representative, **AgSolutions** Customer Care, **Clearfield** lentil retailer or seed seller.

Always read and follow label directions.

The **Clearfield** lentil Seed Quality Offer.

With the **Clearfield®** lentil Seed Quality Offer, you can test your seed for **Clearfield**-Confirm®, as well as germination, vigour, disease and thousand kernel weight (TKW). Simply fill out the form below and include a copy with your seed sample AND send via the submission information. All fields must be completed to qualify for the free offer. Uncompleted fields will result in charges for the **Clearfield** lentil Seed Quality Offer.

STEP 1: Grower and seed information.

Complete the form below and agree to the Offer Terms and Privacy Consent to qualify.

Grower Full Name _____

Farm Name (if applicable)_____

Address _____

City _____

Province _____ Postal Code_____

Phone _____ Email/Fax_____

Variety _____

Clearfield lentil seeded acres 2020:_____

Clearfield lentil intentions for 2021*: _____

☐ I agree to the Terms and Conditions of this offer.*

☐ I consent to Privacy Consent Form (PIPEDA).*

☐ I consent to Commercial Electronic Messaging (CEM).

By checking these boxes, you are confirming that information provided in this form is valid and that you consent to the Terms and Conditions*, PIPEDA* and/or CEM that you can find at **agsolutions.ca/clearfieldlentiloffer**.

*** Participation required to receive this offer.**

Clearfield® Production System for Lentils | BASF We create chemistry

STEP 2: Preferred seed lab.

Please send a 1 kg sample of your **Clearfield** lentil seed variety to a participating lab from the list below.

☐ **20/20 Seed Labs Inc.** | (1-877-420-2099)
507-11th Avenue, Nisku, AB T9E 7N5

☐ **20/20 Seed Labs Inc.** | (1-866-540-7333)
3489 Pembina Hwy, Winnipeg, MB R3V 1A4

☐ **SGS Canada Inc.** | (1-800-952-5407)
Unit 310, 280 Portage Close, Sherwood Park, AB T8H 2R6

☐ **SGS Canada Inc.** | (1-877-532-8889)
Unit 106, 10136 128 Ave, Grande Prairie, AB T8V 1E9

☐ **SGS Canada Inc.** | (1-204-942-8557)
930, 167 Lombard Ave, Winnipeg, MB, R3B 0V3

☐ **Discovery Seed Labs** | (306-249-4484)
450 Melville Street, Saskatoon, SK S7J 4M2

☐ **Lendon Seed Lab** | (306-585-7333)
147 Hodsman Road, Regina, SK S4N 5W5

☐ **Prairie Diagnostic Seed Lab** | (306-842-7375)
1105 Railway Avenue, Weyburn, SK S4H 3H5

☐ **Seed Check Technologies Inc.** | (780-980-8324)
Unit 101, 5906-50 Street, Leduc, AB T9E 0R6

☐ **Seed Solutions Seed Labs** | (306-741-9309)
Box 1420, Swift Current, SK S9H 3G6

STEP 3:

Grower Signature _____ Date_____

By signing this form, you acknowledge that you have read and agree to the Terms and Conditions outlined at **agsolutions.ca/clearfieldlentiloffer**.

Submit Form

Email: basf@basf-agsolutions.ca

Mail: **AgSolutions®** Customer Care
500-90 Burnhamthorpe Road West, Mississauga, ON L5B 3C3

Getting right down to the root of the season.

Selecting a formulation.

Inoculants are available in a variety of formulations: solid core granular, peat granular, self-adhering peat and liquid. Each formulation has different characteristics that make it beneficial.

Breakdown of BASF formulations[1]

	Solid Core Granular	Self-Adhering Peat (SAP)	Liquid
Characteristics	• Uniform, engineered pellet • Most accurate placement • Low dust • Free-flowing (fewer application errors at seeding) • Highly resistant to crumbling • Increased performance under ideal conditions • "House" for the rhizobia	• Reliable, proven performance • Can be applied dry, damp or as slurry • Includes built-in adhesive • Rhizobial cells injected and allowed to grow in SAP	• Easy-to-use • Proven performance • Rhizobial cells living in a broth medium
Application	In-furrow	On seed	On seed
Rhizobia	Minimum $8x10^7$ viable cells per gram	Minimum $1x10^9$ viable cells per gram	Minimum $7.5x10^8$ viable cells per gram
Survivability		• 24-hour on-seed survivability • An application within 4-6 hours of inoculation brings optimal results	• 6-hour on-seed survivability

[1] Refer to inoculant and seed compatibility here.

PEAS & LENTILS

Crop Establishment

Equipped for seeding success.

Another important factor for successful seeding is equipment selection. With many seeding equipment options available in today's marketplace, it's important to keep these considerations top of mind during the selection process.

Key advantages and limitations – Knowing your equipment needs is easier when you're aware of the benefits and drawbacks of a model—for example, tank options (i.e. saddle/auxiliary tanks, inter-tank flexibility).

Ease of use/experience – Due to the narrow window at seeding, it's crucial that tank setup, tank fill, tank calibration and seeding are as efficient as possible. Since not all systems are the same, it's helpful to be aware of the intricacies of your machine and account for time to adjust necessary components. Some features that can help you improve efficiency include bulk boom options, product lift systems and conveyor or auger options.

Technology – Manufacturers offer many helpful tools, including camera systems, load cells, product sensors, outside calibration and overlap control. Taking the time to understand your system prior to seeding pays off with the assurance that all seed, fertilizer and inoculant are being used properly.

Resources – Utilizing the expertise of your equipment provider can save you a lot of time troubleshooting; the manufacturer knows the details of their equipment best.

It’s all in the delivery.

Knowing how your seeding system meters can give you a better understanding of how the seed or product gets into the ground. Each manufacturer has their own unique design when it comes to metering systems, but each falls into one of three categories.

Class A

These systems meter the product (seed, inoculant, etc.) into a large primary tube that carries seed to a primary splitter. Product is then separated randomly into a series of smaller lines that carry it to a second splitter where it is again randomly separated. From there, these individual lines go to the seed openers where the product is placed in the ground.

Class B

These systems meter the product into a series of primary hoses which lead to a splitter. From there, each seed flows directly to the openers. The goal of having only one random split is to improve the coefficient of variation (accuracy).

Class C

These systems distribute the product directly under the grain tank. Seed is metered directly to individual lines which are then carried to the openers and into the ground. This system involves no random splits.

Setting yourself up for success.

While choosing your equipment is one crucial step, setting it up correctly before the season starts is equally important. Consider the following factors:

Ensure accurate calibration – Use the metering settings on the rate charts as a starting reference point and field test (use a known volume of product over a known acreage).

Set fan speed – Regardless of your system, this needs to be set correctly to reduce damaged seed and ensure seed/product is delivered properly to openers.

Use proper metering auger/roller – Ensure your systems are set up for low output products when dealing with small granular inoculant, small seed, etc. Use the appropriate auger/roller for the product to ensure accurate rate.

	Bourgault	John Deere	Väderstad
Class system	A	B	B
Metering system requirements for small products/seed (inoculant, canola seed, etc.)	Low output auger Options: UHMW (plastic), steel Recommendation: UHMW	Yellow roller/cartridge Recommendation: use roller spacers	18 CC low displacement roller
Necessary component	1 auger/tank	1 cartridge/tank	1 roller/10 ft of drill
	Seed Master	**Morris**	**Case New Holland**
Class system	C	B	B
Metering system requirements for small products/seed (inoculant, canola seed, etc.)	UltraPro™ canola roller (1/4 inch)	Fine seed plates and spiral fluted metering wheel	Orange cartridge/roller for inoculant White cartridge/roller for canola seed
Necessary component	1 roller/10 ft of drill	1 seed plate/metering wheel	1 roller/10 ft of drill

*If you have any questions specific to your application system, speak to your BASF **AgSolutions**® Grower or Retail Representative or call **AgSolutions** Customer Care at 1-877-371-BASF (2273).*

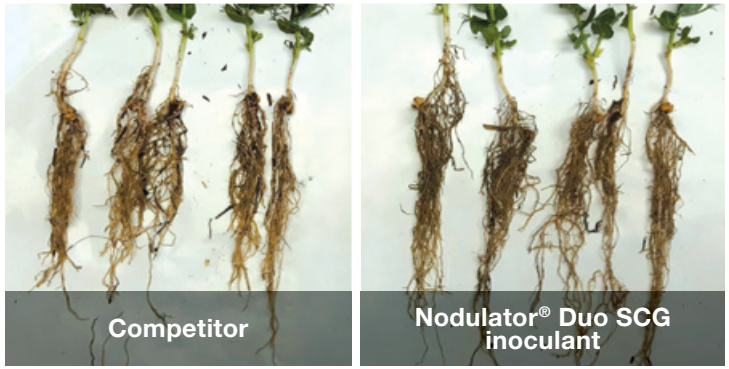
Click here for more information on inoculant storage, best use and handling practices.

Nodulator® Duo SCG

Biostacked® solid core granular pea and lentil Inoculant

The newest solid core granular inoculant featuring root-strengthening biofilm—and taking yield potential to the next level.

- Top-performing strain of rhizobium (strain 1435) specifically selected for peas and lentils
- Root-strengthening biofilm bacterium (strain BU1814) helps protect the roots from the stresses encountered in the soil to reserve more energy for growth
- Technically advanced multi-layered granular carrier for rhizobia



Source: BASF research trials, 2017

Bioactive ingredients	*Rhizobium leguminosarum* biovar *viceae* (strain 1435) *Bacillus subtilis* (strain BU1814)
Formulation	Solid core granules
One case contains	1 x 22.68 kg bag Also available as 1 x 364 kg mini-bulk Q-Pak

Crop treatment
Applied directly in furrow.

Inoculant activity
This inoculant contains a minimum of 8 x 10^7 viable cells of *Rhizobium leguminosarum* biovar *viceae* per gram and 2 x 10^8 viable cells of *Bacillus subtilis* per gram.

Application rates
One bag will treat 10.6 acres (7" rows) to 18.5 acres (12" rows).
One Q-Pak will treat 170 acres (7" rows) to 296 acres (12" rows).

Apply granular inoculant at a rate of 28.5 g/1,000 linear row feet.

Row spacing		Application rate		Area treated per bag	
cm	in	kg/ha	lb/ac	ha	ac
15.2	6	6.2	5.6	3.7	8.9
17.8	7	5.3	4.7	4.3	10.6
20.3	8	4.6	4.1	4.9	12.2
22.9	9	4.0	3.6	5.7	13.9
25.4	10	3.7	3.3	6.1	15.2
27.9	11	3.4	3.0	6.7	16.7
30.5	12	3.0	2.7	7.6	18.5

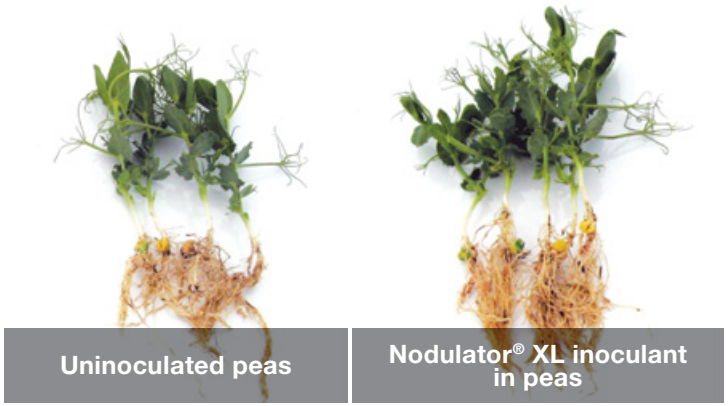
Seed treatment compatibility
Nodulator Duo SCG inoculant is compatible with all seed-placed products, as it is applied directly to the furrow and does not come in contact with the seed.

Nodulator® XL

Inoculant

High-performance inoculant for pulses.

- Highly efficient and more active strain of rhizobia for greater yield potential
- Peat: Built-in adhesive qualities make inoculation quick and simple
- Liquid: Convenient, easy-to-use product can be applied up to 6 hours before seeding. It can be applied on seed or in-furrow



Uninoculated peas | Nodulator® XL inoculant in peas

Source: BASF trials, Southern AB, 2012

Bioactive ingredient	*Rhizobium leguminosarum* biovar *viceae,* strain 1435
Available formulations	Self-adhering sterile peat and liquid
Each case contains	Peat: 5 x 1.2 kg packages or Liquid: 3 x 7.5 L bladders

Crop treatment
Peat: Dry or damp inoculation on seed
Liquid: Apply directly on seed or in-furrow

Inoculant activity
Sterile peat formulation: Product contains a minimum of 1 x 10^9 rhizobia per gram.
Liquid formulation: Product contains a minimum of 7.5 x 10^8 rhizobia per gram.

Nodulator XL contains *Rhizobium leguminosarum* biovar *viceae*, a highly efficient, more active strain of rhizobium.

Maintaining diversity
The organism formulated into this product is classified as *Rhizobium leguminosarum* biovar *viceae*. All organisms used by BASF inoculants are common to Canadian soils. No BASF inoculant products sold in Canada contain genetically modified organisms.

Application rates
Sterile peat formulation: One case will treat 110 bushels of seed.
The standard rate of application is 1.2 kg per 600 kg of seed.

Liquid formulation:
One case will treat 300 bushels of seed.

Flow valve setting	Inoculant flow rate		Seed/auger flow rate	
	ml/ min	fl. oz/min	kg/ min	lb (bu)/min
1	360	12	131	289 (5)
2	860	29	313	690 (11)
3	1,340	45	487	1,074 (18)
4	1,660	56	604	1,332 (22)
5	1,780	60	647	1,426 (24)
6	2,030	68	738	1,627 (30)

Liquid formulation (in-furrow):
One case will treat 2.9 acres to 5.7 acres.

Row spacing		Application rate		Area treated per case	
cm	in	L/ha	L/ac	ha	ac
15.2	6	6.5	2.6	1.2	2.9
17.8	7	5.5	2.2	1.4	3.3
20.3	8	4.9	2.0	1.5	3.8
22.9	9	4.3	1.7	1.7	4.3
25.4	10	3.9	1.6	1.9	4.8
27.9	11	3.5	1.4	2.1	5.2
30.5	12	3.2	1.3	2.3	5.7

Seed treatment compatibility
For details on seed treatment compatibility, visit **agsolutions.ca**, call **AgSolutions®** Customer Care at 1-877-371-BASF (2273) or contact your BASF **AgSolutions** Grower or Retail Representative.

AgCelence® Expect more | BASF We create chemistry

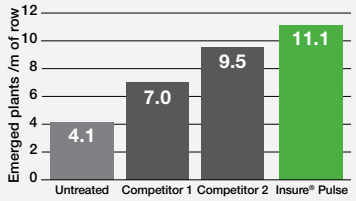
Insure® Pulse

Seed Treatment

Premium broad-spectrum protection for maximum pea and lentil production.

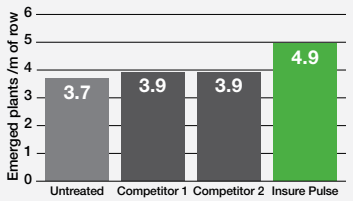
- Three modes of effective action to deliver a new standard of broad-spectrum protection against key seed- and soil-borne diseases, including ascochyta
- Xemium® delivers unique mobility and translocation characteristics for more consistent and continuous disease protection
- **AgCelence®** benefits[1] offer greater germination for improved emergence and enhanced seedling vigour, including under minor stress events such as cold conditions[2]
- Can also be applied in soybeans; for a complete list of crops, visit **agsolutions.ca/insure-pulse**

Lentils – More plants emerged under fusarium disease pressure



Source: Third party generated registration data, 2013

Field peas – Number of plants emerged under botrytis disease pressure



Source: Third party generated registration data, 2013

Active ingredients	Metalaxyl – Group 4 Fluxapyroxad – Group 7 Pyraclostrobin – Group 11
Formulation	Water-based suspension
One case contains	2 x 9.8 L jugs Also available in 120 L drum

Crop treatment

Standard slurry, mist-type or gravity flow seed treatment application equipment.

Diseases controlled and suppressed

For a complete list of diseases controlled and suppressed, refer to the opposing page.

Application rates

Apply at 300 ml/100 kg (220 lb) seed.

Bushels (bu) treated per jug	Bushels (bu) treated per 120 L drum
120	1,469

Inoculant compatibility

For details on seed treatment and inoculant compatibility, see the Applied Pesticide Compatibility Information for the respective crops available on **agsolutions.ca**.

General guideline for seed-borne disease thresholds in pulses.

Major pathogen	Acceptable levels
Ascochyta spp.	<5% for lentils, <10% for peas
Fusarium spp.	<5%
Botrytis cincerea	<10%
Sclerotinia spp.	<10%
Colletotrichum spp. (anthracnose)	0-0.5% (zero tolerance if none in the area or if planted on a field where lentils have never been grown)

Note: *Botrytis* + *Sclerotinia* + *Fusarium* spp. should not exceed 10%.

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.

Choose a seed treatment. And confidence.

Pea and lentil diseases controlled or suppressed	Insure® Pulse		Vibrance® Maxx® RTA®/RFC		Trilex® EverGol®	
All *Fusarium* spp.	**Lentils**	**Field peas**	**Lentils**	**Field peas**	**Lentils**	**Field peas**
Seed rot	**C**	**C**	**C**	**C**	**C**	**C**
Seedling blight	**C**	**C**	**C**	**C**		
Damping-off			**C**	**C**	**C**	**C**
Root rot	S	S	**C**			
Rhizoctonia solani						
Seed rot	**C**	**C**	**C**	**C**	**C**	**C**
Root rot	**C**	**C**				
Seedling blight	**C**	**C**	**C**	**C**		
All *Pythium* spp.						
Seed rot	**C**	**C**	**C**	**C**	**C**	**C**
Seedling blight	**C**	**C**	**C**	**C**		**C**
Botrytis cinerea						
Seed rot	S	S	**C**	**C**	**C**	**C**
Seedling blight	S	S	**C**	**C**	**C**	**C**
All *Ascochyta* spp.						
Seedling blight	**C**	**C**	**C**		S	S
Anthracnose *(Colletotrichum lindemuthianum)*						
Seedling blight	S	S				

C= Controlled, S= Suppressed

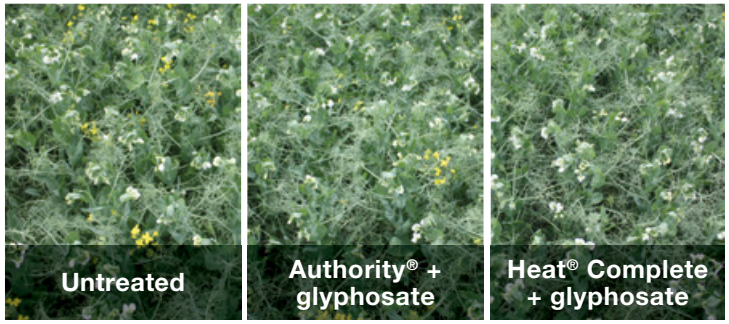
Heat® Complete

Powered by **Kixor®** Herbicide

The ultimate pre-seed burndown with extended residual activity on key grassy and broadleaf weeds.

- Provides rapid and complete burndown of tough-to-control weeds, plus extended residual activity on many weeds
- Contains Group 14 and Group 15 active ingredients in a convenient co-pack for control or suppression of Group 1-, 2- and 9-resistant weeds
- Multiple modes of effective action for management of resistant weeds
- Can also be applied in corn and soybeans; for a complete list of crops, visit **agsolutions.ca/heat-complete**

Weed control in peas



Source: BASF Demonstration Site, Saskatoon, SK, 2018

Active ingredient	Saflufenacil – Group 14 Pyroxasulfone – Group 15
Formulation	Liquid suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 3.89 L jug of Zidua® SC herbicide 2 x 8.1 L jugs of Merge® adjuvant

Crop staging
Pre-seed and pre-emergence

Weeds controlled

Broadleafs
Canada fleabane[1]
Cleavers[2]
Common waterhemp[2]
Dandelion[3]
Flixweed
Kochia[1,2]
Lady's thumb[4]
Lamb's quarters[2]
Narrow-leaved hawk's beard
Perennial sow-thistle[4,5]
Prickly lettuce[4,5]
Ragweed (common, giant)[4]
Redroot pigweed[2]
Round-leaved mallow
Shepherd's-purse[4]
Stinkweed[2]
Volunteer canola[2,6]
Wild buckwheat[2]
Wild mustard[2]

Grasses
Foxtail (green, yellow)[7]
Wild oats[7]

[1] Includes Group 2-resistant and glyphosate-resistant biotypes.
[2] Residual suppression (may be rate dependent).
[3] Top growth burndown control only of perennial plants, control of spring-germinating plants.
[4] Burndown control is rate-dependent.
[5] Top growth burndown control.
[6] All herbicide-tolerant canola systems, including glyphosate-tolerant canola.
[7] Residual suppression only.

Application rates
One case treats 80 acres for lentils and 40 to 80 acres for field peas. The recommended standard rate for field peas is 60 acres.

Field peas

Heat LQ	22 to 43 ml/ac (53 to 106 ml/ha)
Zidua SC	49 to 97 ml/ac (120 to 240 ml/ha)

Lentils

Heat LQ	22 ml/ac (53 ml/ha)
Zidua SC	49 ml/ac (120 ml/ha)

All applications

Merge	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume
Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval
60 days for all pre-seed and pre-emergent applications.

Follow crops
1 year after application
All crops, 1 year after a spring, pre-seed or pre-emergent application.

Residual activation
Heat Complete requires about a 1/2 inch of rainfall for full residual activation. If rainfall does not occur right away, Heat Complete can remain on the surface for several weeks and can activate with a later rain to provide residual suppression after the rainfall. Burndown control does not require rainfall to activate.

Heat® LQ

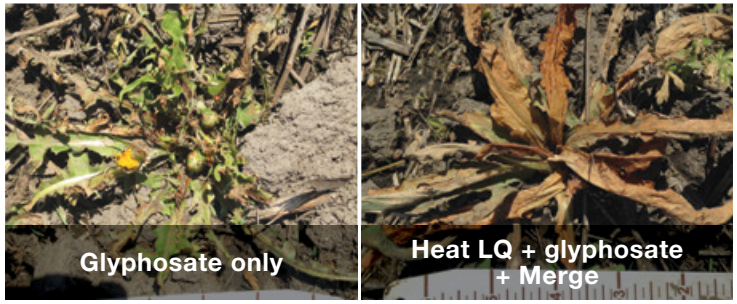
Powered by **Kixor®** Herbicide

PRE-SEED/PRE-EMERGENT BURNDOWN

The ultimate pre-seed/pre-emergent burndown in a new, easy-to-use liquid formulation.

- Rainfast and quickly absorbed for fast, complete weed control even under cool conditions with broadleaf weed control in as few as 3 to 5 days[1]
- Heat® LQ herbicide complements and improves your glyphosate application
- Group 14 chemistry for control of Group 2- and glyphosate-resistant weeds
- Can also be applied in corn, soybeans, and cereals; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Comparison of dandelion after a pre-seed application of Heat LQ plus glyphosate plus Merge® adjuvant



Source: BASF Research Authorization trial, Stoughton, SK, 2014

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 2 x 8.1 L jugs of Merge adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Crop staging

Pre-seed, pre-emergence (before ground crack)

Weeds controlled

Broadleafs

Canada fleabane[2]
Cleavers[3]
Dandelion[4]
Flixweed
Kochia[2]
Lady's thumb[5]
Lamb's quarters
Narrow-leaved hawk's beard
Perennial sow-thistle[5,6]
Prickly lettuce[5,6]
Ragweed (common, giant)[5]
Redroot pigweed[3]
Round-leaved mallow
Shepherd's-purse[5]
Stinkweed[3]
Volunteer canola[3,7]
Wild buckwheat[3]
Wild mustard[3]

[1] Depending on growing conditions. [2] Includes Group 2-resistant and glyphosate-resistant biotypes [3] For suppression of secondary flushes in addition to rapid burndown, use higher application rate of 59 ml/ac (146 ml/ha). [4] Top growth burndown control only of perennial plants, control of spring germinating plants. [5] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha). [6] Top growth burndown control only. [7] All herbicide-tolerant canola systems including glyphosate-tolerant canola. [8] Use the 21.5 ml/ac (53 ml/ha) rate for burndown control and use the higher rates if weeds are large or for flushing weeds or residual suppression on key weeds. [9] Do not use rates higher than 21.5 ml/ac (53 ml/ha) or injury could result. See label for details. [10] Glyphosate (required for optimum activity) is not included in the case. [11] Merge adjuvant is required and is included with Heat LQ herbicide.

Application rates

One case will treat 30 to 80 acres.
One tote treats 2,000 acres for lentils and 730 to 2,000 acres for field peas.

Field peas[8]

Heat LQ	21.5 to 59 ml/ac (53 to 146 ml/ha)

Lentils[9]

Heat LQ	21.5 ml/ac (53 ml/ha)

Chemfallow

Heat LQ	21.5 to 59 ml/ac (53 to 146 ml/ha)

All applications

Glyphosate[10] (360 g ae/L)	0.51 to 1 L/ac (1.25 to 2.5 L/ha)
Merge adjuvant[11]	200 to 400 ml/ac (0.5 to 1 L/ha)

(At the higher Heat LQ application rates (30 or 40 acres per case), BASF recommends using Merge at the higher rate (400 ml/ac). Use both Merge jugs included in the case regardless of the Heat LQ rate. Use all Merge in the tote when applying at 2,000 acres per tote.)

Water volume

Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

60 days for all pre-seed and pre-emergent applications.

Follow crops

1 year after application

All crops, 1 year after a spring, pre-seed or pre-emergent application.

Control that continues all season.

Managing weeds is hard enough without second-guessing herbicide selection and application timing. The Advanced Weed Control Program takes away the guess work by providing a strategy that combines multiple modes of effective action, herbicide layering and residual weed control. Its cornerstone is Heat® Complete herbicide, the newest innovation in weed control that provides broad-spectrum burndown with extended residual activity. It also takes into account the critical period for weed control in field peas and lentils, the crucial timing for controlling weeds before they can cause substantial yield loss.

While application timing can vary across crops and depend on environmental conditions, proper timing can make all the difference. Reducing weed competition at the start of the season sets the crop up for success—and in-crop applications keep the momentum going.

ADVANCED WEED CONTROL

Heat® Complete
Powered by Kixor® Herbicide

IN LENTILS	Critical period for weed control	5 node to 9 node stage
IN FIELD PEAS	Critical period for weed control	emergence to 6 node stage

LENTILS: PRE-SEED

Applying a pre-seed herbicide gives your crops a cleaner, weed-free start to set you up for success.

Heat® Complete
Powered by **Kixor®** Herbicide
(80 ac/case)

LENTILS: IN-CROP

Eliminate costly competition from weeds with a planned in-crop herbicide application.

Solo® Ultra Herbicide
(for re-cropping flexibility)

or

Odyssey® Ultra NXT Herbicide
(for flushing weed control)

LENTILS: KEY WEEDS CONTROLLED (INCL. RESISTANT BIOTYPES)

Foxtail (green, yellow) | Lamb's quarters | Redroot pigweed
Volunteer canola | Wild buckwheat | Wild oats

PEAS: PRE-SEED

Applying a pre-seed herbicide gives your crops a cleaner, weed-free start to set you up for success.

Heat® LQ
Powered by **Kixor®** Herbicide
(30 ac/case)

or

Heat® Complete
Powered by **Kixor®** Herbicide
(60 ac/case)

PEAS: IN-CROP

Eliminate costly competition from weeds with a planned in-crop herbicide application.

Viper® ADV
Herbicide

PEAS: KEY WEEDS CONTROLLED (INCL. RESISTANT BIOTYPES)

Using Heat LQ:
Cleavers | Redroot pigweed | Stinkweed | Volunteer canola
Wild buckwheat | Wild mustard

Using Heat Complete – the above, plus:
Foxtail (green, yellow) | Kochia | Lamb's quarters
Waterhemp | Wild oats

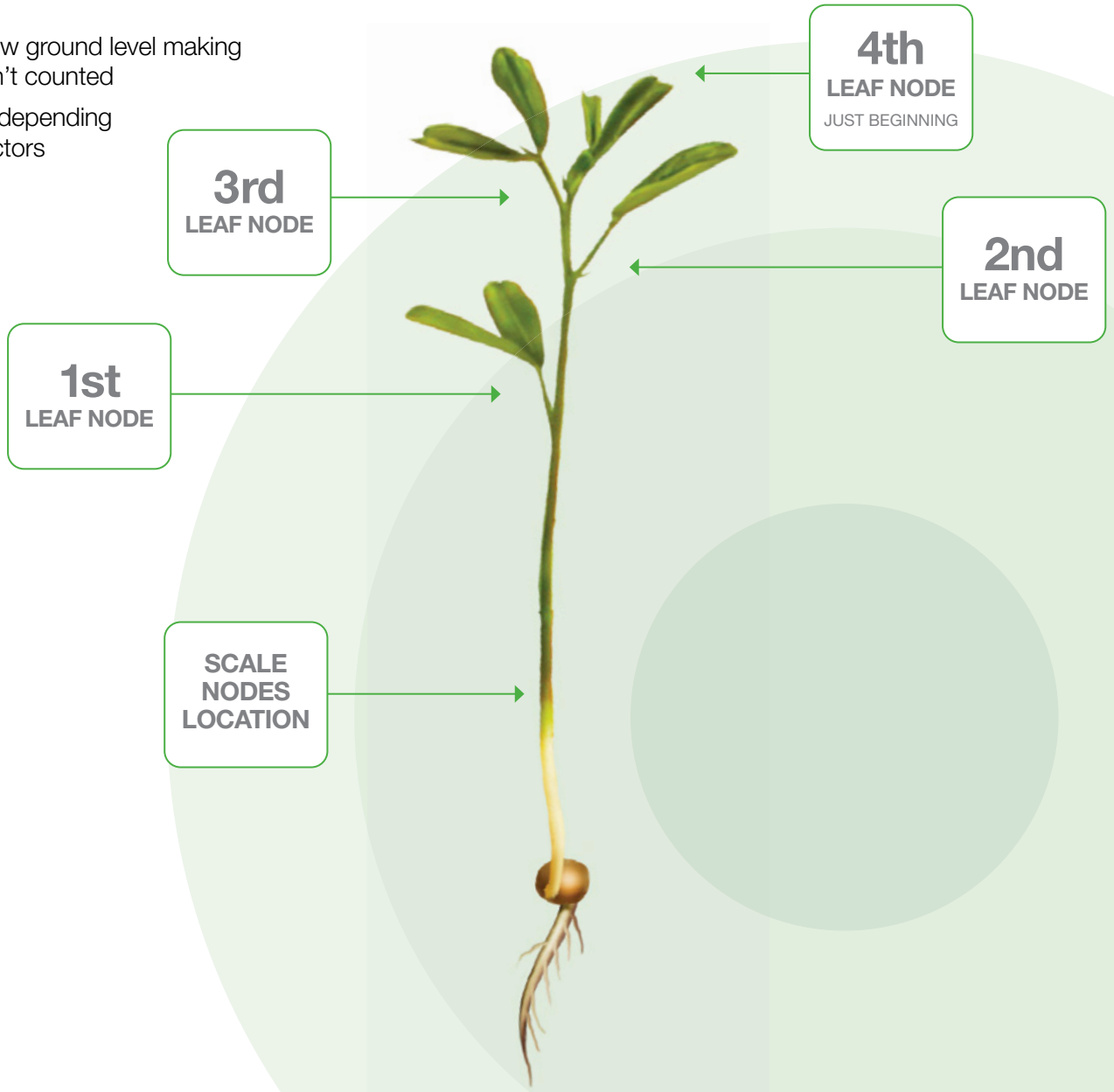
Something else to plan on: peace of mind.

The Advanced Weed Control Program also provides additional re-spray support for weed escapes (even resistant biotypes)—an industry first. BASF will provide Heat LQ pre-harvest herbicide or Basagran® Forté herbicide for broadleaf weed escapes and a BASF graminicide for grassy weed escapes. For more information about the Advanced Weed Control Program, product re-spray or the support process visit **agsolutions.ca/advancedweedcontrol**.

ADVANCED WEED CONTROL

Identifying lentil stages.

- In lentils, the first leaf emerges at the 1st visible node above ground
- Scale nodes are often at or below ground level making them less visible—and they aren't counted
- Multifoliate leaves emerge later, depending on variety and environmental factors

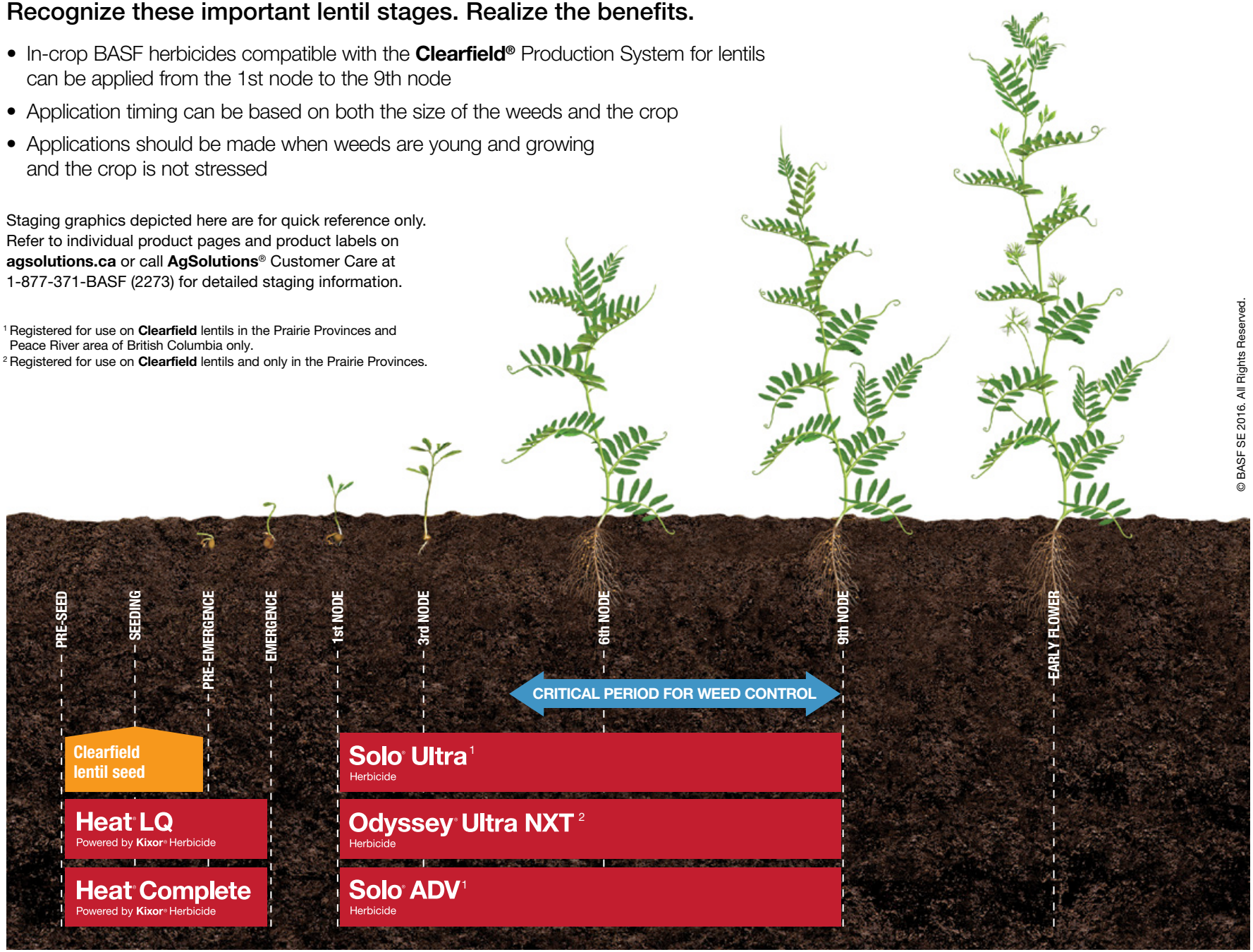


Recognize these important lentil stages. Realize the benefits.

- In-crop BASF herbicides compatible with the **Clearfield®** Production System for lentils can be applied from the 1st node to the 9th node
- Application timing can be based on both the size of the weeds and the crop
- Applications should be made when weeds are young and growing and the crop is not stressed

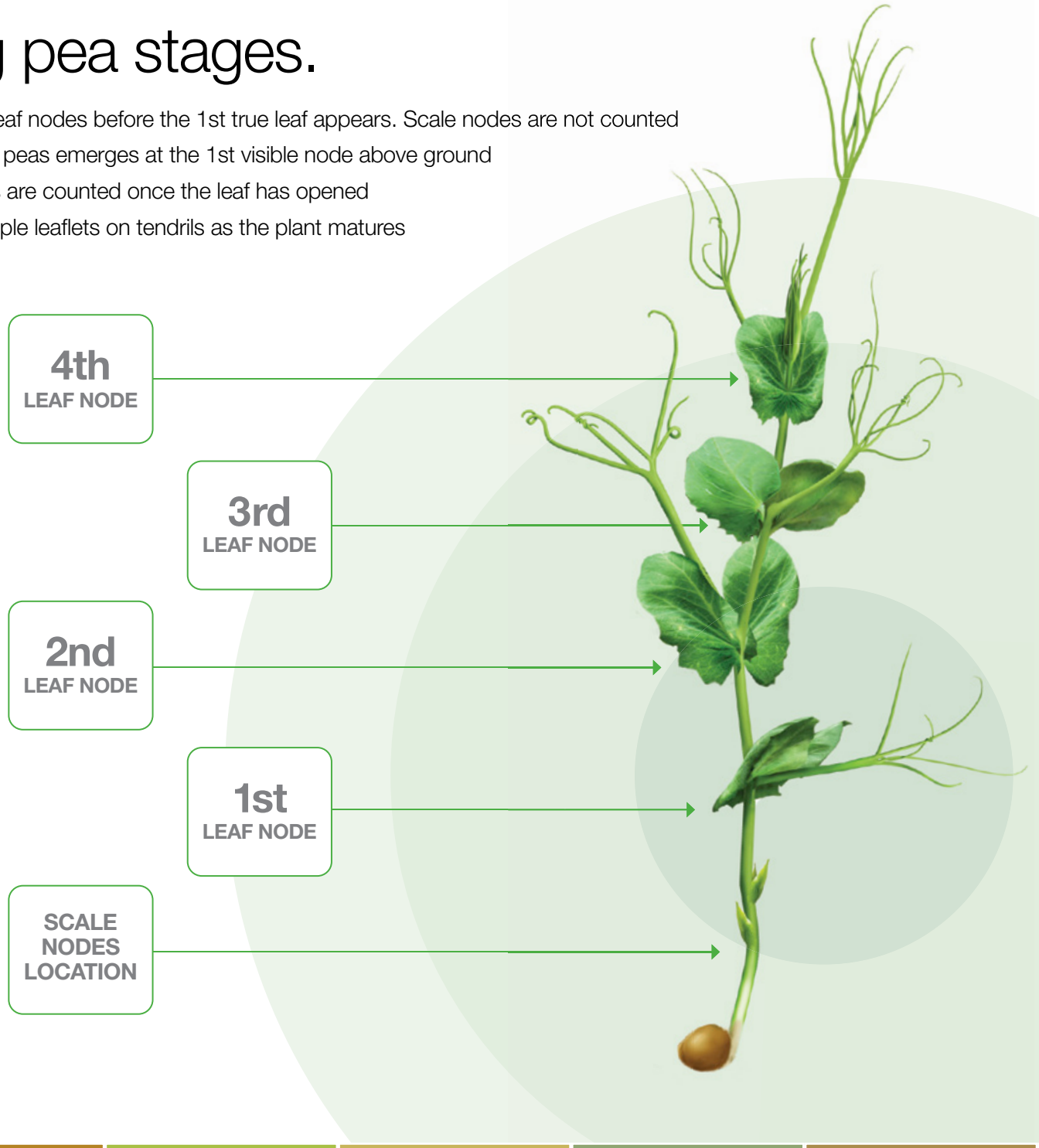
Staging graphics depicted here are for quick reference only. Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions®** Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] Registered for use on **Clearfield** lentils in the Prairie Provinces and Peace River area of British Columbia only.
[2] Registered for use on **Clearfield** lentils and only in the Prairie Provinces.



Identifying pea stages.

- Field peas show scale leaf nodes before the 1st true leaf appears. Scale nodes are not counted
- The first true leaf in field peas emerges at the 1st visible node above ground
- For crop staging, nodes are counted once the leaf has opened
- Later stages show multiple leaflets on tendrils as the plant matures

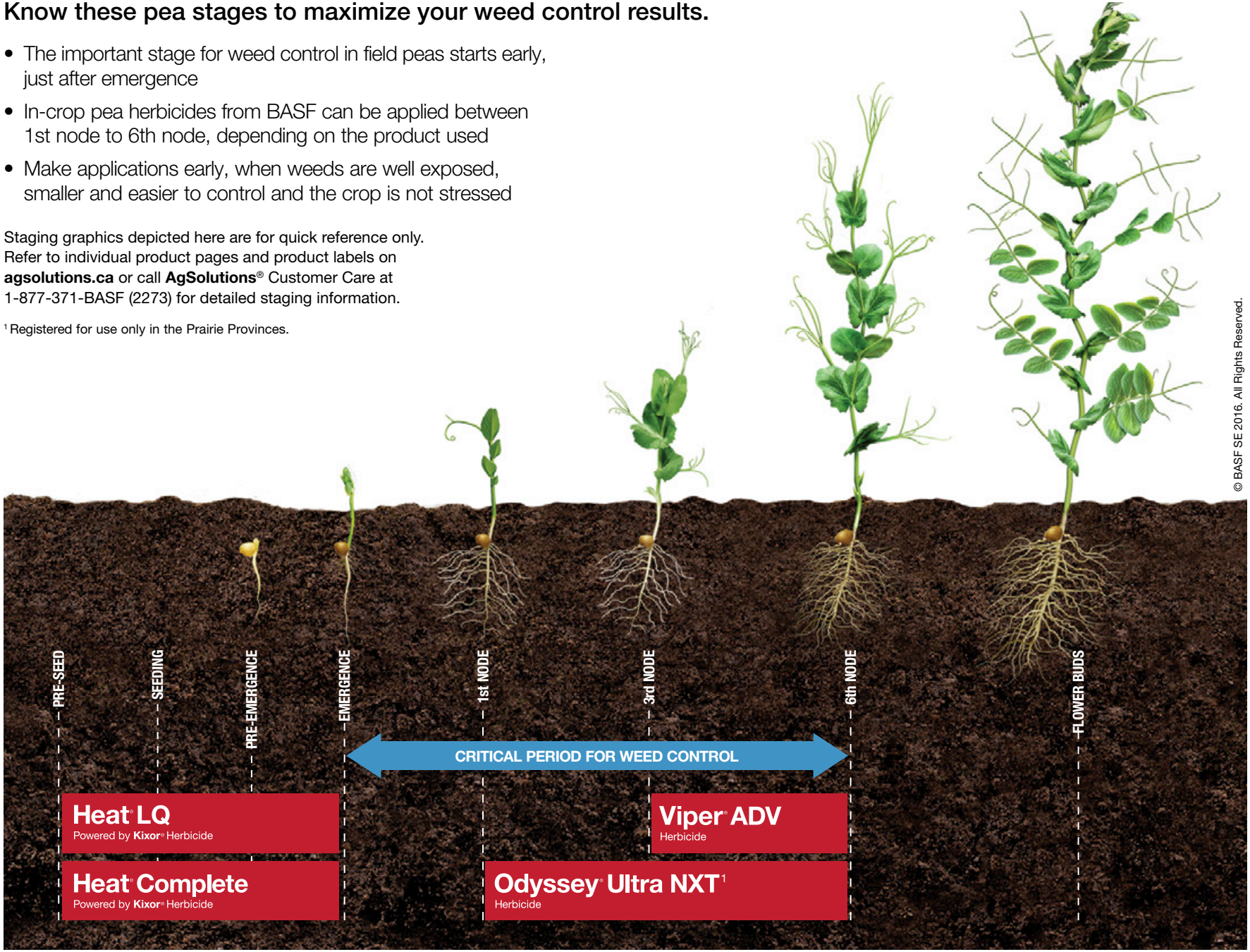


Know these pea stages to maximize your weed control results.

- The important stage for weed control in field peas starts early, just after emergence
- In-crop pea herbicides from BASF can be applied between 1st node to 6th node, depending on the product used
- Make applications early, when weeds are well exposed, smaller and easier to control and the crop is not stressed

Staging graphics depicted here are for quick reference only. Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] Registered for use only in the Prairie Provinces.



Odyssey® Ultra NXT

Herbicide

Multiple modes of action for proven, early-season control of tough grassy and broadleaf weeds.

- Early post-emergence treatment for control, including multiple flushing weeds
- Proven, wide-spectrum control of key grassy weeds including Japanese brome grass, along with suppression of quackgrass
- Wide application window of up to 6-leaf on grassy weeds and up to 4-leaf on broadleaf weeds
- Management of resistant grassy weeds with multiple modes of action
- For a complete list of crops, visit **agsolutions.ca/odysseyultraNXT**

Japanese brome grass control 28 days after application in Clearfield® lentils

Source: BASF research trial, Saskatoon, SK, 2014

Active ingredients	(a) Imazamox – Group 2 Imazethapyr – Group 2 (b) Sethoxydim – Group 1
Formulation	(a) Water dispersible granules (b) Emulsifiable concentrate
One case contains	(a) 692 g jug (b) 6.16 L jug 8.1 L jug Merge® adjuvant

Crop staging[2]
Clearfield lentils: 1 to 9 node
Field peas: 1 to 6 true leaf

Weeds controlled

Broadleafs
Chickweed, cleavers, flixweed, green smartweed, hemp-nettle[3], lamb's quarters[4], redroot pigweed, Russian thistle[3,5], shepherd's-purse, stinkweed, stork's-bill, volunteer canola[6], volunteer tame mustard, wild buckwheat[3], wild mustard[5]

Grasses
Barnyard grass, crabgrass (large), fall panicum, green foxtail (incl. Group 1- or 2-resistant)[7], Japanese brome grass[8], Persian darnel, proso millet, quackgrass[4,8], volunteer barley, volunteer corn, volunteer tame oats, volunteer wheat (incl. **Clearfield** wheat), wild oats (incl. Group 1- or 2-resistant)[7], witchgrass, yellow foxtail

Application rates
One case treats 40 acres.

(a) Odyssey Ultra NXT herbicide	17 g/ac (43 g/ha)
(b) Odyssey Ultra NXT herbicide	154 ml/ac (380 ml/ha)[9]
Merge adjuvant[10]	0.5% v/v (e.g. 500 ml per 100 L spray solution)

Water volume
Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval
60 days after application.[11]

Rainfastness
3 hours.

Follow crops[12]
1 year after application
Canary seed, chickpeas, **Clearfield** canola, durum wheat, field corn, field peas, lentils (incl. **Clearfield** lentils), soybeans, spring barley, spring wheat, tame oats

2 years after application
Flax, non-**Clearfield** canola, sunflowers

[1] Odyssey Ultra NXT provides the same performance as Odyssey Ultra herbicide. [2] Registered for use only in the Prairie Provinces. [3] Suppression in field peas and **Clearfield** lentils. [4] Suppression. [5] Odyssey Ultra NXT will not control weed biotypes that are resistant to Group 2. [6] Non-**Clearfield** canola varieties only. [7] Odyssey Ultra NXT herbicide tank-mix will not control weed biotypes that are multiple-resistant to both Group 1 and Group 2 herbicides. [8] Odyssey Ultra NXT will provide control of spring germinating Japanese brome grass and suppression of quackgrass and fall emerged Japanese brome grass. [9] For control of fall-emerged Japanese brome grass, add Poast® Ultra herbicide at 90 ml/ha to the tank mix. See label for details. [10] Merge adjuvant is required, is included with Odyssey Ultra NXT in the case, and will treat 40 acres at the 10 gal/ac water volume rate. [11] Field peas may be fed to livestock 30 days after application. [12] Refer to label for additional follow-crop restrictions. Contact your BASF **AgSolutions®** Grower Representative for details on any crops not listed here.

Solo® Ultra

Herbicide

Two modes of action for proven control of grasses and tough broadleaf weeds, with rotational freedom.

- Built-in adjuvant, for ease of handling and reduced fill-up times
- Reliable control of a wide spectrum of tough grasses and targeted broadleaf weeds
- Extended application window on grassy weeds
- Multiple modes of action for management of resistant weeds

Active ingredients	(a) Imazamox – Group 2 (b) Sethoxydim – Group 1
Formulation	(a) Liquid solution (b) Liquid emulsifiable concentrate
One case contains	(a) 2 x 6.5 L jugs of Solo® ADV herbicide (b) 6.16 L jug of Poast® Ultra herbicide

Crop staging
Clearfield® lentils: 1 to 9 node

Weeds controlled

Broadleafs
Cleavers[1]
Cow cockle
Green smartweed[2]
Lamb's quarters
Redroot pigweed
Round-leaved mallow[1]
Russian thistle[3]
Shepherd's-purse
Stinkweed
Volunteer canola[4]
Wild buckwheat[1]
Wild mustard[3]

Grasses
Barnyard grass
Crabgrass
Fall panicum
Green foxtail
Japanese brome grass[1]
Persian darnel
Proso millet
Quackgrass[1]
Volunteer barley
Volunteer canary seed
Volunteer corn
Volunteer durum wheat
Volunteer spring wheat[5]
Volunteer tame oats
Wild oats[2]
Witchgrass
Yellow foxtail

Application rates
One case treats 40 acres.

Field peas

(a) Solo ADV herbicide	325 ml/ac (800 ml/ha)
(b) Poast Ultra herbicide	154 ml/ac

Water volume
Ground application only
40 L/ac (10 gal/ac)

Pre-harvest interval
60 days after application for **Clearfield** lentils.

Rainfastness
3 hours.

Follow crops
1 year after application
Canary seed, canola, chickpeas, durum wheat, field corn, field peas, flax, lentils (incl. **Clearfield** lentils), soybeans, spring barley, spring wheat, sunflowers (incl. **Clearfield** sunflower) and tame oats

2 years after application
Mustard (condiment-type only)

[1] Suppression only.
[2] Including Group 1-resistant biotypes and Group 2-resistant biotypes. Solo Ultra will not control biotypes that have multiple resistance to both Group 1 and Group 2 herbicides.
[3] Solo Ultra will not control weed biotypes that are resistant to Group 2.
[4] Non-**Clearfield** varieties only.
[5] All varieties including **Clearfield**.

Viper® ADV

Herbicide

Proven, broad-spectrum weed control.

- Convenient, user-friendly 100% liquid formulation
- Multiple modes of action to help manage resistant weeds
- Control of resistant wild mustard and volunteer canola
- Excellent rotational freedom
- Can also be applied in soybeans; for a complete list of crops, visit **agsolutions.ca/viperadv**

Cleavers control, 7 days after application of Viper® ADV herbicide

Source: BASF Research Authorization trial, SK, 2012

Active ingredient	Imazamox - Group 2 Bentazon - Group 6
Formulation	Liquid concentrate
One case contains	2 x 8.1 L jugs Also available in 129.6 L drum

Crop staging

Field and succulent peas: 3 to 6 above-ground node (3 to 6 true leaf)

Weeds controlled

Broadleafs

Cleavers[1,2]
Cow cockle
Green smartweed
Hemp-nettle[2]
Kochia[1,2]
Lamb's quarters
Redroot pigweed
Round-leaved mallow[2]
Russian thistle
Shepherd's-purse
Sow thistle (annual)[2]
Sow thistle (perennial)[3]
Stinkweed
Volunteer canola
Volunteer lentils
Wild buckwheat[2]
Wild mustard[1]

Grasses

Barnyard grass
Green foxtail
Japanese brome grass[2]
Persian darnel
Volunteer barley
Volunteer canary seed
Volunteer durum wheat
Volunteer spring wheat[4]
Volunteer tame oats
Wild oats
Yellow foxtail

Application rates

One case treats 40 acres.
One drum treats 320 acres.

Viper ADV	404 ml/ac (1 L/ha)
28% UAN[5]	809 ml/ac (2 L/ha)

Water volume

Ground application only
40 L/ac (10 gal/ac)

Pre-harvest interval

40 days after application for succulent peas and 60 days after application for field peas.

Follow crops

3 months after application

Winter wheat

1 year after application

Canary seed, canola[6], chickpeas, durum wheat, field corn, field peas, flax, lentils (incl. **Clearfield®** lentils), soybeans, spring barley, spring wheat (incl. **Clearfield** wheat), sunflowers (incl. **Clearfield** sunflowers) and tame oats

2 years after application

Mustard (condiment-type only)

[1] Includes resistant biotypes. [2] Suppression. [3] Top growth suppression only. [4] Excluding **Clearfield** wheat. [5] Addition of a nitrogen source (28% UAN) is recommended for grass control, and is not included in the case. [6] Research studies have shown that non-**Clearfield** canola may be safely planted the year following an application of Viper ADV in all regions of Western Canada except the Northern Peace River Region of Alberta (any area in Township 100 and north, including the areas of Keg River, La Crete, Fort Vermillion and High Level). In this region, non-**Clearfield** canola can be grown safely the second year following an application (2 YAT).

Basagran® Forté

Herbicide

Post-emergent control of the toughest weeds.

- Efficient control of key broadleaf weeds
- Group 6 chemistry to provide alternative mode of action for control of resistant broadleaf weeds
- Flexible tank-mix options for targeted weed control in dry beans
- For a complete list of crops, visit **agsolutions.ca/basagranforte**

Active ingredient	Bentazon – Group 6
Formulation	Liquid
One case contains	2 x 10 L jugs Also available in 130 L shuttle

Crop staging

Peas (field and processing): after 3 leaf pairs/nodes form until just prior to flowering

Weeds controlled

Broadleafs

Buttercup
Canada thistle[1]
Cleavers
Cocklebur
Common chickweed
Common groundsel[2]
Common ragweed[2]
Corn spurry
Field bindweed[1,3,4]
Flower-of-an-hour
Giant ragweed
Hairy galinsoga
Hairy nightshade
Jimsonweed
Lady's thumb
Lamb's quarters[2]
Low cudweed
Purslane
Redroot pigweed[2,3]
Russian thistle[3]
Shepherd's-purse
Stinkweed
Velvetleaf[5]
Volunteer canola[6]
Wild mustard
Wild radish

Sedge

Yellow nutsedge[1]

Application rates

One case treats 22 to 29 acres, depending on rate.

Field peas

Basagran® Forté	700 to 900 ml/ac (1.75 to 2.25 L/ha)

Water volume[7]

Ground application only
40 to 120 L/ac (10 to 32 gal/ac)

Rainfastness

6 to 8 hours.

Use a minimum of 80 L/ac (20 gal/ac) of water if crop canopy or heavy weed population interferes with thorough spray coverage, or under cool temperature.

[1] For perennial weeds, repeat application 7 to 15 days after first, if needed.
[2] Includes triazine-resistant biotypes.
[3] Suppression.
[4] Treat before it is dark green and has begun to trail.
[5] Will defoliate 4-leaf and larger but regrowth may occur.
[6] Only provides control in field peas up to 4-leaf at 404 ml/ac (1 L/ha).
[7] Use larger water volumes for weeds at the upper limit of their recommended stage for treatment.

Pick your pre-seed herbicide.

Ensure your peas and lentils get the proper start. With the chart below, choose the best pre-seed solution to meet your weed challenges.

Products	Heat® LQ (80 ac/case)	Heat LQ (30 ac/case)	Heat Complete (80 ac/case)	Heat Complete (60 ac/case)
I need	*Burndown of broadleaf weeds* **Strengths:** Broad-spectrum broadleaf burndown, including Group 2- and glyphosate-resistant biotypes	*Burndown plus residual on broadleaf weeds* **Strengths:** Excellent residual suppression of volunteer canola, cleavers, wild buckwheat and stinkweed	*Burndown of broadleaf weeds with early-season residual activity on broadleaf and grassy weeds* **Strengths:** Residual suppression of redroot pigweed, lamb's quarters, wild oats, and green and yellow foxtail	*Burndown of broadleaf weeds with* **EXTENDED** *residual activity on broadleaf and grassy weeds* **Strengths:** Residual suppression of kochia and grassy weeds Complementary effects between Zidua SC and Heat LQ herbicides from overlapping broadleaf activity but different spectrum strengths
Situations	Prior to seeding peas or lentils: • When weed pressure is low and burndown of broadleaf weeds is all that is wanted	Prior to seeding peas: • When growing peas on canola stubble • When known Group 2-resistant cleavers or wild buckwheat is present • When not significantly concerned about grassy weeds	Prior to seeding lentils: • When field has known Group 1- or 2-resistant wild oats and low kochia pressure	Prior to seeding peas: • When field has known Group 1- or 2-resistant wild oats, moderate/high kochia pressure, heavy pigweed or lamb's quarters pressure
Active ingredients	Saflufenacil – Group 14	Saflufenacil – Group 14	(a) Saflufenacil – Group 14	(a) Saflufenacil – Group 14
	—	—	(b) Pyroxasulfone – Group 15	(b) Pyroxasulfone – Group 15
Merge®	Included in case	Included in case	Included in case	Included in case
Formulation	Water-based suspension concentrate	Water-based suspension concentrate	Liquid suspension concentrate	Liquid suspension concentrate
One case contains	(a) 1.73 L jug (b) 2 x 8.1 L jugs Merge adjuvant	(a) 1.73 L jug (b) 2 x 8.1 L jugs Merge adjuvant	(a) 1.73 L jug Heat LQ (b) 3.89 L jug Zidua® SC herbicide (c) 2 x 8.1 L jugs Merge adjuvant	(a) 1.73 L jug Heat LQ (b) 3.89 L jug Zidua SC herbicide (c) 2 x 8.1 L jugs Merge adjuvant

Products	Heat LQ (80 ac/case)	Heat LQ (30 ac/case)	Heat Complete (80 ac/case)	Heat Complete (60 ac/case)
Crop(s)	Field peas Lentils	Field peas	Field peas Lentils	Field peas
Staging	Pre-seed and pre-emergence			
Broadleaf weeds controlled	Apply at 8-leaf (except where indicated)			
	Canada fleabane[1] Cleavers[2] (4 whorls) Dandelion[3] (15 cm height) Flixweed Kochia[1] (15 cm height) Lady's thumb[4] (6 leaf) Lamb's quarters Narrow-leaved hawk's beard (8 cm height) Perennial sow thistle[4,5] Prickly lettuce[4,5] (9 leaf) Ragweed (common, giant)[4] Redroot pigweed[2] Round-leaved mallow Shepherd's-purse[4] (full flower) Stinkweed[2] Volunteer canola[2,6] Wild buckwheat[2] Wild mustard[2]	Canada fleabane[1] Cleavers[2] (4 whorls) Dandelion[3] (15 cm height) Flixweed Kochia[1] (15 cm height) Lady's thumb[4] (6 leaf) Lamb's quarters Narrow-leaved hawk's beard (8 cm height) Perennial sow thistle[4,5] Prickly lettuce[4,5] (9 leaf) Ragweed (common, giant)[4] Redroot pigweed[2] Round-leaved mallow Shepherd's-purse[4] (full flower) Stinkweed[2] Volunteer canola[2,6] Wild buckwheat[2] Wild mustard[2]	Canada fleabane[1] Cleavers[7] (4 whorls) Common waterhemp[7] (prior to emergence) Dandelion[3] (15 cm height) Flixweed Kochia[1,7] (15 cm height) Lady's thumb[8] (6 leaf) Lamb's quarters[7] Narrow-leaved hawk's beard (8 cm height) Perennial sow thistle[3,8] Prickly lettuce[3,8] (9 leaf) Ragweed (common, giant)[8] Redroot pigweed[7] Round-leaved mallow Shepherd's-purse[8] (full flower) Stinkweed[7] Volunteer canola[6,7] Wild buckwheat[7] Wild mustard[7]	Canada fleabane[1] Cleavers[7] (4 whorls) Common waterhemp[7] (prior to emergence) Dandelion[3] (15 cm height) Flixweed Kochia[1,7] (15 cm height) Lady's thumb[8] (6 leaf) Lamb's quarters[7] Narrow-leaved hawk's beard (8 cm height) Perennial sow thistle[3,8] Prickly lettuce[3,8] (9 leaf) Ragweed (common, giant)[8] Redroot pigweed[7] Round-leaved mallow Shepherd's-purse[8] (full flower) Stinkweed[7] Volunteer canola[6,7] Wild buckwheat[7] Wild mustard[7]
Grasses controlled	–	–	Prior to emergence	
	–	–	Foxtail (green, yellow)[9] Wild oats[9]	Foxtail (green, yellow)[9] Wild oats[9]

Note: One case contains two separate jugs: (a) and (b).

[1] Includes Group 2-resistant and glyphosate-resistant biotypes.
[2] For suppression of secondary flushes, use higher application rate of 59 ml/ac (146 ml/ha).
[3] Top growth burndown control only of perennial plants, control of spring germinating plants.
[4] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha).
[5] Top growth burndown control only.
[6] All herbicide-tolerant canola systems including glyphosate-tolerant canola.
[7] Residual suppression (may be rate dependent).
[8] Burndown control is rate-dependent.
[9] Residual suppression only.

There's a solution to every weed. And pea and lentil need.

Whether you're looking for rotational flexibility or control of a particular weed in your peas and **Clearfield®** lentils, this chart will help you choose the best in-crop solution to fit your needs.

Product	Solo® ADV	Odyssey® Ultra NXT	Solo Ultra	Viper® ADV
Crop(s)	**Clearfield** lentils	**Clearfield** lentils, field peas	**Clearfield** lentils	Field and succulent peas
I need	Excellent re-cropping flexibility the following year plus the convenience of a ready-to-use liquid formulation.	Proven, early-season control of tough grassy and broadleaf weeds, including multiple flushes.	Additional control of tough grasses and the broadleaf control and re-cropping flexibility of Solo ADV herbicide in a convenient liquid co-pack.	Excellent rotational freedom with broad-spectrum weed control in a convenient liquid formulation.
Active ingredients	Imazamox – Group 2	(a) Imazamox – Group 2 Imazethapyr – Group 2	(a) Imazamox – Group 2	Imazamox – Group 2 Bentazon – Group 6
	—	(b) Sethoxydim – Group 1	(b) Sethoxydim – Group 1	—
Merge®	Built-in	Included in case	Built-in	Built-in
Formulation	Solution	(a) Water dispersible granules (b) Emulsifiable concentrate	(a) Liquid solution (b) Liquid emulsifiable concentrate	Liquid concentrate
One case contains (40 ac/case)	2 x 6.5 L jugs or 3 x 4.33 L jugs	(a) 692 g jug (b) 6.16 L jug 8.1 L jug Merge adjuvant	(a) 2 x 6.5 L jugs Solo ADV (b) 6.16 L jug Poast® Ultra	2 x 8.1 L jugs
Crop staging	**Clearfield lentils:** 1 to 9 node	**Clearfield lentils:** 1 to 9 node **Field peas:** 1 to 6 above-ground node	**Clearfield lentils:** 1 to 9 node	**Field and succulent peas:** 3 to 6 above-ground node (3 to 6 true leaf)

Products	Solo ADV	Odyssey Ultra NXT	Solo Ultra	Viper ADV
Broadleaf weeds controlled	Apply at cotyledon to 4 leaf (except where indicated)			
	Cleavers[1] (1 to 4 whorls) Cow cockle Green smartweed Lamb's quarters Redroot pigweed Round-leaved mallow[1] Russian thistle Shepherd's-purse Stinkweed Volunteer canola Wild buckwheat[1] Wild mustard	Chickweed Cleavers Flixweed Green smartweed Hemp-nettle[3] Lamb's quarters[1] Redroot pigweed Russian thistle[3,4] Shepherd's-purse Stinkweed Stork's-bill Volunteer canola Volunteer tame mustard Wild buckwheat[3] Wild mustard[4]	Cleavers[1] (1 to 4 whorls) Cow cockle Green smartweed[2] Lamb's quarters Redroot pigweed Round-leaved mallow[1] Russian thistle[4] Shepherd's-purse Stinkweed Volunteer canola Wild buckwheat[1] Wild mustard[4]	Cleavers[1,8] Cow cockle Green smartweed Hemp-nettle[1] Kochia[1,8] Lamb's quarters Redroot pigweed Round-leaved mallow[1] Russian thistle Shepherd's-purse Sow thistle (annual)[1] Sow thistle (perennial)[9] Stinkweed Volunteer canola Volunteer lentils Wild buckwheat[1] Wild mustard[8]
Grasses controlled	Apply at 1 to 4 true leaf up until early tillering	Apply at 1 to 6 true leaf or up to 2 tillers (except where indicated)	Apply at 1 to 6 true leaf until early tillering	Apply at 1 to 4 true leaf or early tillering
	Barnyard grass Green foxtail Japanese brome grass[1] Persian darnel Volunteer barley Volunteer canary seed Volunteer durum wheat Volunteer spring wheat[2] Volunteer tame oats Wild oats Yellow foxtail	Barnyard grass Crabgrass (large) Fall panicum Green foxtail[5] Japanese brome grass[6] Persian darnel Proso millet Quackgrass (2 to 5 leaf)[1,6] Volunteer barley Volunteer corn Volunteer tame oats Volunteer wheat[7] Wild oats[5] Witchgrass Yellow foxtail	Barnyard grass Crabgrass Fall panicum Green foxtail Japanese brome grass[1] Persian darnel Proso millet Quackgrass[1] Volunteer barley Volunteer canary seed Volunteer corn Volunteer durum wheat Volunteer spring wheat[3] Volunteer tame oats Wild oats[2] Witchgrass Yellow foxtail	Barnyard grass Green foxtail Japanese brome grass[1] Persian darnel Volunteer barley Volunteer canary seed Volunteer durum wheat Volunteer spring wheat[10] Volunteer tame oats Wild oats Yellow foxtail

Note: One case contains two separate jugs: (a) and (b).
Note: Odyssey Ultra NXT herbicide can also be applied in field peas at the 1 to 6 true leaf stage.

[1] Suppression only. [2] Non-**Clearfield** varieties. [3] Suppression in field peas and **Clearfield** lentils. [4] Odyssey Ultra NXT and Solo Ultra will not control weed biotypes that are resistant to Group 2. [5] Including Group 1-resistant biotypes and Group 2-resistant biotypes. Will not control biotypes that have multiple resistance to both Group 1 and 2 herbicides. [6] Odyssey Ultra NXT herbicide will provide control of spring germinating Japanese brome grass and suppression of fall-emerged Japanese brome grass. [7] All varieties including **Clearfield**. [8] Includes resistant biotypes. [9] Top growth suppression only. [10] Excluding **Clearfield** wheat.

Know your enemy. (Defeat them too.)

Mycosphaerella blight in peas and anthracnose and ascochyta in lentils are the most consistent early-season pulse diseases that rob yield. That's why it's important to scout conditions early in the season—and scout often. If conditions are conducive to disease development, apply a fungicide preventatively at early flower or at first sign of disease (whichever comes first). If conditions remain conducive, follow up with another fungicide application to prevent less common late-season diseases such as white mold.

Diseases in peas.

Ascochyta/ Mycosphaerella blight

Source: Bruce Watt, University of Maine, Bugwood.org

Downy mildew

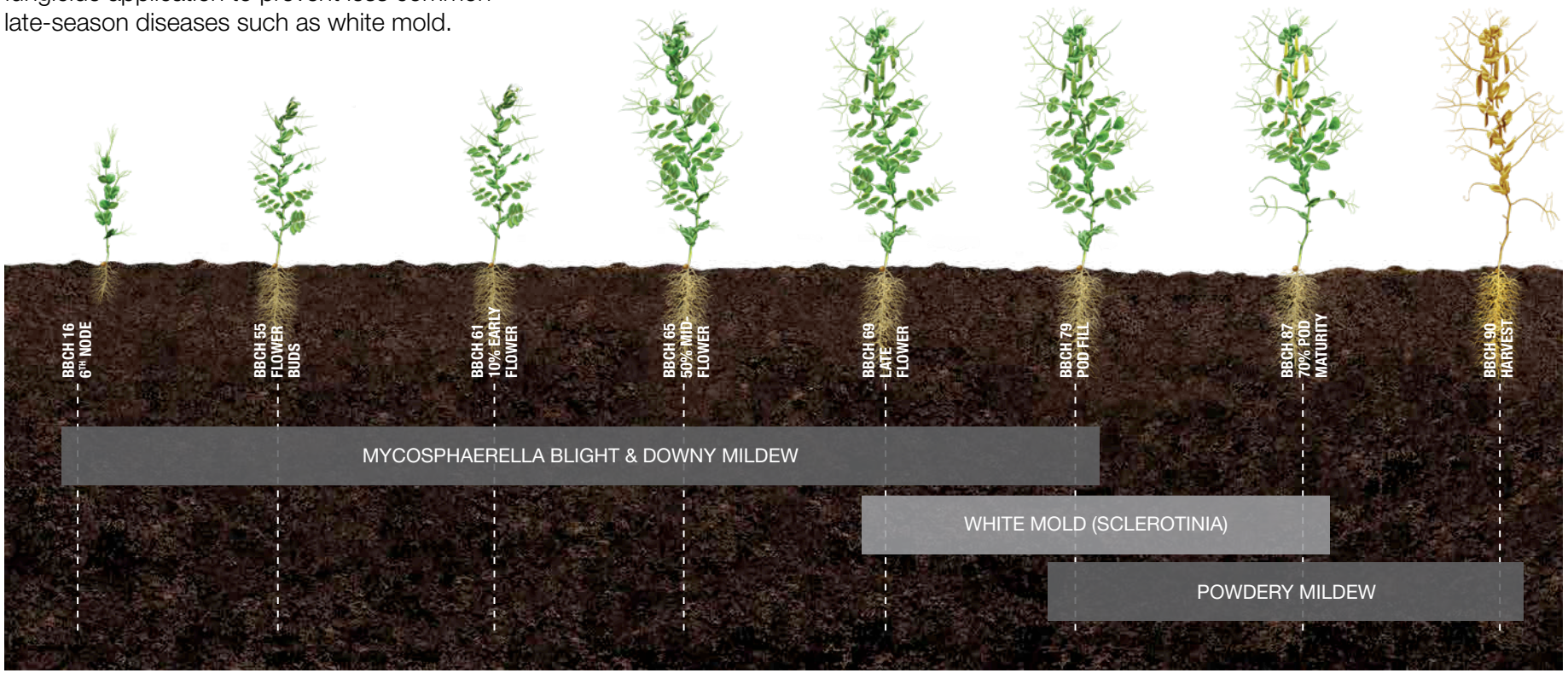
Source: Agriculture Victoria, DEDJTR

White mold (sclerotinia)

Source: **AgSolutions®** Performance Trials, AB, 2011

Powdery mildew

Source: Bruce Watt, University of Maine, Bugwood.org



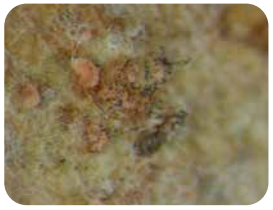
Diseases in lentils.

Anthracnose

Source: Agriculture Victoria, DEDJTR

Ascochyta blight

Source: Agriculture Victoria, DEDJTR



Stemphylium

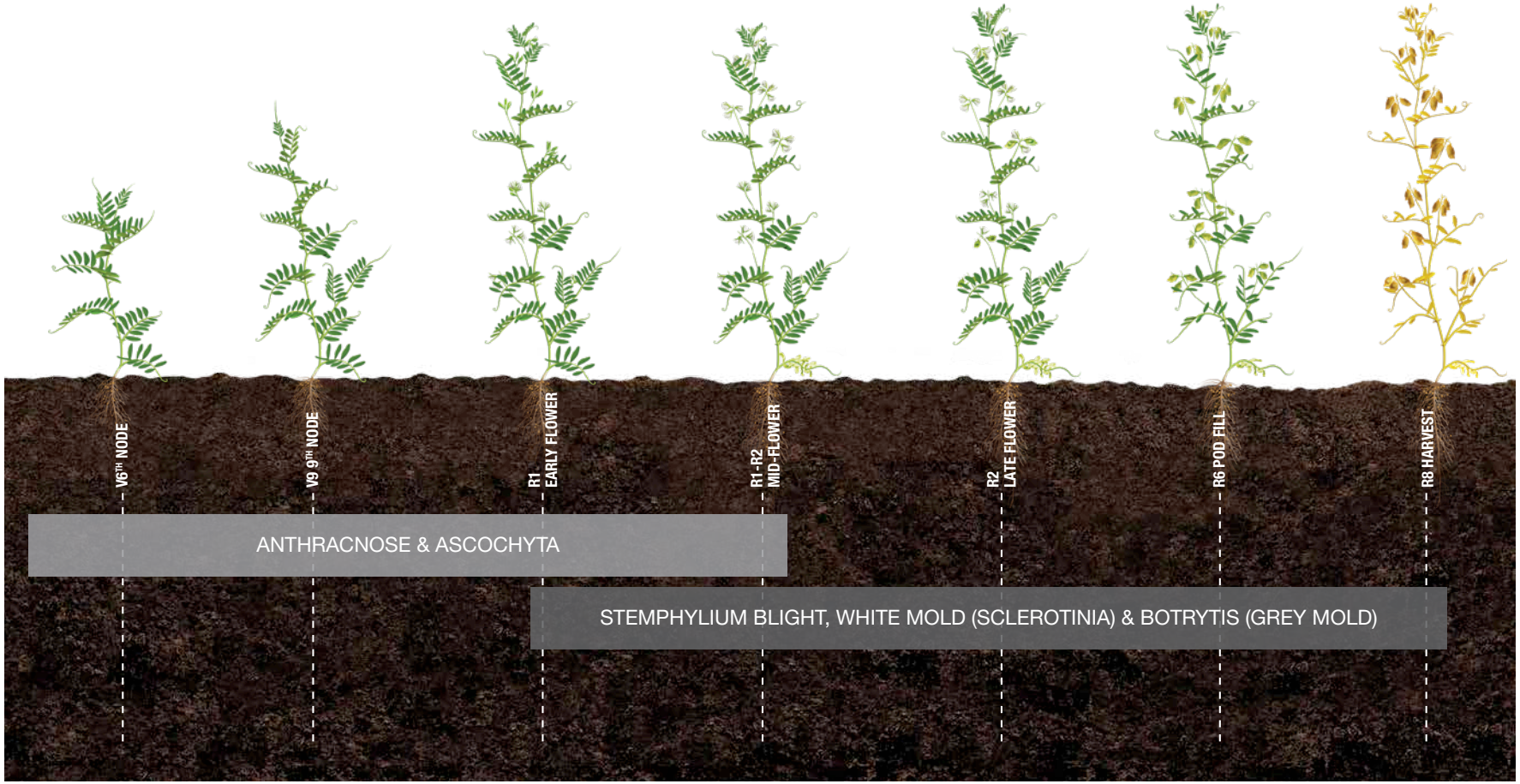
Mary Burrows, Montana State University, Bugwood.org

White mold (sclerotinia)

Source: USDA-Agricultural Research Service, 2016

Botrytis (grey mold)

Source: Agriculture Victoria, DEDJTR



Clear choices. Easier decisions.

Take preventative action against disease in your pulse crops by choosing a fungicide that best fits the needs of your operation. Re-assess 10 to 14 days later to determine if a second application is required. In peas, one application is often enough. In lentils, a second application for white mold can be beneficial if the environment is conducive to disease development.

DISEASES OF CONCERN	RECOMMENDED SOLUTION[2,3,4]
Early-season diseases[1] Application timing: Apply 1st flower to prior to row closure.	**Dyax®** Xemium® Fungicide

DISEASES OF CONCERN	RECOMMENDED SOLUTION[4,5]
White mold (sclerotinia) and early-season diseases when Group 11 resistance is suspected. Application timing: If one pass, apply at 1st flower. If 2nd pass, apply 7-14 days after first application.	**Cotegra®** Fungicide

[1] In lentils: anthracnose, ascochyta blight. In field peas: mycosphaerella blight.
[2] For moderate to high disease pressure, apply the high rate of Dyax® fungicide.
[3] Do not apply Dyax twice in one season. If a second application is required, apply Cotegra® fungicide.
[4] If Group 11 anthracnose is confirmed, apply Cotegra to control early-season diseases.
[5] Cotegra will provide efficacy on early-season diseases such as anthracnose in lentils and mycosphaeraella blight in field peas. Refer to label for more information.

AgCelence® Expect more | BASF We create chemistry

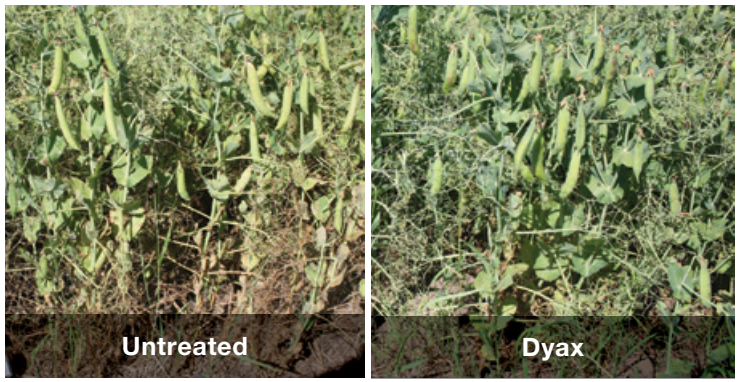
Dyax®

Xemium® Fungicide

A premium fungicide with increased levels of Xemium® for improved disease control.

- Increased rate of Xemium allows for even more consistent and continuous disease control
- Proven benefits[1] of **AgCelence®** for increased growth efficiency, better management of minor stress and greater yield potential[2]
- Can also be applied in chickpea[3], soybeans, flax, faba bean[4] and dry bean[5]; for a complete list of crops, visit **agsolutions.ca/dyax**

Dyax® fungicide provides excellent disease control of mycosphaerella blight in fields peas



Source: BASF research trials, Drumheller, AB, 2011

Active ingredients	Pyraclostrobin – Group 11 Fluxapyroxad – Group 7
Formulation	Suspension concentrate (SC) liquid premix
One case contains	2 x 9.6 L jugs

Crop staging[6]
Field peas: start of flowering or prior to row closure
Lentils: start of flowering or prior to row closure

Diseases managed
In field peas.
Mycosphaerella blight (*Mycosphaerella pinodes*), ascochyta blight (*Ascochyta pisi*), powdery mildew (*Erysiphe pisi*), Asian soybean rust (*Phakopsora pachyrhizi*) and suppression of white mold (*Sclerotinia sclerotiorum*)
In lentils.
Anthracnose (*Colletotrichum truncatum*), ascochyta blight (*Ascochyta lentis*) and suppression of white mold (*Sclerotinia sclerotiorum*)

Application rates
One case will treat 120 acres at the recommended rate of 160 ml/ac, depending on crop and disease targeted.

For field peas[7] and lentils	120[8] to 160 ml/ac (300 to 400 ml/ha)

Water volume

Ground application	40 L/ac (10 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval
30 days after application.

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.
[3] To control ascochyta, apply Dyax at 160 ml/ac (400 ml/ha).
[4] To control Asian soybean rust, apply Dyax at 160 ml/ac (400 ml/ha).
[5] For control in dry beans, apply at 160 to 320 ml/ac (400 to 800 ml/ha). To suppress white mold, apply Dyax at 240 to 320 ml/ac (600 to 800 ml/ha).
[6] If disease persists or weather conditions are favourable for disease development, make a second application 10 to 14 days later with a fungicide that contains an alternative mode of action.
[7] To control powdery mildew and Asian soybean rust, apply Dyax at 160 ml/ac (400 ml/ha).
[8] Apply the lower rate only in low disease risk situations.

Cotegra®

Fungicide

The new standard for white mold management and more.

- Combines two leading sclerotinia actives, in a convenient liquid premix
- Provides best-in-class management of sclerotinia
- Strong disease management in peas and lentils
- Can also be applied in canola and soybeans; for a complete list of crops, visit **agsolutions.ca/west-cotegra**

Cotegra activity on anthracnose in lentils

Untreated | Cotegra®

Source: Greenhouse trials, Saskatoon, SK, 2019

Active ingredients	Boscalid – Group 7 Prothioconazole – Group 3
Formulation	Suspension concentrate (SC) liquid pre-mix
One case contains	2 x 9.8 L jugs

Crop staging[1]

Beginning of flowering or at first sign of disease

Diseases controlled

In field peas.

Ascochyta blight *(Ascochyta spp.)*[2], mycosphaerella blight *(Mycosphaerella pinodes)*[2], white mold *(Sclerotinia sclerotiorum)*[2]

In lentils.

Anthracnose *(Colletotrichum truncatum)*[3], white mold *(Sclerotinia sclerotiorum)*[2]

Application rates

One case will treat 70 to 80 acres, depending on crop and disease targeted.

Cotegra fungicide	240 to 280 ml/ac (0.6 to 0.7 L/ha)

Water volume

Ground application[4]	40 to 80 L/ac (10 to 20 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval

21 days after application.

[1] A second application can be made 7 to 14 days after first application if disease persists, or weather conditions favour disease development. Use the shorter interval when disease pressure is high to obtain extended protection and maximum yield benefit.

[2] Suppression.

[3] For control, use a rate of 280 ml/ac (0.7 L/ha); for suppression, use a rate of 240 ml/ac (0.6 L/ha).

[4] Higher water volumes recommended for optimal coverage.

Time to put the heat on application staging.

Heat® LQ pre-harvest herbicide staging for field peas.

For field peas, harvest can typically commence within 14 days after application, when environmental conditions are favourable and the product has been applied at accurate crop staging. Under cool temperatures, overcast conditions or periods of rain, time from application of Heat LQ to harvest may be delayed.

Optimal timing.

Field pea plants ripen over time, therefore all pods will not be dry at the same time. Apply Heat LQ when about 75% of the pods have dried down (turned colour). There will still be about 25% green pods, however, the peas in these pods should be firm.

Too early for application.

When applied too early, applications may result in yield loss. 50% of the pods are still green and the pods that are starting to dry down have peas inside that are still soft and can be split by squeezing. Application prior to correct physiological timing can potentially reduce yield and/or impact quality.

Heat LQ pre-harvest herbicide staging for red lentils.

For red lentils, harvest can typically commence within 14 days after application, when environmental conditions are favourable and the product has been applied at accurate crop staging. Under cool temperatures, overcast conditions or periods of rain, time from application of Heat LQ to harvest may be delayed.

Optimal timing.

Red lentils are indeterminate in growth and will have a variety of pods in different stages. They may still have green leaves on the plant at pre-harvest application. The lowermost pods of the red lentil plant will ripen first. The majority (>75%) of seeds in the field should be physiologically mature at application; containing less than 30% seed moisture. Gather plants from several different areas in the field and shell out seeds to determine average maturity/drydown of the field. Physiologically mature seeds should be firm when squeezed.

NOTE: Heat LQ is registered for use on red lentil varieties only and is only labelled for an application tank mixed with glyphosate. DO NOT apply Heat LQ to green lentils. Please check with your grain buyer prior to the pre-harvest application of Heat LQ in red lentils.

Too early for application.

When applied too early, applications may result in yield loss. The bottom pods have not ripened. Limited colour change has occurred. The seeds are not firm and no rattling can be heard. Application prior to correct physiological timing can potentially reduce yield and/or impact quality.

To ensure you're up to date on approved pre-harvest solutions for your pulses, visit ***keepingitclean.ca.***

Heat® LQ

Powered by **Kixor®** Herbicide

PRE-HARVEST

Faster harvest. Better weed control.

- Easy-to-use liquid formulation for fast dry down of crops and broadleaf weeds
- Improved crop uniformity and harvestability
- Tank mixed with glyphosate for fast broadleaf weed dry down and cleaner fields next season
- Can also be applied in canola, cereals and soybeans; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Crops staging[1]

Harvest aid

Field peas: Apply when about 75% of pods have dried down (changed colour).

Red lentils[2]: The majority (>75%) of seeds in the field should be physiologically mature at application, containing less than 30% seed moisture.

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 2 x 8.1 L jugs of Merge® adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Application rates

One case tank mixed with glyphosate will treat 40 acres. One tote treats 1,000 acres.

Recommended use pattern

Heat LQ tank mixed with glyphosate rate	43 (106 ml/ha)
Glyphosate[3] (360 g ae/L)	1.0 L/ac (2.5 L/ha)
Merge adjuvant[4]	200 to 400 ml/ac (0.5 to 1 L/ha)

(Heat LQ should always be tank mixed with glyphosate.)
(Use all Merge included in the case or tote of Heat LQ.)

Water volume

Ground application — 40 L/ac (10 gal/ac) minimum
(BASF recommends using higher water volumes for best results.)

Aerial application[5] — 20 L/ac (5 gal/ac)

Pre-harvest interval — 3 days after application.

Follow crops

In the spring following a fall application

Barley (spring, malt, winter)
Canary seed
Canola (all types incl. **Clearfield®** canola)
Chickpeas
Corn (field and sweet)
Field peas
Flax
Lentils
Oats
Soybeans
Wheat (incl. **Clearfield** wheat, spring, winter, durum)

[1] Heat LQ herbicide must be applied after physiological maturity (less than 30% seed moisture).
[2] Heat LQ is supported for pre-harvest use on red lentil varieties only. DO NOT apply Heat LQ pre-harvest to green lentils. Please check with your grain buyer prior to the pre-harvest application of Heat LQ in red lentils.
[3] Glyphosate is not included in the case.
[4] Merge adjuvant is required and is included with Heat LQ herbicide. Use all Merge included in the case.
[5] Heat LQ is registered for aerial applications. Some glyphosate formulations are also registered for aerial applications; therefore, Heat LQ plus glyphosate can be applied through aerial applications when both products have aerial registrations.

Clearfield®
Production System for Lentils

BASF
We create chemistry

Backed by an unrivalled portfolio for the highest lentil quality and yield.

By combining high-performing red and green **Clearfield®** lentil varieties with an unrivalled portfolio of crop solutions, the **Clearfield** Production System for lentils helps maximize your lentil quality and yield. When you sign the **Clearfield** Commitment for lentils, a portion of the herbicide sales is reinvested into the Crop Development Centre to support ongoing research and development of new **Clearfield** lentil varieties.

Clearfield lentil varieties

- Superior genetics across all major red and green lentil market classes
- High-performance varieties for maximum yield and quality
- Choose from different agronomic traits including height, maturity and resistance to diseases such as ascochyta and anthracnose

Compatible inoculants	
Nodulator® Duo SCG inoculant	The first Biostacked® solid core granular inoculant for pulses to contain a second active biological that forms a root-strengthening biofilm, enhancing energy efficiency.
Nodulator XL inoculant	Delivers a highly efficient and more active strain of rhizobia in two different formulations, leading to increased yield potential for your crop.

Compatible seed treatment	
Insure® Pulse seed treatment	Combines the unique translocation and mobility characteristics of Xemium® with the benefits[1] of **AgCelence®** for enhanced seed and seedling disease protection, including ascochyta.

Compatible herbicides	
Heat® Complete herbicide	Applied pre-seed or pre-emergent for rapid and complete burndown of tough-to-control weeds with extended residual suppression of key grassy and broadleaf weeds.
Solo® Ultra herbicide	Two modes of action for proven control of grasses and tough broadleaf weeds, with rotational freedom.
Odyssey® Ultra NXT herbicide	Multiple modes of action for proven, early-season control of tough grassy and broadleaf weeds, including multiple flushes.
Solo ADV herbicide	Designed for rotational flexibility and reliable weed control in a convenient liquid formulation with a built-in adjuvant.
Heat LQ herbicide	Applied **pre-seed** or **pre-emergent** with glyphosate for rapid burndown of tough broadleaf weeds with residual activity on key flushing weeds. Applied at **pre-harvest** with glyphosate for fast, complete dry down of red lentils,[2] resulting in improved harvestability through enhanced crop uniformity.
Distinct® herbicide	Offers multiple modes of action that complement glyphosate, for post-harvest control of broadleaf weeds, including resistant biotypes and excellent follow-crop flexibility.

Compatible fungicides	
Dyax® fungicide	A premium fungicide designed for pulses, with increased levels of Xemium for improved disease control.
Cotegra® fungicide	Two industry-leading actives in one liquid premix for superior management of white mold (sclerotinia) in a wide range of crops.
Lance® AG fungicide	For late-season control of key diseases like white mold (sclerotinia), plus effective protection against minor stress during the critical flowering period through the proven benefits[1] of **AgCelence.**

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] BASF supports the use of Heat LQ for pre-harvest for red lentils, however we are still in the process of aligning the Maximum Residue Limits (MRL) in the European Union with other trade jurisdictions. NOTE: Heat LQ is supported for pre-harvest use on red lentil varieties only. DO NOT apply Heat LQ to green lentils. Please check with your grain buyer prior to the pre-harvest application of Heat LQ in red lentils.


Don’t just protect your
soybean yield potential.
Drive it.

Crop Establishment

Weed Management

Insect Management

Disease Management

Harvest Management

Additional Resources

Soybeans.
Under new management.

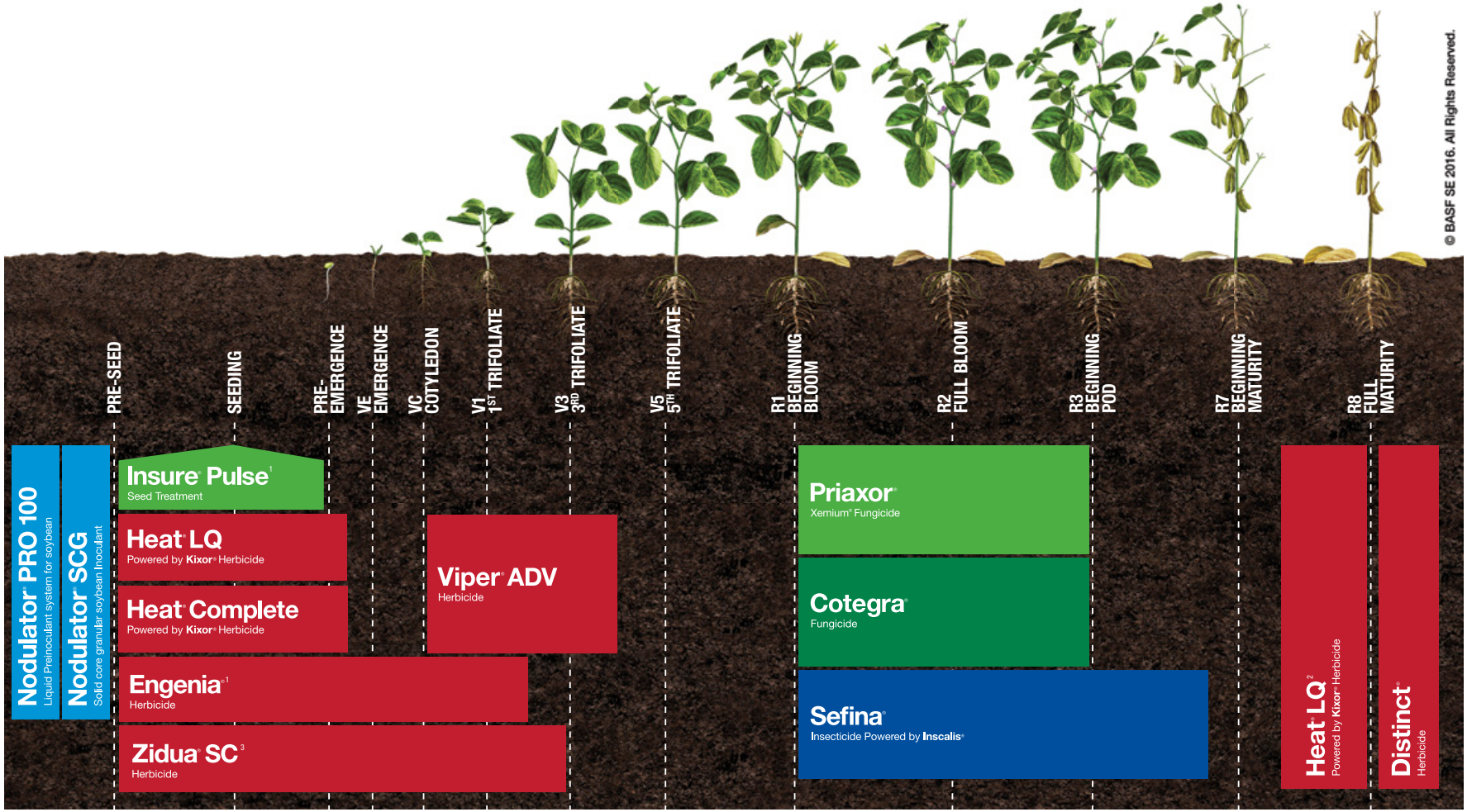
ADVANCED WEED CONTROL

Do you have tough-to-control and resistant weeds getting in the way? The Advanced Weed Control Program can help with that. It works through herbicide layering, combining multiple modes of effective action and residual activity. Plus, with Zidua® SC herbicide in your back pocket, your soybeans will overshadow any chance weeds might have. Learn more.

Zidua® SC
Herbicide

Exceptional solutions for glyphosate- and dicamba-tolerant soybeans.

Solutions for soybeans.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

[1] Apply by ground ONLY to dicamba-tolerant soybeans. Soybean varieties that are not designated as dicamba-tolerant will be damaged or destroyed by this treatment.
[2] Apply when stems are green to brown, pods are mature (yellow, brown) and 80 to 90% of leaves have dropped.
[3] BASF is in the process of establishing import tolerances (maximum residue limits (MRLs)) for markets around the world. Talk to your grain buyer before applying to conventional or IP soybeans.

Equipped for seeding success.

Another important factor for successful seeding is equipment selection. With many seeding equipment options available in today's marketplace, it's important to keep these considerations top of mind during the selection process.

Key advantages and limitations – Knowing your equipment needs is easier when you're aware of the benefits and drawbacks of a model—for example, tank options (i.e. saddle/auxiliary tanks, inter-tank flexibility).

Ease of use/experience – Due to the narrow window at seeding, it's crucial that tank setup, tank fill, tank calibration and seeding are as efficient as possible. Since not all systems are the same, it's helpful to be aware of the intricacies of your machine and account for time to adjust necessary components. Some features that can help you improve efficiency include bulk boom options, product lift systems and conveyor or auger options.

Technology – Manufacturers offer many helpful tools, including camera systems, load cells, product sensors, outside calibration and overlap control. Taking the time to understand your system prior to seeding pays off with the assurance that all seed, fertilizer and inoculant are being used properly.

Resources – Utilizing the expertise of your equipment provider can save you a lot of time troubleshooting; the manufacturer knows the details of their equipment best.

It’s all in the delivery.

Knowing how your seeding system meters can give you a better understanding of how the seed or product gets into the ground. Each manufacturer has their own unique design when it comes to metering systems, but each falls into one of three categories.

Class A

These systems meter the product (seed, inoculant, etc.) into a large primary tube that carries seed to a primary splitter. Product is then separated randomly into a series of smaller lines that carry it to a second splitter where it is again randomly separated. From there, these individual lines go to the seed openers where the product is placed in the ground.

Class B

These systems meter the product into a series of primary hoses which lead to a splitter. From there, each seed flows directly to the openers. The goal of having only one random split is to improve the coefficient of variation (accuracy).

Class C

These systems distribute the product directly under the grain tank. Seed is metered directly to individual lines which are then carried to the openers and into the ground. This system involves no random splits.

Setting yourself up for success.

While choosing your equipment is one crucial step, setting it up correctly before the season starts is equally important. Consider the following factors:

Ensure accurate calibration – Use the metering settings on the rate charts as a starting reference point and field test (use a known volume of product over a known acreage).

Set fan speed – Regardless of your system, this needs to be set correctly to reduce damaged seed and ensure seed/product is delivered properly to openers.

Use proper metering auger/roller – Ensure your systems are set up for low output products when dealing with small granular inoculant, small seed, etc. Use the appropriate auger/roller for the product to ensure accurate rate.

	Bourgault	John Deere	Väderstad
Class system	A	B	B
Metering system requirements for small products/seed (inoculant, canola seed, etc.)	Low output auger Options: UHMW (plastic), steel Recommendation: UHMW	Yellow roller/cartridge Recommendation: use roller spacers	18 CC low displacement roller
Necessary component	1 auger/tank	1 cartridge/tank	1 roller/10 ft of drill
	Seed Master	**Morris**	**Case New Holland**
Class system	C	B	B
Metering system requirements for small products/seed (inoculant, canola seed, etc.)	UltraPro™ canola roller (1/4 inch)	Fine seed plates and spiral fluted metering wheel	Orange cartridge/roller for inoculant White cartridge/roller for canola seed
Necessary component	1 roller/10 ft of drill	1 seed plate/metering wheel	1 roller/10 ft of drill

*If you have any questions specific to your application system, speak to your BASF **AgSolutions**® Grower or Retail Representative or call **AgSolutions** Customer Care at 1-877-371-BASF (2273).*

Inoculant options for soybeans. The choice is yours.

Maximize nitrogen fixation and nodulation in your soybean fields by selecting an inoculant that best suits your operation. These inoculants contain a highly efficient strain of *Bradyrhizobium japonicum* or come Biostacked® with both *Bradyrhizobium japonicum* and *Bacillus amyloliquefaciens*. The following are granular and liquid formulations which can be applied on-seed and/or in-furrow.

	Product	One case contains	Application rates[1]
On-seed	**Nodulator® PRO 100** Liquid Preinoculant system for soybean	1 x 3 L PRO 100 inoculant 1 x 3 L PRO 100 conditioner 1 x 400 ml bottle Integral® biofungicide (packaged separately)	1 case: 4,536 kg (200 units) of seed Rate: 130 ml[1] (inoculant + conditioner) + 9 ml Integral per 100 kg of soybean seed
In-furrow	**Nodulator® SCG** Solid core granular soybean Inoculant	1 x 22.6 kg bag or 1 x 364 kg mini-bulk Q-Pak	1 bag: 10 ac (7” rows) 1 Q-Pak: 160 ac (7” rows) Rate: 2.3 kg/ac (7” rows)
In-furrow	**Nodulator® LQ[2]** Liquid soybean Inoculant for in furrow	1 x 12.4 L bladder	1 case: 4.8 to 11.3 ha (12 to 28 ac) Rate: 29 ml non-diluted product per 304 linear row m (1 fl oz/1,000 linear row ft)

View inoculant storage and handling best practices information here.

Note: Some seed treatments are harmful to liquid inoculants and the application method can affect the days-on-seed compatibility. Please see respective product labels or call **AgSolutions®** Customer Care for further information.

[1] For specific application rates, refer to the label.
[2] Approved and supported for organic production.

Effective nodulation with double inoculation.

Double inoculation and its benefits.

- Use of an on-seed inoculant paired with an in-furrow inoculant at seeding time
- Robust formulation that provides excellent back-up to on-seed applications during stressful environmental conditions
- Ensures rhizobia populations, which aren't natural to Western Canada, are suitable for effective nodulation

Increased root branching with double inoculation

Single inoculation with competitor

Nodulator® PRO 100 + Nodulator SCG

Understand the risks.

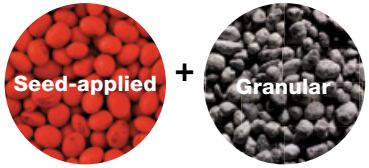
High Risk
No inoculation

Growers rely solely on whatever rhizobia populations are present in the field

Moderate Risk
Single inoculation

If there are adverse weather conditions or crop stresses, this can impact the amount of rhizobia available for nodulation

Least Risk
Double inoculation



Having ample amounts of rhizobia available offers the best chance for effective nodulation

Remember, you can't go back and add more inoculant later.

Nodulator® PRO 100

Liquid Preinoculant system for soybean

PLUS INTEGRAL® BIOFUNGICIDE

Integral®

Biofungicide

For use on: ALL SOYBEAN PLATFORMS — YES

Professionally applied Biostacked® preinoculant with up to 100 days of on-seed survivability.

- Biostacked preinoculant system provides nitrogen-fixing rhizobium of Nodulator® PRO 100 plus the biofungicide activity of Integral
- Unique formulation and bladder system provides up to 100 days of on-seed survivability
- Low application volume and ability to apply early for convenience
- Better plant growth with *B. amyloliquefaciens*
- Built-in disease suppression
- Increased vigour for greater yields

Make sure you ask for Nodulator PRO 100 to be applied on your seed.

Nodulator PRO 100

Bioactive ingredient	*Bradyrhizobium japonicum*
Formulation	Liquid
One case contains	1 x 3 L PRO 100 inoculant 1 x 3 L PRO 100 conditioner

Integral biofungicide

Bioactive ingredient	*Bacillus amyloliquefaciens*
Formulation	Liquid
Packaged separately	1 x 400 ml bottle Integral biofungicide

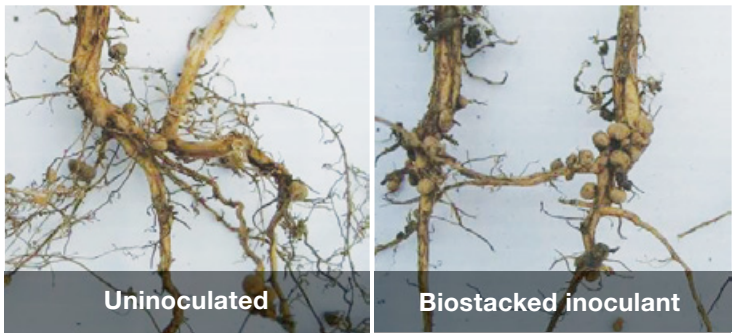
Crop treatment Applied on-seed exclusively by commercial seed treaters

Application rates One case of preinoculant will treat 4,536 kg (10,000 lbs) of seed.

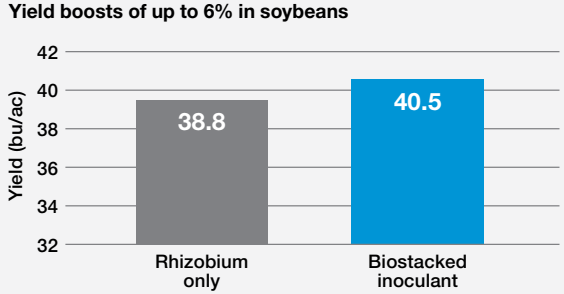
Rate per 100 kg seed:

Nodulator PRO 100 (inoculant + conditioner)	130 ml[1]
Integral	9 ml

Follow crop No follow-crop restrictions.



Source: BASF trials, 2007



Source: BASF, 76 station years (n sites x n years)

Some seed treatments are harmful to liquid inoculants and the application method can affect the days-on-seed compatibility. Please see respective product labels or call **AgSolutions®** Customer Care for further information.

[1] Please refer to the product label for application rates without pesticides, as 139 ml /100 kg is not sufficient for even seed coverage and requires additional liquid volume (water and/or pesticide).

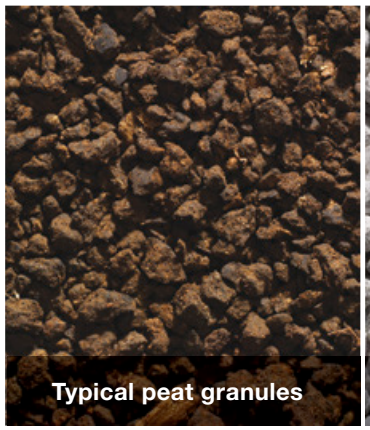
Nodulator® SCG

Solid core granular soybean Inoculant

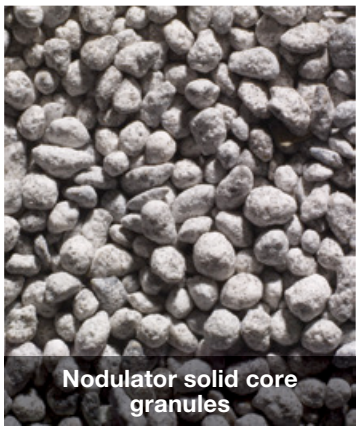
For use on: ALL SOYBEAN PLATFORMS — YES

Superior granular formulation designed for performance.

- Technologically advanced multi-layered granular carrier for rhizobia
- Engineered to deliver more viable rhizobia directly where needed most
- Durable, uniformly sized, dust-free formulation for ease of use



Typical peat granules

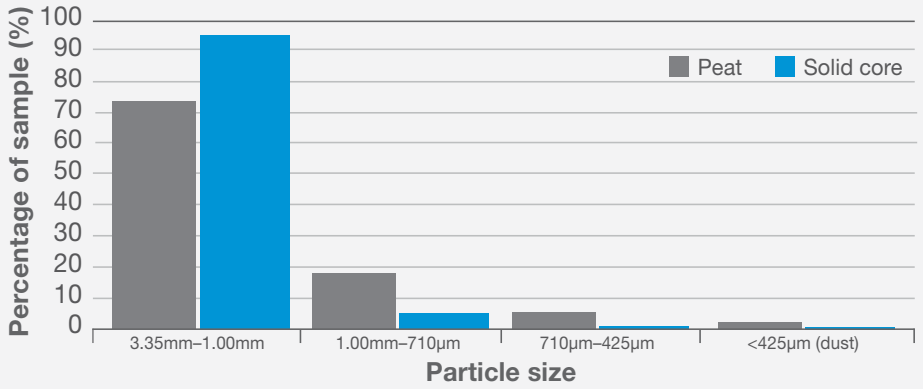


Nodulator solid core granules

Bioactive ingredient	*Bradyrhizobium japonicum*
Formulation	Solid core granules
Package options	1 x 22.6 kg bag 1 x 364 kg mini-bulk Q-Pak

Crop treatment
Applied directly in furrow.

Particle size comparison:
Peat granules vs Nodulator solid core granules



Source: BASF sieve analysis

Application rates
One bag will treat 10 acres.
One Q-Pak will treat 160 acres.

Apply granular inoculant directly in furrow at 2.3 kg/ac (5 lb/ac).

Follow crop
No follow-crop restrictions.

Learn more about handling, storing and applying inoculants.

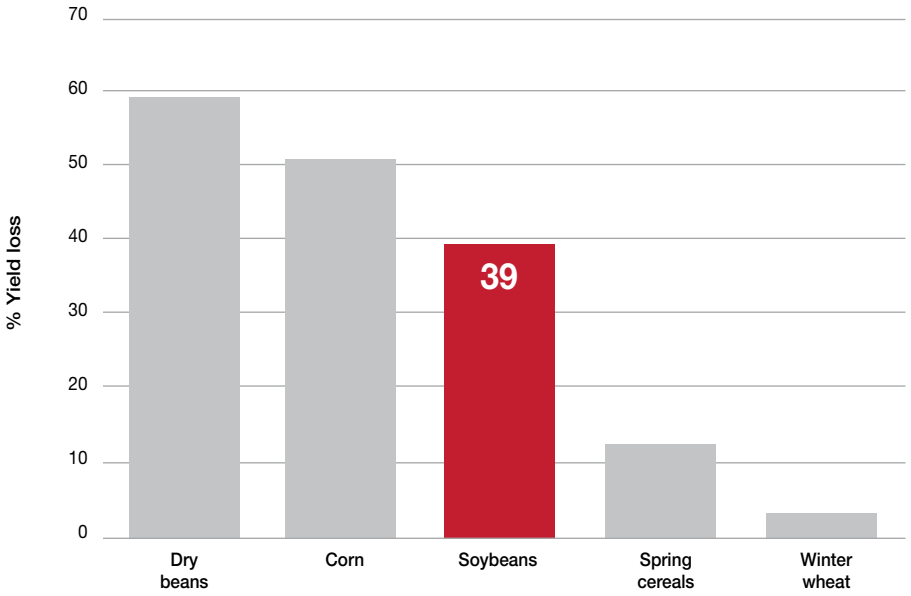
Weed control that puts you in charge of your soybean fields.

Soybean crops are highly susceptible to yield losses due to weeds such as cleavers, kochia, volunteer canola, foxtail and waterhemp. The Advanced Weed Control Program from BASF combines multiple modes of effective action, herbicide layering and residual activity for weed control and resistance management. As the cornerstone of the program, Heat® Complete herbicide provides the newest innovation in weed control that provides broad-spectrum burndown with extended residual activity.

ADVANCED WEED CONTROL

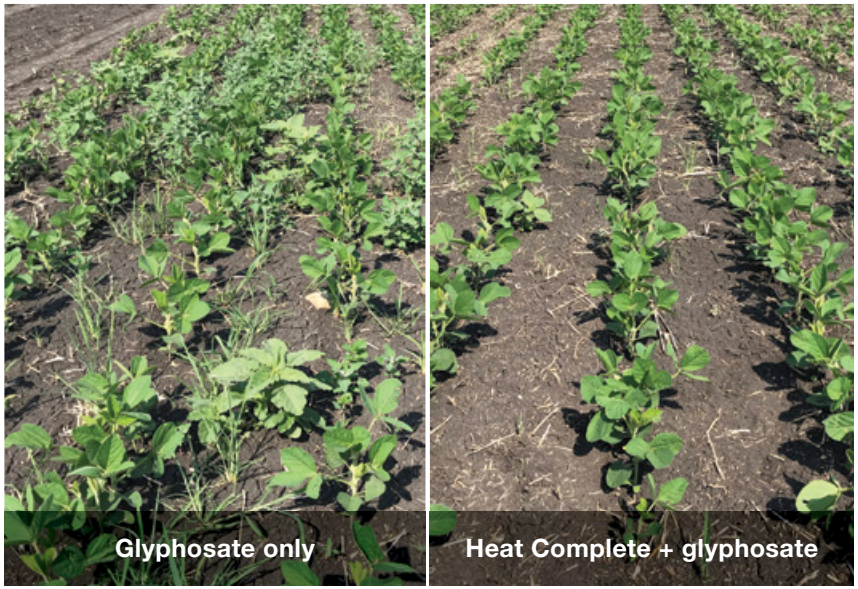
Weed control in soybeans is crucial to maximizing yield potential.

Yield loss due to weeds.



Source: Sikkema, Ridgetown and Exeter, 2007-2015, 224 field studies

Enhanced weed control in soybeans.



Source: **AgSolutions®** Performance Trials, Howden, MB, 2018

GLYPHOSATE-TOLERANT SOYBEANS: PRE-SEED

Heat® LQ Powered by **Kixor®** Herbicide (60 ac/case) *or* **Heat® Complete** Powered by **Kixor®** Herbicide (60 ac/case)

GLYPHOSATE-TOLERANT SOYBEANS: IN-CROP

Viper® ADV Herbicide

KEY WEEDS CONTROLLED (INCL. RESISTANT BIOTYPES)

Using Heat LQ:
Cleavers | Stinkweed | Volunteer canola
Wild buckwheat | Wild mustard

Using Heat Complete – the above, plus:
Foxtail (green, yellow) | Kochia | Lamb's quarters
Redroot pigweed | Wild oats

DICAMBA-TOLERANT SOYBEANS: PRE-SEED

Engenia® Herbicide (40 ac/case) + **Heat® LQ** Powered by **Kixor®** Herbicide (60 ac/case) *or* **Heat® Complete** Powered by **Kixor®** Herbicide (60 ac/case)

DICAMBA-TOLERANT SOYBEANS: IN-CROP

Viper® ADV Herbicide

KEY WEEDS CONTROLLED (INCL. RESISTANT BIOTYPES)

Using Heat LQ + Engenia®:
Cleavers | Kochia | Lamb's quarters | Perennial sow thistle |
Stinkweed | Volunteer canola
Wild buckwheat | Wild mustard

Using Heat Complete + Engenia – the above, plus:
Foxtail (green, yellow)
Redroot pigweed | Waterhemp | Wild oats

Something else to plan on: peace of mind.

The Advanced Weed Control Program also provides additional re-spray support for weed escapes (even resistant biotypes)—an industry first. BASF will provide Heat LQ pre-harvest herbicide or Basagran® Forté herbicide for broadleaf weed escapes and a BASF graminicide for grassy weed escapes. For more information about the Advanced Weed Control Program, product re-spray or the support process visit **agsolutions.ca/advancedweedcontrol**.

Pick your pre-seed herbicide.

Ensure your soybeans get the proper start. With the chart below, choose the best pre-seed solution to meet your weed challenges.

Projects	Heat® LQ (60 ac/case)	Heat Complete (60 ac/case*)
I need	Burndown on broadleaf weeds **Strengths:** Broad-spectrum broadleaf burndown	Burndown of broadleaf weeds, **EXTENDED** residual activity on broadleaf and grassy weeds **Strengths:** Kochia and grassy residual. Complementary effects between Zidua® SC and Heat LQ herbicides coming from overlapping broadleaf activity but different spectrum strengths.
Situations	Low to moderate broadleaf weed control and want burndown	Recommended application rate for use on peas, soybeans and corn. Known Group 1- or 2-resistant wild oats, moderate/high kochia pressure. Heavy pigweed or lamb's quarters pressure
Active ingredients	Saflufenacil – Group 14	**(a)** Saflufenacil – Group 14
	–	**(b)** Pyroxasulfone – Group 15
Merge®	Included in case	Included in case
Formulation	Water-based suspension concentrate	Liquid suspension concentrate
One case contains	**(a)** 1.73 L jug **(b)** 2 x 8.1 L jugs Merge	**(a)** 1.73 L jug Heat LQ **(b)** 3.89 L jug Zidua SC **(c)** 2 x 8.1 L jugs Merge
Staging	Pre-seed and pre-emergence	Pre-seed and pre-emergence
Broadleaf weeds controlled Apply at 8-leaf (except where indicated)	Canada fleabane[1], cleavers[2] (4 whorls), dandelion[3] (15 cm height), flixweed, kochia[1] (15 cm height), lady's thumb[4] (6-leaf), lamb's quarters, narrow-leaved hawk's beard (8 cm height), perennial sow-thistle[4,5], prickly lettuce[4,5] (9-leaf), ragweed (common, giant)[4], redroot pigweed[2],round-leaved mallow, shepherd's-purse[4] (full flower), stinkweed[2], volunteer canola[2,6], wild buckwheat[2], wild mustard[2]	Canada fleabane[1],cleavers[7] (4 whorls), dandelion[3] (15 cm height), flixweed, kochia[1,7] (15 cm height), lady's thumb[8] (6-leaf), lamb's quarters[7], narrow-leaved hawk's beard (8 cm height), perennial sow-thistle[3,8], prickly lettuce[3,8] (9-leaf), ragweed (common, giant)[8], redroot pigweed[7], round-leaved mallow, shepherd's-purse[8] (full flower), stinkweed[7], volunteer canola[6,7], waterhemp[7] (prior to emergence), wild buckwheat[7], wild mustard[7]
Grasses controlled Prior to emergence	–	Prior to emergence Foxtail (green, yellow)[9], wild oats[9]

* Note: One case contains two separate jugs: (a) and (b).

[1] Includes Group 2-resistant and glyphosate-resistant biotypes. [2] For suppression of secondary flushes, use higher application rate of 59 ml/ac (146 ml/ha). [3] Top growth burndown control only of perennial plants, control of spring germinating plants. [4] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha). [5] Top growth burndown control only. [6] All herbicide-tolerant canola systems including glyphosate-tolerant canola. [7] Residual suppression (may be rate dependent). [8] Burndown control is rate-dependent. [9] Residual suppression only.

Soybean herbicide option chart.

	Engenia®[1]	Heat LQ	Heat Complete	Zidua® SC	Viper® ADV
Acres treated	40-80 ac/case	60 ac/case	60-80 ac/case	40-165 ac/case	40 ac/case
Active ingredient(s)	Dicamba	Saflufenacil	Saflufenacil, Pyroxasulfone	Pyroxasulfone	Imazamox, Bentazon
WSSA Group(s)	4	14	14 + 15	15	2 + 6
Grassy weeds:					
Barnyard grass	-	-	RS	C[8]	**C**
Green foxtail	-	-	RS	RS[6], C[8]	**C**
Yellow foxtail	-	-	RS	RS[6], C[8]	**C**
Wild oats	-	-	RS	RS[6]	**C**
Broadleaf weeds:					
Canada thistle	**C**[2]	-	-		-
Cleavers	**C**	**C**	**C**[7]		S[4]
Dandelion	**C**[3]	**C**[5]	**C**[8]		-
Kochia	**C**[4]	**C**[4]	**C**[4,7]	RS[6]	S[4]
Lady's thumb	**C**	**C**	**C**[8]		-
Lamb's quarters	**C**	**C**	**C**[7]	RS[6]	C
Perennial sow thistle	**C**[2]	TG	TG[5]		**TG**
Redroot pigweed	**C**	**C**	**C**[7]	RS[6], C[8]	C
Ragweeds	**C**	**C**	**C**[8]		-
Shepherd's-purse	**C**[3]	**C**	**C**		**C**
Vol. canola	**-**	**C**[6]	**C**[5,7]		**C**[6]
Waterhemp	**C**[3]	-	**C**[7]	RS[6], C[8]	-
Wild buckwheat	**C**	**C**	**C**		S
Application timing	Pre-seed to 2nd trifoliate	Pre-seed to pre-emerge	Pre-seed to pre-emerge	Pre-seed[9] to 3rd Trifoliate	1 to 4 trifoliate
Residual weed control	2 weeks	5 to 7 days	4 to 6 weeks	4 to 6 weeks	N/A
Moisture to activate	N/A	1/2"	1/2" - 3/4"	1/2" - 3/4"	N/A

RS = residual suppression S = suppression C = control TG = top growth

[1] Apply by ground ONLY to Roundup Ready 2 Xtend® soybeans (dicamba-tolerant). Soybean varieties that are not designated as dicamba-tolerant will be damaged or destroyed by this treatment. [2] Apply Engenia herbicide annually for three years at the flowering stage of bindweed and the budding stage of thistles. [3] When applied with glyphosate. [4] Includes Group 2-resistant and glyphosate-resistant biotypes. [5] Top growth burndown control only of perennial plants, control of spring-germinating plants. [6] All herbicide-tolerant canola systems including glyphosate-tolerant canola. [7] Residual suppression (may be rate dependent). [8] Burndown control is rate dependent. [9] Up to 30 days before seeding.

Heat® Complete

Powered by **Kixor®** Herbicide

For use on:

ALL SOYBEAN PLATFORMS	CONVENTIONAL/ IP SOYBEANS
YES	TALK TO GRAIN BUYER[1]

The ultimate pre-seed burndown with extended residual activity on key grassy and broadleaf weeds.

- Provides rapid and complete burndown of tough-to-control weeds, including cleavers, kochia, volunteer canola, wild mustard and stinkweed
- Extended residual activity on many weeds, including wild oats, cleavers, kochia, wild mustard, volunteer canola, redroot pigweed, waterhemp and green and yellow foxtail
- Contains Group 14 and Group 15 active ingredients in a convenient co-pack for control or suppression of Group 1-, 2- and 9-resistant weeds
- Multiple modes of effective action for management of resistant weeds
- Can also be applied in corn and peas and lentils; for a complete list of crops, visit **agsolutions.ca/heat-complete**

Enhanced weed control in soybeans

Source: **AgSolutions®** Performance Trials, Howden, MB, 2018

Active ingredient	Saflufenacil – Group 14 Pyroxasulfone – Group 15
Formulation	Liquid suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 3.89 L jug of Zidua® SC herbicide 2 x 8.1 L jugs of Merge® adjuvant

Crop staging

Pre-seed and pre-emergence

Weeds controlled

Broadleafs

Canada fleabane[2]
Cleavers[3]
Dandelion[4]
Flixweed
Kochia[2,3]
Lady's thumb[5]
Lamb's quarters[3]
Narrow-leaved hawk's beard
Perennial sow-thistle[5,6]
Prickly lettuce[5,6]
Ragweed (common, giant)[5]
Redroot pigweed[3]
Round-leaved mallow
Shepherd's-purse[5]
Stinkweed[3]
Volunteer canola[3,7]
Waterhemp[3]
Wild buckwheat[3]
Wild mustard[3]

Grasses

Foxtail (green, yellow)[3,8]
Wild oats[3,8]

Application rates

One case of Heat Complete herbicide will treat 60 to 80 acres, depending on rate.

Heat LQ	21.5 to 29 ml/ac (53 to 71 ml/ha)
Zidua SC	49 to 65 ml/ac (120 to 160 ml/ha)
Merge	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume

Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

60 days for all pre-seed and pre-emergent applications.

Follow crops

1 year after application

All crops, 1 year after a spring, pre-seed or pre-emergent application.

Learn more about Heat Complete as part of the Advanced Weed Control Program.

[1] BASF is in the process of establishing import tolerances (maximum residue limits (MRLs)) for markets around the world.
[2] Includes Group 2-resistant and glyphosate-resistant biotypes.
[3] Residual suppression (may be rate dependent).
[4] Top growth burndown control only of perennial plants, control of spring-germinating plants.
[5] Burndown control is rate-dependent.
[6] Top growth burndown control.
[7] All herbicide-tolerant canola systems, including glyphosate-tolerant canola.
[8] Residual suppression only.

Heat® LQ

Powered by **Kixor®** Herbicide

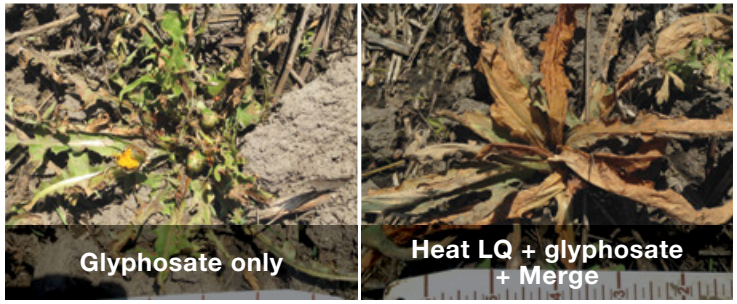
PRE-SEED/PRE-EMERGENT BURNDOWN

For use on: ALL SOYBEAN PLATFORMS — YES

The ultimate pre-seed/pre-emergent burndown in a new, easy-to-use liquid formulation.

- Rainfast and quickly absorbed for fast, complete weed control even under cool conditions
- Heat® LQ herbicide complements and improves your glyphosate application
- Broadleaf weed control in as few as 3 to 5 days[1]
- Group 14 chemistry for control of Group 2- and glyphosate-resistant weeds.
- Can also be applied in corn, peas and lentils, and cereals; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Comparison of dandelion after a pre-seed application of Heat LQ plus glyphosate plus Merge® adjuvant



Source: BASF Research Authorization trial, Stoughton, SK, 2014

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 2 x 8.1 L jugs of Merge adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Crop staging

Pre-seed, pre-emergence (before ground crack)

Weeds controlled

Broadleafs

Canada fleabane[2]
Cleavers[3]
Dandelion[4]
Flixweed
Kochia[2]
Lady's thumb[5]
Lamb's quarters
Narrow-leaved hawk's beard
Perennial sow-thistle[5,6]
Prickly lettuce[5,6]
Ragweed (common, giant)[5]
Redroot pigweed[3]
Round-leaved mallow
Shepherd's-purse[5]
Stinkweed[3]
Volunteer canola[3,7]
Wild buckwheat[3]
Wild mustard[3]

Application rates

One case of Heat LQ herbicide will treat 60 to 80 acres, depending on rate.

Heat LQ[8]	21.5 to 29 ml/ac (53 to 71 ml/ha)
Glyphosate[8] **(360 g ae/L)**	0.5 to 1 L/ac (1.25 to 2.5 L/ha)
Merge adjuvant[9,10]	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume

Ground application
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

60 days for all pre-seed and pre-emergent applications.

Follow crops

1 year after application

All crops, 1 year after a spring, pre-seed or pre-emergent application.

Learn more about Heat LQ as part of the Advanced Weed Control Program.

[1] Depending on growing conditions. [2] Includes Group 2-resistant and glyphosate-resistant biotypes. [3] For suppression of secondary flushes, use higher application rate of 59 ml/ac (146 ml/ha). [4] Top growth burndown control only of perennial plants, control of spring germinating plants. [5] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha). [6] Top growth burndown control only. [7] All herbicide-tolerant canola systems including glyphosate-tolerant canola. [8] Glyphosate (required for optimum activity) is not included in the case. [9] Merge adjuvant is required and is included with Heat LQ herbicide. [10] At the higher Heat LQ application rates (30 or 40 acres per case), BASF recommends using Merge at the higher rate (400 ml/ac). Use both Merge jugs included in the case regardless of the Heat LQ rate. Use all Merge in the tote when applying at 2,000 acres per tote.

Weed control is your goal. Stewardship is your priority.

Proper Engenia® herbicide stewardship is essential to the effectiveness of your weed management program. There are several factors to consider when using a dicamba herbicide. They include:

- **Nozzles –** use nozzles to ensure extremely coarse to ultra-coarse droplets
- **Wind speed –** spray when wind speeds are between 3 to 15 km/h
- **Ground speed –** maintain your sprayer speed at 25 km/h or less (no aerial application)
- **Boom height –** keep spray boom height no higher than 50 cm above crop canopy
- **Sensitive crop awareness –** identify neighbouring crop species
- **Application volume –** use a minimum spray volume of 10 GPA
- **Additives/adjuvants –** only use as required or recommended on product label
- **Sprayer cleanout –** triple rinse, and use a detergent-based cleaner

Engenia®
Herbicide

Engenia Spray Tool

The Spray Tool will help you plan your application with confidence.* The tool will keep you up to date with live information of weather condition, precipitation probability, inversion potential level, wind speed and wind direction. To help you plan and steward your application, you'll be able to enter the location of your operation and filter the information by the hour.

*This tool is for planning purposes and does not replace checking weather in the field at the time of application prior to making a spray application decision.

Visit **agsolutions.ca/applicationstewardship** to learn more and access the Engenia Stewardship learning module.

TECH TIP:
Do not apply Engenia when there is a temperature inversion.
The three indicators of a temperature inversion including the following:
1) Clear sky
2) No wind
3) Dew present.
Applications are only permitted beginning one hour after sunrise until two hours before sunset. Access the Engenia Spray Tool at **www.engeniaspraytool.ca** to check current weather conditions for application in your area.

Engenia®
Herbicide

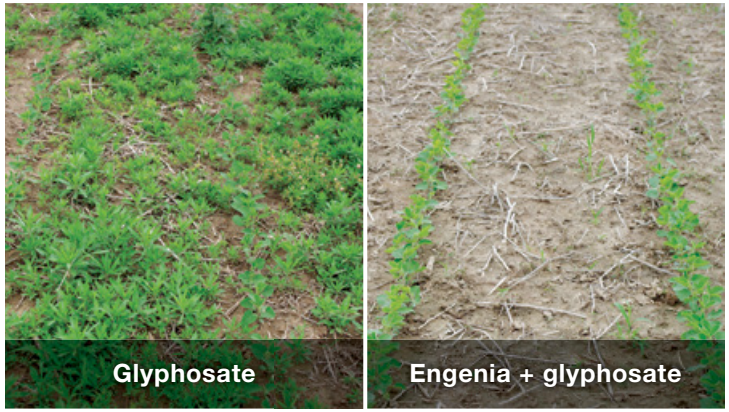
For use on:

GLYPHOSATE TOLERANT SOYBEANS	DICAMBA TOLERANT SOYBEANS	CONVENTIONAL/ IP SOYBEANS
NO	YES	NO

An advanced dicamba formulation with lower-volatility properties for improved broadleaf control in Roundup Ready 2 Xtend® soybeans.

- New, more highly concentrated liquid formulation for easier handling and lower use rate
- Effective resistance management tool for Group 2-, triazine-, and glyphosate-resistant biotypes
- For a complete list of crops, visit **agsolutions.ca/engenia**

Weed control in Roundup Ready 2 Xtend® soybeans with glyphosate alone versus Engenia® herbicide plus glyphosate



Source: University of Guelph research trial, Ridgetown, ON, 2015

Active ingredient	Dicamba – Group 4
Formulation	Soluble liquid
One case contains	2 x 8.09 L jugs Also available in 121.2 L shuttle

Crop staging[1]
Pre-seed, pre-emergence, post-emergence (up to early flower)

Weeds controlled[2]
In-crop applications.

Buckwheat (tartary, wild)
Canada fleabane[3]
Canada thistle[4]
Cleavers
Corn spurry
Cow cockle
Field bindweed[4]
Green smartweed
Lady's thumb
Lamb's quarters
Mustards (including wild)
Perennial sow thistle[4]
Ragweed (common, false, giant)
Redroot pigweed
Russian pigweed
Velvetleaf

Learn more about Engenia as part of the Advanced Weed Control Program.

Application rates
One case of Engenia herbicide will treat 40 to 80 acres. One shuttle will treat 303 to 606 acres.

Pre-emergent and/or in-crop application[5,6]

Roundup Ready 2 Xtend® soybeans[7,8,9,10]	200 to 400 ml/ac (500 ml/ha to 1000 ml/ha)

Water volume
Ground application only
40 L/ac (10 gal/ac) minimum

Use higher water volumes to ensure adequate coverage.[6]

Pre-harvest interval
7 to 10 days for soybean forage and 13 to 15 days for soybean hay.

Follow crops
A plant-back interval of 120 days is required for all crops not on the Engenia label for Roundup Ready 2 Xtend® soybeans.

ROUNDUP READY 2 XTEND SOYBEANS

[1] Apply by ground ONLY to Roundup Ready 2 Xtend® soybeans. Soybean varieties that are not designated as dicamba-tolerant will be damaged or destroyed by this treatment. [2] For a complete list of proper weed staging, please refer to the product label. [3] Post-emergence only. [4] Apply Engenia herbicide annually for three years at the flowering stage of bindweed and the budding stage of thistles. [5] See label for a complete list of additional available tank mixes and their rates. Tank mix options are not included in the case. [6] See label for water rate for application. [7] Engenia can be used alone or in tank mix with glyphosate for additional broadleaf and grass weed control. See label for important details. [8] For application to Roundup Ready 2 Xtend® soybeans, apply Engenia using nozzles that deliver extremely coarse to ultra-coarse spray droplets. [9] The 400 ml/ac rate of Engenia is to be used only once a season and should be used pre-plant, pre-emergence or in-crop early post-emergence. [10] 793 ml/ac of Engenia is the maximum total to be applied in a single growing season.

Zidua® SC

Herbicide

NEW

For use on:

GLYPHOSATE TOLERANT SOYBEANS	DICAMBA TOLERANT SOYBEANS	CONVENTIONAL/ IP SOYBEANS
YES	YES	TALK TO GRAIN BUYER[1]

Residual control of key annual grasses and select broadleaf weeds.

- Group 15 chemistry delivers control of tough weeds, including resistant redroot pigweed and green and yellow foxtail, as well as suppression of wild oats and kochia
- Residual activity controls germinating weed seedlings before or soon after crop emergence
- Wide window of application from early pre-seed to early post-emergence and post-harvest
- Can also be applied in corn and potatoes; for a complete list of crops, visit **agsolutions.ca/ziduasc**

Active ingredient	Pyroxasulfone – Group 15
Formulation	Suspension concentrate
One case contains	2 x 4.05 L jugs

Crop staging

Pre-seed[2], pre-emergence, early post-emergence up to 3rd trifoliate

Weeds controlled

Broadleaf weeds	*Grasses*
Kochia[3]	Annual bluegrass[5]
Lamb's quarters[3]	Barnyard grass[4]
Redroot pigweed[3,4]	Crabgrass (large)[4]
Waterhemp[3,4]	Foxtail (giant[4], green[3,4], yellow[3,4])
	Ryegrass (Italian)[4]
	Wild oats[3]

Learn more about Zidua® SC herbicide as part of the Advanced Weed Control Program.

Application rates One case treats 40 to 165 acres.

	Rate by soil texture				Recommended acres/case
	Coarse	Medium-fine		Fine	
		Organic matter ≤ 3%	3% < Organic matter < 7%		
Pre-seed, pre-emergence	101 ml/ac (250 ml/ha)	134 ml/ac (332 ml/ha)	169 ml/ac (417 ml/ha)	200 ml/ac (493 ml/ha)	40 to 80
Early post-emergence	73 ml/ac (180 ml/ha)				110

Water volume

Ground application Minimum 40 L/ac (10 gal/ac)

Follow crops

Following spring after application:
Chickpeas, field corn, field peas, flax, lentils, soybeans, spring wheat, sunflowers

4 months following application:
Winter wheat

11 months following application:
Barley, durum wheat, oats

12 months following application:
Canola

[1] BASF is in the process of establishing import tolerances (maximum residue limits (MRLs)) for markets around the world.
[2] Up to 30 days before planting.
[3] Early-season residual suppression at 50 to 95 ml/ac (120 to 240 ml/ha).
[4] Controlled at 101 to 200 ml/ac (250 to 493 ml/ha).
[5] Provides control when applied as a post-harvest treatment prior to weed emergence.

Viper® ADV

Herbicide

For use on: ALL SOYBEAN PLATFORMS — YES

Proven, broad-spectrum weed control for soybeans.

- Convenient, user-friendly 100% liquid formulation
- Multiple modes of action to help manage resistant weeds
- Control of resistant wild mustard and volunteer canola
- Excellent rotational freedom
- Can also be applied in peas and lentils; for a complete list of crops, visit **agsolutions.ca/viperadv**

Cleaver control, 7 days after application of Viper® ADV herbicide

Source: BASF Research Authorization trial, SK, 2012

Active ingredient	Imazamox - Group 2 Bentazon - Group 6
Formulation	Liquid concentrate
One case contains	2 x 8.1 L jugs Also available in 129.6 L drum

Crop staging

Cotyledon to 4th trifoliate

Weeds controlled

Broadleafs

Cleavers[1,2]
Cow cockle
Green smartweed
Hemp-nettle[2]
Kochia[1,2]
Lamb's quarters
Redroot pigweed
Round-leaved mallow[2]
Russian thistle
Shepherd's-purse
Sow thistle (annual)[2]
Sow thistle (perennial)[3]
Stinkweed
Volunteer canola
Volunteer lentils
Wild buckwheat[2]
Wild mustard[1]

Grasses

Barnyard grass
Foxtail (green, yellow)
Japanese brome grass[2]
Persian darnel
Volunteer barley
Volunteer canary seed
Volunteer durum wheat
Volunteer spring wheat[4]
Volunteer tame oats
Wild oats

Application rates

One case will treat 40 acres.
One drum will treat 320 acres.

Viper ADV[5]	404 ml/ac (1 L/ha)
28% UAN[6]	809 ml/ac (2 L/ha)

Water volume

Ground application only
40 L/ac (10 gal/ac)

Pre-harvest interval

60 days after application.

Follow crops

1 year after application

2 years after application:
Potatoes

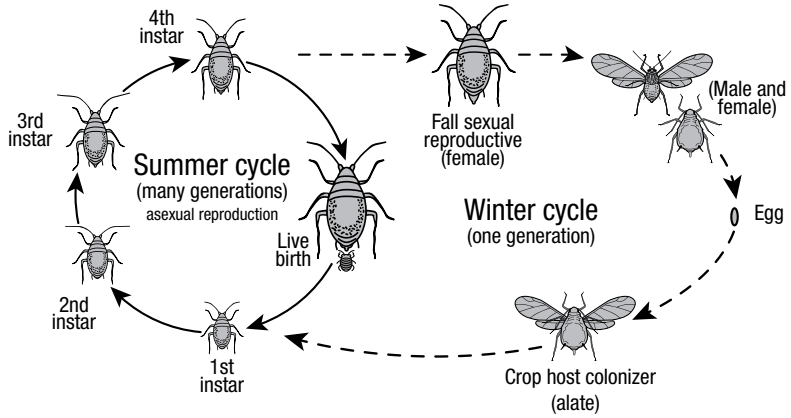
Learn more about Viper ADV as part of the Advanced Weed Control Program.

[1] Includes resistant biotypes.
[2] Suppression.
[3] Top growth suppression only.
[4] Excluding **Clearfield®** wheat.
[5] For dry edible beans only, Viper ADV requires the addition of Basagran® Forté herbicide at 146 ml/ac (360 ml/ha) to control additional weeds. Basagran Forté is not included in the case.
[6] Addition of a nitrogen source (28% UAN) is recommended for grass control, and is not included in the case.

Aphids can be very hard to spot.

Get to know your foe.

Developing effective integrated pest management strategies involves knowing what you're up against. Posing more threat to soybean growers than any other pest, aphids have a very complex life cycle with several generations per year.



- Soybean aphids lay eggs on common buckthorn – a woody shrub or small tree – which overwinter and hatch in the spring
- Wingless females emerge and produce more females without mating
- Third generation develops wings and flies to colonize on soybeans
- More wingless generations are produced until it becomes overcrowded, and winged adults are produced to disperse to other plants or fields
- Towards the fall, winged males and females are produced, which fly to buckthorn to mate and begin the life cycle again

Learn more about insect scouting by visiting the Soybean Production Guide found at ***agsolutions.ca/soybean-production.***

Aphids get around.

Aphids can migrate from nearby fields or from great distances – even the USA – via storm fronts. Fields seeded early are prone to infestations as aphids move from buckthorn to soybeans in the spring. Late-planted fields are prone to the summer migration of adults from other soybean fields. And any field under drought stress or potassium deficiency can be more prone to injury. Aphid populations can grow to extremely high levels under favourable conditions.

Check your fields for enemies. And allies.

Natural enemies.

While scouting your soybeans for aphids, it's also a good idea to look out for natural enemies. They're beneficial because they help limit aphid populations from rapidly expanding. See below for examples of natural enemies:

Economic thresholds.

When deciding on whether or not to use an insecticide, it's important to follow *economic thresholds of 250 aphids/plant* and increasing populations on 80% of plants. Damage is typically only economic from R1 to R5.

Got aphids? You also have choices.

Seed treatments.

Some seed treatments contain an insecticide component that's registered for soybean aphids. However, their level of control may not be as long-lasting, providing only early-season protection from aphids.

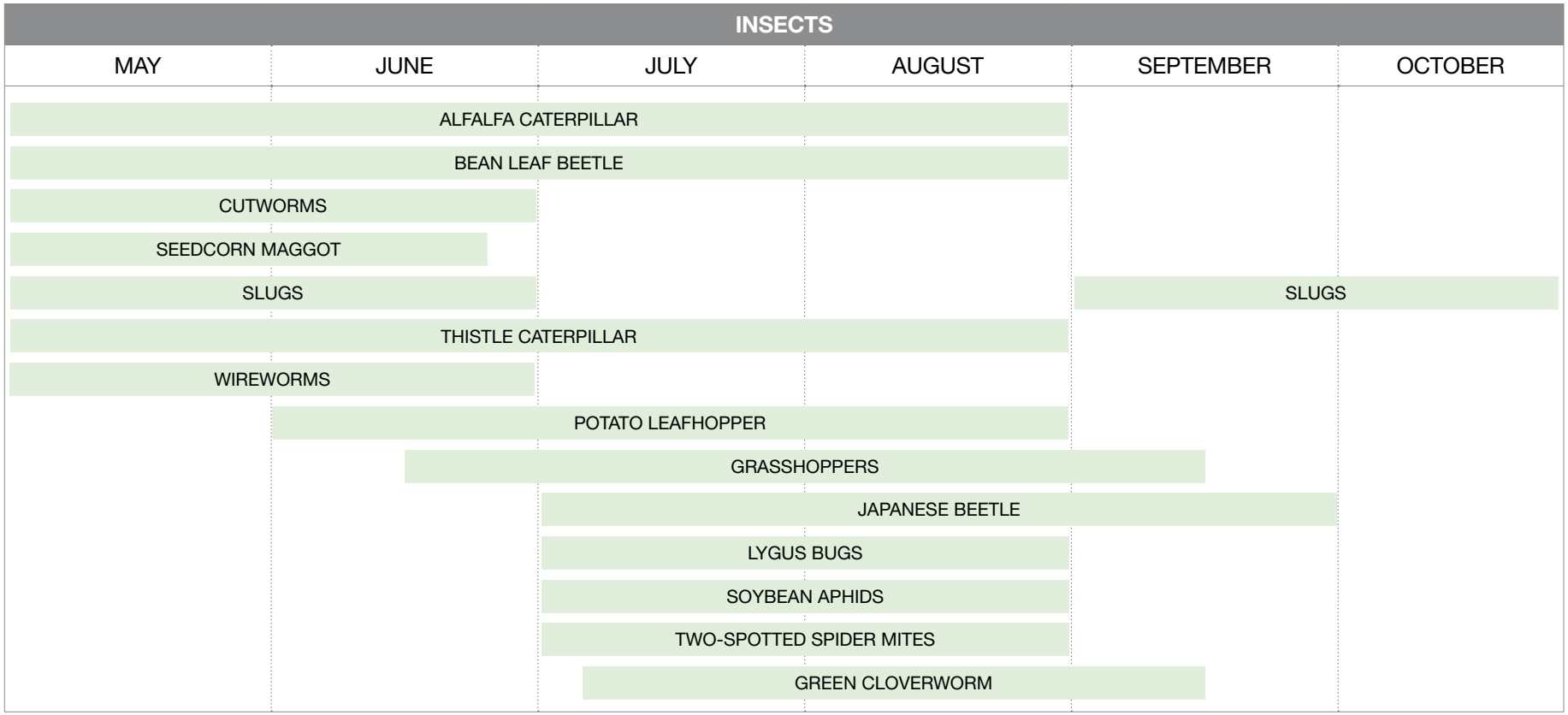
Foliar insecticides.

It's preferable to use an insecticide that targets a pest specifically versus a broad-spectrum product. Targeted insecticides used in an integrated pest management strategy are the best way to reduce aphids and the chances of population rebound.

Consider insect scouting timing your best defense.

It's essential to evaluate insect pests in order to effectively manage them. To do that, growers should consider recent weather and scout their fields. Scouting is one of the most important management strategies for insect control because it allows for proper identification, evaluation of prevalence and severity and determination of thresholds for each pest. The proper time to scout is dependent on the insect of concern as shown in the calendar below. Once growers reach spray thresholds, there are numerous strategies to manage populations and ensure a healthy crop. Growers can rely on biological control, cultural practices and chemical options. In order to optimize these management strategies, growers should monitor spray threshold levels with sweep nets, sticky traps or simply walk the fields. If growers find an insect pest they cannot identify, or a pest they believe is new in their region, they should submit it to their Provincial Entomologist or a lab.

Get familiar with the Canadian insect scouting calendar.



Source: Adapted from Manitoba Pulse & Soybean Growers.

Sefina®

Insecticide Powered by **Inscalis®**

For use on:

GLYPHOSATE TOLERANT SOYBEANS	DICAMBA TOLERANT SOYBEANS	CONVENTIONAL/ IP SOYBEANS
YES	YES	TALK TO GRAIN BUYER[1]

A lasting barrier that protects against aphids.

- Quickly halts aphid feeding, which reduces production losses and virus transmission
- Extended control of aphids
- Powered by Inscalis®, a unique mode of action that controls labeled aphid pests that have developed resistance to other insecticides
- Effective tool in an Integrated Pest Management strategy with safe use on beneficial insects, including predatory and parasitic insects
- Now registered for Group 17 and 18 crops, including alfalfa, in addition to the other crops such as potatoes; for a complete list of crops, visit **agsolutions.ca/sefina**

Active ingredient	Afidopyropen – Group 9D
Formulation	Dispersion concentrate
One case contains	2 x 3.24 L jugs

Crop staging
Emergence to full maturity

Pests controlled	**Staging**
Soybean aphid *(Aphis glycines)*	all life stages

Application rates[2,3]
One case of Sefina® insecticide will treat 80 acres.

For soybean aphid control	81 ml/ac (0.2 L/ha)

Water volume

Ground application	40 to 80 L/ac (10 to 20 gal/ac)
Aerial application	20 L/ac (5 gal/ac) minimum

Grazing
Do not feed or graze treated soybean hay or forage to livestock.

Pre-harvest interval
7 days after application.

Follow crops

0 months after application (same season)
Brassica head and stem vegetables
Cucurbits
Fruiting vegetables
Leafy vegetables
Root crops
Soybeans
Tuberous and corm vegetables (including potatoes)

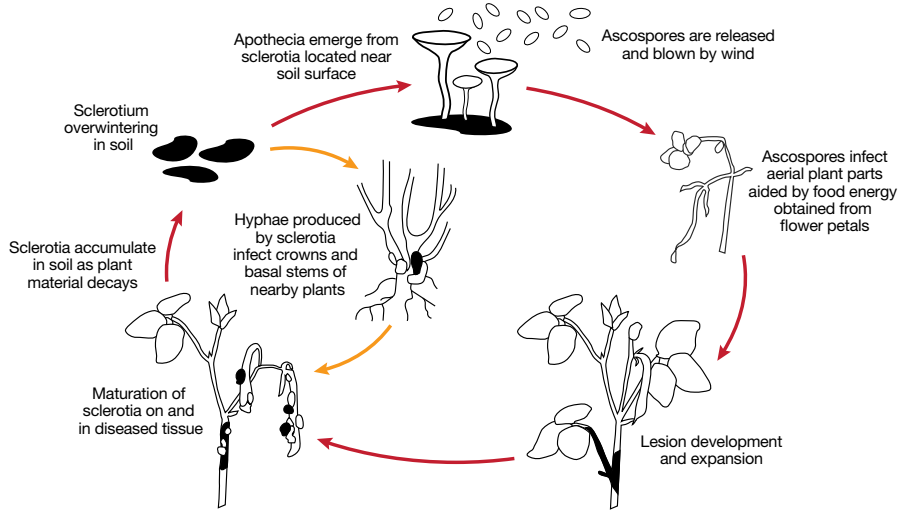
2 months after application
All other crops not listed on label when the soybean maximum seasonal rate is 161.87 ml/ac (0.4 L/ha).

[1] BASF is in the process of establishing import tolerances (maximum residue limits (MRLs)) for markets around the world.
[2] Allow a minimum of 7 days between applications.
[3] Do not apply more than 162 ml/ac (0.4 L/ha) per year.

Keep white mold out of your soybean fields. Know what to look for.

White mold can have a high impact on yield and is on the rise due to tighter crop rotations, increased fertility and the growth of higher yielding and bushier varieties. The yield impact has been estimated as 2.5-5 bu/ac for every 10% incidence of the disease.[1] Understanding the white mold disease cycle, factors affecting your control decisions and which fungicide to use can help you protect your field.

[1] Yang, Lundeen and Uphoff, 1999.



Source: Soybean Disease Management CPN-1005, White Mold

Source: Canola Council of Canada

Weather

- Cool and wet conditions allow white mold to infect and thrive

Field history

- There is higher disease risk in a soybean/corn rotation vs. a longer, multi-crop rotation
- Rotate to a non-host crop for a minimum of two to three years after a white mold incident

Variety selection/plant populations

- Soybeans with shorter stature and more branching that are prone to lodging are more susceptible
- Wider rows can reduce white mold incidence
- Under high disease pressure, distance between plants is more important than row spacing

Soil type and manure/fertilizer applications

- High fertility, medium-textured soils tend to grow larger soybeans
- Manure contains nitrogen that stimulates vegetative growth
- Over-fertilizing leads to lush, dense canopies, creating conditions conducive for infection

Tillage

- Sclerotia left on the surface deteriorate much faster than if they are buried in the soil

Gauging risk indicators.

LOW RISK

- Below-average moisture
- No-till
- Tolerant varieties

HIGH RISK

- Above-average moisture
- Moderate temperatures
- Field history
- Tight crop rotation
- Manure
- Tillage
- High plant population
- Narrow row spacing
- Susceptible varieties

Get advanced chemistry with Cotegra® fungicide.

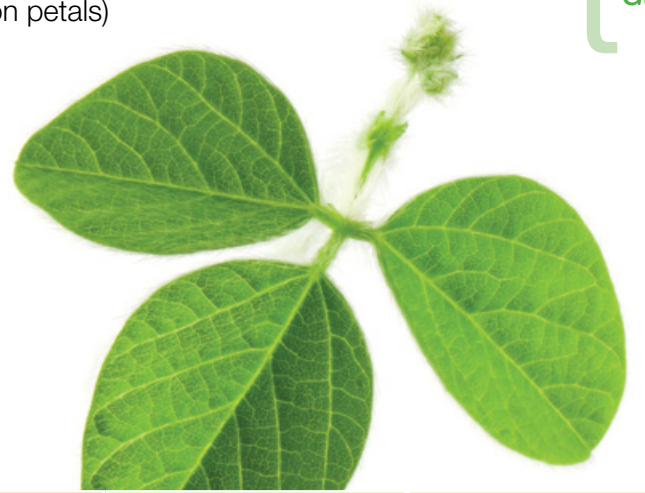
- Combines two leading sclerotinia active ingredients, in a convenient liquid premix
- Delivers industry-leading disease management
- Strong disease management in a wide range of crops, including canola, peas, lentils, chickpeas, soybeans, and dry beans

Apply at proper timing.

- Apply fungicide at R1-R3
- Remember, fungicides are more effective when applied preventatively
- When in doubt, apply during early flowering (white mold spores feed on petals)

Fungicide Application	Rate	Timing
Cotegra® Fungicide	High risk: 70 acres/case	R1-R3
Priaxor® Xemium® Fungicide	Low risk: 160 acres/case	R1-R3

*Learn more by visiting the Soybean Production Guide found at **agsolutions.ca/soybean-production.***



AgCelence® Expect more | BASF We create chemistry

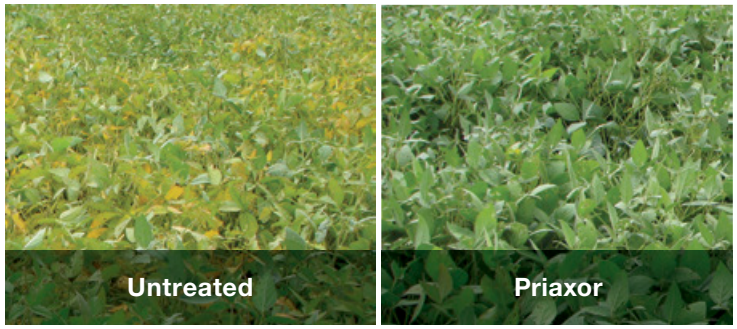
Priaxor®

Xemium® Fungicide

Proven and consistent. A more advanced fungicide that helps maximize your crop's yield potential.[1]

- Combines the active ingredient Xemium® with the proven benefits[2] of **AgCelence®**
- More consistent and continuous control of key diseases, along with increased growth efficiency and better management of minor stress[1]
- Multiple modes of action for increased performance and reduced risk of developing fungicide resistance
- Can also be applied in corn; for a complete list of crops, visit **agsolutions.ca/priaxor**

Multiple-mode-of-action control of major leaf diseases with Priaxor® fungicide



Source: **AgSolutions®** Performance Trials, ON, 2013

Active ingredients	Fluxapyroxad – Group 7 Pyraclostrobin – Group 11
Formulation	Liquid suspension
One case contains	2 x 9.6 L jugs

Crop staging[3]

Early to late flower (R1 to R3) or prior to disease development

Diseases controlled

Asian soybean rust
(Phakopsora pachyrhizi)
Frog eye leaf spot
(Cercospora sojina)
Sclerotinia stem rot
(Sclerotinia sclerotiorum)[4]
Septoria brown spot
(Septoria glycines)

Application rates

One case treats 107 to 160 acres.

Priaxor[5]	120 to 180 ml/ac (300 to 450 ml/ha)

Water volume

Ground application[6]
40 L/ac (10 gal/ac)

Aerial application
20 L/ac (5 gal/ac)

Pre-harvest interval

21 days after application.

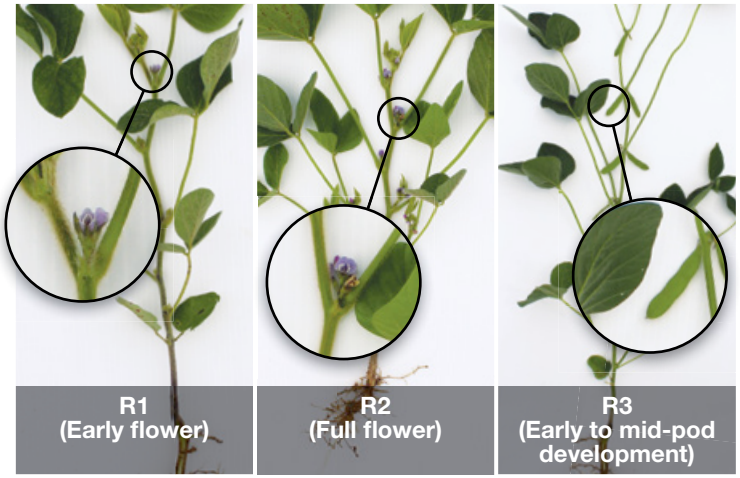
[1] All comparisons are to untreated, unless otherwise stated.
[2] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[3] Refer to label for additional crops.
[4] Suppression only.
[5] Use increased rate for suppression of sclerotinia stem rot.
[6] Increase water volume to improve overall efficiency of the product under high disease pressure.

Cotegra®

Fungicide

A new era of sclerotinia management to help preserve yield potential and quality in soybeans.

- Combines two leading sclerotinia actives, in a convenient liquid premix
- Delivers industry-leading disease management
- Strong disease management in a wide range of crops, including canola, peas, lentils, chickpeas, soybeans and dry beans
- Can also be applied in canola and peas and lentils; for a complete list of crops, visit **agsolutions.ca/west-cotegra**



Active ingredients	Boscalid – Group 7 Prothioconazole – Group 3
Formulation	Suspension concentrate (SC) liquid pre-mix
One case contains	2 x 9.8 L jugs

Crop staging
Prior to disease development (late R1/R2 to R3)

Note: A 2nd application can be made 7 to 14 days after 1st application if disease persists, or weather conditions favour disease development. Use the shorter interval when disease pressure is high to obtain extended protection and maximum yield benefit.

Diseases managed
Asian soybean rust (*Phakopsora pachyrhizi*)[1]
Frog eye leaf spot (*Cercospora sojina*)[1]
Septoria brown spot (*Septoria glycines*)[2]
White mold (*Sclerotinia sclerotiorum*)[2]

Application rates
One case will treat 70 acres.

Cotegra®	280 ml/ac (0.7 L/ha)

Water volume
Ground application[3]
40 to 80 L/ac (10 to 20 gal/ac)

Aerial application
20 L/ac (5 gal/ac)

Pre-harvest interval
21 days after application.

[1] Control.
[2] Suppression.
[3] Higher water volumes recommended for optimal coverage.

Heat® LQ

Powered by **Kixor®** Herbicide

PRE-HARVEST

For use on: ALL SOYBEAN PLATFORMS — YES

Faster harvest. Better weed control.

- Easy-to-use liquid formulation for fast dry down of crops and broadleaf weeds
- Improved crop uniformity and harvestability
- Tank mixed with glyphosate for fast broadleaf weed dry down and cleaner fields next season
- Can also be applied in canola, cereals, and peas and lentils; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Learn more about Heat® LQ herbicide as part of the Advanced Weed Control Program.

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ 2 x 8.1 L jugs of Merge® adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Crop staging

Apply when stems are green to brown, pods are mature (yellow, brown) and 80 to 90% of leaves have dropped.

Application rates

One case of Heat LQ herbicide tank mixed with glyphosate will treat 40 acres. One tote treats 1,000 acres.

Heat LQ	43 ml/ac (106 ml/ha)
Glyphosate[1] (360 g ae/L)	1.0 L/ac (2.5 L/ha)
Merge adjuvant[2]	200 to 400 ml/ac (0.5 to 1 L/ha)

(Heat LQ should be tank mixed with glyphosate for best performance. Consult with your grain buyer for further details.)

(Use all Merge included in the case or tote of Heat LQ.)

Water volume

Ground application 40 L/ac (10 gal/ac) minimum
(BASF recommends using higher water volumes for best results).

Aerial application[3] 20 L/ac (5 gal/ac)

Pre-harvest interval 3 days after application.

Follow crops

In the spring following a fall application

Barley (spring, malt, winter), canary seed, canola, chickpeas, corn (field and sweet), field peas, flax, lentils, oats, soybeans, wheat (incl. **Clearfield®** wheat, spring, winter, durum)

[1] Glyphosate is not included in the case.
[2] BASF recommends using Merge at the higher rate (400 ml/ac) when tank mixed with glyphosate. Use both Merge jugs included in the case when applying Heat LQ at 40 acres per case. Use all Merge in the tote when applying at 1,000 acres per tote.
[3] Heat LQ is registered for aerial applications. Some glyphosate formulations are also registered for aerial applications; therefore, Heat LQ plus glyphosate can be applied through aerial applications when both products have aerial registrations.

TECH TIP:

Coverage is key. The deeper into the canopy the herbicide gets, the more complete the dry down will be. Spraying on larger plants means more biomass coverage and time to dry down. Remember:

- Min. 20 gal/ac water volume
- Keep boom height approximately 50 cm above canopy
- Spray on a clear sunny day, in the middle of the day
- Avoid spraying when dew is present
- Avoid spraying during cooler, overcast or wet conditions

Harvest Management

Lock in your corn crop's success with these key solutions.

Corn staging

Crop Establishment

- Stamina® seed treatment

Weed Management

- Advanced Weed Control Program
- Heat® Complete herbicide vs Heat LQ herbicide
- Heat Complete herbicide
- Heat LQ pre-seed herbicide
- Armezon® + Zidua® SC herbicide
- Armezon herbicide
- Zidua SC herbicide

Disease Management

- Fungicide recommendations
- Priaxor® fungicide

Additional Resources

- Handling, storing and applying inoculants
- Challenging weeds - identification and control
- Mixing order
- Bulk available products

Corn. Stand tall against rising weed challenges.

Weed control is always on growers' minds, and being able to provide multiple modes of effective action is our way of providing relief. The Advanced Weed Control Program is a great example. Using advanced concepts like herbicide layering, it provides solutions that cater to your individual weed management needs. Learn more.

Also, Armezon® + Zidua® SC herbicide tank mix is an excellent early post-emergent weed control option; providing rapid burndown and enhanced residual control. Learn more.

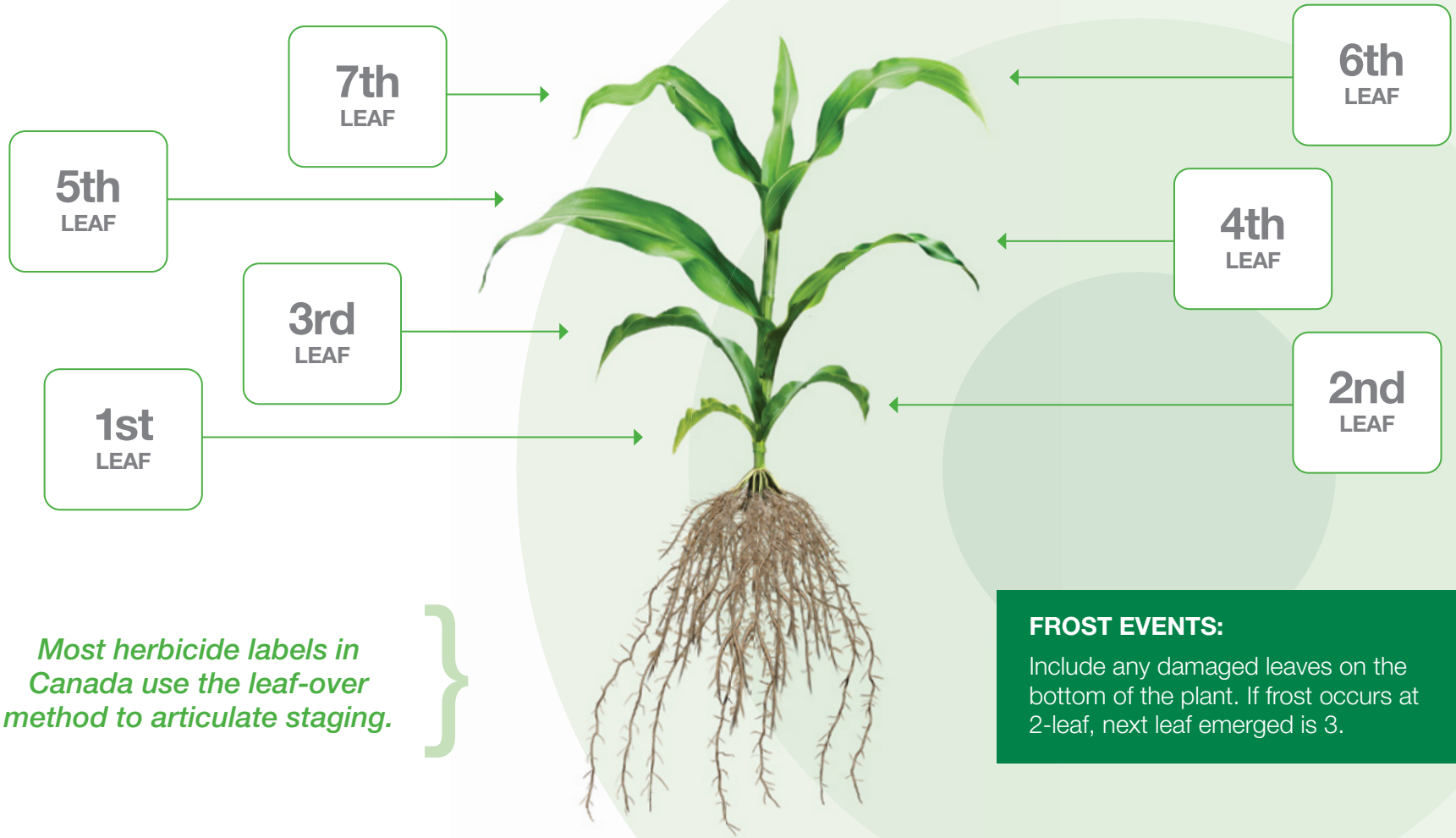
Your best line of defense with both pre-seed and in-crop options.

Identifying corn stages.

1. Leaf-over method
Count the number of leaves that hang over or become horizontal. Most herbicide labels in Canada use the leaf-over method to articulate staging. There are seven leaves hanging over in the image below, so it would be the 7-leaf stage.

2. Leaf-collar method
Count all visible leaf collars on the plant. The leaf-collar method is used primarily in the United States to identify the vegetative (V) stage of corn.

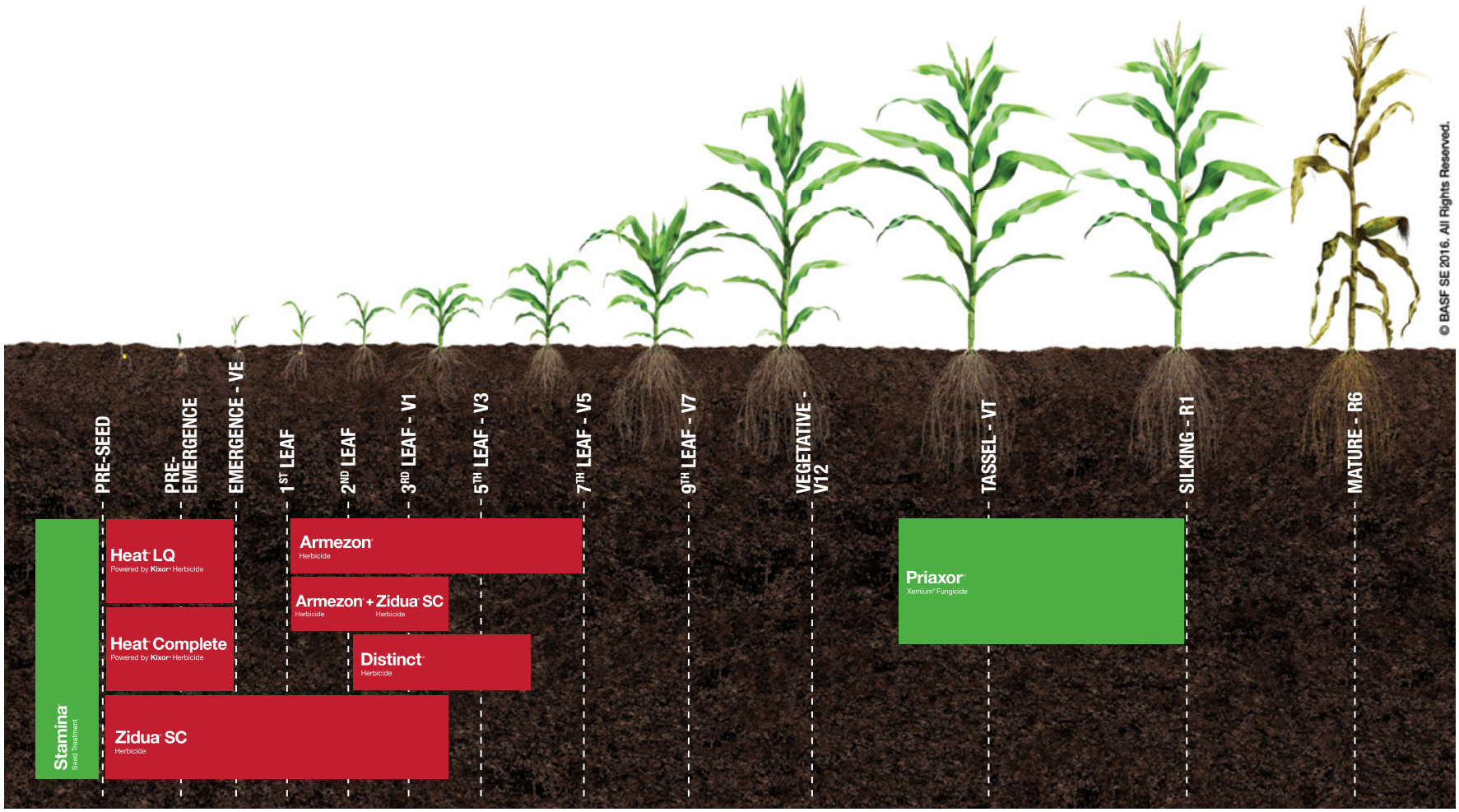
3. Leaf-tip method
Count the number of leaf tips.



Most herbicide labels in Canada use the leaf-over method to articulate staging.

FROST EVENTS:
Include any damaged leaves on the bottom of the plant. If frost occurs at 2-leaf, next leaf emerged is 3.

Solutions for corn.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

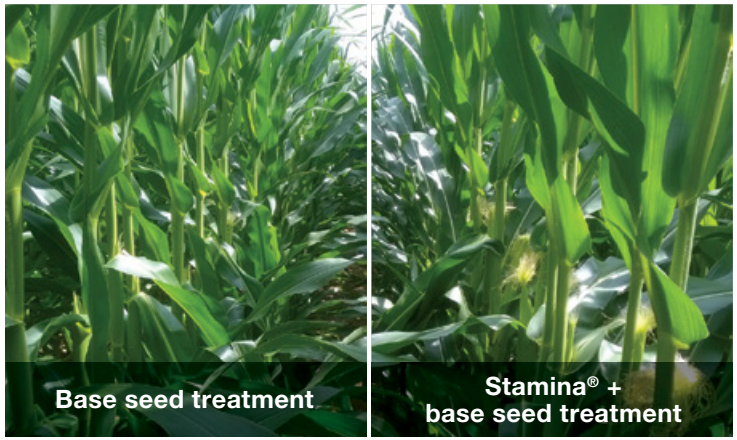
AgCelence® Expect more | BASF We create chemistry

Stamina®

Seed Treatment

The benefits[1] of **AgCelence®** for preventative protection against rhizoctonia in corn.

- Effective protection against seed rot caused by *Rhizoctonia solani*
- More consistent and uniform emergence, for maximum yield potential
- Increased seedling vigour both above and below ground, even under cold conditions[2]
- Enhanced ability to manage exposure to minor environmental stress[2]



Source: BASF research trial, Ridgetown, ON, 2016

Formulation	Water-based suspension

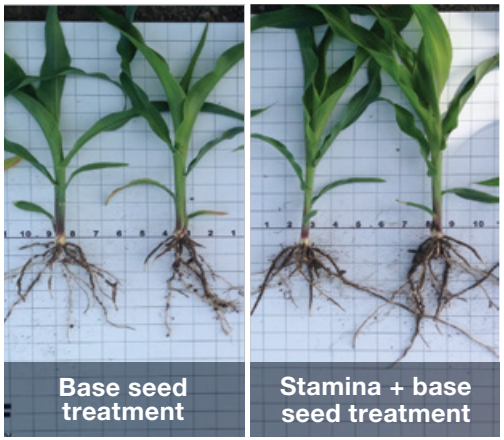
Crop treatment
Applied on-seed by select seed companies

Diseases controlled
Seed rot caused by seed- and soil-borne *Rhizoctonia solani*

Seed treatment compatibility
Stamina is compatible with insecticides such as Fortenza®[3].

Call **AgSolutions®** Customer Care at 1-877-371-BASF (2273) for further information.

Talk to your BASF **AgSolutions** Grower or Retail Representative or seed dealer about Stamina.



Source: BASF research trial, Ridgetown, ON, 2016

Source: BASF research trial, Ridgetown, ON, 2016

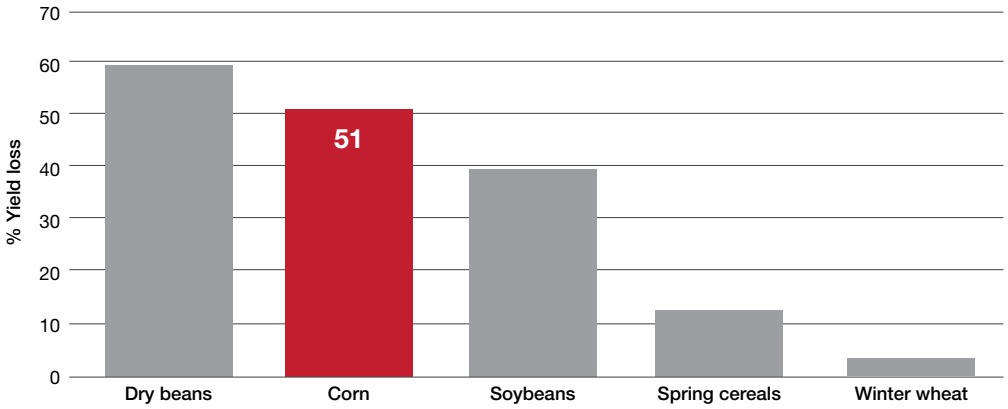
[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.
[3] Fortenza® is a Syngenta product.

The weed control your fields have been waiting for.

ADVANCED WEED CONTROL

Corn crops are highly susceptible to yield losses due to weeds such as lamb's quarters, cleavers, stinkweed, volunteer canola, foxtail and waterhemp. The cornerstone of the Advanced Weed Control Program is Heat® Complete herbicide, the newest innovation in weed control that provides broad-spectrum burndown with extended residual activity. The program provides a strategy to deliver reliable weed control that offers enhanced efficacy by combining multiple modes of effective action, herbicide layering and residual weed control.

Percentage of corn yield loss caused by weed competition



Source: Sikkema, Ridgetown and Exeter, 2007-2015, 224 field studies

Something else to plan on: peace of mind.

The Advanced Weed Control Program also provides additional re-spray support for weed escapes (even resistant biotypes)—an industry first. BASF will provide a second pass of Armezon herbicide or Distinct® herbicide for broadleaf weed escapes. For more information about the Advanced Weed Control Program, product re-spray or the support process visit **agsolutions.ca/advancedweedcontrol**.

CORN: PRE-SEED

Heat® LQ Powered by **Kixor®** Herbicide (30 ac/case)

or

Heat® Complete Powered by **Kixor®** Herbicide (60 ac/case)

CORN: IN CROP

Armezon® Herbicide

KEY WEEDS CONTROLLED (INCL. RESISTANT BIOTYPES)

Using Heat LQ:
Cleavers | Redroot pigweed | Stinkweed | Volunteer canola
Wild buckwheat | Wild mustard

Using Heat Complete – the above, plus:
Foxtail (green, yellow) | Kochia | Lamb's quarters
Waterhemp | Wild oats

Pick your pre-seed herbicide.

Ensure your corn gets the proper start. With the chart below, choose the best pre-seed solution to meet your weed challenges.

Projects	Heat® LQ (30 ac/case)	Heat Complete (60 ac/case*)
I need	Burndown plus residual on broadleaf weeds **Strengths:** Volunteer canola, cleavers, wild buckwheat	Burndown of broadleaf weeds, **EXTENDED** residual activity on broadleaf and grassy weeds **Strengths:** Kochia and grassy residual. Complementary effects between Zidua® SC herbicide and Heat LQ coming from overlapping broadleaf activity but different spectrum strengths.
Situations	Corn following canola within the last two years. Known Group 2-resistant cleavers	Recommended application rate for use on peas, soybeans, and corn. Known Group 1- or 2-resistant wild oats, moderate/high kochia pressure, heavy pigweed or lamb's quarters pressure
Active ingredients	Saflufenacil – Group 14	**(a)** Saflufenacil – Group 14
	–	**(b)** Pyroxasulfone – Group 15
Merge® adjuvant	Included in case	Included in case
Formulation	Water-based suspension concentrate	Liquid suspension concentrate
One case contains	**(a)** 1.73 L jug **(b)** 2 x 8.1 L jugs Merge	**(a)** 1.73 L jug Heat LQ **(b)** 3.89 L jug Zidua SC **(c)** 2 x 8.1 L jugs Merge
Staging	Pre-seed and pre-emergence	Pre-seed and pre-emergence
Broadleaf weeds controlled Apply at 8-leaf (except where indicated)	Canada fleabane[1], cleavers[2] (4 whorls), dandelion[3] (15 cm height), flixweed, kochia[1] (15 cm height), lady's thumb[4] (6-leaf), lamb's quarters, narrow-leaved hawk's beard (8 cm height), perennial sow-thistle[4,5], prickly lettuce[4,5] (9-leaf), ragweed (common, giant)[4], redroot pigweed[2], round-leaved mallow, shepherd's-purse[4] (full flower), stinkweed[2], volunteer canola[2,6], wild buckwheat[2], wild mustard[2]	Canada fleabane[1], cleavers[7] (4 whorls), common waterhemp[7] (prior to emergence), dandelion[3] (15 cm height), flixweed, kochia[1,7] (15 cm height), lady's thumb[8] (6-leaf), lamb's quarters[7], narrow-leaved hawk's beard (8 cm height), perennial sow-thistle[3,8], prickly lettuce[3,8] (9-leaf), ragweed (common, giant)[8], redroot pigweed[7], round-leaved mallow, shepherd's-purse[8] (full flower), stinkweed[7], volunteer canola[6,7], wild buckwheat[7], wild mustard[7]
Grasses controlled Prior to emergence	–	Foxtail (green, yellow)[9], wild oats[9], barnyard grass

* Note: One case contains two separate jugs: (a) and (b).

[1] Includes Group 2-resistant and glyphosate-resistant biotypes. [2] For suppression of secondary flushes, use higher application rate of 59 ml/ac (146 ml/ha). [3] Top growth burndown control only of perennial plants, control of spring germinating plants. [4] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha). [5] Top growth burndown control only. [6] All herbicide-tolerant canola systems including glyphosate-tolerant canola. [7] Residual suppression (may be rate dependent). [8] Burndown control is rate dependent. [9] Residual suppression only.

Heat® Complete

Powered by **Kixor®** Herbicide

The ultimate pre-seed burndown with extended residual activity on key grassy and broadleaf weeds.

- Provides rapid and complete burndown of tough-to-control weeds, including cleavers, kochia, volunteer canola, wild mustard and stinkweed
- Extended residual activity on many weeds, including wild oats, cleavers, kochia, wild mustard, volunteer canola, redroot pigweed, waterhemp and green and yellow foxtail
- Contains Group 14 and Group 15 active ingredients in a convenient co-pack for control or suppression of Group 1-, 2- and 9-resistant weeds
- Multiple modes of effective action for management of resistant weeds
- Can also be applied in soybeans and peas and lentils; for a complete list of crops, visit **agsolutions.ca/heat-complete**

Improved weed control in corn, 16 days after application

Source: **AgSolutions®** Performance Trials, Woodlands, MB, 2018

Active ingredient	Saflufenacil – Group 14 Pyroxasulfone – Group 15
Formulation	Liquid suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 3.89 L jug of Zidua® SC herbicide 2 x 8.1 L jugs of Merge® adjuvant

Crop staging

Pre-seed and pre-emergence

Weeds controlled

Broadleafs

Canada fleabane[1]
Cleavers[2]
Dandelion[3]
Flixweed
Kochia[1,2]
Lady's thumb[4]
Lamb's quarters[2]
Narrow-leaved hawk's beard
Prickly lettuce[4,5]
Ragweed (common, giant)[4]
Redroot pigweed[2]
Round-leaved mallow
Shepherd's-purse[4]
Stinkweed[2]
Volunteer canola[2,6]
Waterhemp[2]
Wild buckwheat[2]
Wild mustard[2]

Grasses

Foxtail (green, yellow)[7]
Wild oats[7]

Application rates

One case will treat 40 to 80 acres, depending on rate.

Heat LQ	22 to 43 ml/ac (53 to 106 ml/ha)
Zidua SC	49 to 97 ml/ac (120 to 240 ml/ha)
Merge adjuvant	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume

Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

60 days for all pre-seed and pre-emergent applications.

Follow crops

1 year after application

All crops, 1 year after a spring, pre-seed or pre-emergent application.

Learn more about Heat Complete as part of the Advanced Weed Control Program.

[1] Includes Group 2-resistant and glyphosate-resistant biotypes.
[2] Residual suppression (may be rate dependent).
[3] Top growth burndown control only of perennial plants, control of spring-germinating plants.
[4] Burndown control is rate dependent.
[5] Top growth burndown control.
[6] All herbicide-tolerant canola systems, including glyphosate-tolerant canola.
[7] Residual suppression only.

Heat® LQ

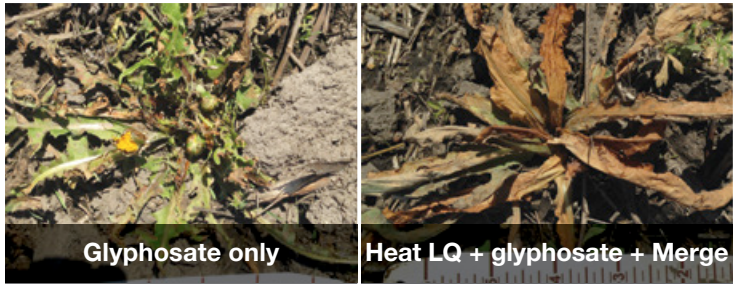
Powered by **Kixor®** Herbicide

PRE-SEED/PRE-EMERGENT BURNDOWN

The ultimate pre-seed/pre-emergent burndown in a new, easy-to-use liquid formulation.

- Rainfast and quickly absorbed for fast, complete weed control even under cool conditions
- Heat® LQ herbicide complements and improves your glyphosate application
- Broadleaf weed control in as few as 3 to 5 days[1]
- Group 14 chemistry for control of Group 2- and glyphosate-resistant weeds.
- Can also be applied in soybeans, peas and lentils and cereals; for a complete list of crops, visit **agsolutions.ca/heat-lq**

Comparison of dandelion after a pre-seed application of Heat LQ plus glyphosate plus Merge® adjuvant



Source: BASF Research Authorization trial, Stoughton, SK, 2014

Active ingredient	Saflufenacil – Group 14
Formulation	Water-based suspension concentrate
One case contains	1.73 L jug of Heat LQ herbicide 2 x 8.1 L jugs of Merge adjuvant Also available as a tote (4 x 10.79 L Heat LQ and 400 L Merge)

Crop staging

Pre-seed, pre-emergence (before ground crack)

Weeds controlled

Broadleafs

Canada fleabane[2]
Cleavers[3]
Dandelion[4]
Flixweed
Kochia[2]
Lady's thumb[5]
Lamb's quarters
Narrow-leaved hawk's beard
Perennial sow-thistle[5,6]
Prickly lettuce[5,6]
Ragweed (common, giant)[5]
Redroot pigweed[3]
Round-leaved mallow
Shepherd's-purse[5]
Stinkweed[3]
Volunteer canola[3,7]
Wild buckwheat[3]
Wild mustard[3]

Application rates[8]

One case of Heat LQ herbicide will treat 30 to 80 acres, depending on rate.

Heat LQ	21.5 to 59 ml/ac (53 to 146 ml/ha)
Glyphosate[9] (360 g ae/L)	0.51 to 1 L/ac (1.25 to 2.5 L/ha)
Merge adjuvant[10,11]	200 to 400 ml/ac (0.5 to 1 L/ha)

Water volume

Ground application only
20 to 40 L/ac (5 to 10 gal/ac)

Pre-harvest interval

60 days for all pre-seed and pre-emergent applications.

Follow crops

1 year after application

All crops, 1 year after a spring, pre-seed or pre-emergent application.

Learn more about Heat LQ as part of the Advanced Weed Control Program.

[1] Depending on growing conditions.
[2] Includes Group 2-resistant and glyphosate-resistant biotypes.
[3] For suppression of secondary flushes in addition to rapid burndown, use higher application rate of 59 ml/ac (146 ml/ha).
[4] Top growth burndown control only of perennial plants, control of spring germinating plants.
[5] For rapid burndown control, use a higher application rate of 29.5 ml/ac (73 ml/ha).
[6] Top growth burndown control only.
[7] All herbicide-tolerant canola systems including glyphosate-tolerant canola.
[8] Some sweet corn hybrids may be sensitive to saflufenacil and injury may occur.
[9] Glyphosate (required for optimum activity) is not included in the case.
[10] Merge adjuvant is required and is included with Heat LQ herbicide.
[11] At the higher Heat LQ application rates (30 or 40 acres per case), BASF recommends using Merge at the higher rate (400 ml/ac). Use both Merge jugs included in the case regardless of the Heat LQ rate.

Armezon® Herbicide Zidua® SC Herbicide

For early post-emergent weed control that provides rapid burndown and enhanced residual control for flushing weeds, BASF recommends tank mixing Armezon® and Zidua® SC herbicides.

- Flexibility to apply on Roundup Ready® corn between 1- to 4-leaf stage with glyphosate
- Broad-spectrum weed control, including volunteer canola, kochia and wild oats
- Incorporates multiple modes of effective action for resistance management
- Fast control of emerged weeds and residual weed control for secondary flushes

	Armezon	Zidua SC
Acres treated	160 ac/case	40 to 80 ac/case
Active ingredient(s)	Topramezone	Pyroxasulfone
WSSA Group(s)	27	15
Grassy weeds:		
Annual bluegrass	–	**C**
Barnyard grass	S	**C**[3]
Crabgrass (large)	–	**C**
Green foxtail	S	S
Yellow foxtail	S	S
Ryegrass (Italian)	–	**C**
Wild oats	–	S
Broadleaf weeds:		
Chickweed	S	–
Common ragweed	**C**	–
Kochia	**C**[1]	S
Lamb's quarters	S	S
Redroot pigweed	**C**	**C**[3]
Volunteer canola	**C**[2]	–
Waterhemp	–	**C**[3]
Application timing	1 to 8 leaf[3]	Pre-seed to 4 leaf
Residual weed control[4]	NA	4 to 6 weeks
Moisture to activate	NA	½ to ¾"

S = suppression C = control

[1] All types, including glyphosate-resistant biotypes. Apply when kochia is less than 10 cm.
[2] Includes glyphosate-tolerant biotypes. [3] 1 to 6 leaf for volunteer canola. 1 to 4 leaf for grasses. [4] Residual weed control only.

Where's the fit?

- Corn growers who use tillage as part of their weed management strategy
- Time management for busy spring – integrate residual with post-emerge

Effective control of emerged weeds with Armezon + Zidua SC. Showing residual activity of Zidua SC 28 days after treatment

Source: BASF internal trials. Maryhill, ON, 2018

Armezon®

Herbicide

Your ideal tank-mix partner for post-emergent weed control in glyphosate-tolerant corn.

- Rapid control of annual broadleaf weeds
- Wide application window from 1- to 7-leaf stage
- Innovative Group 27 chemistry for control of Group 2-resistant, glyphosate-resistant and triazine-resistant weeds

Rapid weed control with Armezon®

Source: RCD trials, Winkler, MB, 2019

Active ingredient	Topramezone – Group 27
Formulation	Liquid suspension
One case contains	4 x 600 ml jugs

Crop staging

1 to 7 leaf

Weeds controlled

Broadleafs

Chickweed[1]
Common ragweed
Kochia[2]
Lamb's quarters[1]
Redroot pigweed
Volunteer canola (all types)[3]
Wild mustard

Grasses

Barnyard grass[1]
Foxtail (green, yellow)[1]

[1] Suppression. [2] All types, including glyphosate-resistant biotypes. Apply when kochia is less than 10 cm. [3] Including glyphosate-tolerant biotypes. [4] A second application of Armezon at 15 ml/ac (37 ml/ha) may be applied, for a total of 30 ml/ac (74 ml/ha) on glyphosate-tolerant corn before the 7-leaf stage. [5] Atrazine, glyphosate, Assist, 28% UAN and Merge are sold separately. [6] Check glyphosate label to confirm application rates. [7] If Armezon is used in a tank mix, refer to tank-mix partner's label for additional follow-crop restrictions. [8] If treated with two applications (30 ml/ac (74 ml/ha)), fields can only be seeded to winter wheat 4 months after application and spring wheat, field corn and canola the following year.

Application rates

One case of Armezon herbicide will treat 160 acres.

Glyphosate-tolerant corn

Armezon[4]	15 ml/ac (37 ml/ha)
Glyphosate[5,6]	

Seed, sweet corn

Armezon	15 ml/ac (37 ml/ha)
Atrazine[5]	420 ml/ac (500 g ai/ha)
Assist®[5]	1.25% v/v (12.5 L per 1000 L spray solution)
28% UAN[5]	1.25% v/v (12.5 L per 1000 L spray solution)

Field corn

Armezon	15 ml/ac (37 ml/ha)
Atrazine[5]	420 ml/ac (500 g ai/ha)
Merge®[5]	0.5% v/v (5 L per 1000 L spray solution)

Water volume

Ground application only 40 to 80 L/ac (10 to 20 gal/ac)

Pre-harvest interval

45 days after application for corn harvest (silage, fodder or grain).

Follow crops[7,8]

4 months after application

Winter wheat

1 year after application

Alfalfa, canola, field corn, lentils (incl. **Clearfield®** lentils), navy beans, peas, potatoes, soybeans, spring wheat

Zidua® SC

Herbicide

Residual control of key annual grasses and broadleaf weeds.

- Group 15 chemistry delivers control of tough weeds, including resistant redroot pigweed, green and yellow foxtail, waterhemp and kochia
- Residual activity controls germinating weed seedlings before or soon after crop emergence
- Wide window of application from early pre-seed to early post-emergence in corn and soybeans
- Can also be applied in soybeans and potatoes; for a complete list of crops, visit **agsolutions.ca/ziduasc**

Active ingredient	Pyroxasulfone – Group 15
Formulation	Suspension concentrate
One case contains	2 x 4.05 L jugs

Crop staging

Pre-seed[1], pre-emergence, early post-emergence up to 4-leaf

Weeds controlled

Broadleafs

Kochia[2]
Lamb's quarters[2]
Redroot pigweed[2,3]
Waterhemp[2,3]

Grasses

Annual bluegrass[4]
Barnyard grass[3]
Crabgrass (large)[3]
Foxtail (green[2,3], giant[3], yellow[2,3])
Ryegrass (Italian)[3]
Wild oats[2]

Application rates

One case of Zidua SC herbicide will treat 40 to 165 acres.

Crop	**Rate by soil texture for residual control**				**Recommended acres/case**
Early-season residual control					
	Coarse	**Medium-fine**		**Fine**	
		Organic matter ≤ 3%	**3% < Organic matter < 7%**		
Field corn (pre-plant, pre-emerge, early post-emerge) or herbicide-tolerant soybeans (pre-plant, pre-emerge)	101 ml/ac (250 ml/ha)	134 ml/ac (332 ml/ha)	169 ml/ac (417 ml/ha)	200 ml/ac (493 ml/ha)	40 to 80

Tank mixes

Armezon, Aatrex® Liquid 480, Heat LQ[5], glyphosate[6]

Water volume

Ground application only — 40 L/ac (10 gal/ac) minimum

[1] Up to 30 days before seeding.
[2] Early-season residual suppression at 50 to 95 ml/ac (120 to 240 ml/ha).
[3] Controlled at 101 to 200 ml/ac (250 to 493 ml/ha).
[4] Provides control when applied as a post-harvest treatment prior to weed emergence.
[5] Pre-seed or pre-emergence only.
[5] Glyphosate present as isopropylamine salt, di-ammonium salt or potassium salt.

Knowing when and how to best protect corn.

Select the proper fungicide for your fields.

There are many factors to consider when making the decision to protect your field or silage corn with a fungicide application, including yield potential, standability, disease pressure, susceptibility of the hybrid and level of stress during pollination.

Fields that benefit the most.

Target fields with the highest yield potential, as they often see the highest returns from an application.

These fields have:

- Adequate nitrogen
- Good fertility
- Uniform plant stand

Also, look for fields with these characteristics:

- History of disease or a corn-on-corn rotation
- Hybrids that are susceptible to leaf disease
- Experience stress during the pollination period

Timing and staging.

Once you have made the decision to use a fungicide, ensure you're making an application at the right stage with the right product. This will help you achieve your production goals and improve your overall results and return on investment.

When choosing your fungicide, consider your objective.

If you're looking to control leaf diseases such as northern corn leaf blight or eyespot and yield is your primary objective, use a fungicide with multiple modes of effective action such as Priaxor® fungicide.

Identify the opportunity for your crop.

	Priaxor
Focal point	Leaf disease and yield
Benefits	• Consistent and continuous disease control through Xemium® translocation • Increased **AgCelence**® benefits[1] for improved plant health and greener leaves[2] • Multiple modes of effective action for resistance management
Application timing	Can be applied earlier, but most consistent results are seen at full tassel (VT).
Rate	120 ml/ac (300 ml/ha)

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[2] All comparisons are to untreated, unless otherwise stated.

Priaxor®

Xemium® Fungicide

Proven and consistent. A more advanced fungicide that helps maximize your crop's yield potential.[1]

- Combines the active ingredient Xemium® with the proven benefits[2] of **AgCelence®**
- More consistent and continuous control of key diseases, along with increased growth efficiency and better management of minor stress[1]
- Multiple modes of action for increased performance and reduced risk of developing fungicide resistance
- Can also be applied in soybeans; for a complete list of crops, visit **agsolutions.ca/priaxor**

Greener leaves with Priaxor fungicide on corn

Source: **AgSolutions®** Performance Trials, ON, 2013

Active ingredients	Fluxapyroxad – Group 7 Pyraclostrobin – Group 11
Formulation	Liquid suspension
One case contains	2 x 9.6 L jugs

Crop staging[3]

Early to full tassel (VT)[4] or prior to disease development

Diseases controlled

Common rust *(Puccinia sorghi)*
Gray leaf spot *(Cercospora zeae-maydis)*
Northern leaf blight *(Setosphaeria turcica)*
Eye spot *(Aureobasidium zeae)*[5]

Application rates

One case treats 160 acres.

Priaxor	120 ml/ac (300 ml/ha)

Water volume

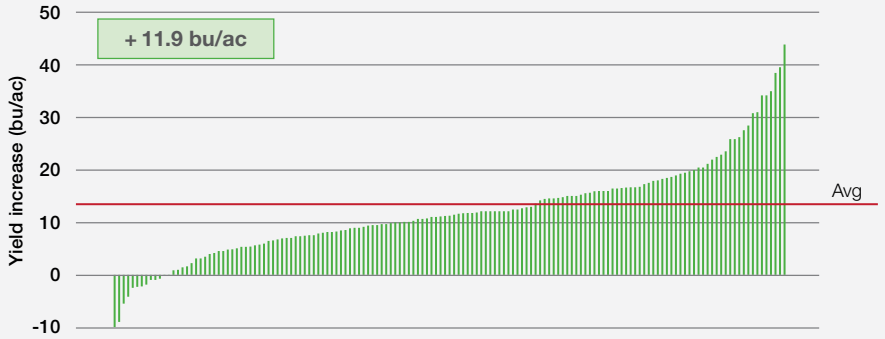
Ground application[6]	40 L/ac (10 gal/ac)
Aerial application	20 L/ac (5 gal/ac)

Pre-harvest interval

7 days after application for sweet corn.

21 days after application for corn (field, pop, and seed types).

Increased corn yield with Priaxor fungicide



Source: **AgSolutions** Performance Trials, ON & QC, 2014-2016, n= 149 on-farm trials

[1] All comparisons are to untreated, unless otherwise stated.
[2] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin.
[3] Refer to label for additional crops.
[4] While Priaxor can be applied at earlier growth stages, research suggests that the optimal timing for corn is at the VT stage for **AgCelence** benefits including disease control.
[5] Suppression only.
[6] Increase water volume to improve overall efficiency of the product under high disease pressure.


Spuds are more than a side.
They're a staple.

Weed Management

Insect Management

Disease Management

Additional Resources

Four products: for potatoes.

All eyes on the most innovative potato solutions.

When it comes to innovation, potato growers have lots to look forward to in 2021. There's Cevya® fungicide, now available for use, powered by Revysol® for preventative and post-infection control of key diseases. Learn more.

There are also two BASF products currently in registration review for use on potatoes — Zidua® SC herbicide[1], a Group 15 chemistry that's tough on weeds, and Serifel® fungicide[1], an innovative biological fungicide. Learn more.

And Cimegra® insecticide, a product in development, that will provide potato growers with a new tool to add to their integrated pest management strategy.[2] Learn more.

Cevya® Revysol® Fungicide

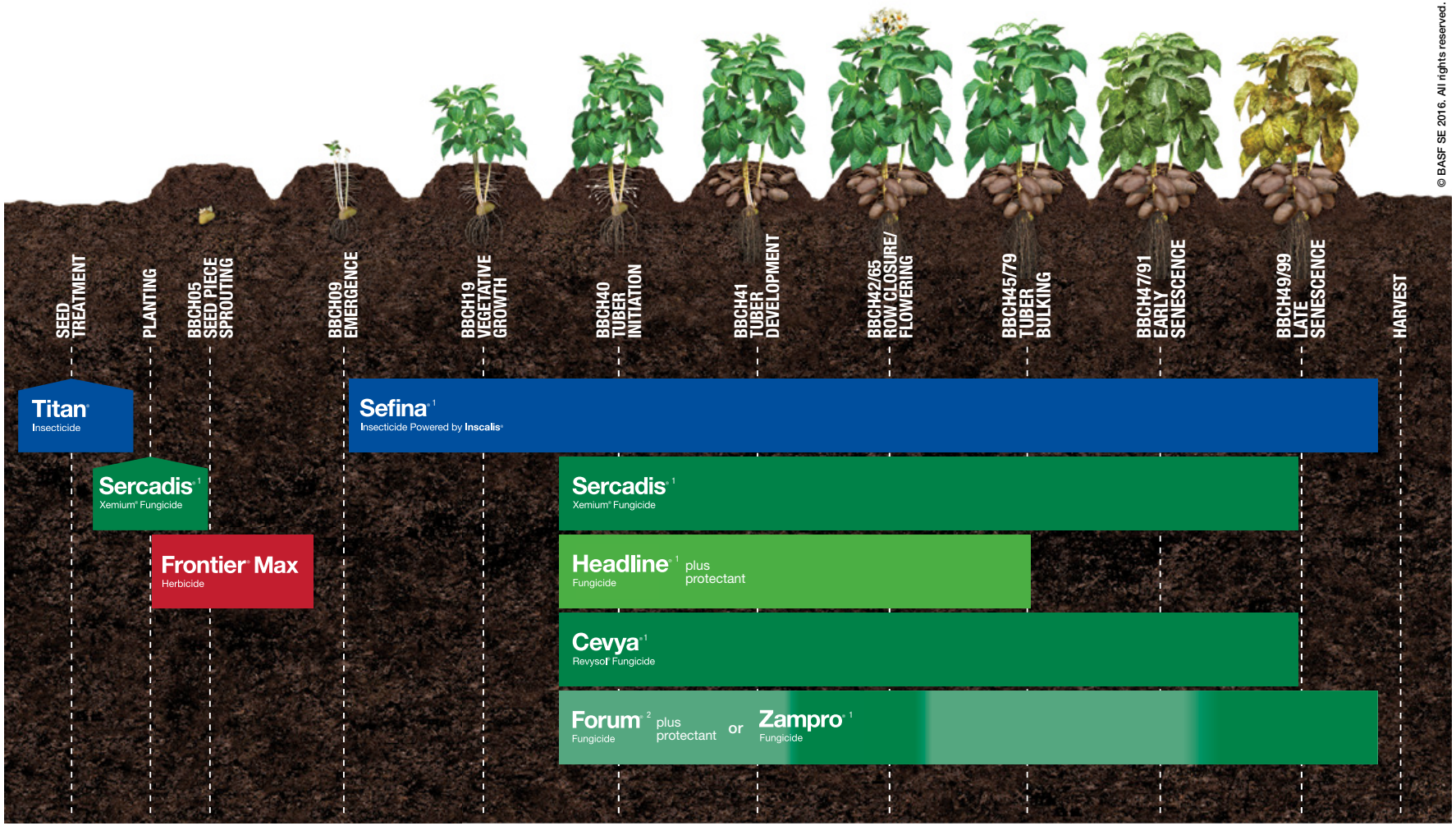
Serifel® Fungicide

Zidua® SC Herbicide

[1] This product is currently in registration review for use on potatoes under the *Pest Control Products Act*. This product cannot be used in Canada on potatoes at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

[2] This product is currently being assessed for registration under the *Pest Control Products Act*. The information presented here is for research purposes only. This product cannot be manufactured, imported, distributed or used in Canada at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

Solutions for potatoes.



Staging graphics depicted here are for quick reference only.
Refer to individual product pages and product labels on **agsolutions.ca** or call **AgSolutions**® Customer Care at 1-877-371-BASF (2273) for detailed staging information.

Darker areas reflect recommended application period for Forum® fungicide.

[1] Do not exceed the total number of sequential applications or total number of applications per season as stated in the product label.
[2] To reduce the risk of the development of fungicide resistance, tank mix Forum fungicide with other fungicides. Do not apply more than three (3) applications per season.

RESEARCH UPDATE

Zidua® SC

Herbicide

Zidua® SC herbicide provides early-season residual suppression of key annual grasses and broadleaf weeds.

- Residual activity controls germinating weed seedlings before or soon after crop emergence
- Group 15 chemistry helps suppress tough weeds
- Zidua SC is currently registered for use in soybeans and corn; for a complete list of crops, visit **agsolutions.ca/ziduasc**

Redroot Pigweed

RESEARCH UPDATE

This product is currently in registration review for use on potatoes under the *Pest Control Products Act*. The information presented here is for research purposes only. This product cannot be used in Canada on potatoes at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

Why let insects take a bite of your profits?

We all know small insects can make a huge impact—and aphids and wireworms are no exception. They can contribute to significant economic loss through direct feeding damage or the transmission of diseases.

Stop aphids in their tracks.

For example, the piercing-sucking insect called the aphid can acquire potato virus Y within seconds of feeding and can then transmit it to healthy plants for 1-2 hours afterward. For potato leafroll virus, uptake only occurs if aphids feed on a diseased plant for 10-30 minutes, but they will then have it for the rest of their life. However, if they feed on a diseased plant that's been treated with an effective insecticide, they will die before they can transmit the virus. That's why it's important to use insecticides such as Sefina® for rapid and long-lasting control against aphids, as well as Titan® for systemic control.

Other best management practices you can implement to minimize the spread of harmful potato viruses include the following:

- Properly destroy all cull piles
- Plant crop barriers (e.g. a non-host crop such as cereals) beside potatoes
- Plant resistant cultivars as much as possible
- Use disease-free seed (identified from field reading and post-harvest test results)
- Disinfect cutting/seeding equipment before contact with seed
- Control volunteer potatoes and weeds that are aphid hosts, such as wild rose, wild mustard and wild radish
- Desiccate seed fields to prevent late-season virus infection

Common potato pests.

Potato aphid
(Macrosiphum euphorbiae)

Silverleaf whitefly
(Aulacorthum solani)

Colorado potato beetle
(Leptinotarsa decemineata)

Green peach aphid
(Myzus persicae)

Wireworm

Potato leafhopper
(Empoasca fabae)

Potato flea beetle
(Epitrix cucumeris)

Source: Hanna Royals, USDA APHIS PPQ, Bugwood.org

RESEARCH UPDATE

Cimegra® Insecticide

Introducing an insecticide that controls chewing insects including challenging pests such as wireworms.

- Cimegra® insecticide provides in-season management of wireworms and helps reduce resident wireworm populations long term
- Powered by an innovative, unique mode of action with no known cross resistance
- Compatible with Integrated Pest Management programs

Wireworms are at the root of the problem.

Another key insect to control in potatoes is the wireworm, the larval stage of the click beetle. Once soil temperatures reach around 10°C, wireworms begin feeding on seed and roots and this can continue through to harvest. That's why it's important to take an integrated pest management approach, including the following practices:

- Assess damage at harvest to determine next year's treatment
- Use bait ball traps to assess the severity of the infestation
- Rotate to a dicot crop such as canola
- Apply an insecticide such as Titan®

POTATOES

Insect Management

Titan®

Insecticide

A broad-spectrum seed-piece insecticide that can also be applied in-furrow for greater flexibility.

- Controls major above-ground pests, including aphids, Colorado potato beetle, flea beetle and leafhopper
- Reduces tuber damage caused by wireworms
- Easy-to-use liquid formulation

Active ingredient	Clothianidin – Group 4
Formulation	Suspension
One case contains	2 x 3 L jugs

Treatment

Apply as a seed-piece treatment or apply as a narrow band in-furrow.

Pests controlled

Seed-piece treatment: Potato aphid *(Macrosiphum euphoribae)*, green peach aphid *(Myzus persicae)*, foxglove aphid *(Aulacorthum solani)*, buckthorn aphid *(Aphis nasturtii)*, Colorado potato beetle *(Leptinotarsa decemineata)*, potato leafhopper *(Empoasca fabae)*, potato flea beetle *(Epitrix cucumeris)*[1], wireworm *(Agriotes obscurus, A. lineatus, Limonius agonus, Melanotus* spp., *M. communis)*[2,3]

In-furrow applications: Colorado potato beetle *(Leptinotarsa decemineata)*, leafhopper

Application rates

Seed-piece treatment

Aphids (on label), Colorado potato beetle, potato leafhopper, potato flea beetle	10.4 to 20.8 ml per 100 kg potato seed pieces
Wireworm (suppression)	20.8 ml per 100 kg potato seed pieces

In-furrow application

Colorado potato beetle, leafhoppers	2.0 to 3.33 ml per 100 m row

Resistance management

When using Titan® insecticide as a seed-piece treatment or in-furrow application, do not apply subsequent Group 4 insecticides that growing season.

[1] Control of overwintered adults and suppression of second generation.
[2] Suppression only.
[3] May reduce the damage caused by other wireworm species.

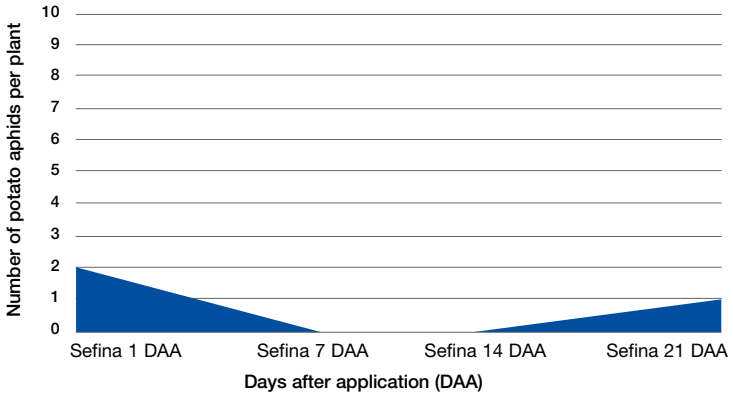
Sefina®

Insecticide Powered by **Inscalis®**

A lasting barrier that protects against aphids.

- Quickly halts aphid feeding, which reduces production losses and virus transmission
- Extended control of aphids
- Powered by a unique mode of action that provides extended control of labeled aphid pests that have developed resistance
- Effective tool in an Integrated Pest Management strategy with safe use on beneficial insects, including predatory and parasitic insects
- Now registered for Group 17 and 18 crops, including alfalfa, in addition to the other crops such as soybeans; for a complete list of crops, visit **agsolutions.ca/sefina**

Efficacy of Sefina® insecticide on potato aphids



Active ingredient	Afidopyropen – Group 9D
Formulation	Dispersion concentrate
One case contains	2 x 3.24 L jugs

Crop timing
Apply between emergence to harvest during all life stages.

Pests controlled
Green peach aphid *(Myzus persicae)*
Potato aphid *(Macrosiphum euphoribae)*
Sweet potato whitefly *(Bemisia tabaci)*
Silverleaf whitefly *(Bemisia argentifolii)*

Application rates[1,2]
One case treats 80 acres (32 hectares).

Green peach aphid and potato aphid control	81 ml/ac (0.2 L/ha)
Sweet potato whitefly and silverleaf whitefly	283 to 405 ml/ac (0.7 to 1.0 L/ha)

Pre-harvest interval
7 days after application.

Resistance management
Do not make more than two sequential applications of Sefina insecticide before using an effective insecticide with a different mode of action.


Potato aphid
(Macrosiphum euphorbiae)


Green peach aphid
(Myzus persicae)

[1] Allow a minimum of 7 days between applications.
[2] Do not apply more than 1012 ml/ac (2.5 L/ha) per year.

Never too early to fight the blight.

Dealing with early blight pressure is nothing new in most potato-growing regions. Early blight starts by forming dark brown lesions on mature foliage and eventually spreads as brown-black, sunken lesions on tubers. Left untreated, this could cause an economic loss of up to 40%—reduced to 5% or less when treated. That's why there's no question about the importance of adopting a management strategy against this common disease.

Conditions early blight likes. (And you don't.)

Caused by the pathogen *Alternaria solani*, early blight overwinters in soil, infected tubers and debris from dead potato plants and other infected hosts, including nightshade. It can also be carried by wind into neighbouring fields. Environmental conditions such as drought, hail and alternating wet and dry foliage when temperatures are between 5°C and 30°C can increase susceptibility to the disease.

In spite of blight.

An integrated management plan is the best path to staying ahead of early blight. This includes well-timed irrigation, rotating to non-host crops such as cereals and using disease-free seed. It's also important to apply fungicides throughout the season, starting with protectant fungicides just prior to row closure or at flowering followed by a tank mix of systemic and protectant fungicides when disease begins to spread up the canopy.

Source: Howard F. Schwartz, Colorado State University, Bugwood.org

Call out the imposters.

When you're on the lookout for early blight in potatoes, be aware that less common diseases can look similar. Brown leaf spot caused by *Alternaria alternate*, for example, is often mistaken for early blight. It can be differentiated by its foliar lesions that transform into large masses.

Large lesions of brown leaf spot

Source: BASF

Black dot, caused by a fungus called *Colletotrichum coccodes*, is another disease that is easily mistaken for verticillium wilt. The main difference is that verticillium-affected plants show yellowing leaves and brown discolouration in the cross-section of the roots or lower stem area, while black dot-infected plants display pepper-black dots on stems.

Black dot on leaf

Source: BASF

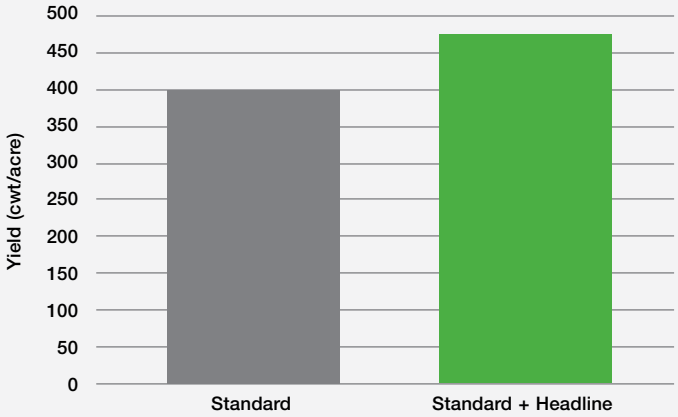
Headline®

Fungicide

Headline® fungicide provides systemic control of both early blight and late blight, the two most devastating diseases of potatoes.

- Proven, effective control of early and late blight (sensitive strains only)
- Will not wash off; it's systemic and rainfast in under 1 hour to ensure long-lasting control, even under adverse conditions
- Excellent tank-mix or rotation partner with fungicides of a different mode of action

Headline at tuber initiation yield trial



Source: Felix Farms

Active ingredient	Pyraclostrobin – Group 11
Formulation	Emulsifiable concentrate
One case contains	2 x 6.5 L jugs

Crop timing

Prior to row closure or when conditions become favourable for the development of disease (whichever comes first)[1]

Diseases controlled

Early blight *(Alternaria solani)*

Late blight *(Phytophthora infestans)*

Application rates

One jug will treat 24 to 35.7 acres (9.7 to 14.4 ha).

Headline	0.18 to 0.27 L/ac (0.45 to 0.67 L/ha)[2]

Pre-harvest interval – 6 days after application.

Rainfastness – 1 hour.

Restricted entry interval – 12 hours.

Resistance management – To limit the potential for development of resistance, DO NOT apply more than one (1) application before rotating to another mode of action for at least one application. No more than three (3) applications should be made per season.

[1] Headline fungicide should be used preventatively.

[2] Under high disease pressure and during rapid growth, use the higher rate and tank mix it with a multisite fungicide such as Bravo® 500 Agricultural Fungicide. Refer to the respective tank-mix partner label for rates, additional recommendations, restrictions and precautions.

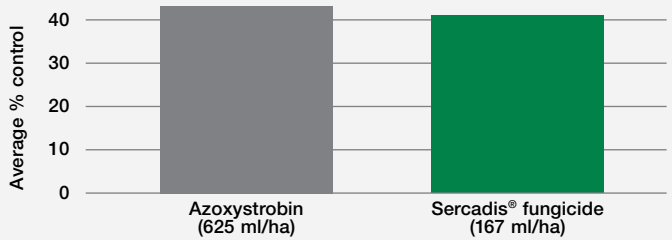
Sercadis®

Xemium® Fungicide

Innovative, new chemistry for consistent, continuous control of key diseases.

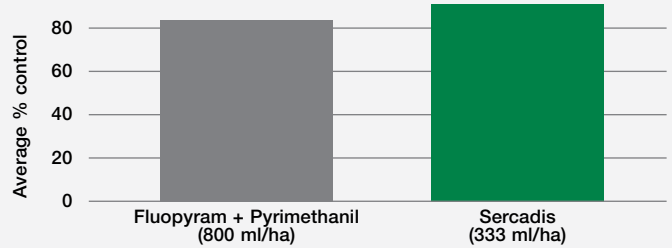
- Control of early blight, white mold and rhizoctonia canker
- Timing and tank-mix flexibility to adapt to the season's needs
- Highly systemic activity helps protect new growth

Rhizoctonia black scurf control



Source: Summary of two BASF trials, 2010

White mold control



Source: BASF Trial, Oregon, 2010

Active ingredient	Fluxapyroxad – Group 7
Formulation	Suspension
One case contains	2 x 1.35 L jugs

Crop timing

For rhizoctonia canker (soil-borne)	at planting (in-furrow spray)
For early blight	preventatively, from tuber initiation to row close as part of a regular early-blight control program
For white mold	begin applications at flowering when there is a risk of disease

Diseases controlled

In-furrow applications: Rhizoctonia canker *(Rhizoctonia* spp.*)*

Foliar applications: Early blight *(Alternaria solani)*, white mold *(Sclerotinia sclerotiorum)*

Application rates

One case treats 20 to 40 acres (8 to 16 hectares), depending on rate.

In-furrow applications:

Rhizoctonia canker	135 ml/ac (333 ml/ha) 36" rows: 30 ml per 1000 m of row

Foliar applications:

Early blight	67 to 135 ml/ac (167 to 333 ml/ha)
White mold	135 ml/ac (333 ml/ha)

Refer to the label for more information on product rates and row spacing.

Pre-harvest interval – 7 days after application.

Rainfastness – 1 hour.

Resistance management – Tank mix with a non-Group 7 fungicide. Do not apply more than two sequential applications of Sercadis before alternating to a fungicide with a different mode of action that controls the same pathogens.

Use of a non-ionic surfactant at 0.125% v/v is recommended.

RESEARCH UPDATE

Serifel®

Fungicide

Serifel® fungicide is an innovative biological fungicide that forms a shield of protection on plants' surfaces to protect against disease. Research is underway against early blight, and in-furrow against rhizoctonia.

- Complements chemistry-based programs and helps manage the potential for resistance
- With no recordable residues, Serifel fungicide provides greater flexibility by extending the window of application, especially near harvest
- Can be used for organic production – EcoCert® and OMRI listed®

RESEARCH UPDATE

This product is currently in registration review for use on potatoes under the *Pest Control Products Act*. The information presented here is for research purposes only. This product cannot be used in Canada on potatoes at this time, unless explicit authorization has been obtained from Health Canada to use this product for the purpose of conducting research under the Pest Control Products Regulations.

Cevya®

Revysol® Fungicide

NEW

Powered by Revysol®, an innovative new active ingredient, Cevya® is a systemic fungicide that provides fast and continuous pre- and post-infection control of key diseases.

- Fast and continuous control of key diseases
- Preventative and post-infection control
- Unique, new binding activity to control biotypes that may have developed resistance to other Group 3, 7, 9 and 11 fungicides

Active ingredient	Mefentrifluconazole – Group 3
Formulation	Suspension concentrate
One case contains	2 x 4 L jugs

Crop timing
7 to 14 day interval

Diseases controlled
Early blight *(Alternaria solani)*

Application rates:
One jug treats 13 to 25 acres (5.3 to 10.5 ha).

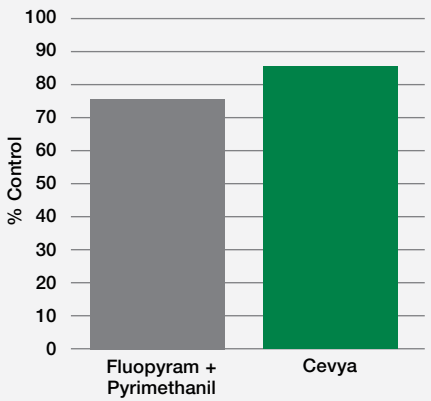
Cevya	0.075 to 0.1 L/ac (0.19 to .25 L/ha)

Pre-harvest interval – 7 days after application.

Rainfastness – 1 hour.

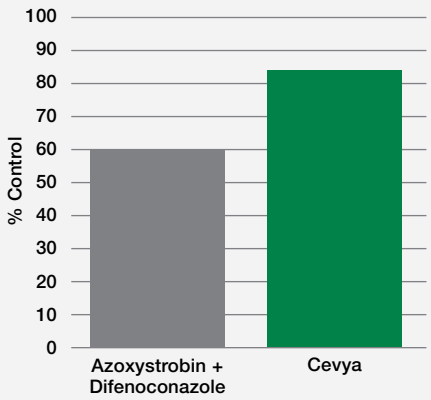
Resistance management – Cevya is an excellent resistance management tool to include in an IPM program. It can be used in combination or rotation with other chemistries to prevent the development of resistant strains. To limit the potential for development of resistance, rotate the use of Cevya or other Group 3 fungicides with different groups that control the same pathogens.

Early blight control



Source: BASF, n=3

Early blight control



Source: BASF, n=3

Better late than never. (Unless it's late blight.)

Late blight may not be as common as early blight, but it's devastating to a potato crop. When it is an issue, late blight is one of the most aggressive and damaging diseases in agriculture. Left untreated, it spreads extremely rapidly and can decimate entire fields in days. The disease causes foliar damage, typically appearing in the lower canopy first and appearing as dark green or brown water-soaked lesions—or black, elongated spots on the stem. The spores also infect tubers and lead to tuber rots during storage.

Dark lesion of late blight

Source: Howard F. Schwartz, Colorado State University, Bugwood.org

Late blight exposed.

Caused by the *Phytophthora infestans* pathogen, late blight infects potatoes through its spores. They can be released from inoculum in infected sources such as cull piles, volunteer potato plants and alternate host plants. Infection can also be spread long distances by wind and storms. Late blight thrives in wet weather with moderate temperatures of 15°C to 25°C, high humidity and frequent rainfall or irrigation. In fact, an 8- to 12-hour wetting period is ideal for spore germination and foliar penetration. To further complicate matters, rainfall can wash off many protectant fungicides, reducing effectiveness.

Shutting the door on late blight.

Given that late blight can rapidly infect a field, management is crucial—and management occurs all throughout the growing season. Best management practices include the following:

- Scout
- Understand there is no threshold tolerance
- Properly destroy all cull piles and seed slivers by burying to a depth of 60 cm before any potatoes emerge in the spring
- Control volunteer potatoes and weeds that are disease hosts, such as hairy nightshade
- Plant certified, disease-free seed
- Irrigate during daylight hours, starting after leaves have been dry for two hours and finishing two hours before dusk
- Avoid having wet spots in the fields and avoid over-irrigating
- Apply a fungicide

At BASF, we recommend applying protectant fungicides preventatively on a regular interval and systemic fungicides, such as Forum® or Zampro® fungicides, when conditions favour the development of disease or as soon as late blight is detected in your area.

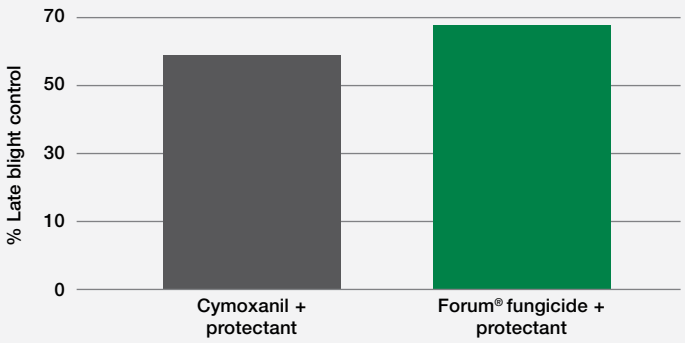
Forum®

Fungicide

Excellent control of late blight, both in the field and into storage.

- Highly systemic tank-mix partner for control of late blight in potatoes
- Antisporulant activity controls spores and stops the spread of disease
- Easy-to-use liquid formulation

Curative late blight control



Average of 7 trials.
Source: BASF

Active ingredient	Dimethomorph – Group 40
Formulation	Flowable concentrate
One case contains	2 x 4.5 L jugs

Crop timing[1]
Apply on 5 to 10 day interval.

Diseases controlled
Late blight *(Phytophthora infestans)*
Suppression of tuber blight in storage *(Phytophthora infestans)*

Application rates
One case treats 50 acres (20.2 ha).

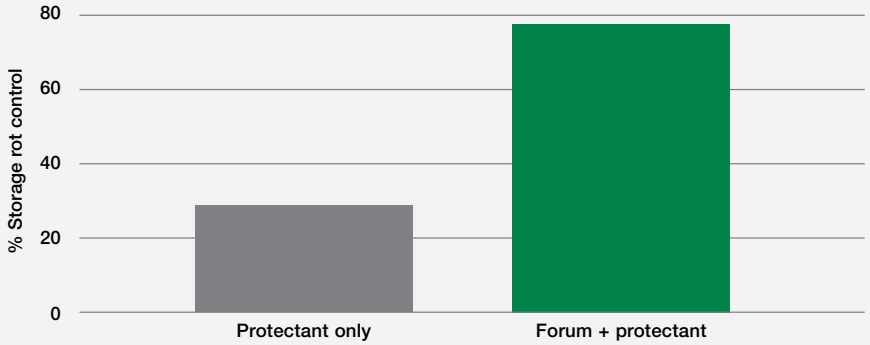
Forum	182 ml/ac (450 ml/ha)

Pre-harvest interval – 4 days after application.

Rainfastness – 2 hours.

Resistance management – In order to reduce the risk of developing fungicide resistance, Forum fungicide should be used in a tank mix or in rotation with a fungicide from a different FRAC Group labeled for control of late blight.

Storage rot control



Forum applied pre-harvest.
Average of 7 trials with ratings taken 1 to 4 months after harvest.
Source: BASF

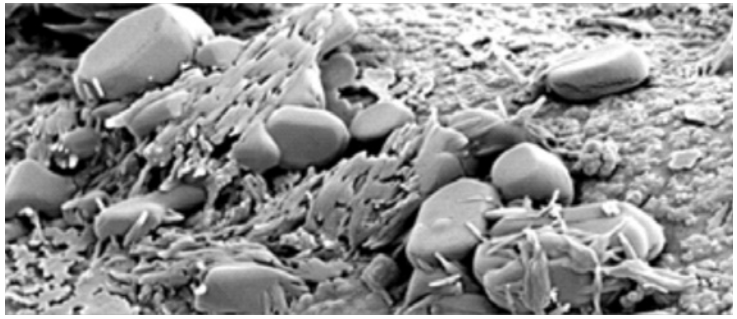
[1] During periods of rapid growth or high disease pressure, use a shorter interval. See label for details.

Zampro®
Fungicide

Powerful control of late blight that recharges with moisture.

- Multiple modes of action to control late blight
- Anti-sporulant, protectant and systemic disease control prevents initial infection and stops disease spread
- Recharges with moisture

Zampro® fungicide on leaf



Ametoctradin is tightly bound to the waxy cuticle and rapidly absorbed.
Magnification: 3.0 µm

Active ingredients	Dimethomorph – Group 40 Ametoctradin – Group 45
Formulation	Suspension concentrate
One case contains	4 x 4.14 L jugs

Crop timing
Apply on 5 to 10 day interval.

Apply preventatively, prior to disease development. During periods of high disease pressure, use a higher rate and shorter interval.

Diseases controlled
Late blight *(Phytophthora infestans)*
Tuber blight[1] *(Phytophthora infestans)*

Application rates
One jug treats 10.1 to 12.8 acres (4.1 to 5.2 ha).

Late blight	324 to 404 ml/ac (0.8 to 1.0 L/ha)[2]
Tuber blight	404 ml/ac (1.0 L/ha)

Rainfastness
2 hours.

Resistance management
Do not make more than two sequential applications before alternating to another effective fungicide with a different mode of action.

[1] When used in accordance to the label recommendations, Zampro also reduces tuber blight when applied immediately prior to or after vine kill.
[2] Addition of spreading/penetrating adjuvants are recommended.


Sometimes you
need answers quick.
Check these
additional resources.

Additional Resources

- Solutions for chickpeas
- Solutions for faba beans
- Solutions for flax
- Solutions for dry beans
- Inoculant compatibility information
- Handling, storing and applying inoculants
- Challenging weeds - identification and control
- Mixing order
- Bulk available products

All of the chickpea solutions you need.

Brand	Timing	Rate	Notes
Insure® Pulse seed treatment	Apply prior to seeding.	300 ml/100 kg of seed	Ensuring thorough seed coverage offers the best protection from seed- and soil-borne diseases. Seed should be tested for germination, vigour and disease and well-cleaned prior to treatment to ensure maximum coverage.
Nodulator® CP SCG inoculant	Apply directly in-furrow.	One bag will treat up to 10 acres	Unique solid core granular (SCG) formulation of *Bradyrhizobium* sp. (*Cicer*).
Heat® Complete herbicide	Pre-seed or pre-emergence	21.5 to 97 ml/ac	The high rate is recommended if expected weed pressure is high. Consult your BASF **AgSolutions®** Grower or Retail Representative for tank mix recommendations with other herbicides.
Heat LQ pre-seed herbicide	Pre-seed or pre-emergence (before ground crack).	21.5 to 59 ml/ac	Higher rates are recommended for residual suppression of key weeds such as volunteer canola or wild buckwheat.
Centurion® herbicide	Post-emergence – apply to actively growing weeds.	50 to 154 ml/ac	
Solo® ADV herbicide	Early post-emergence, 1 to 6 node of chickpea.	324 ml/ac	Solo ADV should only be applied on the following varieties: **CDC Alma (Kabuli)** **CDC Cory (Desi)**
Cotegra® fungicide	Beginning of flowering or at first sign of disease.	280 ml/ac	Follow the BASF recommended sequence every 10 to 14 days (as disease conditions dictate): 1st pass: Dyax fungicide at early flower. 2nd pass: Cotegra or another Group 3 sclerotinia fungicide if conditions for sclerotinia are present. 3rd pass: Dyax. 4th pass: Cotegra or another Group 3 sclerotinia fungicide.
Dyax® fungicide	At the onset of symptoms prior to row closure.	160 ml/ac	
Heat LQ pre-harvest herbicide	Apply when majority of plants are mature with only the upper part remaining green. Seed moisture is 30% or less. Majority of Desi type seeds are yellow/brown, and Kabuli type seeds are tan/white.	43 ml/ac	

Optimal solutions for your faba beans.

Faba beans

Brand	Timing	Rate	Notes
Insure® Pulse seed treatment	Apply prior to seeding.	300 ml/100 kg of seed	Ensuring thorough seed coverage offers the best protection from seed- and soil-borne diseases. Seed should be sound and well cleaned prior to treatment to ensure maximum coverage and to prevent dusting off.
Nodulator® FB peat inoculant	Apply directly on-seed.	1.2 kg per 982 kg seed	
Heat® LQ pre-seed herbicide	Pre-seed or pre-emergence (before ground crack).	21.5 to 59 ml/ac	Higher rates are recommended for residual suppression of key weeds such as volunteer canola or wild buckwheat.
Basagran® Forté herbicide	After 2 leaf.	700 to 900 ml/ac	Use larger water volumes for weeds at the upper limit of their recommended stage for treatment.
Odyssey® NXT herbicide	1 to 6 leaf.	17 g/ac	For flushing control on broadleaf weeds.
Viper® ADV herbicide	1 to 2 trifoliate leaf.	404 ml/ac	For multiple modes of action (MMOA) on broadleaf weeds.
Centurion® herbicide	Post-emergence – apply to actively growing weeds.	50 to 154 ml/ac	
Lance® fungicide	Beginning of flowering or at first sign of disease.	227 to 312 g/ac	To manage disease in faba beans, apply a fungicide at early- to mid-flower. BASF lead recommendations include Dyax, Lance and Cotegra fungicides. Apply Dyax for control of Asian soybean rust and suppression of ascochyta blight with the added benefits[1] of **AgCelence®**. Apply Lance/Cotegra for late-season mold management.
Cotegra® fungicide	Beginning of flowering or at first sign of disease.	400 ml/ac	
Dyax® fungicide	Start of flowering or at onset of symptoms.	160 ml/ac	
Heat LQ pre-harvest herbicide	Apply when 80% of lower pods have turned black, middle pods have turned yellow/tan and top green pods have firm seed.	43 ml/ac	

[1] **AgCelence** benefits refer to products that contain the active ingredient pyraclostrobin

Only the best for your flax.

Brand	Timing	Rate	Notes
Insure® Pulse seed treatment	Apply prior to seeding.	300 to 600 ml/100 kg of seed	Use a higher rate of 600 ml/100 kg seed if: a) there is a history of high disease pressures in the field or b) where field conditions favour seed- and soil-borne pathogens. If using the 600 ml/100 kg rate, it is highly recommended that the seed be treated into a bin or truck box to allow the treated seed to dry prior to placing into the seeder hopper. This will prevent clumping and bridging in the seeder.
Basagran® Forté herbicide[1]	After 5 cm height.	700 to 900 ml/ac	The best option for in-crop management of cleavers.
Centurion® herbicide	Post-emergence – apply to actively growing weeds.	50 to 154 ml/ac	
Dyax® fungicide	20 to 50% flowering.	120 to 160 ml/ac	If disease persists or weather conditions are favourable for disease development, make a second application 10 to 14 days later with a fungicide that contains an alternative mode of action. Apply Dyax for control of pasmo and suppression of sclerotinia stem rot.

[1] Excluding low linolenic acid varieties.

A variety of top solutions for your dry beans.

Brand	Timing	Rate	Notes
Insure® Pulse seed treatment	Apply prior to seeding.	300 ml/100 kg of seed	Ensuring thorough seed coverage offers the best protection from seed- and soil-borne diseases. Seed should be sound and well cleaned prior to treatment to ensure maximum coverage and to prevent dusting off.
Basagran® Forté herbicide	After 1st trifoliate.	700 to 900 ml/ac	
Viper® ADV herbicide	1 to 2 trifoliate leaf.	404 ml/ac[1]	Viper ADV requires the addition of Basagran Forté in higher weed pressure situations (145 ml/ac or 360 ml/ha). Initial transient crop yellowing may be observed after application, but this is outgrown and should not affect yield. Refer to label for specific variety information. Addition of a nitrogen source (28% UAN) is also recommended.
Centurion® herbicide	Post-emergence – apply to actively growing weeds.	50 to 154 ml/ac	
Cotegra® fungicide	20 to 50% flowering.	400 ml/ac	For management of white mold, a second application can be made 7 to 14 days after the first. BASF recommends making the first pass with Cotegra and then rotating fungicides for resistance management.
Dyax® fungicide	Start of flowering or at onset of symptoms.	160 ml/ac[2]	This is recommended when leaf diseases such as anthracnose, rust, powdery mildew and Asian soybean rust are present. Apply at early flowering for control of Asian soybean rust, anthracnose, powdery mildew and suppression of white mold.
Heat® LQ pre-harvest herbicide	Apply when stems are green to brown, pods are mature (yellow, brown) and 80 to 90% of leaves have dropped.	43 ml/ac	Consult glyphosate label or your BASF **AgSolutions®** Grower or Retail Representative for information regarding use on specific varieties of dry common beans.

[1] Dry edible beans may vary in their tolerance to herbicides. See label for important notes. For dry edible beans, Viper ADV requires addition of Basagran Forté herbicide plus 28% UAN.
[2] To suppress white mold, apply Dyax at 240 to 320 ml/ac (600 to 800 ml/ha).

Seed-applied pesticide compatibility information.

Nodulator Duo SCG and Nodulator XL for lentils and field peas.

Nodulator® Duo SCG inoculant is compatible with all pesticide-treated seed in furrow.

Lentils and field peas	Application type	Nodulator Duo SCG	Nodulator XL LQ	Nodulator XL Peat
Non-pesticide treated seed		**Fully compatible**	**6 hours**	**24 hours**
Insure® Pulse seed treatment	Tank-mix[1] time on seed	Fully compatible	Not recommended	
	Wet sequential	Fully compatible	Not recommended	Not recommended
	Dry sequential	Fully compatible	Not recommended	2 hours
Apron® Advance	Tank-mix[1] time on seed	Fully compatible	Not recommended	
	Wet sequential	Fully compatible	Not recommended	24 hours
	Dry sequential	Fully compatible	Not recommended	24 hours
ApronMaxx® RTA	Tank-mix[1] time on seed	Fully compatible	Not recommended	24 hours
	Wet sequential	Fully compatible	2 hours	24 hours
	Dry sequential	Fully compatible	Not recommended	24 hours
CruiserMaxx® pulses (Cruiser® 5FS plus ApronMaxx® RTA)	Tank-mix[1] time on seed	Fully compatible	Not recommended	
	Wet sequential	Fully compatible	Marginal	6 hours
	Dry sequential	Fully compatible	Not recommended	6 hours
Intego®	Tank-mix[1] time on seed	Fully compatible	6 hours	
	Wet sequential	Fully compatible	2 hours	24 hours
	Dry sequential	Fully compatible	2 hours	24 hours
Trilex® EverGol®	Tank-mix[1] time on seed	Fully compatible	Not recommended	Not recommended
	Wet sequential	Fully compatible	2 hours	Lentils: 4 hours Field peas: 2 hours
	Dry sequential	Fully compatible	Lentils: 2 hours Field peas: 1 hour	4 hours
Trilex® EverGol® + Stress Shield® (104 ml/100 kg)	Tank-mix[1] time on seed	Fully compatible	Not recommended	Not recommended
	Wet sequential	Fully compatible	Not recommended	2 hours
	Dry sequential	Fully compatible	Not recommended	4 hours
Vibrance® Maxx	Tank-mix[1] time on seed	Fully compatible	4 hours	
	Wet sequential	Fully compatible	2 hours	24 hours
	Dry sequential	Fully compatible	2 hours	24 hours

Nodulator Duo SCG and Nodulator XL for lentils and field peas.

Nodulator Duo SCG inoculant is compatible with all pesticide-treated seed in furrow.

Lentils and field peas	Application type	Nodulator Duo SCG	Nodulator XL LQ	Nodulator XL Peat
Non-pesticide treated seed		**Fully compatible**	**6 hours**	**24 hours**
Vibrance® Maxx RFC	Tank-mix[1] time on seed	Fully compatible		
	Wet sequential	Fully compatible	6 hours	24 hours
	Dry sequential	Fully compatible	4 hours	24 hours
Vitaflo® 280 / IPCO Vitaflo® SP / Loveland Vitaflo® fungicide	Tank-mix[1] time on seed	Fully compatible	Not recommended	
	Wet sequential	Fully compatible	Not recommended	Marginal
	Dry sequential	Fully compatible	Not recommended	6 hours

Field peas only	Application type	Nodulator Duo SCG	Nodulator XL LQ	Nodulator XL Peat
Non-pesticide treated seed		**Fully compatible**	**6 hours**	**24 hours**
CruiserMaxx® pulses (CruiserMaxx® beans + ApronMaxx® RTA)	Tank-mix[1] time on seed	Fully compatible	Not recommended	
	Wet sequential	Fully compatible	Marginal	6 hours
	Dry sequential	Fully compatible	Not recommended	6 hours
Vibrance Maxx® + Stress Shield® (104 ml/100 kg)	Tank-mix[1] time on seed	Fully compatible	4 hours	
	Wet sequential	Fully compatible	2 hours	24 hours
	Dry sequential	Fully compatible	2 hours	24 hours

Not applicable or not available.

[1] These on-seed shelf life recommendations are based on a maximum four-hour tank-mix period.

This data is correct at the time of distribution. Please check with your dealer for updates.
Updated: 2020

Nodulator inoculants for chickpea and faba bean.

Chickpeas and faba bean	Application type	Nodulator SCG (chickpea)	Nodulator Peat (faba bean)
Non-pesticide treated seed			
Insure Pulse seed treatment	Tank-mix[1] time on seed	Fully compatible	
	Wet sequential	Fully compatible	Not recommended
	Dry sequential	Fully compatible	Not recommended
Apron® Advance	Tank-mix[1] time on seed	Fully compatible	Not recommended
	Wet sequential	Fully compatible	Not recommended
	Dry sequential	Fully compatible	24 hours
ApronMaxx® RTA	Tank-mix[1] time on seed	Fully compatible	
	Wet sequential	Fully compatible	2 hours
	Dry sequential	Fully compatible	4 hours
CruiserMaxx® pulses (Cruiser® 5FS + ApronMaxx® RTA)	Tank-mix[1] time on seed	Fully compatible	
	Wet sequential	Fully compatible	6 hours
	Dry sequential	Fully compatible	6 hours
Trilex® EverGol®	Tank-mix[1] time on seed	Fully compatible	
	Wet sequential	Fully compatible	2 hours
	Dry sequential	Fully compatible	4 hours
Vitaflo® 280 / IPCO Vitaflo® SP / Loveland Vitaflo® fungicide	Tank-mix[1] time on seed	Fully compatible	
	Wet sequential	Fully compatible	
	Dry sequential	Fully compatible	

Not applicable or not available.

[1] These on-seed shelf life recommendations are based on a maximum four-hour tank-mix period.

This data is correct at the time of distribution. Please check with your dealer for updates.
Updated: 2020

Inoculants are alive.

How to handle, store and apply.

STORAGE

Inoculants are living organisms. Handle and store with care.

DO

- Keep liquid inoculants cool, but not freezing (0 to 20°C)
- Pre-inoculated seed must be stored as cool as possible
- Store in a dry environment

DON'T

- Store in direct sunlight and drying winds
- Double stack granular inoculants
- Store next to pesticides and bulk fertilizers

All living things come to an end.

- Use before expiration date

EQUIPMENT

Equipment? Check.

- Have a separate tank for inoculants
- Regularly inspect hoses and fittings for cracks and broken parts
- Calibrate for accurate metering
- Run fans to dry out tank before adding inoculants

Know your limits.

- Fill tank no more than ½ full
- Run auger at 50% capacity or less
- Don't leave inoculant in tank overnight

APPLICATION

Some things just don't mix with inoculants.

- Like caustic fertilizers
- Or certain seed treatments[1]

Avoid soil conditions that are:

- Very acidic
- Low in organics
- Very dry

Use it. Don't lose it.

- Seed soon after inoculation
- Re-inoculate if past planting time

Get the best results.

Unlike other products, inoculants are alive and require special care and handling. For best results, follow these guidelines and share them with growers.

[1] Not all inoculants are compatible with seed treatments. Find individual product labels and compatibility charts at **agsolutions.ca**.

Identification and control of challenging weeds.

Waterhemp

How to identify waterhemp.

With known resistance to Group 2 herbicides, waterhemp management is crucial. Identifying it apart from other *Amaranthus* weeds is a good way to start managing it effectively. Waterhemp has smooth, hairless stems. Redroot pigweed, however, has thick hairs on the stem—and smooth and green pigweed have thin hairs. The long, narrow and glossy first true leaves of waterhemp also contrast with the hairy, egg-shaped leaves of the other *Amaranthus* weeds, excluding the smooth Palmer amaranth leaves.

How to control waterhemp.	Glyphosate-tolerant (GT) corn	GT soybeans	Dicamba-tolerant (DT) soybeans	Peas
Pre-seed/ pre-emergent	Heat® Complete herbicide	Heat Complete	Engenia® herbicide + Heat Complete	Heat Complete
Post-emergent	Armezon® herbicide	Viper® ADV herbicide	Engenia or Viper ADV	Viper ADV

Volunteer canola

How to identify volunteer canola.

Volunteer canola grows up to 1 m tall and has a branched, erect stem that is a tinge of blue mixed with green. The leaves are dark green, smooth and hairless. It produces yellow flowers on a raceme. It then produces small green rounded seeds that become dark brown to black at maturity. Volunteer canola can cause a problem because it can be a host to diseases like clubroot and will need to be managed. It also presents a unique weed control challenge as it is usually resistant to Group 2, 9 or 10 herbicides.

How to manage volunteer canola.	GT corn	GT soybeans	DT soybeans	Peas	Clearfield® lentils
Pre-seed/ pre-emergent	Heat LQ or Heat Complete	Heat LQ or Heat Complete	Engenia + Heat LQ or Heat Complete	Heat LQ or Heat Complete	Heat LQ or Heat Complete
Post-emergent	Armezon	Viper ADV	Viper ADV	Viper ADV	Solo® Ultra or Odyssey® Ultra NXT

Kochia

How to identify kochia.

Kochia is a bushy plant that grows anywhere from 15 to 180 cm in height but usually reaches 90 to 120 cm. During the seedling stage, the underside of the cotyledon is pink. Kochia has many branches and the stems have a red tinge. The plant has many alternate leaves that are pale green and hairy with pointed tips. The leaves can turn purple or red in the fall. The plant also has green flowers that are found either in the leaf axils or on spikes. It spreads its seeds by tumbling at the end of the season. Most kochia plants are Group 2 resistant and there are other, including overlapping, populations that are resistant to Group 4 or 9 herbicides.

How to manage kochia.	GT corn	GT soybeans	DT soybeans	Peas	Clearfield lentils
Pre-seed/ pre-emergent	Heat Complete	Heat Complete	Engenia + Heat LQ or Heat Complete	Heat Complete	Heat Complete
Post-emergent	Armezon	Viper ADV	Viper ADV	Viper ADV	Viper ADV

Cleavers

How to identify cleavers.

Cleavers have weak and limp stems, square cross-sections with strongly ribbed corners and very short curved bristles. There are three to eight linear leaves arranged in a whorl. A key identifying feature of cleavers is that they stick together or to clothing, animal fur, etc. The flowers are very small and short lived, being replaced by the fruit—a small green sphere. The plant flowers from May to August. There are also known cleavers populations that are resistant to Group 2 and 4 herbicides.

How to manage cleavers.	GT corn	GT soybeans	DT soybeans	Peas	InVigor® canola
Pre-seed/ pre-emergent	Heat LQ	Heat LQ	Engenia + Heat LQ	Heat LQ	
Post-emergent	Armezon	Viper ADV	Viper ADV	Viper ADV	Facet® L herbicide + Liberty® herbicide

Lamb's quarters

How to identify lamb's quarters.

Lamb's quarters can grow 60 to 90 cm in height and is erect. The stem has some grooves on it and sometimes green or red stripes. The leaves can have many shapes such as lance shaped or triangular; however, they are alternate and have coarse-toothed margins. There are white speckles (salt accumulation) mostly on the underside of the leaves that can have a red tinge during the early growth stages. The small flowers are green and located in the top leaf axils. Some populations of lamb's quarters are resistant to Group 2 herbicides.

How to manage lamb's quarters.	GT corn	GT soybeans	DT soybeans	Peas	InVigor canola	Clearfield lentils
Pre-seed/ pre-emergent	Heat LQ or Heat Complete	Heat LQ or Heat Complete	Engenia + Heat LQ or Heat Complete	Heat LQ or Heat Complete		Heat LQ or Heat Complete
Post-emergent	Armezon	Viper ADV	Viper ADV	Viper ADV	Facet L + Liberty	Solo Ultra or Odyssey Ultra NXT

Wild oats

How to identify wild oats.

Wild oats seedlings have a counter-clockwise twist, a ligule and no auricles. The mature plant has erect stems that reach 150 cm in height. The head is a panicle with spikelets containing seeds of a wide range of colours (black, brown, yellow and white). The base of the seed is hairy. There are also resistant populations to Group 1, 2 and 8 herbicides.

How to manage wild oats.	Corn	Soybeans	Peas	InVigor canola	Clearfield lentils
Pre-seed/ pre-emergent	Heat Complete	Heat Complete	Heat Complete		Heat Complete
Post-emergent	Zidua® SC	Viper ADV	Viper ADV or Odyssey Ultra NXT	Centurion® herbicide + Liberty	Odyssey Ultra NXT or Solo Ultra

Mixing order for tank mixes.

Ensure tank-mix compatibility by using the proper mixing order.

Wettable powders, flowable

Agitate, **A**nti-flowing compounds, buffers

Microcapsule suspension

Liquid and soluble

Emulsifiable concentrates

High load **G**lyphosates

Surfactants

Always remember:

W·A·M·L·E·G·S

Always consult the label prior to mixing.

ADDITIONAL RESOURCES

For growers who just can’t get enough.

BASF bulk containers (shuttles, totes and drums) are easy to move, store and organize, providing increased convenience for higher-volume users. For the 2021 crop season, the following products are available in bulk:

Safety and efficiency benefits.

- Convenient colour coding identifier
- Durable construction
- Bottom valve with protective door
- Low volume gravity feed
- Translucent to view volume level

129.6 L Drum

130 L Shuttle

450 L Tote

Sizes, volumes and coverage

SEED TREATMENTS			
Available products	**Volume***	**Bushels/pack size**	**Unit colour**
Insure® Cereal FX4 Seed Treatment	120 L	1,837 bu (barley)	**Red**
		2,584 bu (oats)	
		1,470 bu (wheat)	
	450 L	6,888 bu (barley)	**Natural**
		9,689 bu (oats)	
		5,510 bu (wheat)	
Insure® Pulse Seed Treatment	120 L	3,000 bu (soybean)	**Green**
		1,469 bu (field peas, lentils)	
		787 to 1,575 bu (flax)	

* Actual product volume.

INOCULANTS			
Available products	**Volume***	**Acres/pack size**	**Unit colour**
Nodulator® SCG Solid core granular soybean Inoculant	364 kg	160 ac	**Grey Q-pak**
Nodulator® Duo SCG Biostacked® solid core granular pea and lentil Inoculant	364 kg	240 ac	**Grey Q-pak**

* Actual product volume.

Sizes, volumes and coverage

HERBICIDES			
Available products	**Volume***	**Acres/pack size**	**Unit colour**
Basagran® Forté Herbicide	130 L	145 to 185 ac	Grey
Engenia® Herbicide	122 L	300 to 600 ac	Peach
Heat® LQ Powered by **Kixor®** Herbicide	4 x 10.79 L + 400 L Merge® adjuvant	1,000 ac	Red
Liberty® Herbicide	108 L	80[1] ac	Blue
Liberty® Herbicide Liberty 150 herbicide only.	432 L	320[1] ac	Blue
Viper® ADV Herbicide	129.6 L	320 ac	Red

* Actual product volume.
[1] When applied at 1.35 L/acre rate.

Sizes, volumes and coverage

FUNGICIDES			
Available products	**Volume***	**Acres/pack size**	**Unit colour**
Caramba® Fungicide	128 L	320 ac	Gold-yellow
	400 L	1,000 ac	
Nexicor® Xemium® Fungicide	128 L	640 ac	Purple

* Actual product volume.

Bulk container return policy.

BASF supports responsible environmental stewardship in the recycling of our bulk containers. All containers remain the property of BASF and should be returned to the BASF retailer where the purchase was made for reuse or to be safely disposed if unusable. Return empty containers by September 30, 2021. A per-container deposit is required at time of invoicing for all products listed.

Please note the BASF return policy doesn't apply to Insure® Cereal FX4 seed treatment or Cotegra® fungicide bulk containers, which should be returned through Cleanfarms.

*Visit **agsolutions.ca/bulk** to find out more about your bulk packaging options.*

Always read and follow label directions.

BASF

We create chemistry

Connect with us. We're here for you.

For more information, reach out to us anytime.

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Call **AgSolutions** Customer Care at 1-877-371-BASF (2273)

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