



2024

Product Guide

CANOLA | BIOLOGICALS





From Your Friend In The Field

This is a real field. You’re a real farmer.
So that’s where we keep our focus.

At BrettYoung, we focus on what’s real, like good products, good information, and good local choice. It’s how we’ve become Canada’s Largest Independent Seed Company. Read on to see how we can help your farm.



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Canola

BrettYoung recently introduced two Pod DefendR-rated (pod shatter tolerant) canola hybrids in BY 6217TF and BY 6211TF. Look more closely at these two options if you are looking for a high-performing TruFlex product for your operation in 2024.

Also, stay tuned for further information being released this fall on new high-performance LibertyLink hybrids being added to our canola portfolio for 2024. With Pod DefendR shatter tolerance and DefendR-rated disease protection, they will be a fit on any farm looking to take advantage of the newest hybrids with the LibertyLink trait.



DL Seeds Making Moves in Pod Shatter Research

It’s something every canola grower worries about: pod shatter. Whether from the weather or the swather, your canola pods are doomed to shatter at some point — or are they?

DL Seeds, our canola breeding partner, has been researching pod shatter for years now, with huge developments in creating hybrids with resistance to this phenomenon. Jesse Mutcheson, Pre-Breeder Seed and QAS Manager at DL Seeds, has been working on his Master’s degree while researching pod shatter. He said their biggest leap so far has been getting their first commercial pod shatter tolerant hybrid into the market — BY 6217TF. BrettYoung has branded this trait as Pod DefendR, which you can expect high performance and a dependable level of pod shatter tolerance from.

But how did we get here?

Once DL Seeds finds unique traits or genes of interest, it takes years to implement them into a parent. First, there are multiple cycles of backcrossing to get the trait as stable as possible within each parent. After that, the first cross between two parents can be made to create an F1 hybrid.

“It’s not blindly picking two parents,” said Mutcheson. “You look at their trait packages on each side and make combinations with what you think would develop an industry-leading hybrid.”

For the first year of testing, most crosses go down to Chile where DL Seeds produces in contra-season.

Once they come back, DL Seeds starts growing them in their trials and that’s where evaluation starts.

DL Seeds has two main tests for evaluating pod shatter resistance:

- **Wind mimicking** — DL Seeds researchers use high-speed leaf blowers to mimic high wind on plots for an extended amount of time. From there, they give the hybrid a rating from one to nine, one meaning low shatter tolerance and nine being the highest. Those numbers coincide with a scale created by the Canola Council of Canada, where a hybrid pod shatter rating of eight is the gold standard for shatter tolerance.
- **Random impact test** — during this test, DL Seeds collects pods off mature canola plants and uses an indoor random impact test machine with an oscillating shaker and ball bearings to see how much impact it takes to shatter the pods. From there, a pod shatter reduction index is given to each hybrid for analysis.

Mutcheson prefers to use the wind test as it gives real data on the spot.

“Once we get the ratings in-house, we start comparing them to the other hybrids in that trial,” he said. “You can see where it lines up against the industry-leading hybrids and start looking at other critical traits like yield performance, disease resistance, and quality.”







In their most recent evaluations, DL Seeds had several hybrids scoring neck and neck with industry-leading shatter-tolerant products.

“We know our pipeline is looking very strong for shatter tolerance,” said Mutcheson. “It wasn’t just a ‘one and done’ that we found something good. Our pipeline is full of quality hybrids that are going to be in demand when released.”

DEFENDR Genetic Traits

DefendR is an easy-to-understand approach that highlights the superior harvest management and disease resistance genetics developed by our primary canola breeding partner, DL Seeds. The DefendR trait platform is gene-driven and can be an important piece of your overall canola management and production strategy. BrettYoung uses the DefendR designation to signal genetic tolerance to pod shatter and durable resistance to three prominent disease complexes affecting canola: clubroot, blackleg, and sclerotinia.

DefendR Traits

Trait	Minimum Resistance Level	Hybrids
	A dependable level of shatter tolerance, well suited to straight-cut or delayed swathing harvest systems. Pod DefendR-rated hybrids score a minimum of 7.0 on the Canola Council of Canada's canola shatter rating scale.	BY 7204LL  BY 6217TF BY 6211TF
	Multi-genic (multiple major gene) resistance to blackleg, and a strong R rating for adult plant blackleg resistance.	BY 7102LL BY 6217TF BY 6211TF
	Stacked 1st and next-generation clubroot resistance genes that provide protection against a broad array of established pathotypes like 3H and newer pathotypes such as 2B, 3A, and 3D.	BY 7204LL  BY 7102LL BY 6217TF
	Improved Tolerance (IT) to sclerotinia stem rot.	6074RR



The introduction of pod shatter-resistant hybrids to canola growers several years ago led to a significant increase in adoption of both direct harvesting and delayed swathing of canola crops. BrettYoung canola growers can now enjoy this same flexibility because of our new pod shatter resistance trait, which delivers a dependable level of shatter tolerance.

Pod shattering, and the seed dispersion associated with it, is a survival mechanism found in nature and, despite decades of breeding and domestication, canola pods still have a natural tendency to split and open at maturity, with the goal of scattering seeds. Plant breeders and trait developers have been working to understand the physiology of canola pod ripening and pod shatter mechanisms.

DL Seeds, and its parent companies, have researched their own solutions, and what has emerged is an understanding of a complex pathway of gene interaction that controls pod valve function.

Much of this work has meant isolating specific genes from other brassica species and breeding them into canola to interrupt these shatter-inducing pathways. If you've ever grown mustard, you're aware of the substantial pod shatter resistance in that crop.

The result is Pod DefendR, a specific genetic trait that reduces pod tension built up at maturity and ultimately, the tendency for canola pods to split at the pod dehiscence zone (pod seam) that holds both sides of the pod (valves) together.



Blackleg is a disease that has made a resurgence in intensive canola production areas. Most agree that a combination of crop rotation, crop management (including regular field scouting), and proper hybrid selection are important factors to reducing the impact of this disease.

The Blackleg DefendR trait means the BrettYoung canola hybrid is rated as a strong R for blackleg resistance. It also means the hybrid incorporates multiple major genes to be completely resistant against specific races of the pathogen. Blackleg DefendR hybrids achieve an enhanced level of resistance compared to competitor's R-rated hybrids that have either zero or only one major gene for blackleg resistance.



Clubroot is now established in all three Prairie provinces. Since 2013, when the first resistance-breaking pathotype was identified in Alberta, several new and more virulent pathotypes have evolved that can evade what is known as 1st generation (Mendel-type) resistance. The Clubroot DefendR trait indicates the canola hybrid has 1st generation resistance stacked with newer, next-generation clubroot resistance gene(s). This approach means resistance to the older, first-identified pathotypes, but also resistance to recently identified ones like 3A, 3D, 3H, and 5X, and others. DL Seeds has a robust pipeline coupled to high-performance hybrids that BrettYoung will continue to commercialize to support you in keeping one step ahead of this impactful disease. For the latest around the conversation on clubroot, see the article on page 06 of this guide.



For growers wanting to further reduce the impact of this disease, BrettYoung's Sclerotinia DefendR tolerance trait is built into the 6074RR hybrid. Screening and testing results for this hybrid demonstrate improved tolerance that's superior to susceptible checks using industry approved protocol.

1. Reduce the impacts of infection and reduce yield loss whenever higher sclerotinia disease pressure is present
2. Allow for greater flexibility in fungicide application timing when flowering is uneven and staggered, which otherwise makes determining ideal fungicide application timing difficult
3. Reduce the impact of sclerotinia in long-flowering crops where the window of fungicide protection is lapsed

Keeping Clubroot Under Control

Clubroot has been ravaging fields in Western Canada for almost two decades now. The soil-borne disease causes galls to form on the roots of canola plants, eventually killing them prematurely. It's well documented that short canola rotations in intensive clubroot zones are a serious factor in aggravating the disease and creating conditions for it to thrive, allowing new pathotypes to emerge.

The University of Alberta has identified over 43 clubroot pathotypes in Western Canada. Pathotype 3A is the most common in the region, followed closely by 3H and 3D. Clubroot is spread easily through soil movement. Root galls release spores back into the soil where they remain dormant until susceptible plants are grown again. So, if you can't prevent it, what can you do?

Clubroot-resistant hybrids

One of the best ways you can manage clubroot is by growing a clubroot-resistant canola hybrid. The canola industry is moving forward on standardized testing and labelling protocol for hybrids with resistance to clubroot pathotypes. This will provide growers with better information when making hybrid selections. Newer pathotypes such as 3A, 3D, and 8E are

overcoming the first-generation resistance genes, which is why next-generation clubroot resistant hybrids may provide you with a better defence.

BrettYoung's Clubroot DefendR: Broad Resistance with a Multi-Genic Approach

Along with the identification of new pathotypes, plant breeders have been identifying and incorporating new sources of resistance into their latest canola hybrids. This includes the stacking of multiple sources of clubroot resistance in hybrids like BY 7102LL, and BY 6217TF. These hybrids have resistance to the older pathotypes that were first identified on the Prairies (2F, 3H, 5I, 6M, and 8N), plus several recently discovered pathotypes.

BrettYoung, through our primary canola genetics supplier, DL Seeds, continues to screen clubroot-resistant hybrids against the most common and newly emerging clubroot pathotypes. DL Seeds' research on clubroot genes is never-ending, and they're constantly working to create hybrids with resistance to the newest clubroot pathotypes.

Glen Hawkins, Senior Agronomist and Pulse Research Manager for DL Seeds, said together, we have a "solid next-generation resistance package" in most of our hybrids.

"At the end of the day, we're not stopping there," he said. "We're always developing new genetics and new potential forms of resistance to bolster what we already have."

Hawkins described the clubroot situation as status quo right now, with Alberta continuing to be a hotspot for the disease but noting that Manitoba is beginning to catch up. He said our first generation and next-generation clubroot-resistant products are doing what they're supposed to, with both having multi-pathotype specificity.

"The gene we insert," he stated, "will have full or partial resistance to a number of different pathotypes."

Clubroot Management Practices

The Canola Council of Canada (CCC) has a list of recommendations to manage the spread of clubroot spores by focusing on keeping them low and local.

Growers in Manitoba, Saskatchewan, and other areas not impacted by clubroot pathotype 3A can prevent the accumulation of spores for as long as possible by using resistant hybrids. Choose BrettYoung's Clubroot DefendR hybrids for areas where incidence of resistance breakdown is suspected.

1 Strelkov, S.E., Hwang, S.F., Manolii, V.P., Cao, T., Fredua-Agyeman, R., Harding, M.W., Peng, G., Gossen, B.D., McDonald, M.R., and Feindel, D. 2018. Virulence and pathotype classification of *Plasmodiophora brassicae* populations collected from clubroot resistant canola (*Brassica napus*) in Canada. Canadian Journal of Plant Pathology. 40:284–298, DOI: 10.1080/07060661.2018.1459851
2 Askarian, H., Akhavan, A., Manolii, V.P., Cao, T., Hwang, S.F., Strelkov, S.E. 2020. Virulence spectrum of single-spore and field isolates of *Plasmodiophora brassicae* able to overcome resistance in Canola (*Brassica napus*). Plant Disease, 105:43–52, DOI: 10.1094/PDIS-03-20-0471-RE
3 Hollman, K.B., Hwang, S.F., Manolii, V.P., Strelkov S.E. 2021. Pathotypes of *Plasmodiophora brassicae* collected from clubroot resistant canola (*Brassica napus* L.) cultivars in western Canada in 2017–2018. Canadian Journal of Plant Pathology. DOI: 10.1080/07060661.2020.1851893

Keep spores **low**

- Crop rotation:** Maintain a minimum 2-year break between canola (1-in-3 rotation).
- Scout:** Examine roots in every canola field during late summer/fall. Pay special attention to high-traffic and high-moisture areas. Soil testing may help identify spores before physical symptoms appear.
- Grow CR:** Early infestations can be missed for years while susceptible hosts multiply spores to catastrophic levels. Clubroot resistance (CR) should be grown on all canola acres as part of an integrated management strategy.
- Control brassica weeds in all crops:** Host weeds (like volunteer canola, stinkweed, flaxweed, shepherd's purse and mustards) should be controlled early to minimize gall formation and resting spore release.

Keep spores **local**

- Biosecurity:** Commit to a biosecurity plan to prevent the introduction and spread of spores on contaminated inputs and equipment. Communicate sanitation expectations with all relevant parties before field entry.
- Reduce tillage:** Minimize soil (and spore) movement within and between fields.

Patch management to keep spores low and local:

If you find clubroot, manage the patches separately from the rest of the field to reduce spore concentration and prevent spores from spreading.

Visit **clubroot.ca** to learn more.

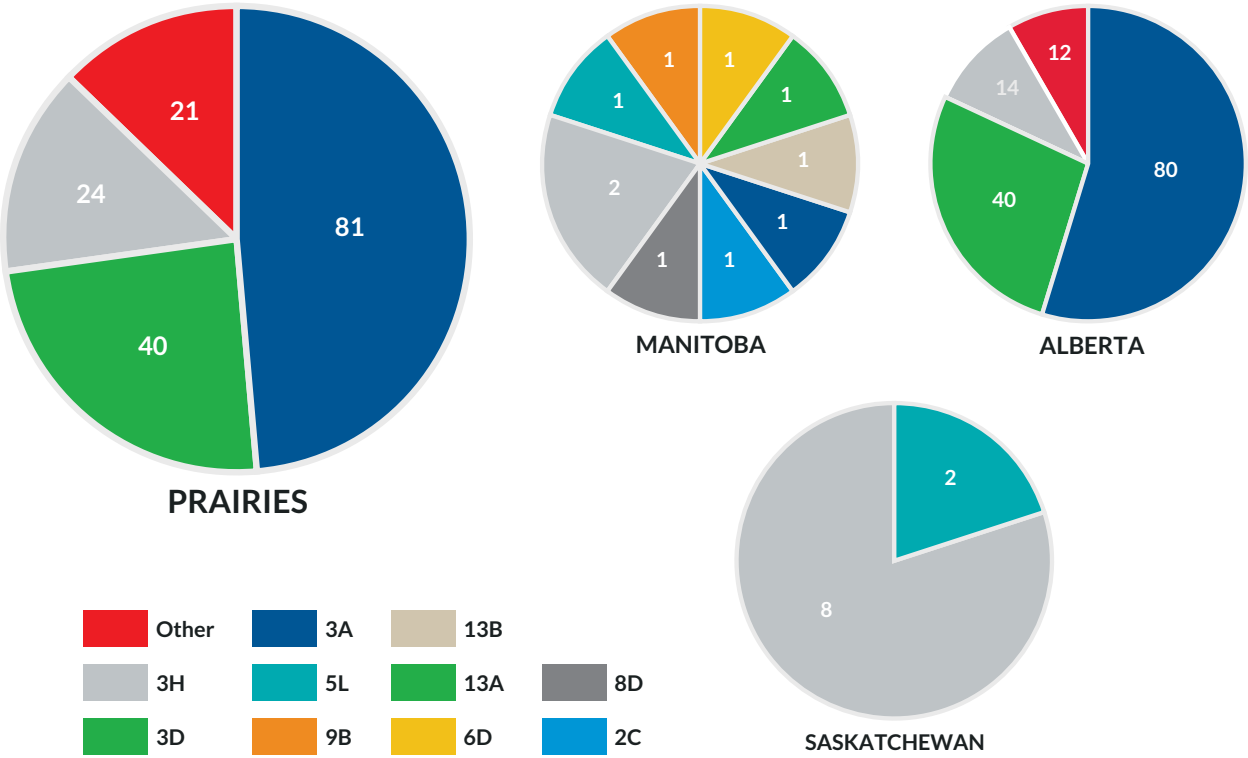


Fig. 1 Prevalence of *Plasmodiophora brassicae* pathotypes across the Canadian Prairies and in the provinces of Alberta, Manitoba, and Saskatchewan. Based on collections made from canola crops in 2017 and 2018. One hundred and sixty-six *P. brassicae* field isolates were tested, including 146 from Alberta, and 10 from each of Manitoba and Saskatchewan. Pathotype classifications are according to the Canadian Clubroot Differential set.

Source: Canola Council of Canada, 2021

Managing Your Blackleg

Blackleg has been around for what seems like forever. The stubble-borne canola disease is most prevalent in Western Canada, its severity dependent on the environment and your management practices.

“The key to managing blackleg on your farm is through scouting fields prior to harvest,” said BrettYoung Agronomic & Regulatory Services Manager, Justine Cornelsen. “Assess the level of incidence and severity and develop an estimate of blackleg risk for future crops.”

A minimum two-year break between canola crops allows for the crop residue housing the blackleg-causing pathogen (*Leptosphaeria maculans*) to break down. Another way to manage blackleg is through the use of genetic-resistance. Canola hybrids use two sources of resistance and it’s best to have a combination of major genes (qualitative resistance) and quantitative resistance within a hybrid.

Major gene resistance are single genes that are race-specific and highly effective at blocking infection of specific blackleg pathogen races at all growth stages. Major genes are identified and classified by resistance gene groups to help you select genes that are relevant to the pathogen causing blackleg damage.

Quantitative resistance involves many genes working together to slow the progression of the pathogen within the plant. This form of resistance is non-race-specific, providing protection against pathogen races.

Stewardship of Genetic Resistance

If your field is at high risk of blackleg infection due to intense canola rotations, or has had known blackleg infections, you should consider rotating blackleg-resistant hybrids. That means selecting a canola hybrid with a different major gene group(s) than the previously grown hybrid. The blackleg race identification test is a great tool to use to determine what the predominant blackleg races are in your field and which major gene groups will be the most effective.



Blackleg stubble tests determine the *L. maculans* genotype and phenotype expressed in the field. The phenotype determines which resistance gene groups will provide protection towards the *L. maculans* races identified.

Blackleg Resistance

<i>L. maculans</i> phenotype	Major Resistance Genes	Resistance Gene Groups*	BrettYoung Hybrids to Utilize
AvrLm4-5-6-7-11	Rlm4, Rlm5, Rlm6, Rlm7, Rlm11	E ₁ , E ₂	BY 7204LL NEW BY 6217TF BY 6216TF
AvrLm2-3-5-9-S	Rlm2, Rlm3, Rlm5, Rlm9, RlmS	C, F, G	BY 7102LL BY 6211TF BY 5125CL

*Not all resistance genes are classified into resistance groups, as they are not currently in Canadian canola germplasm

BrettYoung Blackleg DefendR Hybrids

Growing a blackleg-resistant hybrid is your number one line of defence when it comes to managing this common disease. Our Blackleg DefendR trait means the canola hybrid is rated as a strong R for blackleg resistance. It also means the hybrid incorporates multiple major genes to be completely resistant against specific races of the pathogen. Blackleg DefendR hybrids achieve an enhanced level of resistance compared to competitors’ R-rated hybrids.

If you’re looking to grow a blackleg-resistant canola hybrid, BrettYoung has lots of options. BY 6217TF, BY 6211TF, and BY 7102LL all come equipped with Blackleg DefendR, ensuring your crop reaches its full potential, regardless of the disease.



Canola root cross-section cuts to assess blackleg infection on a 0 (healthy) to 5 (severely infected) disease severity scale.

Canola Portfolio

Realize your yield potential with BrettYoung canola. BrettYoung has industry-leading hybrids in the TruFlex, LibertyLink, and Clearfield systems, sourcing the best technology and genetics to keep your operation profitable.

BrettYoung’s premium canola genetics also carry the DefendR trait platform as part of an active disease and harvest management strategy. A variety of maturity and DefendR trait combinations will help you find the best canola hybrid fit for your farm.



For product performance information scan this QR code or visit brettyoung.ca/product-performance.

NEW

Variety	System	Yield Rating ¹	Blackleg Rating	Major Gene ID	Clubroot Rating	Sclerotinia Rating	DefendR Disease Resistance	Standability	Pod DefendR Rating	Relative Days to Maturity
BY 7204 ^{LL***}	LIBERTY LINK	1	R – E ₂	Rlm7	R (Next-generation* resistance)	—	DEFENDR	Excellent	DEFENDR 7.5 ²	- 0.5 days
BY 7102 ^{LL}	LIBERTY LINK	1	R – CF	Rlm3, Rlm7	R (Next generation** resistance)	—	DEFENDR	Excellent	—	91
BY 6217 ^{TF}	TruFlex CANOLA	1	R – CE ₂	Rlm3, Rlm7	R (Next generation* resistance)	—	DEFENDR	Excellent	DEFENDR 8.0 ²	90
BY 6211 ^{TF}	TruFlex CANOLA	1	R – AG	Rlm3, RlmS	S	—	DEFENDR	Very Good	DEFENDR 7.2 ²	88
BY 5125 ^{CL}	Clearfield [®] Production System for Canola	1	R – C	Rlm3	R (1st generation* resistance)	—	—	Excellent	—	89
6074 ^{RR}	Roundup Ready CANOLA	1	R	Rlm3	S	IT	DEFENDR	Excellent	—	91

Disease Management Rating: R = Resistant, IT = Improved Tolerance
S = Susceptible
¹ Yield and maturity ratings based on relative to check performance in co-op registration trials.
² Pod shatter tolerance rating. This is based on the Canola Council of Canada’s shatter tolerance scale of 1 – 9. 1 = poor, 9 = excellent. Results may vary slightly on your farm due to environmental factors and management practices.
* Next-generation resistance includes pathotypes covered by 1st generation resistance plus resistance to newer pathotypes such as 3A, 3D, 3H, and other prevalent pathotypes.
** 1st generation resistance means resistant to pathotypes 2F, 3H, 5I, 6M, and 8N (these are equivalent to pathotypes 2, 3, 5, 6, 8 on the Williams’ Differential set).
*** Registration pending.

Canola Seed Treatments

All BrettYoung canola hybrids are treated with Helix[®] Saltro[®] with the option of switching to Prosper[®] EverGol[®] and BUTEO[™] start for added flea beetle control.

Pests Controlled by Seed Treatments	Base Treatment	Optional Treatment
	Helix Saltro	Prosper Evergol + BUTEO start
Pythium spp.	✓	✓
Fusarium spp.	✓	✓
Rhizoctonia spp.	✓	✓
Seed-Borne Blackleg	✓	✓
Airborne Blackleg	✓	
Flea Beetles	✓	✓
Leaf Hoppers	✓	
Enhanced Flea Beetle control		✓

Canola Hybrids



The First in our New Generation Of Libertylink® Hybrids: A High Yield Potential, Mid-Maturity Hybrid with Pod DefendR® Technology and Next-generation Clubroot Protection

- Pod DefendR — durable shatter resistance technology
- DefendR-rated next-generation clubroot protection
- Strong early season vigour and excellent standability

Yield	Blackleg	Major Gene ID	Clubroot	Standability	Maturity	Pod Shatter Tolerance Rating
105%	R – E ₂	Rlm7	R (Next-generation* resistance)	Excellent	- 0.5 days	7.5



Our Premier LibertyLink Hybrid with Blackleg and Clubroot DefendR Protection, and Full-Season Yield Potential

- Next-generation clubroot resistance, including resistance to newer pathotypes such as 3A, 3D, 3H, and others
- DefendR-rated clubroot resistance
- DefendR-rated blackleg protection

Yield	Blackleg	Major Gene ID	Clubroot	Standability	Relative Days to Maturity
1	R – CF	Rlm3, Rlm9	R (Next-generation* resistance)	Excellent	91



Pod, Clubroot, and Blackleg DefendR Protection and Flexibility of the TruFlex Canola System

- Another BrettYoung canola hybrid with Pod DefendR — a shatter reduction trait
- DefendR-rated clubroot and blackleg resistance
- Medium-long maturity suitable for mid- and long-season zones
- TruFlex canola hybrid equipped with the latest in herbicide trait technology

Yield	Blackleg	Major Gene ID	Clubroot	Standability	Relative Days to Maturity	Pod Shatter Tolerance Rating
1	R – CE ₂	Rlm3, Rlm7	R (Next-generation* resistance)	Excellent	90	8.0

*** Pending registration
² Pod shatter tolerance rating. This is based on the Canola Council of Canada's shatter tolerance scale of 1 – 9. 1 = poor, 9 = excellent. Results may vary slightly on your farm due to environmental factors and management practices.



New Level of Pod Shatter Resistance with Blackleg DefendR Protection

- Contains a new genetic source of pod shatter resistance well suited to direct harvest and delayed swathing systems
- DefendR-rated multi-genic blackleg resistance
- Excellent yield potential with mid-season maturity

Yield	Blackleg	Major Gene ID	Clubroot	Standability	Relative Days to Maturity	Pod Shatter Tolerance Rating
1	R – AG	Rlm3, RlmS	S	Very Good	88	7.2



An Outstanding Yield Performer in the Clearfield® Segment

- 1st generation** clubroot protection
- Blackleg-resistant
- Can be marketed under the Clearfield (non-GMO) canola premium programs

Yield	Blackleg	Major Gene ID	Clubroot	Standability	Relative Days to Maturity
1	R – C	Rlm3	R (1st generation** resistance)	Excellent	89



The Yield Leader

- Roundup Ready canola hybrid with yields to challenge InVigor(R)
- Improved tolerance to sclerotinia stem rot
- Consistent performer with excellent harvestability

Yield	Blackleg	Major Gene ID	Clubroot	Standability	Relative Days to Maturity
1	R	Rlm3	S	Excellent	91

Disease Management Rating: R = Resistant, IT = Improved Tolerance
¹ Yield and maturity ratings based on relative to check performance in co-op registration trials.
* Next-generation resistance includes pathotypes covered by 1st generation resistance plus resistance to newer pathotypes such as 3A, 3D, 3H, and other prevalent pathotypes.
** 1st generation resistance means resistant to pathotypes 2F, 3H, 5I, 6M, and 8N (these are equivalent to pathotypes 2, 3, 5, 6, 8 on the Williams' Differential set).

Biologicals

Our biological lineup is industry-leading, featuring distinct inoculant technologies to provide you improved performance in tough conditions.

Ensuring Your Inoculants Work in Every Condition

Choosing the right inoculant isn’t about what you want — it’s about what you need. It means balancing performance, ease of use, and cost factors.

Our inoculant lineup features a range of products including both granular and liquid inoculants.

Granular Inoculants

Granular inoculants are widely used in Western Canada for their ability to protect rhizobia and ensure inoculant survival. They allow for maximum flexibility with seed treatments and fertilizers as they’re applied to the soil separately from the seed.

The challenge with granular inoculants is they’re bulky. And though their separate application can be a benefit in some ways, it means they must be handled separately during seeding, which requires you to have suitable equipment.

Liquid Inoculants

Liquid inoculants are applied directly onto your seed, eliminating the extra handling. They’re less expensive per acre than granular inoculants, too.

Liquid inoculants can be applied with a chemical seed treatment application. Advances in liquid inoculant manufacturing technology have significantly improved the on-seed life of some liquid inoculants, but growers using one should be aware of its on-seed life and compatibility with chemical seed treatments.

There are a few key items to think about when it comes to choosing your inoculant. You need to know if it will work in conjunction with your seed-applied products. You need to choose between a granular or liquid inoculant. The most significant factor to consider, however, is the risk of nodulation failure in a particular crop.

In fields with little or no history of soybeans or pulse crops, or those that have experienced flooding or significant drought, double inoculation (using both a granular in-furrow and liquid on-seed inoculant) is the best strategy.

Double inoculating increases the number of rhizobia in the soil and distributes them more broadly in the seed row, which maximizes your crop’s opportunity to fix nitrogen when background rhizobia populations in the soil are low.

Compatibility Testing

BrettYoung inoculants work in every condition. Our partner, Rizobacter, uses a robust compatibility testing process, which ensures their products perform in the field with seed-applied products. The process includes on-seed rhizobia counts and grow-outs of treated seeds to ensure those rhizobia not only survive but form sufficient nodules to support your crop.

In Rizobacter’s compatibility testing process, seeds are treated and inoculated, then held at temperatures that represent real world conditions, measuring the on-seed life of the inoculant with seed-applied products.

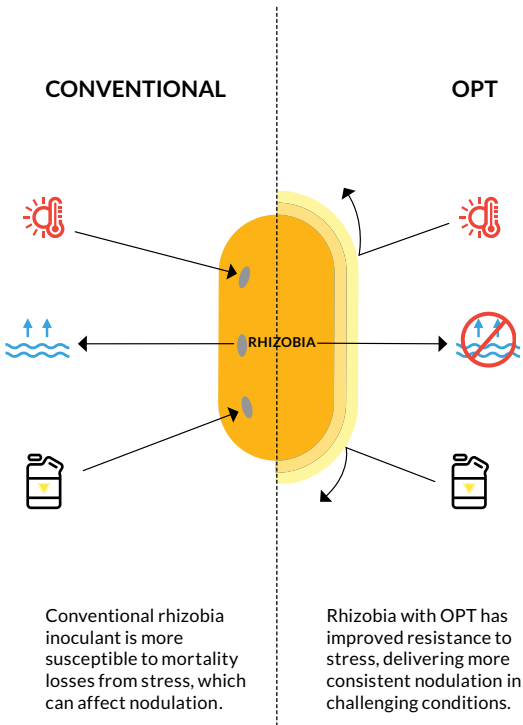
These seeds are then planted in sterile soil media to ensure only the rhizobia on the seed are present for the test. The plants then grow and form nodules before being removed from the soil to measure the number, size, and position of the nodules on each plant.

“This robust testing process allows us to support some of the longest on-seed life ratings on the market,” said BrettYoung Corn, Soybeans, and Biologicals Product Manager Vikas Chand. “And to stand behind our products with confidence.”

Osmo Protector Technology (OPT)

Osmo Protector Technology strengthens the cell walls of rhizobial bacteria through a longer, stress-inducing manufacturing process. This enhances on-seed survival and performance in challenging environments including high temperature, low moisture availability, and chemical (seed treatment) stresses.

Many of BrettYoung’s inoculants come equipped with Osmo Protector Technology, which features high-performance bacteria with longer on-seed survival. Rhizobia with Osmo Protector Technology are also better equipped to withstand the tough Prairie conditions like hot, dry soils and to survive exposure to seed treatments.



Bio-Inducer Technology

To accomplish nodulation, plant roots and rhizobia bacteria communicate using chemical signals. In turn, rhizobia respond with additional chemical signals (called nodulation determinants) initiating the nodulation process.

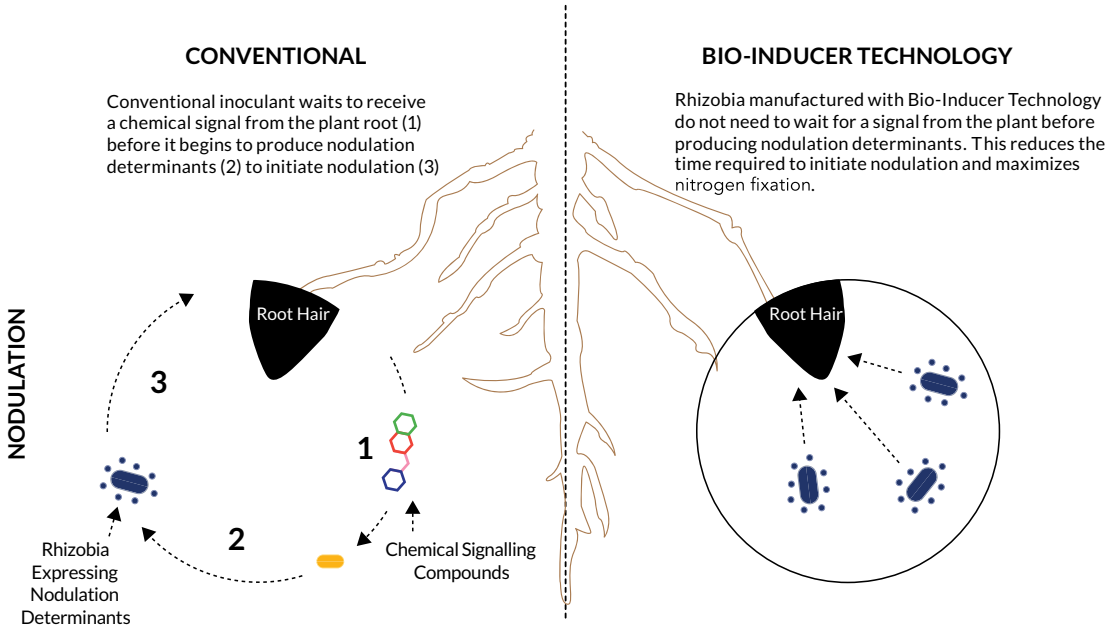
These nodulation determinants include:

- **Nod Factors** — Chemical compounds released by the rhizobia bacteria signaling the plant to initiate nodulation
- **Lipopolysaccharides (LPS)** — Long chain fatty acid molecules responsible for the development of the infection tube
- **Type Three Secretion System (T3SS)** — A protein structure used to transport substances between the cells of the rhizobia and the plant

Bio-Inducer Technology assists in the process by stimulating earlier production of specific nodulation determinants through introducing rhizobia to plant-based signaling compounds, called Bio-Inducer components, during the manufacturing process. These compounds mimic what plant roots release naturally in the soil, inducing the rhizobia to respond by releasing nodulation determinants, as if they were already in the presence of a receptive host.

The early presence of these nodulation determinants accelerates the nodulation process in the soil and improves nodulation on a plant’s crown and ptary roots, where nodules are most effective. This maximizes nitrogen fixation and yield potential, delivering more consistent performance under all conditions.

Signum® Soybean inoculants come equipped with Bio-Inducer Technology, which accelerates and improves nodulation. This not only maximizes nitrogen fixation but improves yield potential for your crop.





Signum Soybean is an effective and convenient inoculant equipped with both Osmo Protector and Bio-Inducer Technology to promote quicker biological fixation of nitrogen, allowing soybean growers to maximize yields even in stressful growing conditions.

- High concentration
- Bio-inducers
- Enhanced performance in challenging environments
- Longer survival on-seed
- Convenient all-in-one liquid formulation



Osmium Pea/Lentil is a convenient liquid inoculant featuring Osmo Protector Technology to provide pea and lentil growers with longer on-seed survival and enhances performance in challenging environments.

- Enhanced performance in challenging environments
- Longer survival on-seed
- Convenient all-in-one liquid formulation



Osmium Chickpea is an inoculant featuring Osmo Protector Technology that provides chickpea growers with a liquid formulation that has on-seed survival that outperforms all other peat and liquid inoculants and enhance performance in challenging environments.

- Enhanced performance in challenging environments
- Longer survival on-seed
- Convenient all-in-one liquid formulation

Formulation:	Liquid Suspension
Guaranteed Analysis:	Bradyrhizobium japonicum 1 x 10 ¹⁰ CFU/ml
Technology:	Bio-Inducer Technology, Osmo Protector Technology
Crops:	Soybean
Application:	On-seed
Application Rate:	2 fl. oz./100 lb (or 130 ml/100 kg)
On-Seed Life:	Up to 120 days ¹
Package Size:	400 fl. oz. (11.84 L) treats 400 units (20,000 lb); 40 fl. oz. (1.18 L) treats 40 units (2,000 lb)

Formulation:	Liquid Suspension
Guaranteed Analysis:	Rhizobium leguminosarum bv. viciae 1 x 10 ⁹ CFU/ml
Technology:	Osmo Protector Technology
Crops:	Pea, Lentil and Faba Bean
Application:	On-seed
Application Rate:	3 fl. oz./100 lb (or 200 ml/100 kg)
On-Seed Life:	Up to 15 days ¹
Package Size:	2 x 184 fl. oz. (2 x 5.45 L) treats 12,000 lb (200 bu)

Formulation:	Liquid Suspension
Guaranteed Analysis:	Mesorhizobium ciceri 1 x 10 ⁹ CFU/ml
Technology:	Osmo Protector Technology
Crops:	Chickpea
Application:	On-seed
Application Rate:	3 fl. oz./100 lb (200 ml/100 kg)
On-Seed Life:	Up to 15 days ¹
Package Size:	2 x 184 fl. oz. (2 x 5.45 L) treats 12,000 lb (200 bu)



Formulation:	Liquid Suspension
Guaranteed Analysis:	Bradyrhizobium japonicum 4 x 10 ⁹
Crop:	Soybean
Application:	On-seed or In-furrow
On-Seed Application Rate:	2 fl. oz/100 lb or 130ml/100kg
In-Furrow Application Rate:	0.5 fl. oz./1,000 ft or 5ml/100m
On-Seed Life:	Up to 4 days ¹
Package Size:	400 fl. oz. (11.84 L) – treats 400 units (20,000 lb); 40 fl. oz. (1.18 L) – treats 40 units (2,000 lb)



Formulation:	Peat Granular
Guaranteed Analysis:	Bradyrhizobium japonicum 1 x 10 ⁸
Crop:	Soybean
Application:	In-furrow
In-Furrow Application Rate:	3.8 lbs/ac (4.4 kg/ha) 12-inch row
Package Size:	40 lb (18.14 kg) or 520 lb (235.87 kg)



Formulation:	Peat Granular
Guaranteed Analysis:	Rhizobium leguminosarum biovar viciae 1 x 10 ⁸
Crop:	Pea, Lentil
Application:	In-furrow
In-Furrow Application Rate:	3.8 lb/ac (4.4 kg/ha) 12-inch row
Package Size:	40 lb (18.14 kg) or 520 lb (235.87 kg)

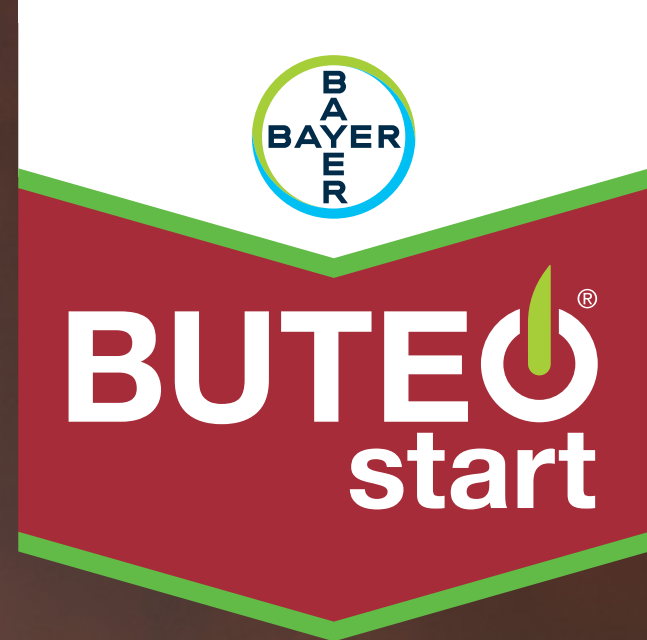


¹ Visit brettyoung.ca/compatibility for seed treatment compatibility information

Bio-Inducer Technology	<div>*Included In </div>	Bio-Inducers Accelerates initial, early communication between rhizobia and plant roots and triggers earlier nodulation for maximum nitrogen fixation.
Osmo Protector Technology	<div>*Included In </div>	Enhanced Performance in Challenging Environments Osmo Protector Technology results in tougher bacteria that enhances performance in the field under adverse conditions. This includes high temperatures, low water availability, and chemical (seed treatment) stresses.
		Longer Survival On-Seed Osmo Protector Technology provides added protection for longer on-seed survival without requiring an extender. This allows growers much greater planting window flexibility compared to other seed-applied liquid and peat inoculants.

PROTECT THAT START OF THE SEASON FEELIN' FROM FLEA BEETLES

BUTEO® start is the powerful seed treatment that protects your canola and your start of the season spirit. BUTEO start is specifically engineered to defend your canola against early flea beetle pressure, delivering unparalleled protection right through the three-leaf stage putting you on the path to strong plants and even stronger yields. So make this year one for the record books and start strong with BUTEO start.



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CANOLANEWS

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HELIX® SALTRO®

A canola seed treatment helped stop an airborne blackleg attack against vulnerable canola.

Experts say that without the early-season protection of Helix® Saltro® in place, blackleg infection at the cotyledon stage would have caused serious, yield-robbing stem infections.

Helix® Saltro®, as part of an integrated approach, protects canola from airborne blackleg infection, helps preserve crop potential and complements resistant canola genetics.



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