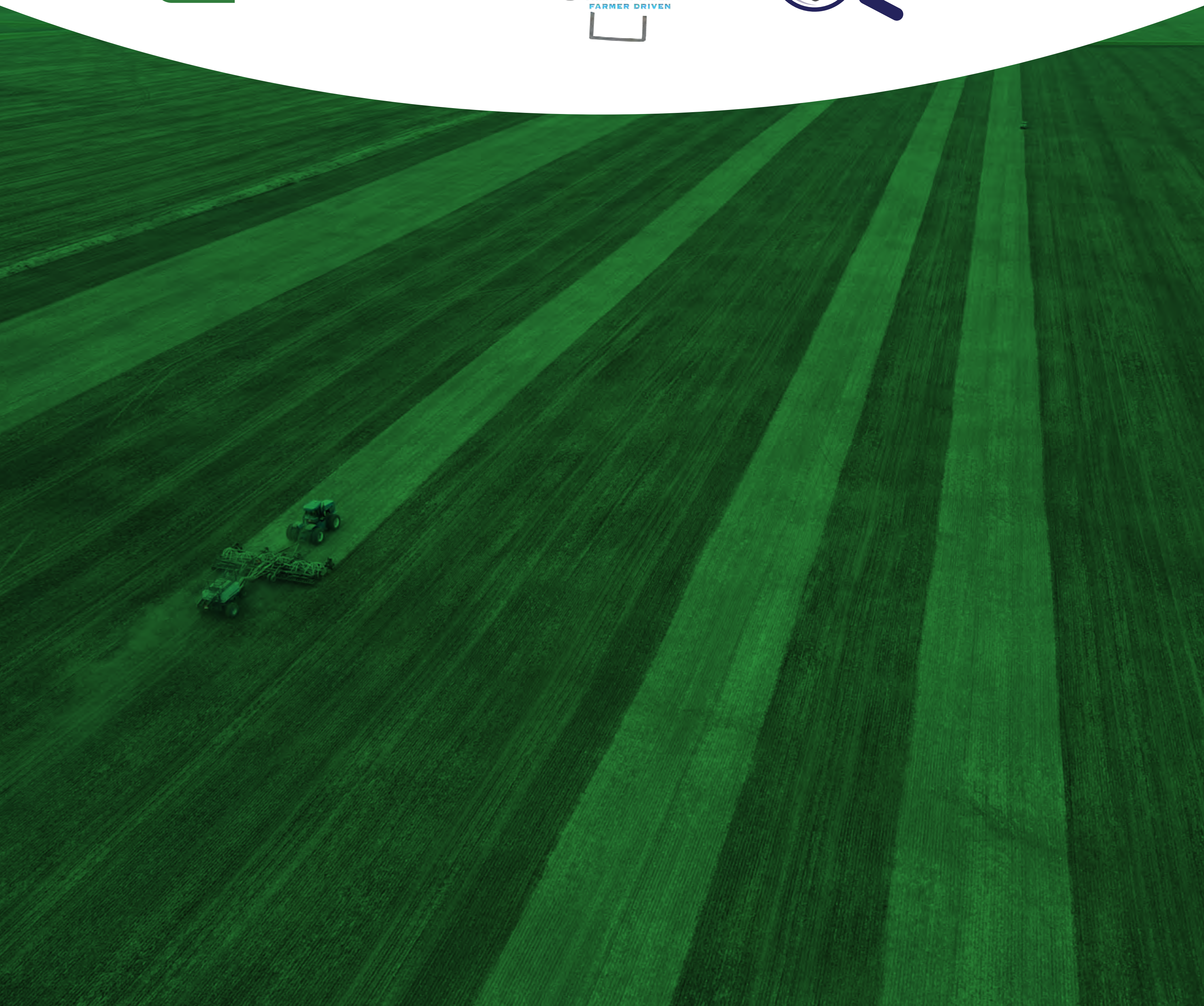
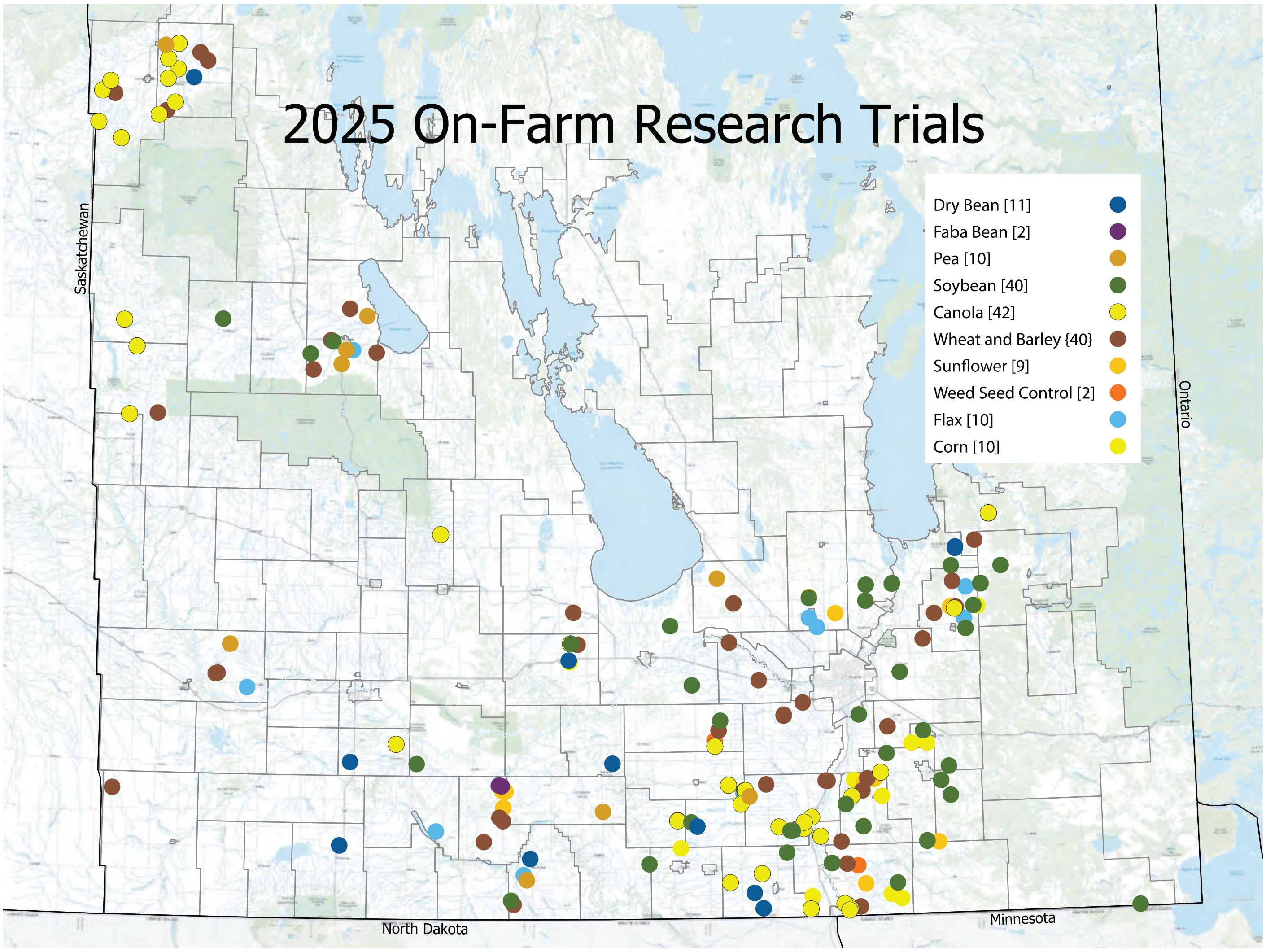
2025

ON-FARM RESEARCH RESULTS





2025 On-farm research trial types

Soybean
- Biological Products
- Boron Fertility
- Double Inoculant
- Nitrogen Fertility
- Row Spacing
- Seeding Equipment
- Seeding Rate
- Seeding Speed
- Single Inoculant
- Starter Phosphorus Fertility

Dry Bean
- Biological Products
- Fungicide
- Row Spacing
- Seeding Rate
- Single Inoculant

Pea
- Biological Products
- Fungicide
- Seed Treatment

Faba Bean
- Fungicide
- Insecticide

Canola
- Early Season Fungicide
- Harvest Management
- Nitrogen Rate
- Phosphorus Source
- Seed Placed Fertilizer
- Seeding Rate

Barley
- Nitrogen Rate and Protein (Malt)
- Variety

Corn
- Starter Phosphorous

Flax
- Fungicide Treatment
- Nitrogen Rates
- Variety

Spring Wheat
- FHB Fungicide Treatment
- PGR use
- Ultra Early Seeding
- Variety

Sunflower
- Avian Control Treatment
- Fungicide Treatment

Winter Wheat
- Planting Rate

Whole Farm
- Harvest Weed Seed Control using Seed Impact Mills

MANITOBA Pulse Soybean GROWERS

MANITOBA CROP ALLIANCE

Manitoba Canola Growers

Thank you for your participation in on-farm research!

This growing season, with your participation and support, more than 176 on-farm trials were conducted across Manitoba through MPSG, MCA and MCGA. We would like to thank each of you for your interest in conducting on-farm research and we hope to help facilitate future research trials on your farms.

In this book you will find important information for interpretation of results followed by a growing season weather overview. Within each chapter, organized by crop type, you will find long-term results summaries and summaries of 2025 results for each trial type.

Along with this booklet, additional information is available online. Single-site reports from 2012 to 2025 can be found by following the QR codes below for each organization or by visiting:

- MPSG's **On-Farm Network database** at manitobapulse.ca/on-farm-research-reports
- MCA's **Research on the Farm program** at mbcropalliance.ca/research/research-on-the-farm-program
- MCGA's **On-Farm Research program** at canolagrowers.com/canola-on-farm-research-program

Thank you for your participation and continued support. This farmer-first research would not be possible without you!

contents

Important information to interpreting on-farm research results:

Variation in yield is expected within an on-farm trial due to the natural variability that occurs across a field. Statistical analysis allows us to tell if a true yield difference occurred due to a treatment effect (like seeding rate or fungicide application), or if the variation in yield we see at a trial is due to field variability.

If results are statistically significant, then we can say with certainty that the treatment caused the yield difference. If the results aren't significant, the differences in yield between treatments is due to the variability in the field and not a result of the treatment we were testing.

To achieve statistically-rigorous trials, on-farm field trials are set up using a randomized complete block design (RCBD). Each trial has four to six replicates in the field. Analysis of variance (ANOVA), treating site as a fixed effect and replicate (block) as a random effect, or t-tests, have been conducted to determine yield results.

Single sites developed are based on single-site analysis, i.e., site-years are not combined. Summaries of trial types within this booklet will report a combined analysis across site-years or a frequency of yield responses if combined analyses have not been conducted yet.

Definitions:

Site-year: A site-year, identified by a unique trial ID, is one research trial location in one year. For example, a seeding rate trial conducted in a field near Carman would be one site-year.

Confidence level: A 95% confidence level is used within our trials. This means we can say we are 95% certain of the outcome.

P-value: While a confidence level tells us how certain we are of the results we get from statistical analysis; the pvalue indicates if the results are statistically significant. The p-value is a probability that is calculated through the statistical analysis process. A p-value less than 0.05 indicates a statistically significant result, but a p-value greater than 0.05 indicates the results are not significant

Coefficient of Variation (CV): The statistical measure of random variation in a trial. The lower the value, the less variable the data.

MPSG, MCA and MCGA don't endorse the use of products tested in on-farm research. Although trials are conducted at multiple sites under varying conditions, your individual results may vary.

Who to contact:

For any questions about existing trial data, data analysis, or for assistance with future trial establishment of an existing or new trial type, please contact your commodity organizations:

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2025 growing season weather

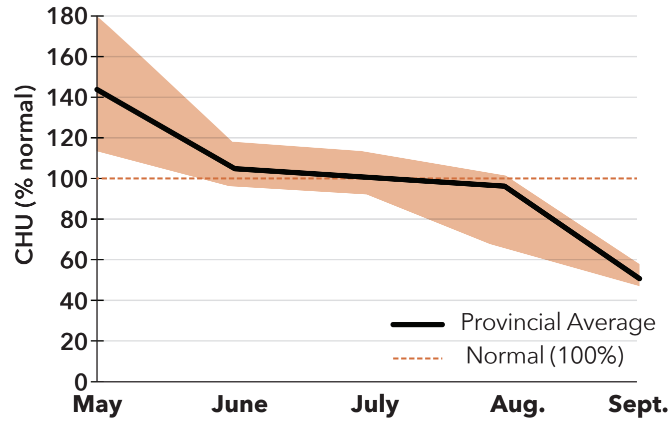
Temperature: May was quite a bit warmer than normal, averaging 142% of normal Corn Heat Units (CHUs) and 137% of normal growing degree days (GDD) across the province. June through August was normal compared to the 30-year period followed by a cold September at 81% CHU and 49% GDD. On average 2,829 CHU were accumulated from May to September.

Precipitation: Overall, rainfall was well below normal (58.9%), other than in August which was slightly above normal (117%). It was highly variable through most regions of the province, which is indicated by the blue line and the shaded area on the regional graphs.

On average, from May to September, each region received:

- Northwest: 10-306% of normal rainfall, accumulating 245 mm
- Southwest: 14-224% of normal rainfall, accumulating 264 mm
- Interlake: 9-236% of normal rainfall, accumulating 178 mm
- Central: 14-328% of normal rainfall, accumulating 278 mm
- Eastern: 5-160% of normal rainfall, accumulating 278 mm

CORN HEAT UNITS (% NORMAL)

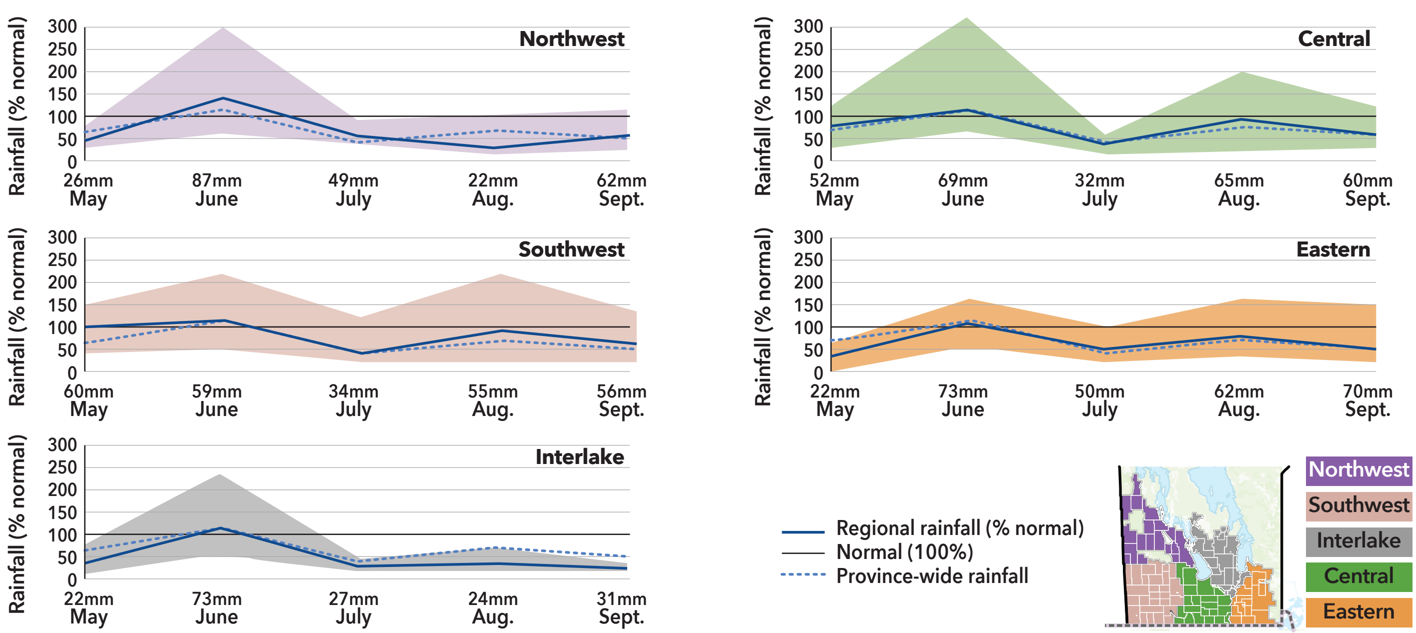


Corn Heat Units (CHU) are a measure that accounts for temperatures that are too cool (<10°C during the day and <4.4°C overnight) and too hot (>30°C) for crop growth.

Weather Extremes:

- One wind event >100 km/hr – occurred overnight on July 4 to 5 in southwestern Manitoba.
- Four rain events >3" (3 in northwest region and one in western Red River Valley) and two additional rain events ~3" in the southeast and northwest regions all in August to September.
- In July/June, weather stations on average had five days >28°C (range: 2-20 days >28°C) – pea and faba bean flowers may abort when temperatures exceed 28 for >2 hours.

Average rainfall amount (mm)



Shaded areas represent the range of rainfall captured by weather stations within each region. Source: Manitoba Agriculture

Manitoba Pulse & Soybean Growers On-Farm Network

In today's era of high input costs, low margins and the ever-increasing need to improve sustainability of the farm operation, validating agronomic management decisions made on-farm are ever-more important. Agronomic recommendations are usually generated by small-plot research, which can efficiently and effectively compare numerous treatments in the same location, at the same time.

But what happens when those treatments are used at a field scale? Are they economical? On-farm trials can help answer these questions.

In 2025, we've added new trials: soybean seeding equipment, soybean seeding speed, soybean boron fertility, dry bean seeding rate, dry bean row spacing and faba bean insecticide.

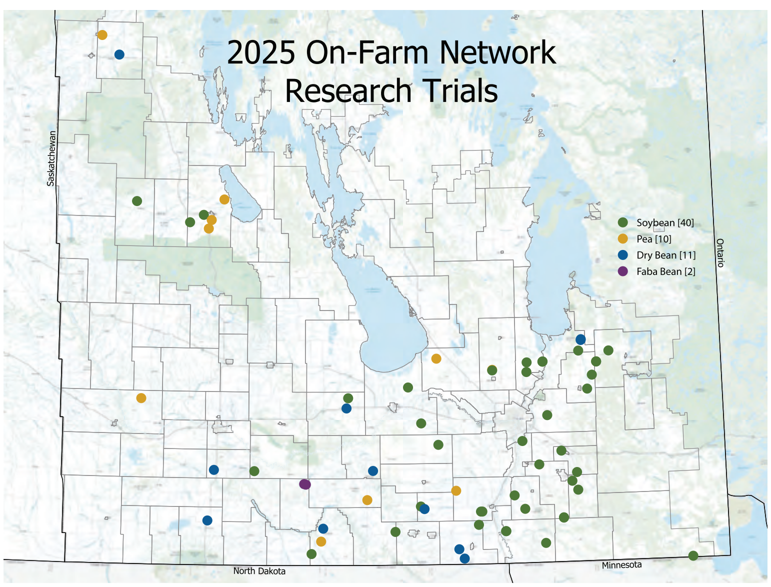
On-farm research is done by the farmer, for the farmer. Well-conducted on-farm trials investigate questions and outcomes on a case-by-case basis while evaluating the overall effects of management decisions through combining data across trial locations and years.

For farmers, there's time involved in conducting the trials on-farm, particularly at seeding and harvest, two of the busiest times of the growing season.

But this investment of time generates valuable information on the agronomics and economics of different management practices and products. Results from on-farm trials can be used to shift management practices or validate current practices on individual farms, but they can also be pooled together across space and time to gain an overall, big-picture understanding of the impact of a treatment or decision.

This wouldn't be possible without you, our farmer collaborators.

Thank-you to our On-Farm Network collaborators:
Farmer-members, Tone Ag Consulting Ltd., New Era Ag Research, U of M, FMC, Canadian Agronomics Inc, Legume Technology LTD., AAE Tech Services Inc., Nexus Bio Ag, AAFC and Manitoba Agriculture, Assiniboine College, BASF, UPL, Corteva and Bayer CropScience.



MPSG on-farm network

Interested in participating in 2026?

Trial topics:

- Seeding rates
- Row spacings
- Inoculant strategies
- Seed treatments
- Fungicides
- N rates in dry beans
- Biological products
- Tillage and residue management

Have a different trial idea? Let us know!

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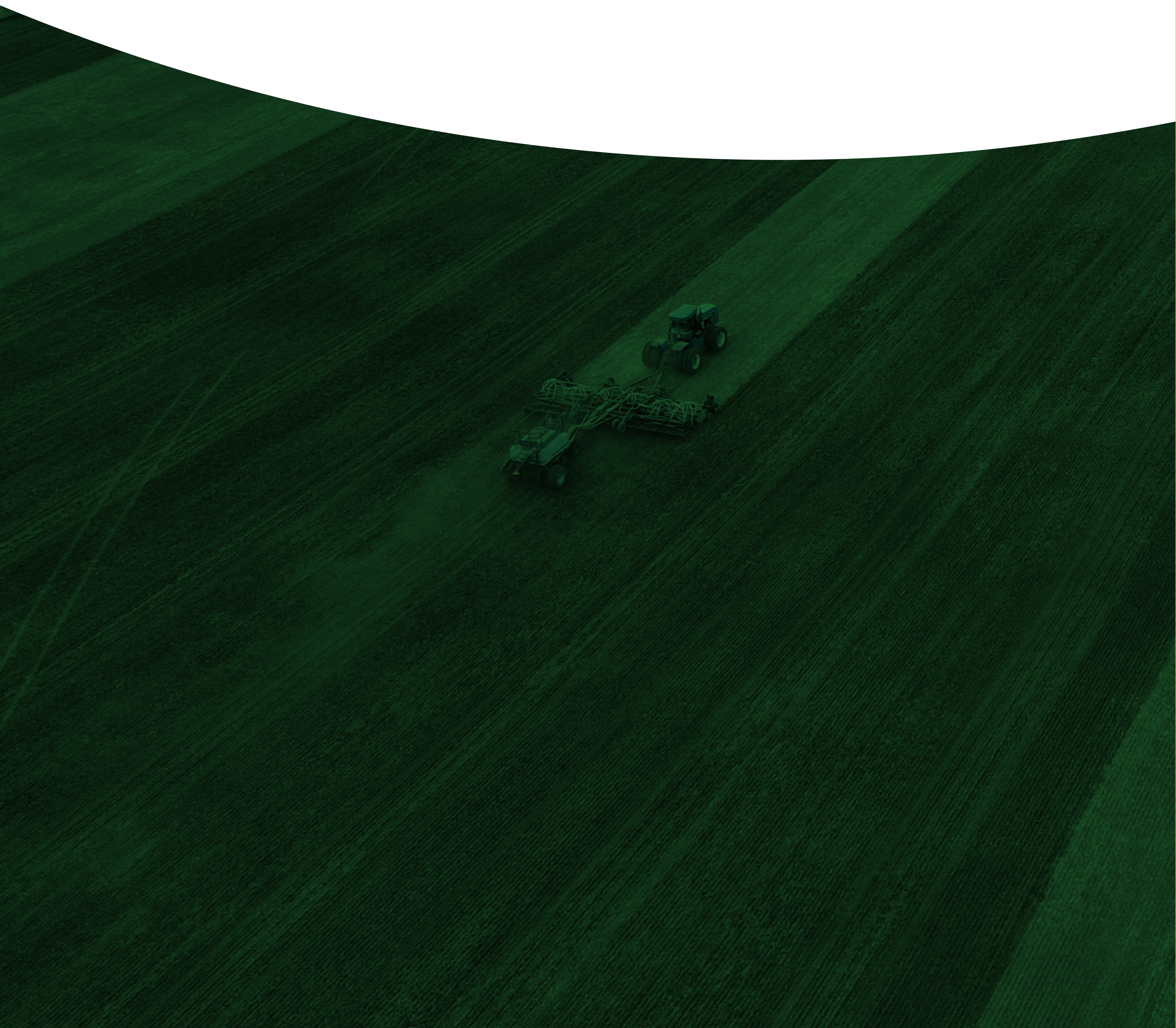
Explore MPSG's on-farm network trial database:

2025 ON-FARM RESEARCH RESULTS

Manitoba Pulse Soybean Growers

on-farm network

research. innovation. connection.



contents

2025 RESULTS

Soybean Seeding Rate Trials

Evaluating different seeding rates on-farm

Trial Information

Three soybean seeding rate trials in 2025 tested the farm's normal seeding rate vs. +/- 30,000 seeds/ac.

Seeding rates tested ranged from 100,000 to 210,000 seeds/ac.

Two trials, SSR01 and SSR04, used a planter on 22″ and 12″ row spacings respectively and one trial, SSR02, used an air seeder on 10″ row spacings.

All other agronomic practices, including variety, row spacing and herbicide application, remained consistent across treatments.

Supporting Data

Plant counts were recorded during vegetative (V) and the same areas revisited for reproductive (R) stages (Table 1).

Average early season establishment was 78% (range of 68–84%) and average late season survivability was 79% (range of 69–84%) (Establishment and survivability (%) = plant count/seeding rate).

Yield and Economic Results

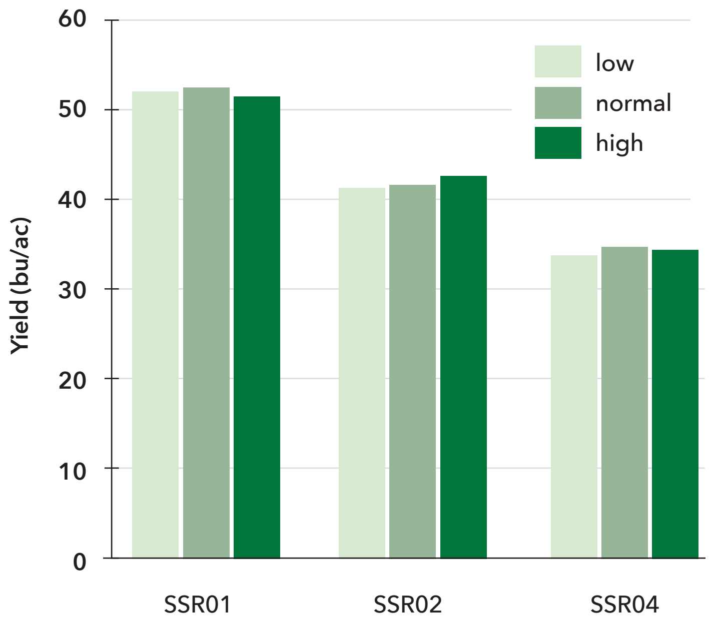
There were no significant yield differences among seeding rates tested on-farm in 2025 (Figure 1), therefore the economically optimum rate was the low seeding rate in each trial.

Seeding rates tested differed by 30,000 and 60,000 seeds/ac, resulting in a loss in profit of $12.90/ac and $25.70/ac respectively when compared to the lowest soybean seeding rate (assuming $60/unit (140,000 seeds)).

TABLE 1: Plant stand and yield results from three soybean seeding rate trials in 2025.

Trial ID	R.M.	Germ. (%)	Seeding Rates Tested (000 seeds/ac)	Plant Stands at V-Stages (000 plants/ac)	Plant Stands at R-Stages (000 plants/ac)	Significant Yield Difference?
SSR01	Emerson-Franklin	88	100 vs.130 vs. 160	76 vs. 105 vs. 132	79 vs. 106 vs. 131	No
SSR02	St. Andrews	88	150 vs. 180 vs. 210	113 vs. 144 vs. 143	112 vs. 151 vs. 145	No
SSR04	Grandview	90	130 vs. 160 vs. 190	109 vs. 129 vs. 148	108 vs. 132 vs. 148	No

FIGURE 1: Average yields (bu/ac) for each seeding rate treatment (low, normal and high) tested at three on-farm trials in 2025.



2012-2025 LONG-TERM RESULTS

Soybean Seeding Rate Trials

Evaluating different seeding rates on-farm

Trial Information

135 soybean seeding rate trials were completed from 2012 to 2025.

Seeding rates tested were the farm's normal seeding rate vs. +/- 30,000 seeds/ac.

All other agronomic practices remained consistent across treatments.

Most common comparisons have been 130 vs. 160 vs. 190,000 seeds/ac and 150 vs. 180 vs. 210,000 seeds/ac.

Equipment: 58% of trials have used an air-seeder and 42% have used a planter.

Row spacings: 49% on narrow (7″–12″), 32% on intermediate (15″–20″) and 19% on wide (22″–30″) rows.

Supporting Data

Plant counts were recorded during vegetative (V) and reproductive (R) stages.

Average early season establishment has been 81% (range: 31–118%) and average late season survivability has been 76% (range: 26–122%) (Establishment and survivability (%) = plant count/seeding rate).

Higher seeding rates were typically associated with lower establishment and survivability.

Average early establishment was 82% for planters and 80% for air seeders. Average late survivability was 79% for planters and 74% for air seeders.

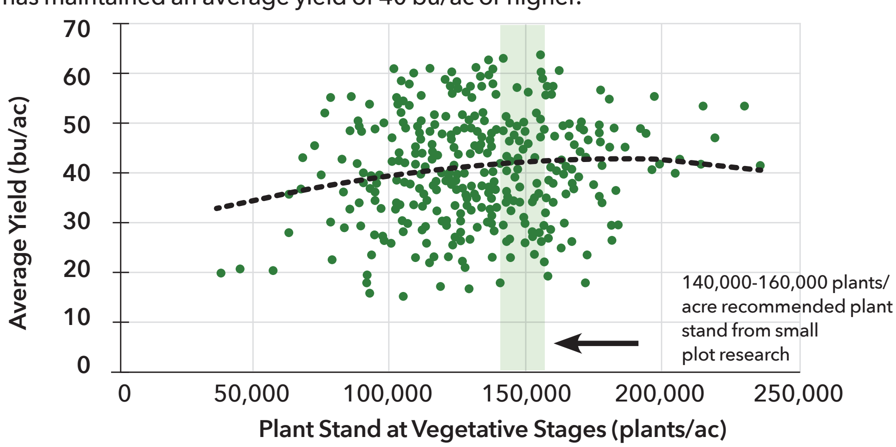
Yield and Economic Results

84% of the time changing soybean seeding rate hasn't changed yield (Figure 2).

Out of 135 total trials, 21 trials (16%) have had a significant yield difference between seeding rates.

Sixteen (76%) of those 21 trials were economical where the yield increase was enough to pay for the increased seed (assuming a maximum soybean price of $12/bu) (Figure 2).

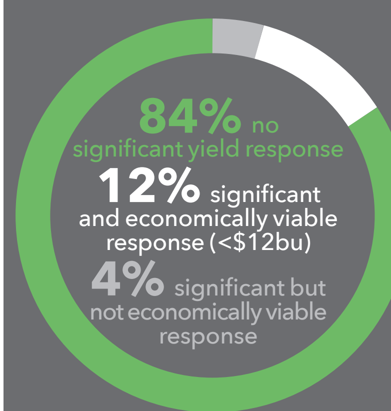
FIGURE 1: Early season living plant stands (plants/ac) vs. yield of 135 seeding rate trials from 2012 to 2025. Living plant stands of approximately 118,000 plants/ac or greater has maintained an average yield of 40 bu/ac or higher.



Recommendations from this Research

- Lowering seeding rates may maintain yield and be economical but lowering too much is risky if establishment or survivability is poor (Figure 1).
- Seeding rates of 150,000 to 190,000 seeds/ac have maintained yield in these trials.
- Evaluate living plant stands in every field, every year and relate stand back to your seeding rate.

FIGURE 2: Proportion of 135 seeding rate trials from 2012 to 2025 with significant and economic yield responses, assuming a maximum soybean price of $12/bu.



2025 RESULTS

Soybean Row Spacings Trials

Evaluating different row spacings on-farm

Trial Information

Three trials in 2025 tested different row spacings.

- Two trials compared 15″ and 30″ rows (SRS01 and SRS03).
- One trial (SRS02) aimed for 15″ vs. 30″ rows but due to a seeding error the actual row spacings were alternating 10″ and 20″ rows vs. 30″.

All other agronomic practices, including variety, seeding rate and herbicide application, remained consistent across treatments.

Supporting Data

Plant counts were recorded during vegetative (V) and the same areas revisited for reproductive (R) stages. Average plant establishment (V) and late season (R) survivability were similar across row spacings (Table 1).

Percent canopy closure was assessed using the Canopeo app at R1, R3 and R5 growth stages (Table 1/Figure 2).

- Across all trials, at R1, the 15″ rows had an average of 17% more row closure than the 30″.
- At SRS02 and SRS03 at R3, the 15″ had an average of 21% more row closure and at SRS03 at R5, the 15″ had 14% more row closure.
- There were no other canopy differences among row spacings.

Weed density was assessed at R5 and there were no significant differences between row spacings at all three trials.

Disease pressure was evaluated during R-stages and there were no significant differences between row spacings at all three trials.

Yield and Economic Results

There was a 3.3 bu/ac yield advantage at SRS03 for soybeans seeded on 15″ rows vs. 30″ rows (Table 1.)

There were no significant differences in yield at the other two trials (SRS01 and SRS02).

Economics of these trials aren't quantified since it's very farm and equipment specific in how different row spacings are achieved.

FIGURE 2. Canopeo app uses a photograph (top) to determine the percent canopy cover (bottom). The above images were captured at R3 and resulted in 60 % canopy cover.

TABLE 1: Results from soybean row spacing trials conducted in 2025.

		V-Stages		R-Stages		Canopy Closure (%)					
Trial ID	Row Spacing	Early-Season Plant Stand	% of Seeding Rate Established	Late-Season Plant Stand	% of Seeding Rate Survived	R1	R3	R5	Weed Density (weeds/ 0.5m2)	Yield (bu/ac)	Sig. Yield Diff.?
SRS01	15″	120,500	86%	116,750	83%	**84 a**	85	92	15	53.4	No
	30″	115,000	82%	115,125	82%	**76 b**	87	90	25	52.4	
SRS02	10″/20″	113,625	76%	115,375	77%	**58 a**	**92 a**	97	0.3	61.9	No
	30″	113,625	76%	113,500	76%	**44 b**	**72 b**	91	2	60.8	
SRS03	15″	120,625	86%	123,125	88%	**77 a**	**92 a**	**96 a**	0	**62.8 a**	**Yes**
	30″	117,500	84%	116,625	83%	**50 b**	**70 b**	**82 b**	0.5	**59.5 b**	

Note: Values within columns per trial ID followed by different letters are significantly different ($p < 0.05$).

2019-2025 LONG-TERM RESULTS

Soybean Row Spacings Trials

Evaluating different row spacings on-farm

Trial Information

Twenty-nine trials tested different row spacings from 2019 to 2025.

Twelve trials tested narrow (7.5″–10″) vs. intermediate (15″–20″) rows and 17 trials tested intermediate (15″) vs. wide (30″) rows.

One trial (2025SRS02) aimed for 15″ vs. 30″ rows but due to a seeding error the actual rows were alternating 10″ and 20″ vs. 30″ rows.

All other agronomic practices, including seeding rate, remained consistent across treatments.

Supporting Data

Plant counts were recorded during vegetative (V) and reproductive (R) stages.

Average early season establishment has been 83% for 7.5″–10″ rows, 81% for 15″–20″ rows and 79% for 30″ rows.

Wide rows (30″) typically had an average of 5% lower late season survivability than narrow and intermediate rows due to increased competition within the row.

Percent canopy closure was assessed at R1, R3 and R5 growth stages.

Narrow and intermediate row spacings close in earlier in the season than wide rows.

Disease pressure has been evaluated since 2023 and there were no significant differences between row spacings except for one trial in 2024 (2024SRS02) where 15″ rows had higher septoria brown spot severity than 30″ rows.

Yield and Economic Results:

Overall, 71% of the time row spacing had no effect on yield (Figure 1.)

Narrow rows significantly improved yield over intermediate rows 33% of the time, increasing yield by 1.8 bu/ac on average.

Intermediate rows significantly improved yield over wide rows 24% of the time, increasing yield by 2.7 bu/ac on average.

Economics of these trials aren't quantified since it's very farm and equipment specific in how different row spacings are achieved.

Recommendations from this Research

- Soybeans may be grown successfully on any row spacing, however, there's greater yield potential with narrow row spacing than wide row spacing.
- Though yield responses may not occur each year on every farm, the competitive advantage of a crop that canopies over earlier in the season is important to mitigate the development of herbicide resistant weeds.

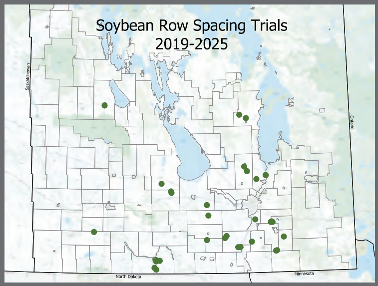
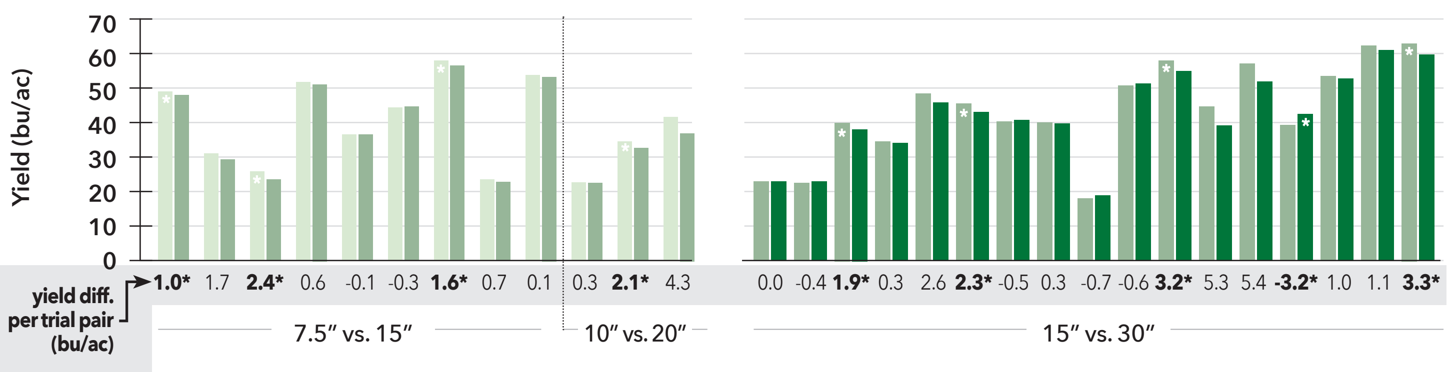


FIGURE 1: Yield comparisons of different row spacing trials



* Indicates a statistically significant yield difference (p<0.05).

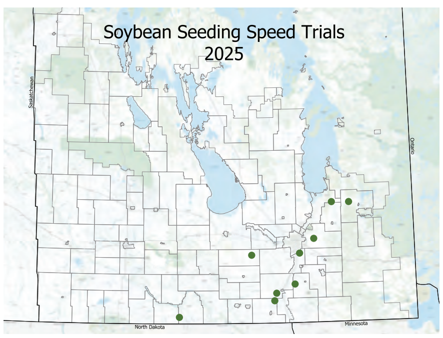
2025 RESULTS

Soybean Seeding Speed Trials

★ NEW TRIAL TYPE Evaluating different seeding speeds on-farm

Background Information

Advancements in seeding equipment technology can allow farmers to seed soybeans at faster speeds without sacrificing yield. Seeding at a faster speed is advantageous when farmers are trying to seed many acres within optimal seeding windows to maximize yield potential. Farmers have asked if varying seeding speed from their normal speed will impact seed depth, plant spacing, plant stand and yield.



Trial Information

Eight soybean trials tested different seeding ground speeds in 2025.

- Three trials tested 5 mph vs. 7 mph speeds.
- Five trials tested 5 mph vs. 7 mph vs. 9 mph speeds.
- Six trials (75%) were established with a planter and two (25%) were with an air seeder.

All other management practices were consistent across all treatments.

Supporting Data

Plant counts were recorded during vegetative (V) and reproductive (R) stages (Figure1). Plant counts were similar across speed treatments for both V– and R–stages.

FIGURE 3. *Soybean seeding speed trial establishment. The trials tested different ground seeding speeds of 5-mph, 7-mph and 9-mph.*

Average early season establishment was 77% and average late season survivability was 76% (Table 1) .

Plant-to-plant spacing uniformity was measured after emergence (Table 1). There was a trend towards less uniformly spaced plants at faster seeding speeds.

Seed depth was assessed after emergence. There were no significant differences in average seed depth among seeding speeds.

The average seed depth per speed treatments were 1.12'' (5 mph), 1.07'' (7-mph) and 1.14'' (9-mph).

Yield and Economic Results

Regardless of seeding equipment or seeding speed, there were no significant yield differences among speed treatments (Table 1/Figure 2).

The economics of changing seeding speeds aren't calculated since factors like seeding time per acre and fuel consumption weren't assessed.

TABLE 1: Results from soybean seeding speed trial conducted in 2025:

Trial ID (R.M.)	Seeding Equipment	Seeding Rate (seeds/ac)	Speed (mph)	% of Seeding Rate Established (V)	% of Seeding Rate Survived (R)	Plant Spacing Standard Deviation (in.)*	Yield (bu/ac)	Significant Yield Difference?
SSS01 (Hanover)	Planter	170,000	5	74	74	1.7	70.3	No
			7	76	75	2.1	70.1	
SSS02 (Grey)	Planter	175,000	5	82	82	2.0	61.7	No
			7	83	83	2.1	60.7	
SSS03 (Ritchot)	Air seeder	175,000	5	63	63	6.7	44.3	No
			7	61	62	6.8	44.7	
			9	62	61	5.7	45.0	
SSS05 (Springfield)	Planter	188,000	5	75	74	**1.6 b**	59.7	No
			7	72	70	**1.8 b**	58.6	
			9	76	74	**1.9 a**	57.8	
SSS06 (Rhineland)	Planter	160,000	5	90	84	**2.1 b**	58.4	No
			7	90	85	**2.3 b**	59.1	
			9	86	79	**2.6 a**	58.4	
SSS07 (St. Clements)	Planter	150,000	5	85	87	1.4	52.0	No
			7	84	85	1.8	49.2	
			9	86	85	1.9	51.1	
SSS08 (Morris)	Planter	145,000	5	88	86	1.1	55.5	No
			7	89	88	1.0	57.2	
			9	81	79	1.2	55.2	
SSS09 (Louise)	Air seeder	180,000	5	60	57	9.1	44.7	No
			7	62	63	8.3	45.2	

Values within columns followed by different letters are significantly different at $p<0.05$. * Plant-to-plant spacing uniformity (in) after emergence for each site. The standard deviation of the distance between plants within a row was used to measure the spacing uniformity of the stand. A standard deviation of zero indicates a perfectly uniform plant-to-plant spacing. An increase in standard deviation value indicates less evenly spaced plants.

FIGURE 1: Average early establishment (V-stages) and average late season survivability (R-stages) of different seeding speeds

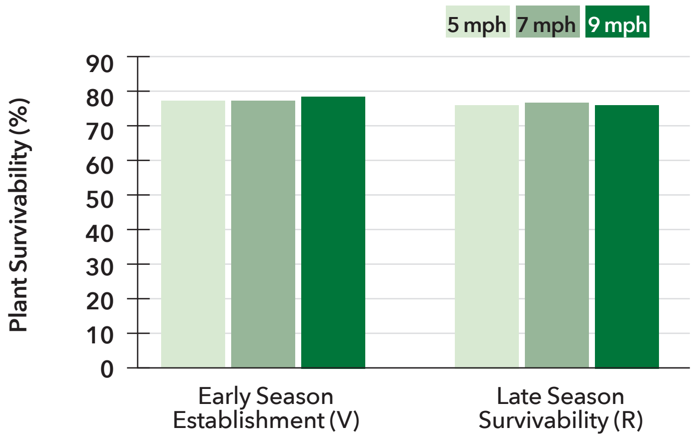
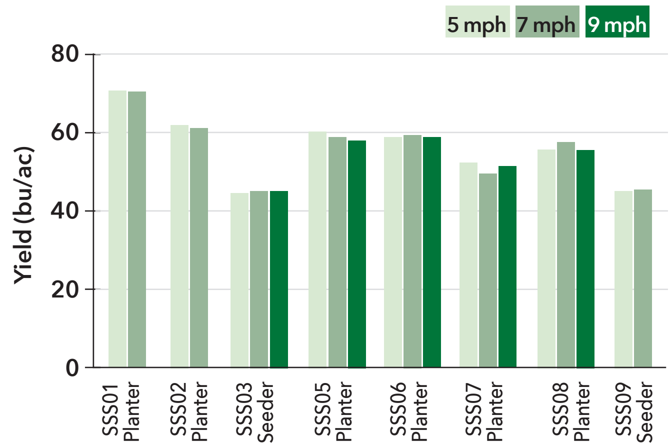


FIGURE 2: Yields (bu/ac) of different seeding speeds at each trial site.



Soybean Biological Trials

Evaluating different biological products on-farm

Trial Information

Four trials in 2025 tested three different biological products.

Treatments included a biological product vs. untreated.

Release HA is a liquid humic fluvic acid product meant to improve soil properties and enhance nitrogen efficacy.

WAVE is a liquid biostimulant product and is meant to improve nutrient use efficiency, help maximize yield potential and mitigate abiotic stressors.

PhycoTerra FX is a microalgae-based liquid product meant to improve drought stress tolerance, nutrient acquisition and improve crop yield.

Release HA was applied at seeding with the seed at a rate of 1.89L/ac (SB01).

WAVE was foliar applied during reproductive stages (R1 at SB02 and R2 at SB03) at a rate of 60 mL/ac (120 ac/jug).

PhycoTerra FX was foliar applied at beginning pod (R3) stage at SB04 at a rate of 1L/ac.

Supporting Data

There were no significant differences in plant stands between untreated and treated soybeans.

Yield and Economic Results

There were no significant yield responses to an application of the biological products tested in 2025 (Table 1).

As a result, there was a loss in profit equal to the cost of these products ($10.76/ac for Release HA, $6.41/ac for WAVE and $6.50/ac for PhycoTerra FX).

TABLE 1: Yield results from four soybean biological trials in 2025.

Trial ID	R.M.	Application Date (stage)	Product	Rate	Yield (bu/ac) Untreated	Yield (bu/ac) Treated	Significant Yield Difference?
SB01	De Salaberry	May 12 (seeding)	Release HA	1.89 L/ac	50.5	50.0	No
SB02	Rockwood	July 2 (R1)	WAVE	60 mL/ac	55.0	54.8	No
SB03	Emerson-Franklin	July 2 (R2)	WAVE	60 mL/ac	58.6	58.0	No
SB04	Roland	July 17 (R3)	PhycoTerra FX	1L/ac	53.1	53.7	No

FIGURE 1: Biological products were foliar applied at three trials during reproductive (R1-R3) stages and at seeding time (not pictured) at one trial in 2025.

2019-2025 LONG-TERM RESULTS

Soybean Biological Trials

Evaluating different biological products on-farm

Trial Information

Thirty-seven trials have compared an application of a biological product vs. untreated soybeans on-farm from 2019 to 2025.

Biological products are chosen by the farmer and applied according to label recommendations.

Fifteen products have been tested to date (Table 1).

Supporting Data

The goal of these trials is to assess the impact of biological products on yield, therefore the only supporting data collected are to determine living plant stands.

Yield and Economic Results

There have been no positive yield responses with the use of these products (Table 1).

There has been one, significant negative response where the application of Crop Aid Foliar reduced soybean yield by 1.8 bu/ac.

These products cost anywhere from approximately $5 to $28/ac. With no yield improvements, there has been a loss in profit equivalent to the product cost.

Currently the On-Farm Network only considers a product's return on investment in the application year.

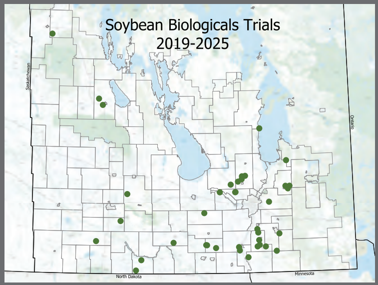
TABLE 1: Biological products tested on-farm (2019 –2025)

Biological Product	# of Trials	Yield Response?
Envita	15	No
Fertiactyl	5	No
OHM	3	No
Release HA/Humic Acid	2	No
Primacy ALPHA	2	No
EZ-Gro Prime	1	No
Active Flower	1	No
HeadsUp (seed treatement)	1	No
ACF-SR (in-furrow)	1	No
Crop Aid Soil/PLUS	2	No
WAVE	2	No
PhycoTerra FX	1	No
Crop Aid Foliar	1	Yes, negative

FIGURE 1: Biological crop inputs have been tested on-farm since 2019 with 37 on-farm trials to-date.

Recommendations from this Research

- There are a lot of biological products entering the market, all with different claims.
- Testing these products on-farm is the best course of action to determine how these products perform in your production system.



2025 RESULTS

Soybean Seeding Equipment Trial

NEW TRIAL TYPE Comparing a seeder to a planter on-farm

Background

Solid seeding soybeans with an air seeder (7.5″–10″ rows) is a normal practice in Manitoba but using a planter with intermediate and wide row spacings (15″–30″) is common in some regions.

Farmers who have access to both equipment types – or wonder about using a different equipment type – may have questions about how different row spacings and seeding equipment affects disease pressure and yield in soybean production.

Trial Information

Two soybean trials in 2025 tested an air seeder with 10″ row spacing vs. a planter with 30″ row spacing.

One trial (SSE01) used a mid-season maturity variety (P004Z87E) and the other (SSE02) used a long-season maturity variety (P008Z25E).

All other agronomic practices, including seeding rate, remained consistent across treatments.

Supporting Data

Plant counts were recorded during vegetative (V) and the same areas revisited for reproductive (R) stages.

At SSE01, average early establishment and late season survivability were similar between row spacings (Table 1).

At SSE02, average early establishment in the 10″ rows was significantly lower (67%) than 30″ rows (93%) (Table 1). The 26% lower emergence in the 10″ rows was likely due to soil crusting at the site and seedlings in the 30″ rows were more effective at pushing up together through the soil crust layer than seedlings in the narrow rows.

Percent canopy closure was assessed using the Canopeo app at R1, R3 and R5 growth stages.

- At R1, at both trials the 10″ rows had an average of 15% more row closure than the 30″ and at R3, at both trials the 10″ rows had an average of 16% more row closure than the 30″.
- At R5 at SSE01, the 10″ rows had 15% more row closure than the 30″ rows and at R5 at SSE02 there were no canopy closure differences.

Weed density was assessed at R5.

- At SSE01, there were significantly more weeds on average in the 30″ rows (22 weeds/0.5m^2) compared to 10″ rows (5 weeds/0.5m^2).
- At SSE02 there were no weed density differences between row spacings.

Disease pressure was evaluated during R-stages and there were no significant disease differences between row spacings at both trials.

Yield Results

There were no significant yield differences at both trials with soybeans seeded on 10″ rows with an air seeder vs. 30″ rows with a planter in 2025 (Table 1).

Economics of these trials aren't quantified since it's very farm and equipment specific in how different row spacings are achieved.

TABLE 1: Plant stand, canopy closure and yield results from two soybean equipment (air seeder vs. planter) trials conducted in 2025.

			V-Stages		R-Stages		Canopy Closure (%)					
Trial ID	Seeding Rate (seeds/ac)	Row Spacing (Equipment Type)	Early-Season Plant Stand	% of Seeding Rate Est'd.	Late-Season Plant Stand	% of Seeding Rate Survived	R1	R3	R5	Weed Density	Yield (bu/ac)	Sig. Yield Diff.?
SSE01	160,000	10″ (air seeder)	140,000	88%	143,625	90%	**66 a**	**86 a**	**99 a**	**5 b**	40.8	No
		30″ (planter)	145,625	91%	146,500	92%	**52 b**	**70 b**	**84 b**	**22 a**	40.5	
SSE02	160,000	10″ (air seeder)	**106,600 b**	67%	**107,500 b**	67%	**79 a**	**91 a**	99	3	41.9	No
		30″ (planter)	**148,000 a**	93%	**147,400 a**	92%	**63 b**	**75 b**	94	5	42.1	

Values within columns per trial ID followed by different letters are significantly different ($p < 0.05$)

FIGURE 1: 30″ vs. 10″ rows on June 10 at V1 (L) and on June 26 at V3 (R) and 30″ vs 10″ rows on August 19 at R5. All pictures are from the SSE01 trial.

2025 RESULTS

Soybean Boron Fertility Trials

★ NEW TRIAL TYPE Evaluating foliar boron applications on-farm

Background Information:
Boron is a micronutrient needed in small quantities for crop growth, though overall, soybeans are quite tolerant to boron deficiency and don't often respond to boron fertilizer.

Soybeans grown on soils that are low in organic matter, sandy soils and peat soils are more likely to be low in boron.

Soybeans are highly sensitive to toxicity from boron fertilizer applications.

Trial Information:
Trials in 2025 compared soybeans with a foliar application of boron fertilizer (Solubor) vs. untreated. Nine boron trials were established and five were completed.

Solubor is a water-soluble boron fertilizer product containing 20.85% boron that can be foliar applied.

TABLE 1: Results from soybean boron fertility trials conducted in 2025.

Trial ID	R.M.	Soil Test Boron (ppm)	Soil Boron Interpretation (AGVISE)	Treatment	Plant Boron (ppm)	Plant Boron Interpretation (AGVISE)	Nodule Rating (0-4)	Yield (bu/ac)	Significant Yield Difference?
SBF03	Emerson-Franklin	0.4	V. Low	Untreated	33	Sufficient	**3.0 b**	46.9	No
				Solubor	32	Sufficient	**3.6 a**	47.9	
SBF04	Brokenhead	1.8	High	Untreated	**42 b**	Sufficient	3.1	42.2	No
				Solubor	**48 a**	Sufficient	2.9	43.5	
SBF06	Hanover	0.7	Low	Untreated	32	Sufficient	3.0	53.7	No
				Solubor	34	Sufficient	3.0	53.1	
SBF07	Lorne	0.3	V. Low	Untreated	**34 b**	Sufficient	3.8	52.8	No
				Solubor	**38 a**	Sufficient	3.9	51.7	
SBF09	La Broquerie	0.8	Low	Untreated	28	Sufficient	3.5	50.2	No
				Solubor	28	Sufficient	3.6	49.6	

Values within columns per trial ID followed by different letters are significantly different ($p < 0.05$)

Solubor was tank-mixed with the second herbicide pass at a rate of 0.5 lb/ac with application timing ranging from second unrolled trifoliate (V2) to beginning bloom (R1) stages depending on the trial.

Supporting Data:
Each field was composite soil sampled (0''– 6'') in spring and analyzed for boron (ppm) (Table 1).

- Soil boron levels were interpreted by AGVISE Laboratories and considered 'very low' at SBF03 (0.4 ppm) and SBF07 (0.3 ppm), 'low' at SBF06 (0.7 ppm) and SBF09 (0.8 ppm) and 'high' at SBF04 (1.8 ppm).

Trials were tissue sampled a minimum of 10 days after product application and analyzed for total boron (ppm). According to AGVISE, the boron sufficiency range is 20 to 55 ppm (Table 1).

- Plant boron was considered sufficient (>20 ppm) in all plant samples and ranged from 25–44 ppm in untreated areas and 24–51 ppm in areas treated with Solubor.
- Plant tissue boron was significantly higher than untreated at two trials, SBF04 and SBF09. There were no significant differences in plant boron at all other trials.

Nodulation ratings (count of pink, active nodules per plant using a 0–4 scale) were conducted at flowering (R1–R2). There were significantly more nodules at SBF03 in the Solubor treated strips (rating of 3.6) vs. untreated strips (rating of 3). Nodule rating was similar between treatments at all other trials.

There were no visible crop micronutrient deficiency symptoms or boron fertilizer toxicity symptoms observed at any trials during field visits.

Yield and Economic Results:
There were no significant yield differences between Solubor treated vs. untreated soybeans in 2025 (Table 1).

As a result, there was a loss in profit equal to the cost of the Solubor ($2/ac).

2025 RESULTS

Pea Seed Treatment Trials

Comparing treated vs. untreated seed on-farm

Trial Information

Two trials investigated pea seed treatments:

- One trial located in the R.M. of Morris (PST01) investigated a fungicide seed treatment (EverGol Energy) vs. untreated seed.
- The second trial located in the R.M. of Dauphin (PST02) investigated a tank mix of two fungicide seed treatments (RANCONA Trio + Belmont) vs. untreated seed.
- RANCONA Trio + Belmont tank mix offers early season control (3-4 weeks only) of Aphanomyces root rot.

Supporting Data

Both trials were soil sampled and tested for the presence of *Aphanomyces euteiches*, the causal agent of Aphanomyces root rot in peas.

At PST01, Aphanomyces root rot was not detected in the "low risk" (i.e. field average) sample, but it was detected at low levels in the "high risk" (i.e. low-lying areas) sample.

At PST02, Aphanomyces root rot wasn't detected in any samples.

At the V6 stage, 10 plants per plot were rated for root rot incidence (percent of plants infected) and severity (0-9 scale where 0 is no root rot symptoms and 9 is severe symptoms) (Figure 1).

At PST01, 23% fewer plants were infected with root rot when comparing treated to untreated peas. At PST02, 13% fewer plants were infected with root rot in the treated peas compared to untreated (Table 1).

Root rot severity was similar between treated and untreated peas at PST01 but was significantly reduced with the seed treatments at PST02. Overall severity remained low at both sites across treatments with an average score of 1.2 (range of 0.75 to 1.5) out of nine.

***FIGURE 1.** Pea root rot severity ratings. L to R: 0 = healthy roots, 1 = infection at the point of seed attachment and 2 = lesion covering 5-10% of roots.*

Yield and Economic Results

There were no significant yield differences between pea seed treatments or untreated peas in 2025 (Table 1).

Since there were no yield increases to cover the seed treatment cost, there was a loss in profit of approximately $16-19/ac for EverGol Energy and $21/ac for RANCONA Trio + Belmont.

TABLE 1: 2025 PEA SEED TREATMENT TRIALS

Trial ID	R.M.	Seed Treatment	Germ. rate	Plant Stand (plants/ft^2)	Incidence (% of plants infected)	Severity (0-9 scale)	Yield (bu/ac)	Significant Yield Difference?
PST01	Morris	EverGol Energy	79%	6.0	65%	0.8	50.5	No
		Untreated	91%	5.7	88%	1.2	47.3	
PST02	Dauphin	RANCONA Trio + Belmont	76%	6.0	85%	**1.2 b**	51.6	No
		Untreated	75%	5.8	98%	**1.5 a**	51.8	

Values within columns followed by different letters are significantly different at $p<0.05$.

Pea Seed Treatment Trials

Comparing treated vs. untreated seed on-farm

Trial information

Seven trials evaluated pea seed treatments from 2023 to 2025.

Five trials evaluated a fungicide seed treatment vs. untreated seed.

Two trials evaluated a fungicide seed treatment plus an insecticide component vs. untreated seed.

Supporting data

On average, 9% fewer plants were infected with root rot when comparing treated to untreated peas.

Root rot severity between treatments has been similar (0.6 for treated vs. 0.7 for untreated on a 0-9 scale).

Insecticide seed treatment components tested in these trials offer protection from pea leaf weevil, and wireworm crop damage.

With the two trials involving insecticide seed treatments there has been no significant differences in total number of pea leaf weevil notches per plant when comparing treated to untreated peas.

Yield and economic results

To date, there have been no significant yield differences between pea seed treatments or untreated peas (Figure 1).

Since there were no yield increases to cover the extra seed treatment cost, there was a loss in profit of approximately $16-19/ac for fungicide seed treatments and $12.5/ac for insecticide seed treatments.

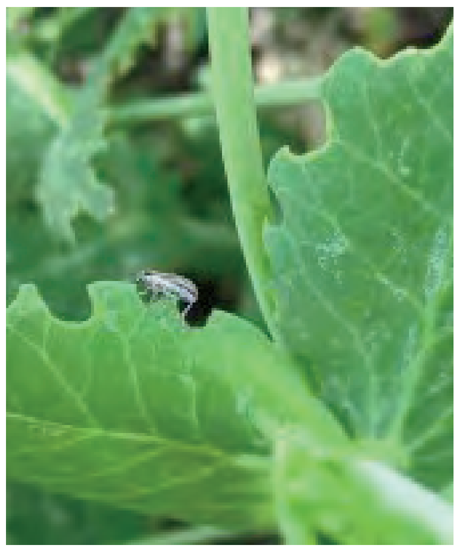
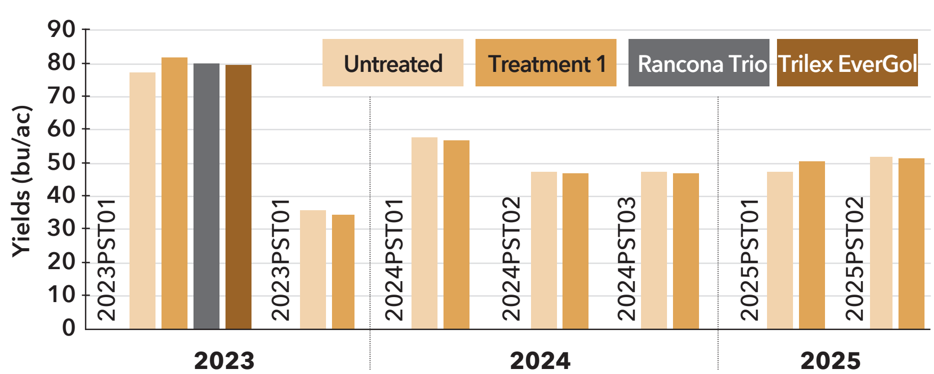


FIGURE 2. Pea leaf weevil feeding on pea leaf margins.

FIGURE 1: Pea yields of trials comparing untreated and treated seed from 2023 to 2025. Treatment 1 in 2023PST01 and 2024PST03 was a fungicide plus an insecticide. Treatment 1 in the other five trials was a fungicide component only.

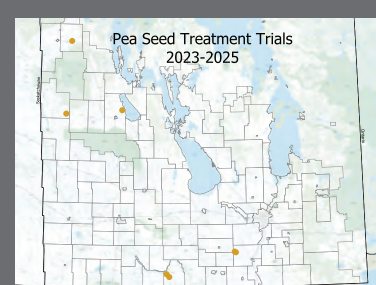


Recommendations from this Research

More research is required to determine when insecticide seed treatments are likely to be economical. Currently, seed treatment decisions are based on regional history of pea leaf weevil populations and damage levels.

An integrated disease management approach is recommended to mitigate the effect of root rots in peas:

- A minimum of four years between pea crops. If Aphanomyces root rot is confirmed in the field, extend this to 6-8 years.
- Seed peas into well drained fields with light texture soils.
- Seed peas early to maximize yield and reduce root rot severity
- Scout peas in June and July to evaluate root rot severity and distribution and soil test for Aphanomyces root rot.



Pea Fungicide Trials

Evaluating fungicide applications on-farm

Trial Information

Four trials compared a single fungicide application applied at early flowering (R2) to untreated strips (PF01, PF02, PF03, PF04).

- At three of those trials (PF01, PF02, PF04), a third treatment consisting of a biostimulant (WAVE) plus fungicide tank mix was applied.

One trial (PF05) compared a double application of fungicide to a single application. The first application was at beginning bloom stage (R2) and the second application was 11 days later at flat pod stage (R3).

Supporting Data

The trials were all located in the southwest, Parkland and Interlake regions and less than normal rainfall occurred during June and July at those sites.

METOS weather stations equipped with disease modelling were placed at three trial sites (PF01, PF02, PF04).

Aschochyta/mycosphaerella blight (A/M) disease modelling is based on whether environmental conditions are conducive to the initiation of infection including cool temperatures (20-21°C) with high humidity and leaf wetness in the crop canopy. The modelling at these sites showed that conditions weren't conducive for severe infection in the weeks leading up to and following flowering. Maximum model infection reached 77% at all sites and if 100% is reached, then protective measures are recommended.

Models using on-site real time data is an additional tool that can be used to strengthen fungicide application decisions.

Foliar and stem infections of A/M and other fungal diseases are rated 10–14 days after application. The percent of plants infected with foliar and stem A/M lesions were similar between treatments.

Average severity of foliar and stem A/M infections were similar between treatments. A/M severity was found to be moderate to severe but remained in the lower third of the canopy (Figure 1).

White mould and downy mildew were also found in varying degrees at all sites but disease symptoms between treatments were similar.

Yield and Economic Results

There were no significant yield differences at the four trials comparing a single fungicide application or a single fungicide plus WAVE biostimulant application against untreated peas (Figure 2).

There was no significant yield difference in the double vs. single application fungicide trial (Figure 2).

Assuming an approximate product cost of $15-20/ac for fungicide and $6/ac for WAVE a profit loss occurred at all trials equal to the cost of the products.

Figure 1: Severity of foliar Aschochyta/mycosphaerella blight (A/M) infections rated on a scale from 1 to 7 where 1 is no symptoms and 7 is stunted and dying plants.

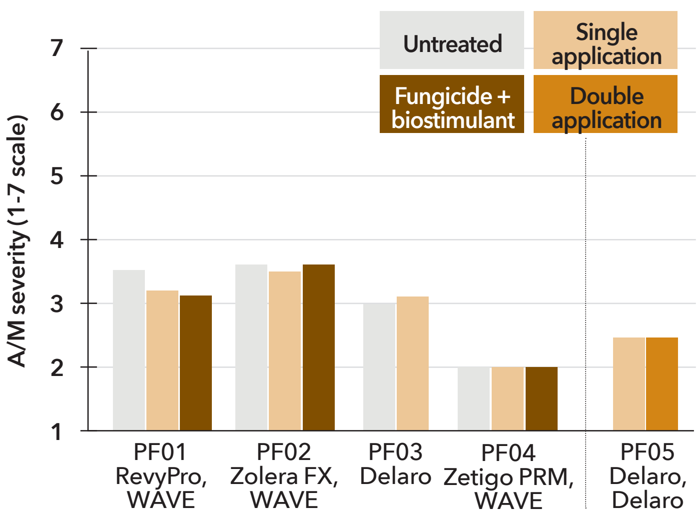
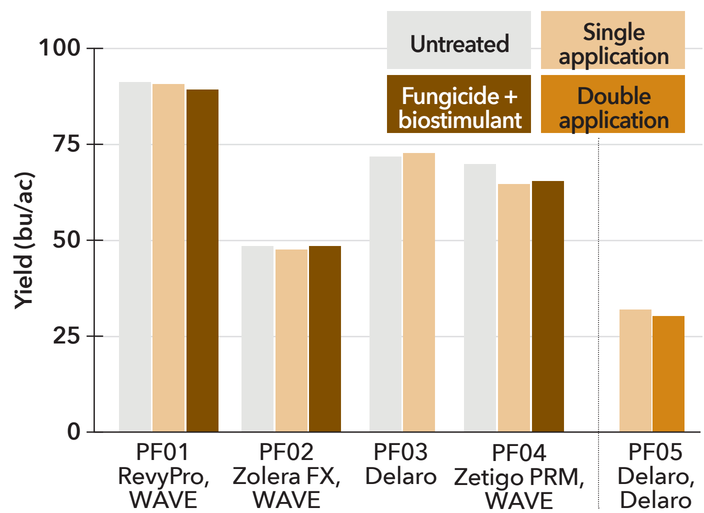


FIGURE 2: Yield responses to a single fungicide application vs. a single fungicide plus biostimulant application and a double vs. single fungicide application.



Pea Fungicide Trials

Evaluating fungicide applications on-farm

Trial Information

Sixty-six on-farm trials have explored fungicide applications in peas from 2017–2025.

- 42 trials have compared a single application vs. untreated peas.
- 24 trials have compared two applications (double) vs. a single application.

Products are chosen by the farmer and applied according to label recommendations.

First applications are typically at flower bud to beginning bloom stages (R1-R2) and second applications are 10–14 days later at flat pod stage (R3).

Supporting Data

Pea disease ratings have occurred since 2019. Ascochyta/Mycosphaerella blight (A/M) is the main target of pea fungicides and both foliar and stem A/M infections are rated.

Single Application vs. Untreated:
The percentage of plants with foliar A/M infections has been similar between a single application (77%) and untreated (76%) peas. The severity of those foliar infections has been reduced with a fungicide application at 56% of trials. The percentage of plants with stem A/M infections has been similar between a single application (48%) and untreated peas (52%). The severity of stem infections has been reduced at 42% of trials with a single fungicide application.

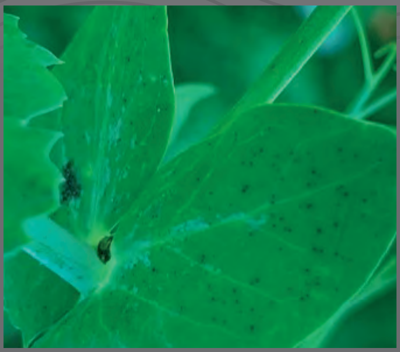
Double vs. Single Application:
The percentage of plants with foliar A/M infections has been similar between a double application (77%) and a single application (79%). The severity of foliar infections was reduced at 57% of trials with a double application. The percentage of plants with stem A/M infections has been similar between a double (42%) and a single (50%) application. The severity of stem infections was reduced at 43% of trials with a double application.

Yield Results*

Single Application vs. Untreated:
A single application of fungicide significantly improved pea yields 24% of the time vs. untreated, increasing yield by 5.8 bu/ac on average resulting in a profit increase of $18.11/ac - $23.11/ac.

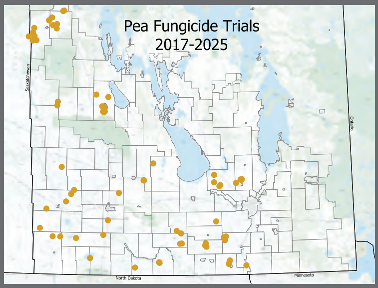
Double vs. Single Application:
Two fungicide applications significantly improved pea yield 29% of the time vs. one application increasing yield by 5.1 bu/ac on average resulting in a profit loss of $-6.49/ac to a profit increase of $3.51/ac.)

* based on $6.57/bu pea sell price and fungicide product cost of $15-$20/ac



Recommendations from this Research

- To aid in the fungicide application process, begin scouting for A/M blight symptoms from the 10th node stage (V10) during the vegetative stages to the beginning bloom stage (R2). Typically, this occurs mid-June to mid-July.
- Use MPSG's *Fungicide Decision Worksheet* to assess risk factors such as crop temperatures, high relative humidity and high leaf wetness in a dense canopy.
- Revisit pea fields following application to assess if a second application may be warranted.



AVERAGE YIELDS, 2017-2025 BY FUNGICIDE APPLICATION TYPE

Untreated	62.8 bu/ac*
Single fungicide application	64.6 bu/ac*
Single fungicide application	65.1 bu/ac**
Two fungicide applications	67.2 bu/ac**

*Based on 42 site years field scale OFN trial data **Based on 24 site years field scale OFN trial data

2025 RESULTS

Pea Biological Trials

Evaluating different biological products on-farm

Trial Information

Two pea biological trials were completed in 2025. One was in the R.M. of Rockwood (PB02) and one in the R.M. of Louise (PB04).

Three foliar applied products were tested, and all are promoted as biostimulants:

- Bio-Forge Premier claims to enhance plant resilience to stress and protect yield potential.
- ONYX Liquid Sugar Plus claims to develop soil biology improving soil structure to improve plant disease and stress tolerance.
- WAVE claims to improve nutrient use efficiency, help maximize yield potential and mitigate abiotic stressors.

At PB04, all strips received a single fungicide cover application.

All other management practices were consistent across all treatments.

Supporting Data

The primary goal of these treatments is to assess the impact of various biological products on pea yields. As a result, the only supporting data collected are plant stands.

Yield and Economic Results

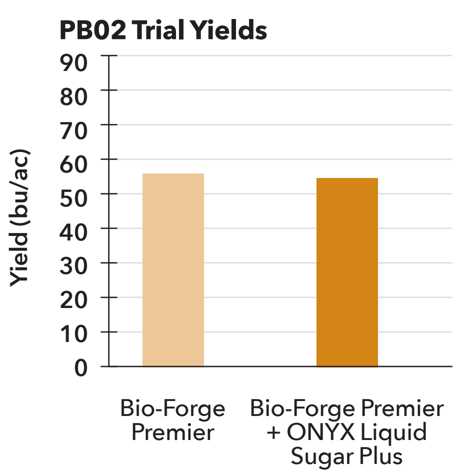
There were no significant yield responses to an application of the biological products tested in 2025 (Figure 1).

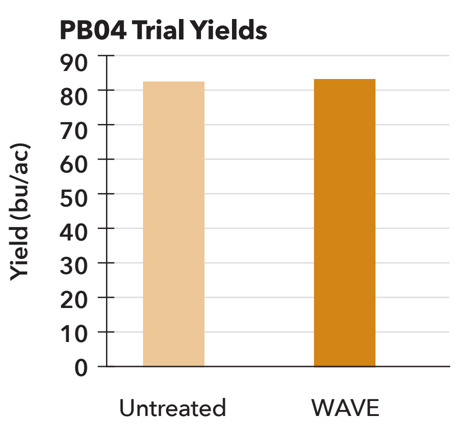
As a result, there was a loss in profit equivalent to the cost of these products ($6.41/ac for WAVE, $7.15/acre for ONYX Liquid Sugar Plus and $11.27/ac for Bio-Forge Premier).

2025 PEA BIOLOGICAL TRIAL SITES

Trial ID	R.M.	Variety	Seeding Rate (lbs/ac)	Application Date (Stage)	Treatment	Plant Stand	Yield (bu/ac)	Significant difference?
PB02	Rockwood	AAC Carver	180	July 2 (R3)	Bio-Forge Premier	293,750	56.0	No
					Bio-Forge Premier + ONYX Liquid Sugar Plus	284,125	55.0	
PB04	Louise	CDC Boundless	168	June 1 (R2)	Untreated	246,750	82.5	No
					WAVE	244,375	83.4	

FIGURE 1: Yield comparisons of pea biological trials.





Pea Biological Trials

Evaluating different plant biological products on-farm

Background Information

Biological products, specifically, biostimulant products are meant to stimulate natural processes to enhance nutrient uptake, nutrient use efficiency, tolerance to abiotic stress or crop quality and yield.

Trial Information

Three trials have compared a single foliar application of biological products to untreated pea strips since 2022.

One 2025 trial compared a tank mix of two foliar applied biological products to a single product.

Products are chosen by the farmer and applied according to label instructions.

Supporting Data

The primary goal of these trials is to assess the impact of various biological products on yield. As a result, the only supporting data collected are plant stands.

The different biological products didn't significantly change plant stands.

Yield Results:

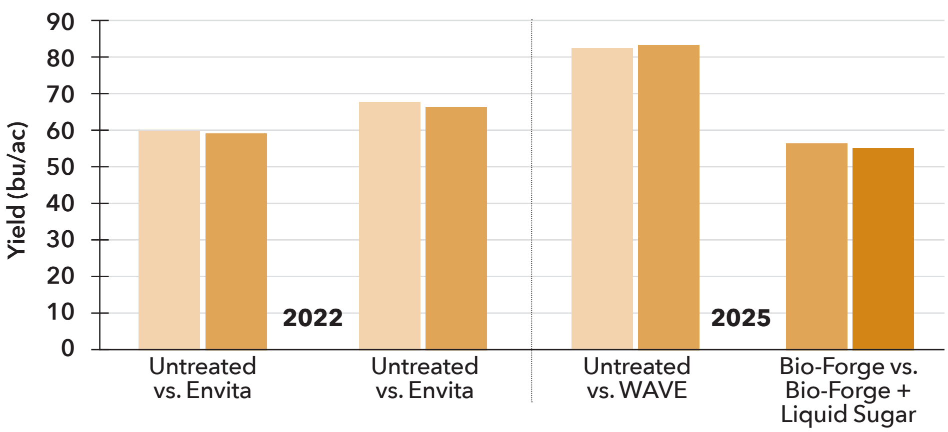
The different biological products tested did not significantly improve pea yields on-farm to-date (Figure 1).

These biological products cost anywhere from $6 to $14.50/acre. With no yield improvements, there has been a loss in profit equivalent to the product cost.

2022 AND 2025 PEA BIOLOGICAL PRODUCTS TESTED

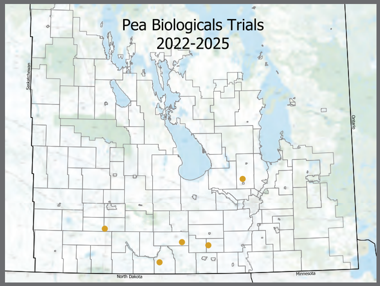
Biological Product	Number of Trials	Change in Plant Stand?	Yield Response?
Envita	2	No	No
WAVE	1	No	No
Bio-Forge Premier	1	No	No
ONYX Liquid Sugar Plus	1	No	No

FIGURE 1: Yields of untreated vs. single biological application trials and a single vs. double application trial.



Recommendations from this Research

- Currently the On-Farm Network only considers a product's return on investment in the application year.
- Farmer interest in using biostimulants to increase production and improve soil health is steadily growing.
- Field-scale validation is needed to determine the yield response and return on investment of these plant biostimulant products in different cropping systems.



2025 RESULTS

Dry Bean Fungicide Trials

Evaluating fungicide applications on-farm

Trial Information

One trial, in the R. M. of Rhineland, compared a single application of Proline GOLD vs. Proline GOLD + Serenade OPTI tank mix applied at beginning pod (R2) in dry bean vs. untreated.

- Proline GOLD fungicide offers control of white mould in dry bean.
- Serenade OPTI biological fungicide (active ingredient: *Bacillus subtilis)* aids in the suppression of white mould in dry bean.
- All other management practices were consistent across all treatments.

Supporting Data

Rainfall in July at flowering plays a large role in white mould development. At the site, rainfall in July (113 mm) was 160% of normal tapering off to 64% of normal in August (42 mm) (Figure 2). Diseases were rated 27 days after application:

- White mould was present at the site, but incidence (% of plants with symptoms) and severity ratings (0-5 scale) were similar among treatments. Average incidence was 24% and average severity was low at 0.4 (Table 1).
- Bacterial blight was present and an average of 70% of plants were infected.
- Fusarium root rot was prevalent at the site but wasn't rated.

Yield and Economic Results

There were no significant yield differences with the fungicide or the biological + fungicide tank mix compared to the untreated (Figure 1), as a result there was a loss in profit equivalent to the cost of the products ($27/ac for Proline GOLD and $13.45/ac Serenade OPTI.)

TABLE 1: Results of a dry bean fungicide and biological fungicide trial conducted in 2025.

Trial ID	Market Class (Variety)	Trial Type	App. Date (Stage)	Treatments	Plant Stand (pl/ac)	White Mould Incidence (%)[1]	White Mould Severity (0-5)[2]	Yield (lbs/ac)	Significant Yield Difference?
DBF01	Pinto (Windbreaker)	1,1+1 vs. 0	July 16 (R2)	Untreated	73,000	30	0.6	3238	No
				Proline GOLD	73,333	33	0.5	3382	
				Proline GOLD + Serenade OPTI	80,000	10	0.1	3379	

(1) Percent of plants infected (2) Rated on a 0-5 scale where 0 = no apparent symptoms and 5 = death of plants caused by massive mycelial growth

FIGURE 1: Yields (lbs/ac) of untreated, fungicide and fungicide + biological fungicide tank mix treatments.

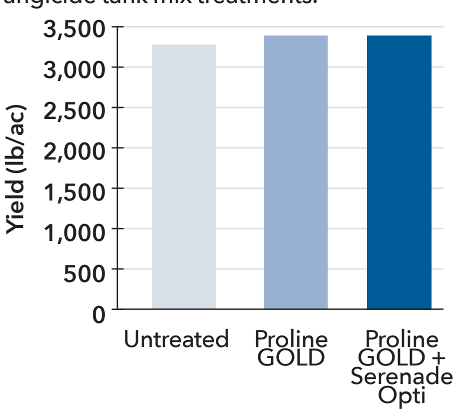


FIGURE 2: Conditions at the trial site were conducive to white mould infection with a dense canopy (L) showing some white mould symptoms (R). Plants are rated for white mould approximately two weeks after fungicide application from zero (no symptoms) to five (massive mycelial growth).

Dry Bean Fungicide Trials

Evaluating fungicide applications on-farm

Trial Information

Twenty-two trials from 2016 to 2025 have compared a single application of foliar fungicide vs. untreated and two trials compared two applications vs. one.

- The first fungicide passes were most frequently applied at beginning pod (R2), and second passes at R3–R4.
- Products included Acapela, Lance, Cotegra, Allegro, Proline GOLD, DYAX and ZOLERA FX.
- Twenty-one trials were grown on 30″ rows and three were grown on 15″ or narrower rows.

Supporting Data

White mould is the main target disease of fungicides applied in dry bean.

Rainfall in July at flowering plays a large role in white mould development. July rainfall was above normal at five of the 24 (21%) trials, otherwise trials were drier than normal.

Diseases were rated (Figure 2) for incidence and severity approximately 10 to 14 days after application.

White mould was present at 46% of trials and fungicide applications reduced the percentage of plants with symptoms at seven out of 11 (64%) trials where the disease was present. Severity has remained low to moderate on average.

Yield and Economic Results

A single foliar fungicide application has improved dry bean yield at two trials (9% of the time) (Figure 1). Yields of those trials were improved by 165–175 lbs/ac.

Two foliar fungicide applications haven't improved yields vs. one foliar application.

Assuming an average product cost of $22.5/ac and a dry bean sell price of $0.40/lb, a break-even yield is approximately 56 lbs/ac.

FIGURE 2: White mould incidence (% of plants infected) rating results of 23 dry bean untreated vs. one fungicide application trials from 2016 - 2025. If a trial has no graph bars, there was no white mould present in the trial.

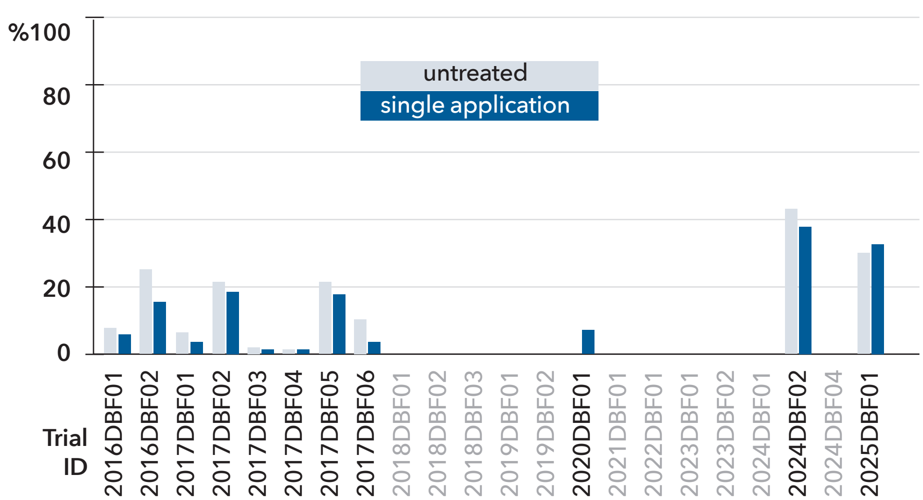
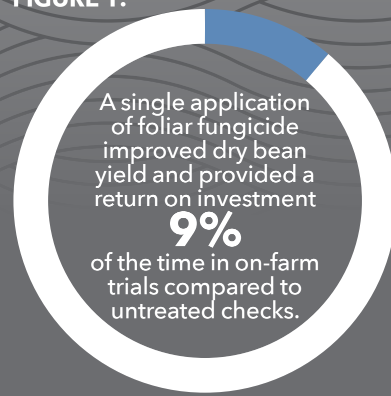
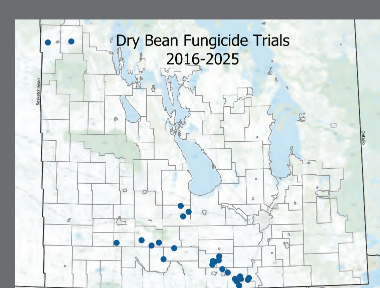


FIGURE 1:



Recommendations from this Research

- Fungicides for white mould are preventative, meaning they must be applied before symptoms of the disease are observed in the field.
- White mould has the potential to limit dry bean yields when conditions are optimal for disease development (warm, humid conditions around flowering) and fungicides can protect yield and provide a return on investment in those scenarios.
- Use MPSG's *Fungicide Decision Worksheet for Managing White Mould in Dry Beans* to assess risk factors like weather conditions and crop history.



2025 RESULTS

Dry Bean Inoculant Trials

Evaluating inoculant products on-farm

Trial Information

Four trials tested two inoculant products in dry edible beans.

- LEGUMEFiX is a peat-based rhizobium inoculant for legume crops containing *Rhizobium tropici*.
- BOS is a peat-based product for dry bean combining a rhizobium inoculant *(Rhizobium leguminosarum biovar phaseoli)* and a beneficial growth promoting bacteria product *(Pseudomonas)*.

Two trials (DB1IN01 and DB1IN04) compared no inoculant with 65 and 60 lb/ac nitrogen (N) fertilizer respectively to LEGUMEFiX and no additional N.

One trial (DB1IN02) compared no inoculant to LEGUMEFiX with 70 lb/ac N broadcasted across both treatments.

One trial (DB1IN03) had three treatments. Treatment one had no inoculant and no N, treatment two was BOS, without N and treatment three had 34 lb/ac N without inoculant.

Supporting Data

The total number of nodules per plant was assessed at flowering (R2) (Fig. 1).

- The LEGUMEFiX treatment had significantly more nodules compared to no inoculant with N at both DB1IN01 and DB1IN04.
- The no inoculant treatment at DB1IN02 had significantly more nodules compared to LEGUMEFiX.
- At DB1IN03, the no inoculant with N treatment had significantly more nodules than the BOS treatment. The no inoculant, no N treatment had a similar number of nodules compared to the other two treatments.

At DB1IN04, plant tissue was analyzed at Agvise Laboratories for total N. There were no significant N content differences between treatments, and all samples were considered "sufficient" in N.

Yield and Economic Results

At DB1IN03, the 34 lbs N/ac without inoculant treatment yielded significantly more by 230 lb/ac than the BOS inoculant treatment without N, and the same treatment yielded 191 lb/ac more than the no inoculant, no N treatment (Fig. 2).

Assuming a cost of $0.86/lb of actual N and a black bean sell price of $0.28/lb, the treatment of N fertilizer without inoculant resulted in an additional profit of $44.11/ac over the BOS inoculant treatment (BOS is $8.95/ac) and an additional $24.24/ac over the no inoculant, no N treatment.

There were no significant yield differences at DB1IN02 and as a result there was a loss in profit at equivalent to the cost of the inoculant ($3.91-4.69/ac for LEGUMEFiX).

There were no significant yield differences at DB1IN01 and DB1IN04, as a result there was a loss in profit equivalent to the cost of the products ($3.91-$4.69/ac for LEGUMEFiX and $51.60 - $55.90/ac for N (based on $0.86/lb of actual N)).

TABLE 1: Soil nitrogen test results per trial ID.

Trial ID (market class)	Spring soil test N lb/ac (0"-24")
DB1IN01 Black	55
DB1IN02 Pinto	89 (after application 70 lb N/ac)
DB1IN03 Black	16
DB1IN04 Black	30*

* Estimate only; not soil tested.

FIGURE 1: Average number of nodules per plant for each treatment and trial at flowering (R2).

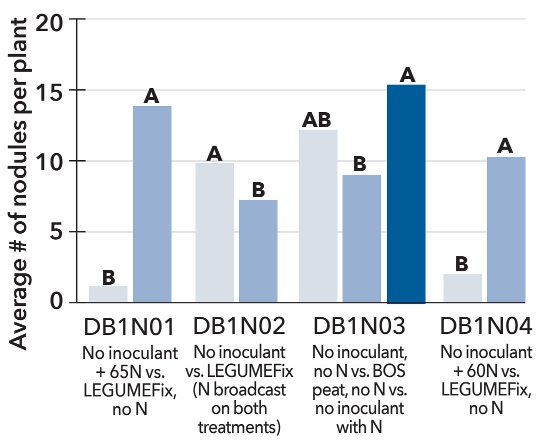
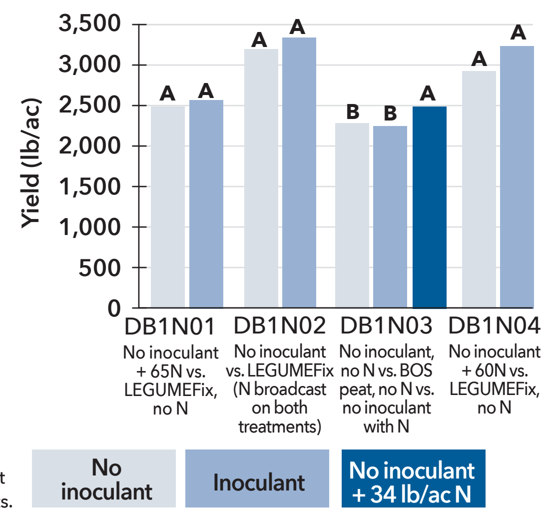


FIGURE 2: Yields (lbs/ac) of different inoculation and nitrogen (N) fertility treatments.



Different letters above trial bars indicates where statistically significant (p<0.05) nodule and yield differences were found between treatments.

2019-2025 LONG-TERM RESULTS

Dry Bean Inoculant Trials

Evaluating inoculant products on-farm

Background Information

Dry beans are relatively poor nitrogen-fixers compared to other legumes and as a result, dry beans are typically fertilized with nitrogen (N) fertilizer, similar to non-legume crops.

Past research* in Manitoba has shown little effect on yield or return on investment of different N fertilizer rates applied in dry bean production.

Inoculation with effective rhizobia strains have the potential to improve dry bean N-fixation and reduce N fertilizer use.

*Led by Kristen Macmillan, MPSG-UM Agronomist-in-Residence at the University of Manitoba.

FIGURE 1: *Dry bean root nodules at V8 stage.*

Trial Information

Nine on-farm trials from 2019 to 2025 tested an inoculant product in dry beans.

- Generally, the farms normal dry bean N rates were applied to both inoculated and non-inoculated dry beans, however, two trials in 2025 compared an inoculant treatment with no additional N to the farm's normal N application practices without inoculant.

Inoculant products included BOS peat at two trials, Agtiv Thrive liquid at two trials, Agtiv Fuel liquid at two trials and LEGUMEFiX peat at three trials.

All products were applied directly to seed prior to seeding.

Supporting Data

The total number of nodules per plant was assessed at flowering (R2) and an average nodule number per plot was calculated.

At two of four trials in 2025 there were significantly more nodules per plant in the LEGUMEFiX inoculant vs. no inoculant treatment. Conversely, at the other two trials, the no inoculant treatments had significantly more nodules per plant than dry beans with inoculant.

At the other five trials held in 2019 and 2023, there were no differences in nodule numbers between untreated dry beans and dry beans treated with inoculant.

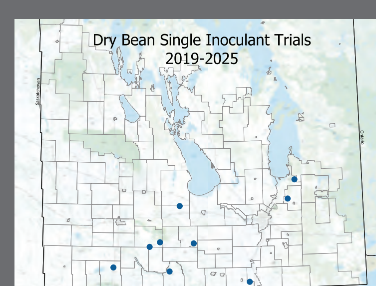
Yield and Economic Results

Yield hasn't been significantly increased with the inoculant products tested on-farm to date.

There was one trial where the 34 lbs/ac N without inoculant treatment resulted in significantly higher yields than inoculated dry beans without N and untreated dry beans without N. (Refer to 2025 Dry Bean Inoculant Trial Results for details).

Recommendations from this Research

- Research has shown that dry beans fix some nitrogen via biological fixation producing less than 45% of their nitrogen requirement, on average. However, dry beans are relatively poor nitrogen fixers compared to other pulse crops like field pea, and therefore require additional N fertilizers.
- Further investigation is underway in Manitoba on inoculants for dry beans. To date these products haven't been effective or widely available.



2025 RESULTS

Dry Bean Row Spacing Trials

★ **NEW TRIAL TYPE** Comparing different dry bean row spacings on-farm

FIGURE 1: Dry bean row spacing trial showing the wide (30″) row spacing treatment.

Background Information

Dry beans have traditionally been planted in wide rows to promote airflow in the crop canopy to prevent disease development (e.g., white mould) and to facilitate inter-row cultivation to manage weeds.

Past research* conducted in Manitoba and Saskatchewan has pointed to yield benefits associated with planting dry beans on narrow rows. This is due to faster crop canopy closure that out-competes later flushes of weeds and captures sunlight more efficiently.

Under dry conditions, narrow rows may also provide the added benefit of moisture conservation.

*Manitoba research led by Rob Gulden's Weed Ecology & Management Lab at the University of Manitoba from 2015-2018 and Sask. research led by Jeff Ewen at Saskatchewan Ministry of Agriculture.

Trial Information

One trial in 2025, located in the R.M. of Noth Norfolk, compared navy beans on intermediate (15″) and wide (30″) rows (Table 1).

The same seeding rate of 110,000 seeds/ac was used for both row spacings.

One planter was used for the 15″ rows and a separate planter was used for the 30″ rows.

All other management practices were consistent across all treatments.

Supporting Data

Plant counts were recorded at V4, and the same area was revisited at R7.

Average early and late season survivability were similar between row spacings.

Average lowest pod bearing node height was measured at maturity but there were no significant differences between row spacings.

Weed pressure was noted to be higher at crop maturity in the 30″ rows compared to 15″ rows but weed density was not quantified (Figure 1).

Yield and Economic Results

There was no significant yield advantage for dry beans planted on 15″ over 30″ rows.

The economics of these results aren't quantified since separate planters were used to achieve the row spacings.

TABLE 1: Results from dry bean row spacing trial completed in 2025.

Trial ID	R.M.	Market Class	Germ.	Seeding Rate (seeds/ac)	Row Spacing	Early Season Survivability (V)	Late Season Survivability (R)	Lowest Pod Node (in)	Yield (lb/ac)	Significant Yield Difference?
DBRS01	North Norfollk	Navy Bean T9905	85%	110,000	15″	79%	80%	6.6	2851	No
					30″	77%	79%	6.9	2589	

2025 RESULTS

Dry Bean Seeding Rate Trials

NEW TRIAL TYPE Comparing different dry bean seeding rates on-farm

Background Information

Target plant stands vary among dry bean market classes and row widths.

Past research* in Manitoba has shown that pinto and navy bean yields were the highest and most stable when grown on 7.5″–15″ row widths targeting moderate stand densities of 80,000 – 120,000 plants/acre.

The same research found in the wet years of 2015 and 2016, increasing plant population increased the severity of white mould disease pressure.

*Research led by Rob Gulden's Weed Ecology & Management Lab at the University of Manitoba from 2015-2018.

Trial Information

One trial in 2025, located in the R.M. of St. Clements tested dry bean seeding rates of 74,000 (low), 94,000 (farm normal) and 114,000 (high) seeds/ac (Table 1).

All seeding rate treatments were achieved with a 39 ft wide planter on 15″ row spacing.

Supporting Data

Plant counts were recorded at V4, and the same area was revisited at R7.

Average early and late season survivability were similar between seeding rates (Figure 1).

Average lowest pod bearing node height was measured at maturity but there were no significant differences between row spacings.

Yield and Economic Results

There were no significant yield differences between the seeding rates tested; therefore, the lowest seeding rate was the most economical rate (Table 1).

Assuming a pinto bean seed cost of $120/unit (1 unit = 100,000 seeds), each change of 20,000 seeds/ac from the normal rate resulted in either a profit loss or increase of $24/ac.

FIGURE 1: The dry bean emergence and survivability at the site was excellent and even between treatments (left and above). At maturity some volunteer hairy vetch was present (right).

TABLE 1: Dry bean seeding rate plant stand and yield results of one trial held in 2025.

Trial ID	R.M.	Market Class/ Variety	Germ.	Row spacing	Seeding Rate (seeds/ ac)	Early Season Survivability (V)	Late Season Survivability (R)	Lowest Pod Node (in)	Yield (lb/ac)	Significant?
DBSR01	St. Clements	Pinto Bean	97%	15″	74,000	97%	96%	5.2	2287	No
					94,000	91%	91%	5.0	2181	
					114,000	97%	97%	5.3	2190	

2025 RESULTS

Faba Bean Fungicide Application Trials

Evaluating fungicide applications on-farm

Trial Information

One trial, located in the R.M. of Argyle, compared a single application of fungicide vs. untreated faba beans.

The product tested was Zetigo PRM (groups 11 and 21) offering control of chocolate spot and suppression of white mould.

The fungicide was foliar applied at early flowering stage (R2) on June 28 at a rate of 0.4 L/ac.

All other management practices were consistent across both treatments.

Supporting Data

Chocolate spot is the main yield-limiting disease of concern in faba bean when weather conditions are conducive for development (15–20°C temperatures and humidity >70% around flowering.).

Conditions were relatively dry around flowering at the site with 36% of normal rainfall in June (32 mm) and 71% of normal rainfall (77 mm) in July (precipitation data from nearest Manitoba Agriculture weather station).

Diseases were rated 14 days after application at full pod (R5) stage and revisited 28 days after application at beginning maturity (R6) stage:

- At the first visit the plants were healthy (Figure 1.)
- At the second visit, chocolate spot was prevalent and found on most plants at the site but there were no significant differences in severity between treatments (Table 1).
- No white mould was found at the site.

Heavy rains following swathing caused harvest delays and some grain losses occurred, but losses weren't quantified (Figure 1).

Yield and Economic Results

There was no significant yield response to a single application of Zetigo PRM vs. untreated faba beans.

As a result, there was a loss in profit of approximately $20–25/acre, or the cost of the product.

FIGURE 1: A healthy plant found at the site approximately two weeks after fungicide application (top) and grain losses in the swath at harvest (bottom).

TABLE 1: Faba bean fungicide trial with chocolate spot incidence and severity ratings 28 days after application at beginning maturity (R6) and yield.

Faba bean Variety	R.M.	Product	Application Date (Stage)	Treatment	Chocolate Spot Rating at R6: % of Plants Infected	Chocolate Spot Rating at R6: Severity (1-5 scale)	Yield (bu/ac)	Significant Yield Difference?
Fabelle	Argyle	Zetigo PRM	June 28 (R2)	Untreated	100	3.2	62.1	No
				Treated	98	3.0	63.3	

Faba Bean Fungicide Application Trials

Evaluating fungicide applications on-farm

Trial Information

Four trials from 2020 to 2025 have explored fungicide applications in faba beans.

- Two trials have compared a single application vs. untreated.
- Two trials have compared two applications (double) vs. one application (single) all with the same product.

Products were chosen by the farmer and applied according to the label.

- First applications were typically applied at beginning bloom (R2) and second applications 10–14 days later at 20–50% bloom (R2.5–R3).
- Products included DYAX (2020FF01 and 2021FF03), Zolera ODX* (2021FF01) and Zetigo PRM (2025FF01).

**During the trial year this product was tested under the name Zolera ODX, but it has the same active ingredients as now sold Zolera FX.*

Supporting Data

Chocolate spot is the main disease target of fungicide application in faba beans and foliar infections were rated 14–28 days after application (Figure 1).

Single vs. untreated:

- The percent of plants with chocolate spot infections and the severity of those infections were reduced with a single fungicide application at one of the two trials.

Ripe faba bean plant from 2025FF01 at harvest on Sept. 30.

Double vs. single:

- The percentage of plants with chocolate spot infections and the severity of infections were similar between treatments at both trials.

July rainfall around flowering is critical for the disease's development. Percent rainfall in July was well above normal in 2020 (168% of normal at 2020FF01) and below normal in the other three trials (59% of normal on average).

Yield and Economic Results

At one trial (2020FF01), the yield of faba beans with a single application of DYAX was significantly higher than yield of untreated faba beans increasing yield by 16 bu/ac (Figure 2).

There were no yield differences at the other single vs. untreated trial (Figure 2). There were no yield differences at the two double vs. single application trials (Figure 2).

Assuming a product cost ranging from $15-$23/ac and a faba bean sell price of $12/ac, a breakeven yield increase would be approximately 1.3 to 1.9 bu/ac.

FIGURE 1: Chocolate spot disease severity ratings 14-28 days after application (rated on a scale of 1-7 where 1 = healthy plants and 7 = most severe symptoms) at four faba bean fungicide trials.

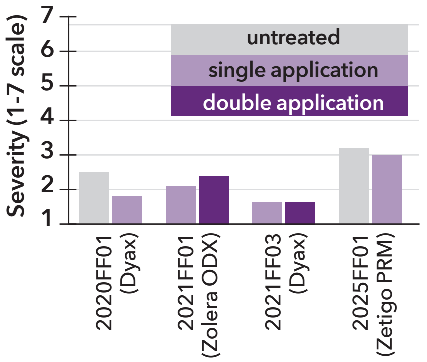
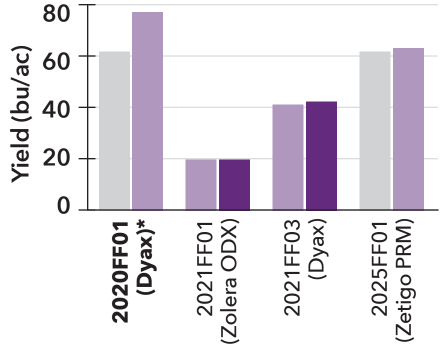


FIGURE 2: Yields (bu/ac) of four faba bean fungicide trials:



* Statistically significant ($p<0.05$) yield differences were found between treatments for this trial

Recommendations from this Research

- Scout for foliar and stem diseases from early July to September.
- The risk of developing chocolate spot infections is higher when weather conditions are conducive for its development (warm 15-20°C temperatures and humid conditions >70% around flowering).
- Several fungicides are registered for use on faba beans, however, very few are registered with activity on chocolate spot.

2025 RESULTS

Faba Bean Insecticide Trials

NEW TRIAL TYPE Evaluating insecticide applications on-farm

Background Information

Tannin faba bean varieties are grown for the human food/food processing market in Manitoba. As a result, grain quality of the harvest is key.

- Lygus bugs are a particular threat because they pierce pods, leaving behind dark sunken areas on the seed from enzymes in their saliva (figure 2.)
- Lygus bugs generally don't limit yield in faba bean, but they are a concern for seed quality and grading.
- Faba beans require less than 1% perforation damage to be graded No. 1 in Canada.

Economic thresholds aren't well established for faba beans, but some agronomists suggest a low threshold – as few as five lygus per 10 sweeps during early pod stages.

However, pollinators are important for seed set in faba beans and should be taken into consideration when making management decisions.

Trial Information

- One trial, located in the R.M. of Argyle, compared a single application of Carbine insecticide vs. untreated faba beans.
- Four replications of treated and untreated faba bean plots were spaced apart from each other and placed in the margins of a half-section field (Figure 1).

Carbine insecticide offers targeted* control of aphids and lygus bug. The insecticide was foliar applied at flat pod (R4) stage on July 8 at a rate of 81 g/ac.

The rest of the field, except the untreated plots, was sprayed with Carbine on the same day and apart from insecticide applications, all plots were managed the same agronomically.

* Carbine has minimal impact on many important beneficial insects and pollinators when applied as directed by label.

Supporting Data

Since the goal of this trial is to test differences in seed quality and grading between treatments, yield data wasn't captured.

After harvest, seed samples were graded according to Canadian Grain Commission guidelines.

Sweep netting at 50% flowering (R3), prior to insecticide application, found three to four lygus bugs (late-stage nymph and adult) per 10 sweeps (Figure 2).

Seed Grading and Economic Results

One application of Carbine insecticide significantly reduced perforated seeds by 1.95% compared to untreated plots (Table 1).

The Carbine treatment resulted in perforations <1%, therefore the grain would have received a No.1 grade whereas the untreated faba beans would be a No. 2 grade (1.0% perforations = No.1, 3.0% perforations = No. 2 to 3). Note that perforations weren't the only downgrading factor at this site and other factors, such as seed discolouration and splits, resulted in a final grade of No. 3 for both treatments with a sell price of $8/bu (No. 1-2 grade is a sell price of $9-10/bu) (Figure 1.)

TABLE 1: Faba bean insecticide trial with perforated seeds (%) graded after harvest.

Trial ID	R.M.	Faba bean Variety	Product	Application Date (Stage)	Treatment	Perforated seeds (%)(1)	Perforated Seeds Grade(2)	Significant Grade Difference?(2)
FBI01	Argyle	Fabelle	Carbine	July 8 (R4)	Untreated	**2.3 A**	No. 2	**Yes**
					Carbine	**0.35 B**	No.1	

Notes: (1) Values within columns followed by different letters are significantly different at $p<0.05$. (2) Perforated seeds (%) grade wasn't the final grade of the samples. Other factors including perforated seeds, seed discolouration and seed splits resulted in a Total Damage (%) of 7.5% and a final grade of No. 3 for both treatments regardless of the perforation percent.

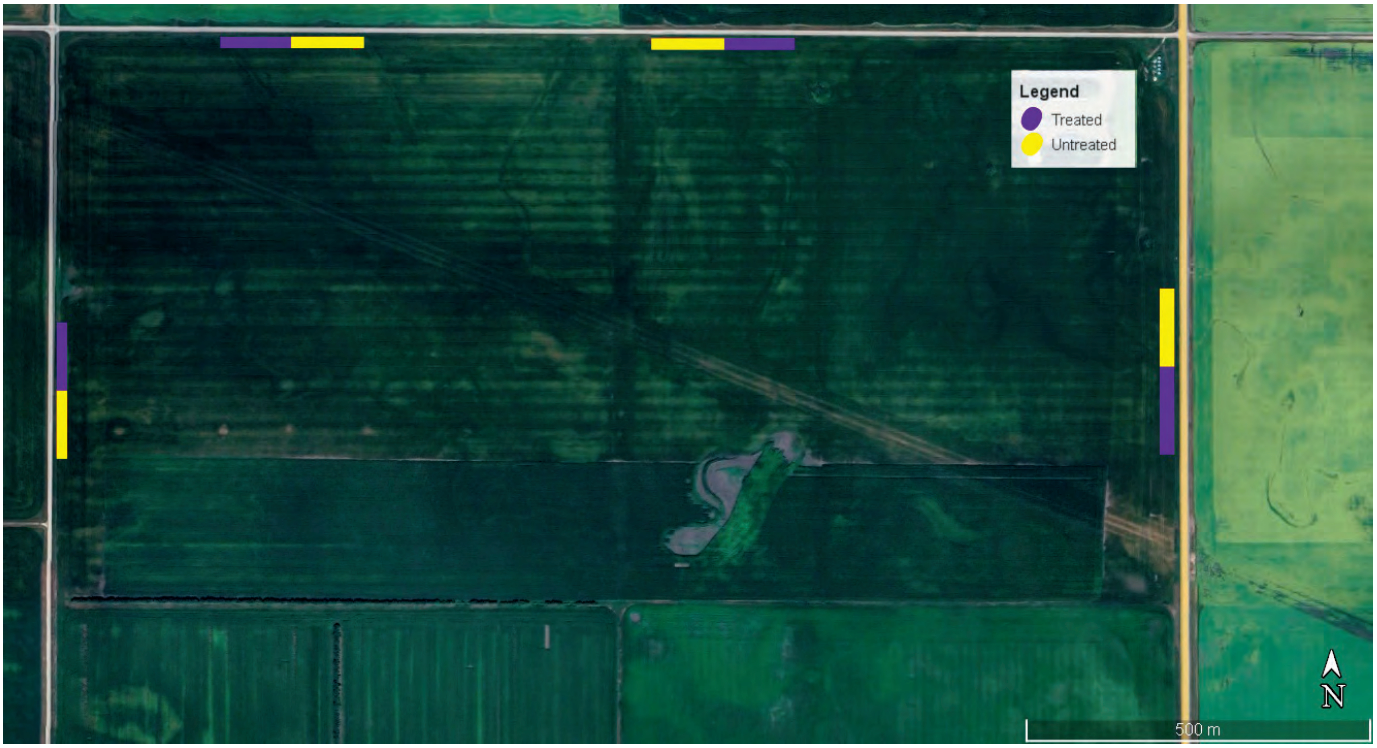


FIGURE 1: *Carbine single application vs. untreated trial layout with four replications separated from each other and placed along field edges. Plot dimensions were 100m long x 20m wide.*

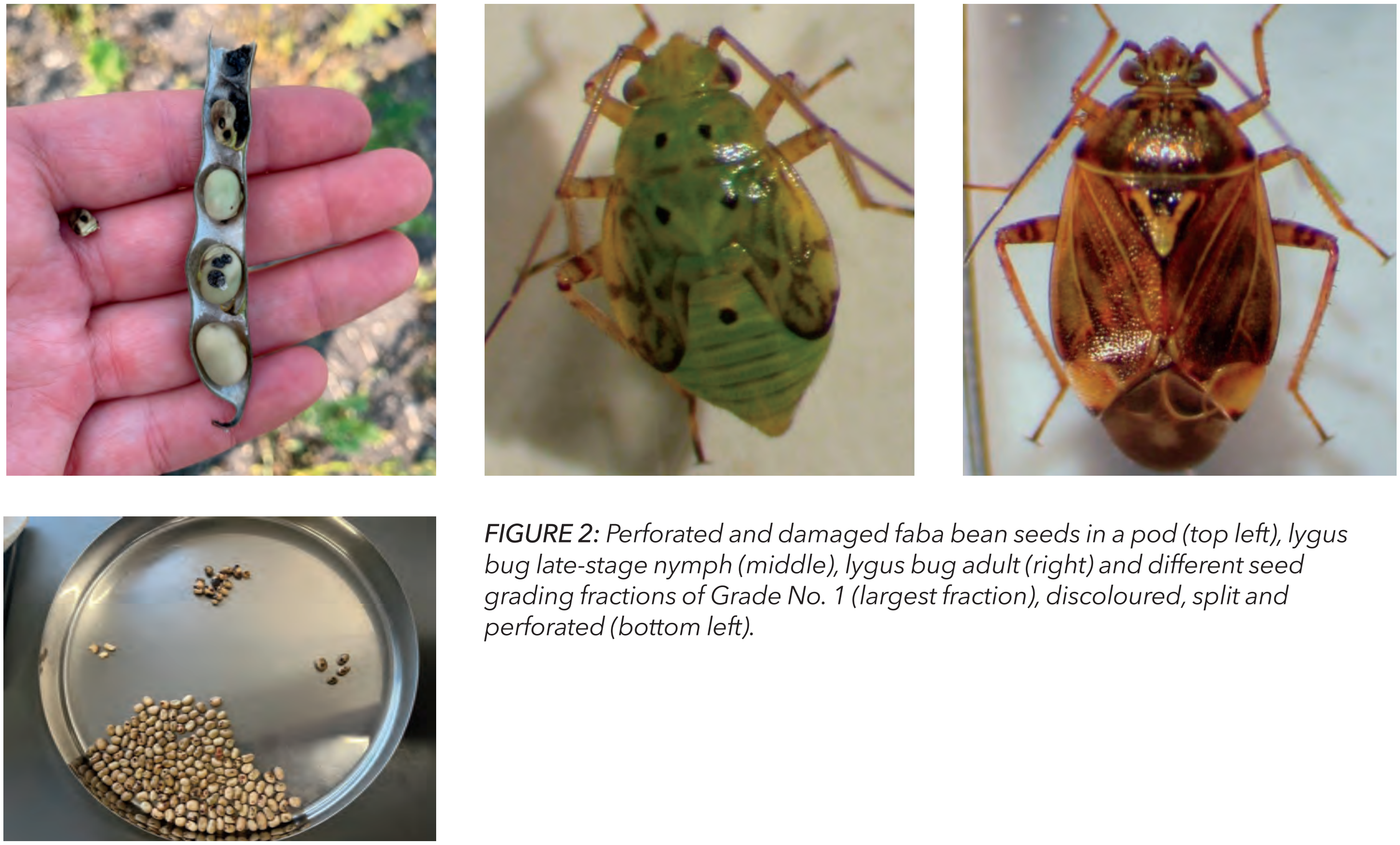


FIGURE 2: *Perforated and damaged faba bean seeds in a pod (top left), lygus bug late-stage nymph (middle), lygus bug adult (right) and different seed grading fractions of Grade No. 1 (largest fraction), discoloured, split and perforated (bottom left).*

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