



EFFICACY REPORT

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2022 EDITION

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2.7 bu/ac 178 kg/ha

LENTILS

AVERAGE YIELD INCREASE

64 sites over 11 years
Canada

10.1%

Lentil split field with AGTIV® PULSES vs competitor inoculant.
Plant growth and health is enhanced on the right,
and row closure occurs sooner in AGTIV® lentil fields.



Enhanced root development leads to thicker stems,
which help lentils stand better and increases ease of harvest.



EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT & STRIP TRIALS

Research partners: GMAC's Ag Team, Wheatland Conservation Area, Prairie Ag research, and Small Plot Inc.

Research site: Brock (SK), Swift Current (SK), Coalhurst (AB), and Vulcan (AB) Canada

Treatments: a) AGTIV® PULSES – Dual inoculant*;
b) Competitor inoculant A*;
c) Competitor inoculant B*;
d) Competitor inoculant C*;
e) Competitor inoculant D*.

Experimental design: 35 replicated plots per treatment (three trials with 6, one with 7, one with 8 and one strip trial with two replicated) in randomized complete block design

*Products applied according to manufacturers recommended rate.



Table 1. Summary of Lentil yields (bu/ac) per trial.

Location	Year	AGTIV® PULSES Dual inoculant	Competitor inoculant			
			A	B	C	D
Brock (SK)	2015	18.4	13.4	11.4		
Swift Current (SK)	2016	50.1	43.3	41.1	37.7	
Coalhurst (AB)	2017	19.5	19.1	19.2	18.5	
Vulcan (AB)	2019	32.6	28.8			28.4
Lethbridge (AB)	2021	46.8		46.4		
Vulcan (AB)	2021	10.0		8.4		

Table 2. Summary of Lentil yields (kg/ha) per trial.

Location	Year	AGTIV® PULSES Dual inoculant	Competitor inoculant			
			A	B	C	D
Brock (SK)	2015	1237	901	766		
Swift Current (SK)	2016	3367	2910	2762	2533	
Coalhurst (AB)	2017	1310	1284	1290	1243	
Vulcan (AB)	2019	2192	1937			1910
Lethbridge (AB)	2021	3145		3118		
Vulcan (AB)	2021	672		564		

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments: a) Untreated Check
b) AGTIV® PULSES • Granular*
c) Competitor inoculant B*

* Granular inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 6 repetitions, 12 m² plots

Variety: Proclaim

Previous crop: Barley

Seeding details: Seeded on May 19, 2021, with a cone seeder at a rate of 50 kg/ha



Table 1. Summary of yields and protein content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Protein content (%)
Untreated Check	42.7	-	27.5
AGTIV® PULSES • Granular	46.8	4.1	27.8
Competitor inoculant B	46.4	3.7	27.2

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - May 19, Glyphosate (emerged weeds)
 - June 28, Odyssey and Merge (broadleaf weeds)
- Harvested on September 14, 2021

Month	Precipitation (mm)
May	33.1
June	16.5
July	10.3
August	35.6
TOTAL	95.5

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Small plot

Research site: Vulcan, AB

Treatments: a) Untreated Check
b) AGTIV® PULSES • Granular*
c) Competitor inoculant B*

* Granular inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 6 repetitions, 16 m² plots

Variety: Impulse

Previous crop: Wheat

Seeding details: Seeded on May 15, 2021, with a plot drilling machine at a rate of 72 kg/ha



LENTILS

Table 1. Summary of yields per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	9.1	-
AGTIV® PULSES • Granular	10.0	0.9
Competitor inoculant B	8.4	-

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - June 13, Odyssey NTX (broadleaf weeds)
- Harvested on August 25, 2021

Month	Precipitation (mm)
May	3.8
June	42.4
July	27.6
August	38.6
September	41.1
TOTAL	153.5

EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan (AB), Canada

Treatments: a) ALPINE G22™ Liquid*;
b) ALPINE G22™ and AGTIV® COMBO • Liquid for PULSES*;
c) ALPINE G22™ and Competitor inoculant A*;
d) ALPINE G22™ and Competitor inoculant D*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Lentil variety: Pedigree CDC Proclaim

Previous crop: Canola

Seeding details: Seeded May 14th, 2019 at 65 lb/ac with a 22.8 cm row spacing.
Products were applied in-furrow.

*Products applied according to manufacturers' recommended rate



LENTILS

Table 1. **Summary of Lentil yields per treatment.**

Treatment	Yield ¹ (bu/ac)	Yield ¹ (kg/ha)
ALPINE G22™ Liquid	25.0 ^a	1681 ^a
ALPINE G22™ and AGTIV® COMBO • Liquid for PULSES	32.6 ^b	2192 ^b
ALPINE G22™ and Competitor inoculant A	28.8 ^{ab}	1937 ^{ab}
ALPINE G22™ and Competitor inoculant D	28.4 ^{ab}	1910 ^{ab}

¹ Yields followed by different letters are significantly different (LSD Test at $p < 0.05$). Data from bloc 1 were not analyzed due to a high presence of *Kochia scoparia*.

Plot operational notes and rain fall.

- No fertilization other than ALPINE G22™
- One herbicide application on June 6th, 2019
- Plants were dessicated September 22th and combined October 17th, 2019.

Month	Precipitation (mm)
May	16
June	50
July	16
August	25
TOTAL	107

EFFICACY REPORT

2016 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

Treatments: a) AGTIV® PULSES • Granular applied at 5 lb/ac*;
b) AGTIV® RHIZO • Granular for PULSES in granular form applied at 5 lb/ac*;
c) Competitor inoculant A applied at 3.6 lb/ac*;
d) Competitor inoculant B applied at 3.6 lb/ac*;
e) Competitor inoculant C applied at 5.1 lb/ac*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Lentil variety: Small Red Lentils, Imax CL variety

Previous crop: Canola

Seeding details: Seeded at 68 lb/ac to obtain 12 plants/ft² using Fabro plot drill, Atomjet knife openers

Fertility: 98 lb/ac of 11-52-0 side banded

Data analysis: All data from replicate 7 was removed as this area was noted by Wheatland Conservation Area to be a lower part of the field and that the yield was significantly lower than the average in the affected plots. The lower part of the field also had a damaging effect on the first plot of replicate 8, which was the competitor inoculant B treatment, and that data point was also removed for the above analysis.

*Granular products applied according to manufacturers recommended rate.



Table 1. Summary of Lentil yields per treatment.

Treatment	Yield (bu/ac) ¹	Yield (kg/ha) ¹
AGTIV® PULSES • Granular (dual inoculant)	50.1 ^b	3369 ^b
AGTIV® RHIZO • Granular for PULSES (single inoculant)	46.6 ^b	3134 ^b
Competitor inoculant A	43.3 ^{a,b}	2912 ^{a,b}
Competitor inoculant B	41.1 ^a	2764 ^a
Competitor inoculant C	37.7 ^{a2}	2535 ^{a2}

¹ Average yields followed by different letters are significantly different using Duncan's multiple range test at $p \leq 0.1$.

² The difference in yield is significant at $p = 0.012$, compared with AGTIV® PULSES • Granular (dual inoculant).

Plot operational notes and rain fall.

- Preseed burnoff with RT 540 at 0.67 L/ac
- Applied Edge pre-seed at 15 lb/ac
- Incrop with Odyssey at 17.3 g/ac
+ Poast Ultra at 190 ml/ac
+ Merge at 0.5 L/100 L spray solution.
- Priaxor at 180 ml/ac at 10% flower
- Dessicated with Reglone @ 700 ml/ac + agsurf adjuvant at 0.1 L/100 L of spray solution
- Combined with winterstieger

Month	Precipitation (mm)
April	7
May	129.3
June	85.1
July	115
August	58
September	39
October until the 5 th	58
TOTAL	491.4

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► STRIP TRIAL

Research partner: GMAC's Ag Team

Research site: Brock (SK), Canada

Objective: This field trial will evaluate the performance of competitor inoculant brands with an emphasis on comparing granular formulations against the competitor inoculant D liquid formulation on lentil.

Treatments: a) AGTIV® PULSES • Granular applied at 5 lb/ac*;
 b) Competitor inoculant A granular applied at 3.6 lb/ac*;
 c) Competitor inoculant B granular applied at 3.6 lb/ac*;
 d) Competitor inoculant C granular applied at 3.6 lb/ac*;
 e) Competitor inoculant D liquid applied at 76 ml/bu*;
 f) Competitor inoculant D liquid applied at 76 ml/bu
 + Competitor inoculant B granular applied at 1.8 lb/ac*.

Experimental design: Site at Brock was laid out using a completely randomized design (CRD) with a minimum of two treatment replicates. See field layout below.

*Products applied according to manufacturers recommended rate.



Table 1. Summary of Lentil yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® PULSES • Granular (dual inoculant)	18.4	1237
Competitor inoculant A	13.4	901
Competitor inoculant B	11.4	767
Competitor inoculant C	11.8	794
Competitor inoculant D	11.3	760
Competitor inoculant D + B	11.1	747

Plot operational notes and rain fall.

Treatments were seeded on May 9, 2015, sprayed, and harvested on August 31, 2015, using the growers' existing machinery. Trial site were managed the same across all treatments, excluding the application of inoculant. In-season herbicide, fungicide, and insecticide, applications were all registered practices and made in accordance with product labels. Harvest data was scaled with weigh wagons then recorded.

Month	Precipitation (in)
May	0.8
June	1.43
July	2.31
TOTAL	4.54



Field layout



3.6 bu/ac 225 kg/ha

PEAS

AVERAGE YIELD INCREASE

22 sites over 9 years
Canada **6.3%**

Pea split field with AGTIV® PULSES vs competitor inoculant.
Plant growth and health is enhanced on the right,
and row closure occurs sooner in AGTIV® pea fields.



AGTIV® pea plants have a better developed root system
with more branching, which leads to increased plant health and growth.



EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIALS

Research partners: ICMS, Wheatland Conservation Area

Research site: Fort Saskatchewan (AB), Swift Current (SK), Saskatoon (SK) Canada and Portage la Prairie (MB)

Treatments: a) AGTIV® PULSES – Dual inoculant*;
b) Competitor inoculant A*;
c) Competitor inoculant B*;
d) Competitor inoculant D*.

Experimental design: 23 replicated plots per treatment (three trials with 6 and one with 5) in randomized complete block design

*Products applied according to manufacturers recommended rate.



PEAS

Table 1. Summary of Pea yields (bu/ac) per trial.

Location	Year	Seed variety	AGTIV® PULSES Dual inoculant	Competitor inoculant		
				A	B	D
Fort Saskatchewan (AB)	2015	Meadow	88.6	86.2	79.5	
Swift Current (SK)	2017	Amarillo	14.0	12.7	12.4	
Saskatoon (SK)	2019	AAC Ardill	65.0	52		63.2
Portage la Prairie (MB)	2021	Carver	45.2		41.3	

Table 2. Summary of Pea yields (kg/ha) per trial.

Location	Year	Seed variety	AGTIV® PULSES Dual inoculant	Competitor inoculant		
				A	B	D
Fort Saskatchewan (AB)	2015	Meadow	5958	5793	5342	
Swift Current (SK)	2017	Amarillo	941	853	833	
Saskatoon (SK)	2019	AAC Ardill	4371	3497		4250
Portage la Prairie (MB)	2021	Carver	3037		2775	

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage la Prairie, MB

Treatments: a) Untreated Check
b) AGTIV® PULSES • Granular*
c) Competitor inoculant B*

* Granular inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 6 repetitions, 24.4 m² plots

Variety: Carver

Previous crop: Wheat

Seeding details: Seeded on June 3, 2021, with a cone seeder at a rate of 200 kg/ha



PEAS

Table 1. Summary of yields and protein content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Protein content(%)
Untreated Check	41.6	-	17.8
AGTIV® PULSES • Granular	45.2	3.6	18.4
Competitor inoculant B	41.3	-	17.8

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - June 25, Viper ADV (to control emerged weeds)
 - July 14, Basagran Forte and Assure II (broadleaf and grassy weeds control)
 - July 27, Cygon (aphids control)
- Harvested on September 1, 2021

Month	Precipitation (mm)
June	90.0
July	78.4
August	68.3
TOTAL	236.7

EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: ICMS

Research site: Saskatoon (SK), Canada

Treatments: a) ALPINE G22™ Liquid*;
b) ALPINE G22™ and AGTIV® COMBO • Liquid for PULSES*;
c) ALPINE G22™ and Competitor inoculant A*;
d) ALPINE G22™ and Competitor inoculant D*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Lentil variety: AAC Ardill

Previous crop: Wheat

Seeding details: Seeded with a cone seeder June 1 at 201 lb/ac with a 15.2 cm row spacing. Products were applied in-furrow.

*Products applied according to manufacturers' recommended rate



PEAS

Table 1. **Summary of Pea yields per treatment.**

Treatment	Yield (bu/ac)	Yield (kg/ha)
ALPINE G22™ Liquid	56.0	3766
ALPINE G22™ and AGTIV® COMBO • Liquid for PULSES	65.0	4371
ALPINE G22™ and Competitor inoculant A	52.3	3517
ALPINE G22™ and Competitor inoculant D	63.2	4250

Plot operational notes and rain fall.

- Fertilizer (Urea 28%) applied at same moment as Viper herbicide at 0.8 lb/ac on July 12, 2019
- Two herbicide applications on July 12, 2019 (Viper) and 29, 2019 (Centurion)
- Two insecticide applications (Matador) on July 8 and 13, 2019
- Combined with a Small Plot Combine on October 11, 2019.

Month	Precipitation (mm)
June	84.8
July	67.6
August	20.3
September	39.5
TOTAL	212.2

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► STRIP TRIAL

Research partner: Down to Earth + PAMI

Research site: Saskatoon (SK), Canada

Treatments: a) AGTIV® PULSES • Granular applied at 5.0 lb/ac + Taurus Advanced Acre (TAA) + fungicide application;
b) AGTIV® RHIZO • Granular for PULSES in granular form applied at 4.0 lb/ac + designed fertility.

Experimental design: 2 replicated strips for a total of 610 ft² per treatment

Pea variety: Meadow variety seeded at 3 bu/ac

Previous crop: Canola / oats split

Seeding details: Seeded 20 May, at 3 bu/ac at 10 in row spacing using Seed Master plot Drill by Down to Earth



PEAS

Table 1. Summary of Pea yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® PULSES • Granular (dual inoculant) + TAA + Fungicide	48.1	3235
AGTIV® RHIZO • Granular for PULSES (single inoculant) + designed fertility	35.8	2408

Plot operational notes and rain fall.

- Fertility – seed placed 2-15-0 -0 actual lb/ac
 - Side band 17-20-15-15 actual lb/ac
- Viper + UAN applied at 400 ml/ac + 81 ml/ac at 5 node Stage
- Combined on August 25, with a Wintersteiger and weighed & moisture averaged by PAMI
- Total rainfall: 100.4 mm

- 1. Designed Fertility Program:** a calculated fertility program based on soil tests and targeted yield. Target yield for Peas was 60 bushels/ac
- 2. The Taurus Advanced Acre™:** Using the Designed Fertility Program with the addition of key Taurus solutions.

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

Treatments: a) AGTIV® PULSES • Granular applied at 5 lb/ac*;
b) AGTIV® RHIZO • Granular for PULSES in granular form applied at 4 lb/ac*;
c) Competitor inoculant A applied at 3.6 lb/ac*;
d) Competitor inoculant B applied at 3.6 lb/ac*;
e) Competitor inoculant C applied at 4.0 lb/ac*;
f) Competitor inoculant E applied at 5.0 lb/ac*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Pea variety: Amarillo, seeded at 200 lb/ac

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate



PEAS

Table 1. **Summary of Pea yields per treatment.**

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® PULSES • Granular (dual inoculant)	14.0	942
AGTIV® RHIZO • Granular for PULSES (single inoculant)	13.1	881
Competitor inoculant A	12.7	854
Competitor inoculant B	12.4	834
Competitor inoculant C	13.2	888
Competitor inoculant E	12.3	827

Plot operational notes and rain fall.

- Peas were planted on May 24, 2017, at 9 in row spacing using Fabro plot drill
- Preseed burnoff with Clean Start at 1 L/ac and Aim at 30 ml/ac
- Application of 98 lb/ac of 11-52-0 sidebanded
- In crop with Viper ADV at 400 ml/ac + Poast Ultra at 190 ml/ac + UAN at 810 ml/ac spray solution.
- Combined on August 17, 2017 with Winterstieger plot combine.

Month	Precipitation (mm)
May	32.1
June	35
July	4
August	28
September	3
TOTAL	102.1

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: ICMS

Research site: Fort Saskatchewan (AB), Canada

Treatments: a) AGTIV® PULSES • Granular applied at 5 lb/ac*;
b) Competitor inoculant A applied at 3.3 lb/ac*;
c) Competitor inoculant B applied at 3.3 lb/ac*.

Experimental design: 5 replicated plots per treatment in randomized complete block design

Pea variety: Meadows

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate



PEAS

Table 1. Summary of Pea yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® PULSES • Granular (dual inoculant)	88.6	5958
Competitor inoculant A	86.2	5797
Competitor inoculant B	79.5	5347

One replication from the competitor inoculant B treatment yielded very low and has a negative impact on the treatment average. The data below represents the average of the competitor inoculant B treatment without the very low yielding rep for a total of four reps for the competitor inoculant B average yield.

Table 2. Summary of Pea yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® PULSES • Granular (dual inoculant)	88.6	5958
Competitor inoculant A	86.2	5797
Competitor inoculant B	85.8	5770

Plot operational notes and rain fall.

- Peas were planted on May 21, 2015, at 15.2 cm row spacing
- In season maintenance with 17 g/ac Odyssey (35%), 67 ml/ac Equinox and 0.5% Edge
- Combined with Winterstieger Elite plot combine on Sept 25, 2015.

Month	Precipitation (mm)
May	37.3
June	59.7
July	108.6
August	10.3
September	71.1
TOTAL	287



3.4 bu/ac

228 kg/ha

SOYBEANS

AVERAGE YIELD INCREASE

87 sites over 7 years
Canada and Europe

7.7%

Soybean split field with AGTIV® SOYBEAN vs competitor inoculant.
Plant growth and health is enhanced on the right,
and row closure occurs sooner in AGTIV® soybean fields.



AGTIV® soybean plants have a better developed root system
with more branching and more nodules.



EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT & STRIP TRIALS

Research partners: ICMS, AgQuest, New Era Ag research, Stoney Ridge Ag Services, and South East Research Farm (SERF), Tall Pines Agricultural Research Ltd and Black Creek Research.

Research sites: Portage La Prairie (MB), Morden (MB), Oakville (MB), Swan River (MB), Binscarth (MB), Redvers (SK), Elm Creek (MB), Rockwood (ON) and Bright (ON)

Treatments: a) AGTIV® SOYBEAN – Dual inoculant*;
b) Competitor inoculant A*;
c) Competitor inoculant B*;
d) Competitor inoculant C*;
e) Competitor inoculant D*;
f) Competitor inoculant E*.

Experimental design: Total of 88 replicated plots per treatment in randomized complete block design, and one strip trial with 2 replicated strips.

*Products applied according to manufacturers recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields (bu/ac)¹ per trial².

Location	Year	Seed variety	AGTIV® SOYBEAN Dual Inoculant	Competitor inoculant				
				A	B	C	D	E
Morden (MB)	2015	Northstar, Anola	31.8 ^a	27.8 ^b	30.5 ^{a,b}			
Portage La Prairie (MB)	2015	Pride Seeds, PS0035	57.3	55.4	58.2			
Oakville (MB)	2016	Legend Seeds, Eclipse	79.7	77.8	77.7			
Swan River (MB)	2017	Prograin, Dario	40.7 ^a	35.0 ^{b,c}		32.5 ^c		
Portage La Prairie (MB)	2017	Northstar, Richer	58.3	54.5	54.5	54.7		
Binscarth (MB)	2017	Pioneer Ultra Early	30.11 ^a	27.71 ^b	28.99 ^{a,b}	28.46 ^b		
Redvers (SK)	2018	Prograin, Dario	31.1	28.2	25.8			
Swan River (MB)	2018	Prograin, Dario	57.7	47.2	54.3	55.5		
Portage La Prairie (MB)	2018	Secan, Barker	49.4	47.2	47.8			
Elm Creek (MB)	2019	Gray R2	37.1	36.9			35.9	
Redvers (SK)	2019	NSC Watson RR2Y	16.3	14.9		15.8		
Swan River (MB)	2019	Syngenta M2	35.7 ^a	29.9 ^b		35.7 ^a		
Rockwood (ON)	2021	Katonda R2	N/A	43.4	48.4			48.4
Bright (ON)	2021	Katonda R2	72.2	70.7	70.1			69.3

¹ Average yields followed by different letters are significantly different at $p \leq 0.05$.

² To obtain kg/ha results, multiply bushels per 60 and then by 1.12085 ($n \times 60 \times 1.12085$).

EFFICACY REPORT

2021 – RHIZOBIAL AND BACILLUS ON SEED INOCULANT

► PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright, ON

Treatments: a) Untreated Check
b) AGTIV® BRADY • Liquid*
c) AGTIV® BB COMBO • Liquid*
d) Competitor B*
e) Competitor A*
f) Competitor E*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 24 m² plots

Variety: Katonda R2

Previous crop: Corn

Seeding details: Seeded on May 19, 2021, with a cone seeder at a rate of 60 kg/ha.
Seeds pretreated with a commercial rhizobium.



SOYBEAN

Table 1. Summary of yields and protein content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Protein content (%)
Untreated Check	70.0	-	35.2
AGTIV® BRADY • Liquid	69.9	-	35.9
AGTIV® BB COMBO • Liquid	72.2	2.2	35.3
Competitor B	70.1	0.1	35.5
Competitor A	70.7	0.7	34.9
Competitor E	69.3	-	35.1

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - Boundary LQD on May 22
 - Roundup Transorb on June 23
- Harvested on September 29, 2021

Month	Precipitation (mm)
May	26.4
June	86.3
July	84.6
August	121.0
September	162.4
TOTAL	480.7

EFFICACY REPORT

2021 – RHIZOBIAL AND BACILLUS ON SEED INOCULANT

► PLOT TRIAL

Research partner: Tall Pines Agricultural Research Ltd

Research site: Rockwood, ON

Treatments: a) Untreated Check
b) AGTIV® BRADY • Liquid*
c) AGTIV® BB COMBO • Liquid*
d) Competitor B*
e) Competitor A*
f) Competitor E*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 12 m² plots

Variety: Katonda R2

Previous crop: Potato

Seeding details: Seeded on June 11, 2021, with a cone seeder at a rate of 60 kg/ha.
Seeds pretreated with a commercial rhizobium



SOYBEAN

Table 1. Summary of yields per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	45.6	-
AGTIV® BRADY • Liquid	47.4	1.8
AGTIV® BB COMBO • Liquid	N/A	
Competitor B	48.4	2.8
Competitor A	43.4	-
Competitor E	48.4	2.8

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - July 10, Roundup transorb
- Harvested on November 7, 2021

Month	Precipitation (mm)
May	28
June	95.5
July	128.4
August	28.2
September	142.6
TOTAL	422.7

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated Check
b) AGTIV® SOYBEAN • Granular*
c) Competitor inoculant E*

* Granular inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 6 repetitions, 20 m² plots

Variety: Syngenta M2

Previous crop: Wheat

Seeding details: Seeded on May 18, 2021, with a cone seeder at a rate of 70 kg/ha.
Seeds pretreated with a commercial rhizobium.



SOYBEAN

Table 1. Summary of yields and protein content per treatment.

Treatment	Yield ¹ (bu/ac)	Yield increase (bu/ac)	Protein content (%)
Untreated Check	41.9 ^a	-	29.5
AGTIV® SOYBEAN • Granular	46.3 ^b	4.4	31.7
Competitor inoculant E	43.5 ^b	1.6	31.1

¹ Yields with same letter are not statistically different according to a Tukey HSD test ($p \leq 0.05$).

Plot operational notes and rain fall.

- Fertilization of 11-52-0 on May 28 at a rate of 86 kg/ha
- Pesticides:
 - June 15 and July 6, RT 540 to control emerged weeds
- Harvested on September 28, 2021

Month	Precipitation (mm)
May	33.0
June	65.9
July	45.5
August	77.1
September	39.0
TOTAL	260.5

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers, SK

Treatments: a) Untreated Check
b) AGTIV® SOYBEAN • Granular*
c) Competitor inoculant E*

* Granular inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 6 repetitions, 8 m² plots

Variety: Watson

Previous crop: Wheat

Seeding details: Seeded on May 29, 2021, with a cone seeder at a rate of 75 kg/ha.
Seeds pretreated with a commercial rhizobium



Table 1. Summary of yields and protein content per treatment.

Treatment	Yield ¹ (bu/ac)	Yield increase (bu/ac)	Protein content (%)
Untreated Check	19.1	-	36.9
AGTIV® SOYBEAN • Granular	21.0	1.9	36.4
Competitor inoculant E	20.0	0.9	36.9

Plot operational notes and rain fall.

- Fertilization of MAP 11-48-0 at seeding at a rate of 65 kg/ha
- Pesticides:
 - June 24, Glyphosate to control emerged weeds
- Harvested on September 17, 2021

Month	Precipitation (mm)
May	52.9
June	70.5
July	19.9
August	55.4
TOTAL	198.7

EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: AgQuest

Research site: Elm Creek (MB), Canada

Treatments: a) ALPINE G22™ Liquid*;
b) ALPINE G22™ and AGTIV® COMBO • Liquid for SOYBEAN*;
d) ALPINE G22™ and Competitor inoculant A*;
e) ALPINE G22™ and Competitor inoculant D*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Soybean variety: Gray R2 with *Bradyrhizobium* pre-inoculated on the seed

Previous crop: Barley

Seeding details: Seeded May 28, 2019, with a 21 cm row spacing

*Products applied according to manufacturers' recommended rate



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
ALPINE G22™ Liquid	34.6	2327
ALPINE G22™ and AGTIV® COMBO • Liquid for SOYBEAN	37.1	2495
ALPINE G22™ and Competitor inoculant A	36.9	2482
ALPINE G22™ and Competitor inoculant D	35.9	2414

Plot operational notes and rain fall.

- Three Roundup WeatherMax applications on June 14, July 9, and 24, 2019
- Insecticide (CORAGEN) August 14, 2019
- Combined on October 26, 2019.

Month	Precipitation (mm)
May	42.2
June	59.5
July	91.7
August	40.9
September	196.7
TOTAL	431

EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River (MB), Canada

Treatments: a) Untreated
b) AGTIV® SOYBEAN • Granular*;
c) Competitor inoculant A applied*;
d) Competitor inoculant C applied*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Soybean variety: Syngenta M2 with *Bradyrhizobium* pre-inoculated on the seed

Previous crop: Canola stubble

Seeding details: Seeded May 24, 2019, with a 22.4 cm row spacing and a rate of 190 000 seeds/acre.

*Products applied according to manufacturers' recommended rate



SOYBEAN

Table 1. Summary of yields and protein content of Soybean per treatment

Treatment	Yield ¹ (bu/ac)	Yield ¹ (kg/ha)	Protein content ¹ (%)
Untreated	26.5 ^a	1782 ^a	32.87 ^a
AGTIV® SOYBEAN • Granular	35.7 ^b	2401 ^b	37.59 ^c
Competitor inoculant A	29.9 ^a	2011 ^a	35.27 ^b
Competitor inoculant C	35.7 ^b	2401 ^b	37.87 ^c

¹ Yields and protein contents followed by different letters are significantly different (Tukey's test HSD at p≤0.05).

Plot operational notes and rain fall.

- Fertilization:
 - 0-20-10-0 fertilizer applied at season start
- Herbicides applied June 12 and 25, and July 12 (Glyphosate).
Insecticide (POUNCE) applied August 12, 2019
- Combined October 7, 2019.

Month	Precipitation (mm)
May	25.7
June	26.1
July	59.4
August	51.8
September	48.8
TOTAL	211.8



EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers (SK), Canada

Treatments: a) Untreated
b) AGTIV® SOYBEAN • Granular*;
c) Competitor inoculant A*;
d) Competitor inoculant C*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Soybean variety: NSC Watson RR2Y with *Bradyrhizobium* pre-inoculated on the seed

Previous crop: Canola

Seeding details: Seeded May 27, 2019, at a rate of 210 000 seeds/acre.

*Products applied according to manufacturers' recommended rate



SOYBEAN

Table 1. Summary of Soybean yields per treatment

Treatment	Yield (bu/ac)	Yield (kg/ha)
Untreated	13.4	901
AGTIV® SOYBEAN • Granular	16.3	1096
Competitor inoculant A	14.9	1002
Competitor inoculant C	15.8	1063

Plot operational notes and rain fall.

- Herbicides applied June 18 (Glyphosate) and July 1 (Viper and UAN)
- Combined October 6, 2019.

Month	Precipitation (mm)
May	18
June	79
July	54
August	88
September	99
TOTAL	338

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers (SK), Canada

Treatments: a) AGTIV® SOYBEAN • Granular*;
b) COMBO AGTIV® • Liquid for SOYBEAN*;
c) Competitor inoculant A*;
d) Competitor inoculant B*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Soybean variety: Dario

Previous crop: Canola stubble

Seeding details: Seeded May 28, 2018, at 210 000 seeds/ac with 15 cm row spacing

*Products applied according to manufacturers' recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)	Protein (%)
AGTIV® SOYBEAN • Granular	31.1	2092	32.5
COMBO AGTIV® • Liquid for SOYBEAN	28.2	1896	29.0
Competitor inoculant A	25.8	1735	28.5
Competitor inoculant B	29.7	1997	30.8

Plot operational notes and rain fall.

- No tillage
- Fertilization: 58 lb/ac of P
- Glyphosate applied twice during growth.
- Combined on September 27, 2018.

Month	Precipitation (mm)
May	13.8
June	44.3
July	19.5
August	17.4
September	27.6
TOTAL	122.6

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage La Prairie (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular*;
b) COMBO AGTIV® • Liquid for SOYBEAN*;
c) Competitor inoculant A*;
d) Competitor inoculant B*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Soybean variety: Barker

Previous crop: Fallow

Seeding details: Seeded June 6, 2018, with 24 m² per plot.

*Granular products applied according to manufacturers' recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® SOYBEAN • Granular	49.4	3322
COMBO AGTIV® • Liquid for SOYBEAN	47.4	3188
Competitor inoculant A	47.2	3174
Competitor inoculant B	47.8	3215

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - Round up on July 5
 - Thiram on July 10, 17 and 27
- Combined on October 19, 2018.

Month	Precipitation (mm)
June	65.1
July	41.1
August	31.8
September	115.3
TOTAL	253.3

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5.1 lb/ac*;
b) Competitor inoculant A applied at 5 lb/ac*;
c) Competitor inoculant B applied at 4.45 lb/ac*;
d) Competitor inoculant C applied at 7.14 lb/ac*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Soybean variety: Dario

Previous crop: Canola stubble

Seeding details: Seeded May 21, 2018, at 200 000 seeds/ac with 25 cm row spacing

*Granular products applied according to manufacturers' recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)	Protein (%)
AGTIV® SOYBEAN • Granular	57.7	3880	34.2
Competitor inoculant A	47.2	3174	31.5
Competitor inoculant B	54.3	3651	33.1
Competitor inoculant C	55.5	3732	33.6

Plot operational notes and rain fall.

- No tillage
- Fertilization:
 - 30 lb/ac of P
 - 40 lb/ac of K
- Pesticides:
 - Glyphosate on June 6, 25 and July 5
 - Proline on July 10
 - Round up + Heat on September 12
- Combined on October 6, 2018.

Month	Precipitation (mm)
May	38.4
June	127.6
July	59.3
August	35.4
September	51.1
TOTAL	311.8

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► STRIP TRIAL

Research partner: Stoney Ridge Ag Services

Research site: Binscarth (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac;
b) Competitor inoculant A applied at 5.0 lb/ac;
c) Competitor inoculant B applied at 5.0 lb/ac;
d) Competitor inoculant C applied at 5.0 lb/ac.

Experimental design: 2 replicated strips of 1.36 acres per treatment

Soybean variety: Pioneer Experimental Ultra-Early variety, treated with Optimize St.

Previous crop: Canola

Seeding details: Seeded May 20, at 180 000 seeds/ac at 15 in row spacing using DB60



Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac) ¹	Yield (kg/ha) ¹
AGTIV® SOYBEAN • Granular	30.11 ^a	2025 ^a
Competitor inoculant A	27.71 ^b	1864 ^b
Competitor inoculant B	28.99 ^{a,b}	1950 ^{a,b}
Competitor inoculant C	28.46 ^b	1914 ^b

¹ Average yields followed by different letters are significantly different (P < 0.05, 1-way ANOVA + Tukey-Kramer Significance Test)

Plot operational notes and rain fall.

- A blend of 5-23-23-13 applied at 231 lb/ac fall broadcast and incorporated
- Preplant application of Roundup Weathermax + Express SG
- Incrop application of Roundup Transorb HC + Xtendimax and second incrop application of Roundup Weathermax + Pursuit.
- Combined on September 18, 2017, and weighed using J&M Speed Tender.

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► STRIP TRIAL

Research partner: Down to Earth + PAMI

Research site: Saskatoon (SK), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac + Taurus Advanced Acre (TAA) + fungicide application;
b) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac + Taurus Advanced Acre (TAA) & no fungicide application;
c) AGTIV® BRADY • Granular for SOYBEAN applied at 4.0 lb/ac + designed fertility.

Experimental design: 2 replicated strips for a total of 540 ft² per treatment

Soybean variety: Syngenta, M2 variety, treated with 1.82 ml/kg Optimize St.

Previous crop: Canola / wheat / oats split

Seeding details: Seeded May 20, at 180 000 seeds/ac at 10in row spacing using Seed Master plot Drill by Down to Earth



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® SOYBEAN • Granular + TAA + Fungicide	39.1	2630
AGTIV® SOYBEAN • Granular + TAA & No Fungicide	41.1	2764
AGTIV® BRADY • Granular for SOYBEAN + designed fertility	34.9	2347

Plot operational notes and rain fall.

- Fertility
 - Seed placed 2-15-0 -0 actual lbs/ac
 - Side band 17-20-15-15 actual lbs/ac
 - Viper+UAN applied at 400 ml/ac + 81 ml/ac at 2-3 trifoliolate,
 - Roundup was applied at 0.67 L/ac at 3-4 trifoliolate
 - Combined on September 18 with a Wintersteiger and weighed & moisture averaged by PAMI
 - Total rainfall: 100.4 mm
- Designed Fertility Program:** a calculated fertility program based on soil tests and targeted yield. Target yield for Soybean was 40 bushels/ac
 - The Taurus Advanced Acre™:** Using the Designed Fertility Program with the addition of key Taurus solutions.
 - The Taurus Advanced Acre™ with no Fungicide:** Using the Designed Fertility Program with the addition of key Taurus solutions without the addition of fungicide.

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: ICMS

Research site: Portage la Prairie (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5 lb/ac*;
b) AGTIV® BRADY • Granular for SOYBEAN applied at 4 lb/ac*;
c) Competitor inoculant A applied at 5.0 lb/ac*;
d) Competitor inoculant B applied at 4.5 lb/ac*;
e) Competitor inoculant C applied at 7 lb/ac*;
f) Competitor inoculant D applied at 0.063 g/1000 seeds*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Soybean variety: Northstar Seeds, Richer

Previous crop: Canola

Seeding details: Seeded June 1 at 165 000 plants/ac with 15 cm row spacing using a cone planter

*Granular products applied according to manufacturers recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® SOYBEAN • Granular	58.3	3921
AGTIV® BRADY • Granular for SOYBEAN	54.6	3672
Competitor inoculant A	54.5	3665
Competitor inoculant B	54.5	3665
Competitor inoculant C	54.7	3679
Competitor inoculant D	54.9	3692

Plot operational notes and rain fall.

- 288 lb/ac of 0-80-40-20 N-P-K-S blend was applied and incorporated just before seeding
- Conventional tillage before spring
- Roundup TR 540 was applied at 0.7 L/ac on June 26 and July 14. Cygon to control aphids was applied on August 8.
- Combined on October 12, 2017, with Winterstieger plot combine.

Month	Precipitation (mm)
May	26.8
June	69.9
July	29.4
August	8.8
September	83.8
TOTAL	218.7

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: New Era research

Research site: Swan River (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5.1 lb/ac*;
b) Competitor inoculant A applied at 5.0 lb/ac*;
c) Competitor inoculant A applied at 10.0 lb/ac*;
d) Competitor inoculant C applied at 7.1 lb/ac*;
e) Competitor inoculant C applied at 14.3 lb/ac.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Soybean variety: Prograin, Dario, treated with 2 ml/kg CBMV and 1.82 ml/kg Optimize

Previous crop: Canola

Seeding details: Seeded May 23, at 200 000 seeds/ac at 10 in row spacing using seedhawk air drill

*Granular products applied according to manufacturers recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac) ¹	Yield (kg/ha) ¹
AGTIV® SOYBEAN • Granular	40.7 ^a	2737 ^a
Competitor inoculant A low rate	35.0 ^{b,c}	2354 ^{b,c}
Competitor inoculant A high rate	36.5 ^b	2455 ^b
Competitor inoculant C low rate	32.5 ^c	2186 ^c
Competitor inoculant C high rate	35.3 ^{b,c}	2374 ^{b,c}

¹ Average yields followed by different letters are significantly different (P < 0.05, Student-Newman-Keuls)

Plot operational notes and rain fall.

- A blend of 7-34-20-0 applied at 102 lb/ac spring broadcast
- Viper+UAN applied at 400 ml/ac + 81 ml/ac at 2-3 trifoliolate, Roundup was applied at 0.67 L/ac at 3-4 trifoliolate and Guardsman at 607 ml/ac at R8.
- Combined on October 10 with Hedge 140 plot combine
- Total rainfall: 197.1 mm.

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Blackcreek Research

Research site: Bright (ON), Canada

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Soybean variety: ELITE SEED, Katonda R2

Previous crop: Winter Wheat

Seeding details: Seeded June 9 at 168 000 plants/ac with 38 cm row spacing using a cone planter



SOYBEAN

Table 1. Soybean yields per treatment.

Treatment	Yield (bu/ac) ¹	Yield (kg/ha) ¹
Untreated	41.4 ^a	2782 ^a
AGTIV® ON SEED™ mycorrhizal inoculant	44.0 ^b	2957 ^b

¹Average yields followed by different letters are significantly different (Tukey's test, $p \leq 0.05$)

Plot operational notes and rain fall.

- No fertilizer was applied
- Conventional tillage in spring
- Boundary Lqd applied at 2.47 l/ha, Broadstrike Rc at 87.5 g/ha, on June 10; Classic at 36 g/ha on June 29.
- Combined on October 19, 2017, with Winterstieger plot combine.

Month	Precipitation (mm)
May	120.0
June	53.5
July	81.0
August	106.0
September	32.0
TOTAL	392.5

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Independent consultant

Research site: St-Simon – #1 (QC), Canada

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: 4 replicated plots per treatment in randomized complete block design

Soybean variety: ELITE SEED, Auriga

Previous crop: Corn

Seeding details: Seeded May 25 at 182 000 plants/ac with 33 cm row spacing using a cone planter



SOYBEAN

Table 1. Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
Untreated	46.4	3119
AGTIV® ON SEED™ mycorrhizal inoculant	48.8	3280

Plot operational notes and rain fall.

- No fertilizer was applied
- Conventional tillage before spring. Vibro before seeding.
- Dual II Magnum at 1.75 l/ha, Firstrate at 20.8 g/ha and Pursuit at 0.312 l/ha on May 25
- Combined on September 27, 2017 with Delta plot combine.

Month	Precipitation (mm)
May	81.5
June	120.4
July	57.4
August	57.6
September	45.0
TOTAL	361.9

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Independent consultant

Research site: St-Simon – #2 (QC), Canada

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: 4 replicated plots per treatment in randomized complete block design

Soybean variety: ELITE SEED, Auriga

Previous crop: Corn

Seeding details: Seeded May 25 at 182 000 plants/ac with 33 cm row spacing using a cone planter



SOYBEAN

Table 1. Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
Untreated	44.3	2953
AGTIV® ON SEED™ mycorrhizal inoculant	45.9	3058

Plot operational notes and rain fall.

- No fertilizer was applied
- Conventional tillage before spring. Vibro before seeding.
- Dual II Magnum at 1.75 l/ha, Firstrate at 20.8 g/ha and Pursuit at 0.312 l/ha on May 25
- Combined on September 27, 2017 with Delta plot combine.

Month	Precipitation (mm)
May	81.5
June	120.4
July	57.4
August	57.6
September	45.0
TOTAL	361.9

EFFICACY REPORT

2016 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: ICMS

Research site: Oakville (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5 lb/ac*;
b) Competitor inoculant A applied at 5 lb/ac*;
c) Competitor inoculant B applied at 4.5 lb/ac*;
d) Competitor inoculant C applied at 7 lb/ac*.

Experimental design: 5 replicated plots per treatment in randomized complete block design

Soybean variety: Legend Seeds, Eclipse

Previous crop: Fallow

Seeding details: Seeded at 95 kg/ha with 15 cm row spacing using plot drill and double disc openers

*Granular products applied according to manufacturers recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® SOYBEAN • Granular	79.7	5360
Competitor inoculant A	77.8	5232
Competitor inoculant B	77.7	5225
Competitor inoculant C	75.7	5091

Plot operational notes and rain fall.

- The plot area was cultivated one week before planting
- Roundup TR 540 was applied at 0.66 L/ac one month after planting to control weeds.
- Combined with Winterstieger plot combine.

Month	Precipitation (mm)
May	58.5
June	90.3
July	86
August	99.9
September	43.6
TOTAL	378.3

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: AgQuest

Research site: Morden (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5 lb/ac*;
b) Competitor inoculant A applied at 5 lb/ac*;
c) Competitor inoculant B applied at 4.5 lb/ac*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Soybean variety: NORTHSTAR genetics, ANOLA variety

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac) ¹	Yield (kg/ha) ¹
AGTIV® SOYBEAN • Granular	31.8 ^a	2139 ^a
Competitor inoculant A	27.8 ^b	1870 ^b
Competitor inoculant B	30.5 ^{a, b}	2051 ^{a, b}

¹Yields followed by different letters are statistically different at alpha 0.05.

Plot operational notes and rain fall.

- Soybeans were planted on June 2, 2015, at 18 cm row spacing and 100 kg/ha
- In season maintenance, Roundup TR 540 was applied at 0.61 L/ac
- Combined with Winterstieger plot combine on Sept 30, 2015.

Month	Precipitation (mm)
May	62.8
June	87.1
July	47.0
August	47.3
TOTAL	244.2

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: ICMS

Research site: Portage La Prairie (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5 lb/ac*;
b) Competitor inoculant A applied at 5 lb/ac*;
c) Competitor inoculant B applied at 4.5 lb/ac*.

Experimental design: 7 replicated plots per treatment in randomized complete block design

Soybean variety: PRIDE SEEDS genetics, PS 0035 NR2 variety

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate.



SOYBEAN

Table 1. Summary of Soybean yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® SOYBEAN • Granular	57.3	3853
Competitor inoculant A	55.4	3725
Competitor inoculant B	58.2	3913

Plot operational notes and rain fall.

- Soybeans were planted on May 29, 2015, at 15.2 cm row spacing and 100 kg/ha
- In season maintenance, Roundup TR 540 was applied at 0.61 L/ac
- Combined with Winterstieger plot combine on Oct 6, 2015.

Month	Precipitation (mm)
May	76.2
June	52.6
July	176.7
August	64.2
September	18.4
TOTAL	388.1



252 lb/ac 294 kg/ha

DRY BEANS

AVERAGE YIELD INCREASE

12 sites over 7 years
Canada

9%

Dry bean split field with AGTIV® vs untreated.
Faster plant development, larger plants and quicker row closure on the right.



AGTIV® dry bean plants are bigger with more branches and larger leaves. With AGTIV®, the root mass is increased with darker green plants (through more nutrient absorption).



EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

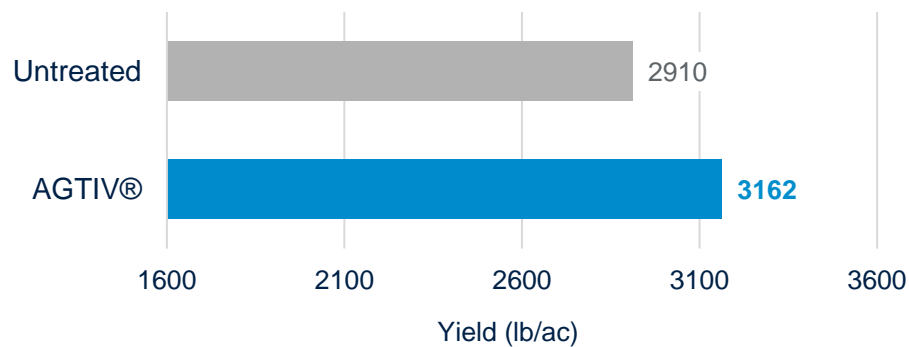
Table 1. Average yield increase with AGTIV® mycorrhizal inoculant for different years (2014 to 2020) in ONTARIO, Canada.

Year	Number of sites	Average increase (lb/ac)	Average increase (kg/ha)	Average increase (%)
2014	2	337	378	13
2015	2	423	474	17.3
2016	5	130	146	5.5
2017	2	146	164	5.1
2020	1	385	175	10.7
Total	12 sites	252 lb/ac	294 kg/ha	9.0%



DRY BEANS

Figure 1. Average yield increase with AGTIV® mycorrhizal inoculant in ONTARIO, Canada (2014 to 2020).



Faster plant development, larger plants and quicker row closure with AGTIV®.



1.5 bu/ac 101 kg/ha

CHICKPEA

AVERAGE YIELD INCREASE

2 sites over 1 year
Canada **4%**

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

Treatments: a) AGTIV® CHICKPEA • Granular applied at 5 lb/ac*;
b) AGTIV® FIELD CROPS • Granular applied at 5 lb/ac*;
c) Competitor inoculant A applied at 5 lb/ac*;
d) Competitor inoculant B applied at 3.6 lb/ac*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Chickpea variety: Leader

Previous crop: Canola stubble

Seeding details: Seeded with cone seeder May 14, 2018, at 40 plants/m² with 22.8 cm row spacing.

*Granular products applied according to manufacturers recommended rate.



CHICKPEA

Table 1. Summary of Chickpea yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® CHICKPEA • Granular	28.0	1882
AGTIV® FIELD CROPS • Granular	26.0	1747
Competitor inoculant A	28.8	1935
Competitor inoculant B	26.1	1754

Plot operational notes and rain fall.

- Fertilized with 96 lb/ac of 11-52-0
- Pre-seeding burn off: Authority at 118 ml/ac on May 14
- Combined on August 16 2018.

Month	Precipitation (mm)
May	13
June	28
July	48
August	19
TOTAL	108

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge (AB), Canada

Treatments: a) AGTIV® CHICKPEA • Granular applied at 5 lb/ac*;
b) AGTIV® FIELD CROPS • Granular applied at 5 lb/ac*;
c) Competitor inoculant A applied at 5 lb/ac*;
d) Competitor inoculant B applied at 3.6 lb/ac*.

Experimental design: 6 replicated plots per treatment in randomized complete block design

Chickpea variety: Alma

Previous crop: Canola stubble

Seeding details: Seeded with cone seeder May 22, 2018, in 2 X 8 m plots

*Granular products applied according to manufacturers recommended rate.



CHICKPEA

Table 1. Summary of Chickpea yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® CHICKPEA • Granular	73.0	4906
AGTIV® FIELD CROPS • Granular	71.5	4805
Competitor inoculant A	71.3	4791
Competitor inoculant B	71.0	4771

Plot operational notes and rain fall.

- No fertilization
- Pre-seeding burnoff with Aim, Agral 90, and Glyphosate applied on May 15. Odyssey and Merge were applied June 5 to control weeds during the trial
- Combined on September 17, 2018.

Month	Precipitation (mm)
May	25.1
June	45.8
July	13.6
August	21.5
September	19.1
TOTAL	125.1



2.5 bu/ac 140 kg/ha

CANOLA

AVERAGE YIELD INCREASE

Total of 20 sites over 4 years
Canada **6.5%**

EFFICACY REPORT

SUMMARY – SERENDIPITA ON SEED INOCULANT

► GROWER SPLIT FIELDS AND PLOT TRIALS

Table 1. Average increase of canola yield with AGTIV® IGNITE • L for different years (2018-2021).

Year	Number of sites	Untreated check (bu/ac)	AGTIV® IGNITE • L yield (bu/ac)	Yield increase (bu/ac)
2018	1	63.5	68.0	4.5
2019	6	44.6	47.1	2.5
2020	5	37.2	39.6	2.4
2021	8	32.5	35.0	2.5
Total	20 sites	38.4^a	40.9^b	2.5 bu/ac *

Table 2. Summary of canola yield trials for different sites (2018-2021).

Year	site	Untreated check yield (bu/ac)	AGTIV® IGNITE • L yield (bu/ac)	Yield increase (bu/ac)
2018	Swan River	63.5	68	4.5
2019	Josephburg	46.8	53.2	6.4
2019	Portage la Prairie	78	78	0
2019	Saskatoon	38.8	41.8	3
2019	Swan River	53.7	55.4	1.7
2019	Taber	25.4	27	1.6
2019	Swift Current	25	27.1	2.1
2020	Josephburg	47.2	49.5	2.3
2020	Moon Lake	16.3	18.2	1.9
2020	Farm Beechy	24.2	27.8	3.6
2020	Swan River	61.2	64	2.8
2020	Taber	37.3	38.5	1.2
2021	Josephburg	23.9	25.0	1.1
2021	Saskatoon	10.3	12.5	2.2
2021	Elm Creek	36.2	37.2	1
2021	Swan River	46.9	48.2	1.3
2021	Portage-La-Prairie	36.3	38.9	2.6
2021	Westline Farms	29.7	32.5	2.8
2021	Lillico Farms	26.4	31.5	5.1
2021	Sandy Ridge Farms	41.8	44.1	2.3
Total	20 sites	38.4^a	40.9^b	2.5 bu/ac *

*Summary of means for IGNITE are significantly different following a combined site ANOVA and a Tukey test ($p < 0.05$) $p = 0.012$



CANOLA

EFFICACY REPORT

2021 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 24.4 m² plots

Variety: RR Canola 6086 CR

Previous crop: Wheat

Seeding details: Seeded on May 31, 2021, with a cone drill at a rate of 7 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated Check	23.9	-	39.1
AGTIV® IGNITE • L	25	1.1	40.2

Plot operational notes and rain fall.

- Fertilizer blend of 81-41-0 lbs/ac N-P-K
- Pesticides:
 - June 12, Round up Weathermax
 - September 20, Heat LQ (dessicant)
- Combined on October 7, 2021

Month	Precipitation (mm)
June	85.3
July	112.1
August	52.5
September	53.7
TOTAL	303.6

EFFICACY REPORT

2021 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m² plots

Variety: InVigor LL234PC

Previous crop: Wheat

Seeding details: Seeded on May 18, 2021, with a cone planter at a rate of 4 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated Check	46.9	-	37.8
AGTIV® IGNITE • L	48.2	1.3	37.8

Plot operational notes and rain fall.

- Fertilization of Urea (46-0-0) and MAP (11-52-0) on May 28
- Pesticides:
 - May 7, Edge pre burn off
 - May 27, RT 540 (emerged weeds)
 - June 13, Pounce (flee beetle) and Arrow
 - June 18, Arrow all in one and Liberty
 - August 26, Guardsman (Dessicant)
- Combined on September 11, 2021

Month	Precipitation (mm)
May	33.0
June	65.9
July	45.5
August	77.1
September	39.0
TOTAL	260.5

EFFICACY REPORT

2021 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage la Prairie, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 24.4 m² plots

Variety: RR Canola CS2100

Previous crop: Wheat

Seeding details: Seeded on June 2, 2021, with a cone drill at a rate of 6 kg/ha



Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content ¹ (%)
Untreated Check	36.3	-	36.8 ^{ab}
AGTIV® IGNITE • L	38.9	2.6	37.1 ^a

¹ Oil content with the same letter are not statistically different according to a Tukey HSD test (p≤0.05).

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
 - June 14, Pounce (cutworm control)
 - June 19, Roundup Transorb
 - July 7, Pounce (Flea beetle control)
 - July 8, Proline 480 SC (sclerotinia control)
 - July 9, Roundup Transorb
 - August 9, Pounce (Flea beetle control)
- Combined on September 10, 2021

Month	Precipitation (mm)
June	90.0
July	78.4
August	68.3
TOTAL	236.7

EFFICACY REPORT

2021 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Saskatoon, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 24.4 m² plots

Variety: LL canola P501L

Previous crop: Wheat

Seeding details: Seeded on May 20, 2021, with a cone drill at a rate of 7 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated Check	10.3	-	41.8
AGTIV® IGNITE • L	12.5	2.2	42.3

Plot operational notes and rain fall.

- Fertilization prior to seeding by mixing a blend of 80-40-10-20 with the tillage
- Pesticides:
 - June 21, Liberty and Centurion (control emerged weeds)
- Combined on August 26, 2021

Month	Precipitation (mm)
May	35.5
June	41.7
July	17.7
August	28.9
TOTAL	123.8

EFFICACY REPORT

2021 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Ag-Quest

Research site: Elm Creek, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 33 m² plots

Variety: DEKALB DKTF 96 SC

Previous crop: Soybean

Seeding details: Seeded on May 18, 2021, with a cone drill at a rate of 6 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated Check	36.3	-	35.1
AGTIV® IGNITE • L	37.4	1.1	37.1

Plot operational notes and rain fall.

- Fertilization:
 - Broadcast of granular blend of 94-79-90-11 (Urea, MAP, MOP and AMS) à seeding
 - June 22, Foliar copper
- Pesticides:
 - May 19, Roundup WeatherMax
 - June 4, Pounce (control of flea beetle)
 - June 10, Roundup WeatherMax
 - June 16, Coragen and Pounce (Grasshoppers and flea beetle control)
 - June 24, Roundup WeatherMax
 - August 13, Pounce (control of flea beetle)
 - August 31, Reglone (Dessicant)
- Combined on September 7, 2021

Month	Precipitation (mm)
May	61.9
June	101.5
July	25.4
August	103.3
TOTAL	292.1

EFFICACY REPORT

2020 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Ag-Quest

Research site: Taber, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 25.2 m² plots

Variety: Pioneer 45CS40

Previous crop: Wheat

Seeding details: Seeded on June 11, 2020, with a cone planter at a rate of 6.41 kg/ha



CANOLA

Table 1. **Summary of yields per treatment.**

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	37.3	-
AGTIV® IGNITE • L	38.5	1.2

Plot operational notes and rain fall.

- Fertilization on June 11:
 - 116.3 kg/ha of 11-52-0
 - 56.3 kg of 20-0-0-24
- Pesticides:
 - May 24, Roundup WeatherMax (emerged weeds)
 - July 17, Decis (Flea beetle control)
 - August 20, Weed Whacker
- Combined on September 23, 2020

Month	Precipitation (mm)
June	80.8
July	23.1
August	18.8
September	47.3
TOTAL	170.0

EFFICACY REPORT

2020 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m² plots

Variety: Pioneer 45CS40

Previous crop: Soybean

Seeding details: Seeded on May 21, 2020, with a cone planter at a rate of 6 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content ¹ (%)
Untreated Check	61.2	-	38.7 ^a
AGTIV® IGNITE • L	64	2.8	40.5 ^b

¹ Oil content with the same letter are not statistically different according to a Tukey HSD test ($p \leq 0.05$).

Plot operational notes and rain fall.

- Fertilization of 163-30-35-60 as NH₃, MAP, potash and AMS applied at fall 2019
- Pesticides:
 - June 5 and 16, Pounce (Flea beetle control)
 - June 23, Roundup
 - July 10, Clethodim
 - July 17, Proline (Sclerotinia rot control)
 - September 5, Guardsman (Dessicant)
- Combined on September 22, 2020

Month	Precipitation (mm)
May	12.0
June	62.8
July	122.7
August	43.2
September	9.9
TOTAL	250.6

EFFICACY REPORT

2020 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Moon Lake, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m² plots

Variety: Pioneer 45CS40

Previous crop: Field pea

Seeding details: Seeded on May 19, 2020, with a cone planter at a rate of 7 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content ¹ (%)
Untreated Check	16.3	-	41.6 ^a
AGTIV® IGNITE • L	18.2	1.9	43.6 ^b

¹ Oil content with the same letter are not statistically different according to a Tukey HSD test (p≤0.05).

Plot operational notes and rain fall.

- Fertilization prior to seeding by mixing a blend of 70-30-0-20 with the tillage
- No maintenance pesticides were applied during the trial
- Combined on August 31, 2020

Month	Precipitation (mm)
May	42.1
June	106.9
July	52.1
August	16.2
TOTAL	217.3

EFFICACY REPORT

2020 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m² plots

Variety: Pioneer 45CS40

Previous crop: Barley

Seeding details: Seeded on May 25, 2020, with a cone planter at a rate of 7 kg/ha



Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated Check	47.2	-	34.7
AGTIV® IGNITE • L	49.5	2.3	36.3

Plot operational notes and rain fall.

- Fertilization prior to seeding by mixing a blend of 51-22-26 with the tillage
- Pesticides:
 - June 12 Roundup Weathermax and Lontrel (emerged weeds)
- Combined on October 6, 2020

Month	Precipitation (mm)
May	93.5
June	121.4
July	121.9
August	68.4
September	4.9
TOTAL	410.1

EFFICACY REPORT

2019 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Saskatoon, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m² plots

Variety: In Vigor L252

Previous crop: Wheat

Seeding details: Seeded on June 7, 2019, with a drill seeder at a rate of 7 kg/ha



CANOLA

Table 1. Summary of yields per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	38.8	-
AGTIV® IGNITE • L	41.8	3

Plot operational notes and rain fall.

- Fertilization prior to seeding by mixing a blend of 70-30-10-20 with the tillage
- Pesticides:
 - July 12, Liberty 150 and Centurion (emerged weeds)
 - September 9, Matador (Grasshopper control)
- Combined on October 21, 2019

Month	Precipitation (mm)
June	84.8
July	67.6
August	20.3
September	39.5
October	3.0
TOTAL	215.2

EFFICACY REPORT

2019 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m² plots

Variety: Dekalb 75-42BL

Previous crop: Barley

Seeding details: Seeded on June 1, 2019, with a cone planter at a rate of 7 kg/ha



CANOLA

Table 1. Summary of yields per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	46.8	-
AGTIV® IGNITE • L	53.2	6.4

Plot operational notes and rain fall.

- Fertilization prior to seeding by mixing a blend of 31-0-10-8 with the tillage
- Pesticides:
 - June 26, Roundup Weather max (emerged weeds)
- Combined on October 4, 2019

Month	Precipitation (mm)
May	0
June	0
July	153.7
August	31
September	43.7
TOTAL	228.4

EFFICACY REPORT

2019 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m² plots

Variety: InVigor L255PC

Previous crop: Canola stubble

Seeding details: Seeded on May 21, 2019, with a drill planter at a rate of 7 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated Check	53.7	-	49.9
AGTIV® IGNITE • L	55.4	1.7	52.1

Plot operational notes and rain fall.

- Fertilization of 90-50-0-25 broadcast at seeding
- Pesticides:
 - May 3, Avadex (pre burn of weeds)
 - June 6, Liberty and Pounce (Flea beetle control)
 - June 11, Arrow
 - June 27, Liberty and Arrow (broadleaf and grassy weeds)
 - July 12, Proline (Sclerotinia rot control)
 - September 6, Heat (Dessicant)
- Combined on September 22, 2019

Month	Precipitation (mm)
May	25.4
June	26.1
July	59.3
August	51.8
September	48.7
TOTAL	211.3

EFFICACY REPORT

2019 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Taber, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 6 repetitions, 16 m² plots

Variety: Pioneer 45M35

Previous crop: Wheat

Seeding details: Seeded on May 27, 2019, with a drill planter at a rate of 5.6 kg/ha



CANOLA

Table 1. Summary of yields per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	25.4	-
AGTIV® IGNITE • L	27.0	1.6

Plot operational notes and rain fall.

- Broadcast fertilization of 29-37-0-30
- Irrigation on June 8, 16; July 6, 15 and 28
- Pesticides:
 - May 20 Roundup WeatherMax
 - Junly 3 Roundup WeatherMax and Pounce (Flea beetle control)
 - August 8 Pounce (Flea beetle control)
- Combined on September 25, 2019

Month	Precipitation (mm)
May	58.7
June	47.0
July	31.3
August	22.8
TOTAL	159.8

EFFICACY REPORT

2019 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: Wheatland Conservation Area (WCA)

Research site: Swift Current, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 6 repetitions, 9 m² plots

Variety: In Vigor L233P

Previous crop: Wheat

Seeding details: Seeded on May 28, 2019, with a cone seeder at a rate of 6.7 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	25.0	-
AGTIV® IGNITE • L	27.1	2.1

Plot operational notes and rain fall.

- Broadcast fertilization of 29-37-0-30 on May 27
- Pesticides:
 - June 25, Roundup WeatherMax
- Combined on September 25, 2019

Month	Precipitation (mm)
May	13.3
June	156.0
July	11.1
August	42.6
September	92.1
TOTAL	315.1

EFFICACY REPORT

2018 – SERENDIPITA ON SEED INOCULANT

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE • L

Experimental design: Complete Randomized Block Design, 8 repetitions, 15 m² plots

Variety: InVigor L140P

Previous crop: Canola stubble

Seeding details: Seeded on June 4, 2018, with a drill planter at a rate of 5.6 kg/ha



CANOLA

Table 1. Summary of yields and oil content per treatment.

Treatment	Yield ¹ (bu/ac)	Yield increase (bu/ac)
Untreated Check	63.5 ^b	-
AGTIV® IGNITE • L	68.0 ^a	4.5

¹ Yield mean with the same letter are not statistically different according to a Tukey HSD test (p≤0.05).

Plot operational notes and rain fall.

- Fertilization midrow band 20-58-5-8 and broadcast 125-0-35-25
- No pesticides applied
- Combined on October 4, 2018

Month	Precipitation (mm)
June	127.6
July	59.3
August	35.4
September	51.1
TOTAL	273.4



3.8 bu/ac 258 kg/ha

DURUM
WHEAT

AVERAGE YIELD INCREASE

12 sites over 7 years
Canada **6.5%**

7.3 bu/ac 394 kg/ha

BARLEY

AVERAGE YIELD INCREASE

28 sites over 6 years
Canada and Europe **10.5%**

Durum wheat split field with AGTIV® vs untreated.
More uniform field, head and spikes almost all out on the right.



Young wheat plants whose root systems show better growth with AGTIV® and the plants are stronger with more leaves. Better nitrogen absorption through the more developed root system.



EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Table 1. **Average yield increase with AGTIV® mycorrhizal inoculant in Canada and Europe (37 sites, 2012 to 2020).**

Number of sites	Average increase (%)
39	8.0%

Table 2. **Average yield increase with AGTIV® mycorrhizal inoculant in Western Canada (2012 to 2018).**

Number of sites	Average increase (bu/ac)	Average increase (%)
12	3.8	6.5%

Table 3. **Average yield increase with AGTIV® mycorrhizal inoculant in FRANCE, Europe (2014 to 2020).**

Number of sites	Average increase (bu/ac)	Average increase (%)
27	8.7	8.5%



DURUM WHEAT

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT



DURUM WHEAT

► PLOT TRIAL

Research partner: Eurofins Agrosience Services

Research site: Beauce, France

Treatments: a) Untreated;
b) AGTIV® FIELD CROPS • Powder*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Wheat variety: Anvergur

Previous crop: Sugar beet

Seeding details: Seeded on November 15 at 300 seeds/m² with 15 cm row spacing.

*Products applied according to manufacturer's recommended rate.

Table 1. Summary of wheat yield per treatment.

Treatment	Yield ¹ (bu/ac)	Yield ¹ (t/ha)
Untreated	142.8 ^a	9.6 ^a
AGTIV® FIELD CROPS • Powder	155.2 ^b	10.4 ^b

¹ Yields with same letter are not statistically different following a Tukey HSD test at p≤0.05

Plot operational notes and rain fall.

- Fertilization:
 - N:P+S at 450 kg/ha (19-02-18)
 - Ammonitrate at 290 kg/ha (19-03-18)
- Pesticides:
 - Atlantis Pro (19-03-21)
 - Priori Xtra (19-04-21)
 - Bofix and Chardol (19-04-23)
 - Rubric 125 SC (19-05-15)
 - Prosaro (19-05-29)
- Harvested on July 25, 2019.

Year	Month	Precipitation (mm)
2018	November	96.7
	December	57.9
2019	January	41.2
	February	34.3
	March	77.5
	April	30.8
	May	79.2
	June	70.7
	TOTAL	488.3

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

Treatments: a) Untreated;
b) AGTIV® FIELD CROPS • Granular*.

Experimental design: 4 replicated plots per treatment in randomized complete block design

Wheat variety: Precision durum

Previous crop: Canola stubble

Seeding details: Seeded with fabro plot drill & Atomjet knife openers on May 13, 2018, at 115 lb/ac on 20 m² plots with 9 in row spacing

*Granular product applied according to manufacturer's recommended rate.



DURUM WHEAT

Table 1. Summary of Wheat yields per treatment.

Treatment	Yield (bu/ac)	Yield (kg/ha)
Untreated	12.0	806
AGTIV® FIELD CROPS • Granular	13.3	894

Plot operational notes and rain fall.

- Fertilized with
 - 58 lb/ac 21-0-0-24
 - 67 lb/ac 11-52-0
 - 111 lb/ac 46-0-0
- Pre-seeding burn off with Clean Start
- Combined on August 9, 2018.

Month	Precipitation (mm)
May	8.8
June	23.6
July	15.1
August	28.3
TOTAL	75.8

EFFICACY REPORT

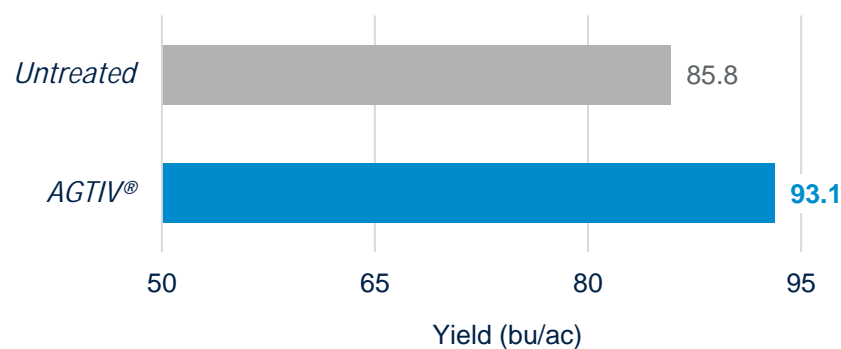
SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Table 1. Average yield increase with AGTIV® mycorrhizal inoculant in Canada (2012 to 2016).

Number of sites	Average increase (bu/ac)	Average increase (kg/ha)	Average increase (%)
26	7.0	377	10.6%

Figure 1. Average yield increase with AGTIV® mycorrhizal inoculant in Canada and Europe (28 sites, 2012 to 2017).



Barley plants have an increased root mass on the right with AGTIV®, which leads to enhanced plant health and growth.

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Antédis

Research site: Bourbourg, North department, France

Treatments: a) Untreated;
b) AGTIV® FIELD CROPS • Powder*.

Experimental design: 9 replicated plots per treatment in randomized complete block design

Seeding details: Seeded April 26 at 2 000 seeds/m² 16.5 cm row spacing.

*Product applied according to manufacturer's recommended rate.



FIBRE FLAX

Table 1. Summary of flax marketable yield (whole and fiber) per treatment

Treatment	Yield ¹		Fiber yield	
	(kg/ha)	(lb/ac)	(kg/ha)	(lb/ac)
Untreated	5490 ^a	4898 ^a	730 ^a	651 ^a
AGTIV® FIELD CROPS • Powder	6390 ^b	5701 ^b	856 ^b	764 ^b

¹ Yields followed by different letters are significantly different (Tukey's test HSD at p≤0.05).

Plot operational notes and rain fall

- Pesticides:
 - Patton M (19-04-26)
 - Lontrel + Oil (19-05-22)
 - Nissodium (19-05-31)
- Harvested October 15, 2019.

Month	Precipitations (mm)
April	3.8
May	47
June	66.6
July	33.2
August	25.4
September	69.6
October	60.6
TOTAL	306.2



577 kg/ha

FORAGES

AVERAGE YIELD INCREASE

47 sites over 2 years
Canada

16.1%

Forage split field with AGTIV® FIELD CROPS • Powder vs untreated.

Greener and denser alfalfa. Alfalfa with AGTIV® is better established versus weeds and will therefore yield better.



More uniform and greener field with AGTIV® for better overall performance.



EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Research sites: 15 farms (fields) in Quebec, Canada

Treatments: a) Untreated;
b) AGTIV® mycorrhizal inoculant

Experimental design: Each data point per field consists of an average of 5 samples taken each from the treated and untreated side.



FORAGES

Table 1. Increase in dry weight per cut over two years with AGTIV® mycorrhizal inoculant

Cut	Yield increase 2016 season	Yield increase 2017 season
1 st	17.5%	23.8%
2 nd	20.8%	5.9%
3 rd	12.7%	10.6%
Average	18.7%¹	13.5%¹

¹ Statistically significant at $p \leq 0.05$ using t-test for dependent samples.

Table 2. Winter 2016 Alfalfa survival

	Survival winter 2016
Untreated	86.4% ^a
AGTIV®	92.2% ^b
Survival increase	+42.8%

Averages followed by different letters are significantly different ($p \leq 0.05$, t-test for dependent samples).

Table 3. Two-year summary of Alfalfa dry weight yield average²

	AGTIV®		Untreated		Difference	
	(kg/ha)	(bu/ac)	(kg/ha)	(bu/ac)	(kg/ha)	(bu/ac)
2016	3910 ^b	58.1 ^b	3295 ^a	49.0 ^a	615	9.1
2017	4190 ^b	62.3 ^b	3691 ^a	54.9 ^a	499	7.4
2016 + 2017					1 114	16.6

² Averages followed by different letters are significantly different ($p \leq 0.05$, t-test for dependent samples).



31.6 cwt/ac 3.6 t/ha

POTATO

AVERAGE INCREASE OF
MARKETABLE YIELD

1172 sites over 10 years
North America and Europe

10%

Potato split field with AGTIV® POTATO vs untreated.
Faster plant development and larger plants on the right,
and row closure occurs sooner with AGTIV®.



UNTREATED



Increased tuber count per plant and marketable yield on AGTIV® side.



UNTREATED



EFFICACY REPORT

SUMMARY – MICORRHIZAL INOCULANT

► GROWER SPLIT FIELDS AND TRIALS



POTATOES

Table 1. Average increase of marketable yield* with AGTIV® POTATO • Liquid for different territories (2011 to 2021).

Territory	Number of sites	Yield increase (t/ha)	Yield increase (cwt/ac)	Yield increase (%)
Canada	581	3.1	27.7	10.0
United States	67	3.3	29.8	10.8
Mexico	4	2.3	20.0	8.6
France & Switzerland	496	4.1	36.3	9.9
Germany	24	4.2	37.5	10.3
Total	1172 sites	3.6 t/ha	31.6 cwt/ac**	10.0 %

Table 2. Average increase of marketable yield* with AGTIV® POTATO • Liquid for different years (2011-2021).

Year	Number of sites	Yield increase (t/ha)	Yield increase (cwt/ac)	Yield increase (%)
2011	32	2.6	23.3	6.6
2012	33	3.2	28.5	9.0
2013	70	3.6	31.9	11.2
2014	116	4.5	40.3	12.8
2015	145	4.0	35.3	10.7
2016	243	3.9	34.8	10.5
2017	213	2.7	24.0	7.7
2018	113	3.4	30.2	11.2
2019	117	3.5	31.1	8.6
2020	49	2.9	25.6	9.8
2021	41	4.1	36.4	10.2
Total	1172 sites	3.6 t/ha	31.6 cwt/ac**	10.0 %

* Statistically significant at $p < 0.001$ following a T test.

**cwt/ac = 100 lb/ac

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

► PLOT TRIAL

Research partner: Progest inc.

Research site: Sainte-Croix de Lotbinière, QC

Treatments: a) Untreated Check
b) AGTIV® POTATO • L*
c) AGTIV® POTATO • L + PTB185 (*Bacillus subtilis*)*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 22 m² plots

Variety: Norland

Previous crop: Oat

Seeding details: Seeded on June 3, 2021, at a rate of 36 400 seeds/ha



POTATOES

Table 1. **Summary of marketable yields per treatment.**

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	313.1	-
AGTIV® POTATO • L	320.3	2.2
AGTIV® POTATO • L + PTB185 (<i>Bacillus subtilis</i>)	326.6	4.3

Plot operational notes and rain fall.

- Fertilizers:
 - Fertilization at seeding of 1333 kg/ha of 12-12-15
- Pesticides:
 - June 4, 25 and July 5, Quadris
 - June 4, Titann
 - June 9 Lorox
 - June 24, Select and Amigo
 - June 25, July 5 and August 13, Manzate
 - July 15 and 29, Coragen
 - July 23, Delegate
 - July 29 and August 13, Agrovia Top
 - August 23 and September 10, Reglone (dessicant)
- Harvested on September 23, 2021

Month	Precipitation (mm)
June	103.0
July	85.8
August	28.4
September	80.8
TOTAL	298.0

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

► PLOT TRIAL

Research partner: New Marc Research

Research site: Saint-Marc-sur-Richelieu, QC

Treatments: a) Untreated Check
b) AGTIV® POTATO • L*
c) AGTIV® POTATO • L + PTB185 (*Bacillus subtilis*)*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 22 m² plots

Variety: Chieftain

Previous crop: Soybean

Seeding details: Seeded on June 4, 2021, at a rate of 2200 kg/ha



POTATOES

Table 1. **Summary of marketable yields per treatment.**

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	103.1	-
AGTIV® POTATO • L	107.8	4.5
AGTIV® POTATO • L + PTB185 (<i>Bacillus subtilis</i>)	116.3	12.8

Plot operational notes and rain fall.

- Fertilization:
 - June 1, Broadcast of 16.9-22.2-12.7 and hilling
 - June 5, Broadcast of Urea (46-0-0)
- Pesticides:
 - June 10 and July 22, Coragen (Colorado potato beetle control)
 - August 27, Delegate (Colorado Potato Beetle control)
- Harvested on September 30, 2021

Month	Precipitation (mm)
May	15.9
June	56.3
July	47.4
August	49.2
September	55.0
TOTAL	223.8

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

► PLOT TRIAL

Research partner: Atlantic Agri Tech

Research site: New Glasgow, IPE

Treatments: a) Untreated Check
b) AGTIV® POTATO • L*
c) AGTIV® POTATO • L + PTB185 (*Bacillus subtilis*)*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 16 m² plots

Variety: Russet Burbank

Previous crop: Oat

Seeding details: Seeded on May 21, 2021, at a rate of 1900 kg/ha



POTATOES

Table 1. **Summary of marketable yields per treatment.**

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	236.9	-
AGTIV® POTATO • L	242.4	2.3
AGTIV® POTATO • L + PTB185 (<i>Bacillus subtilis</i>)	247.4	4.4

Plot operational notes and rain fall.

- Fertilization of 15-15-15-4 (S)-2 (Mg) on May 1, in band
- Pesticides:
 - June 2, Lorox and Sencor (weed control)
 - June 28; July 12 and 28; August 9, Pencozeb 75DF (Blight control)
 - July 5, Zampro (Blight control) and Coragen (CPB Control)
 - July 19, Revus (Blight control) and Delegate (CPB control)
 - August 25, Echo (Blight control)
 - September 8, Reglone (top killing)
- Harvested on October 4, 2021

Month	Precipitation (mm)
May	96.8
June	45.8
July	142.4
August	39.2
September	217.2
TOTAL	541.4

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

► PLOT TRIAL

Research partner: Tall Pines Agricultural Research Ltd.

Research site: Rockwood, ON

Treatments: a) Untreated Check
b) AGTIV® POTATO • L*
c) AGTIV® POTATO • L + PTB185 (*Bacillus subtilis*)*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 18 m² plots

Variety: Chieftain Red

Previous crop: Fallow

Seeding details: Seeded on May 21, 2021, at a rate of 26 000 seed pieces/ha



POTATOES

Table 1. Summary of marketable yields per treatment.

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	266.7	-
AGTIV® POTATO • L	286.4	7.3
AGTIV® POTATO • L + PTB185 (<i>Bacillus subtilis</i>)	322.3	20.8

Plot operational notes and rain fall.

- Fertilization 120-60-90 on April 20, in band, at a rate of 590 kg/ha
- Pesticides:
 - May 28, Boundary LQD (weed control)
 - July 15, Bravo Zn (diseases control)
 - July 28, Coragen (CPB control)
- Harvested on November 9, 2021

Month	Precipitation (mm)
May	28
June	95.5
July	128.4
August	28.2
September	142.6
TOTAL	422.7

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

► PLOT TRIAL

Research partner: Wellington Agricultural Research Ltd.

Research site: Elmira, ON

Treatments: a) Untreated Check
b) AGTIV® POTATO • L*
c) AGTIV® POTATO • L + PTB185 (*Bacillus subtilis*)*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 22 m² plots

Variety: Chieftain Red

Previous crop: Canola

Seeding details: Seeded on June 17, 2021, at a rate of 27 778 seed pieces/ha



POTATOES

Table 1. Summary of marketable yields per treatment.

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	298.2	-
AGTIV® POTATO • L	320.7	7.3
AGTIV® POTATO • L + PTB185 (<i>Bacillus subtilis</i>)	343.9	15.3

Plot operational notes and rain fall.

- Pesticides:
 - July 1, Sencor DF (weed control)
 - July 26, August 5, 7, 13, 19, 23 and september 9, Bravo and Revus (diseases control)
- Harvested on October 9, 2021

Month	Precipitation (mm)
June	136.4
July	79.9
August	49.9
September	177.8
TOTAL	444

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

► STRIP TRIAL

Research partner: Willard Waugh & Sons LTD.

Research site: Bedeque (PEI), Canada

Treatments: a) Untreated;
b) AGTIV® POTATO • Liquid*.

Experimental design: 20 acres strip

Potato variety: Prospect

Previous crop: Alfalfa

Seeding details: Seeded May June 7, 2019, at 6 tubers/m with 33 cm row spacing

*Liquid products applied according to manufacturers' recommended rate.



POTATOES

Table 1. **Summary of potato marketable yields per treatment.**

Treatment	Yield (cwt/ac)	Yield (t/ha)
Untreated	359.1	40.2
AGTIV® POTATO • Liquid	405.2	45.4

Plot operational notes and rain fall.

- Conventional tillage
- Pesticides: Titan & Emesto
- Fertilization: 17-16-10 at 392.4 kg/ac
- Harvested on October 10, 2019.

Month	Precipitation (mm)
June	113.0
July	26.6
August	115.1
September	204.9
October	100.0
TOTAL	559.6



EFFICACY REPORT

2016 – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Research partner: EUROCELP

Research site: 75 farms (fields) in France, Europe

Treatments: a) Untreated;
b) AGTIV® mycorrhizal inoculant.

Experimental design: Every data point per field consists in an average of 3 samples each (untreated and AGTIV®).



POTATOES

Table 1. Marketable potato yields per treatment (all markets)

Treatment	Yield (cwt/ac)	Yield (t/ha)	Difference (%) AGTIV® vs untreated
Untreated	412.7	45.7	
AGTIV® mycorrhizal inoculant	455.1	50.4	+9.3%*

*Statistically significant at $p \leq 0,05$ using T Test analysis for paired samples.

Figure 1. Marketable potato yields (t/ha) per treatment (all markets)

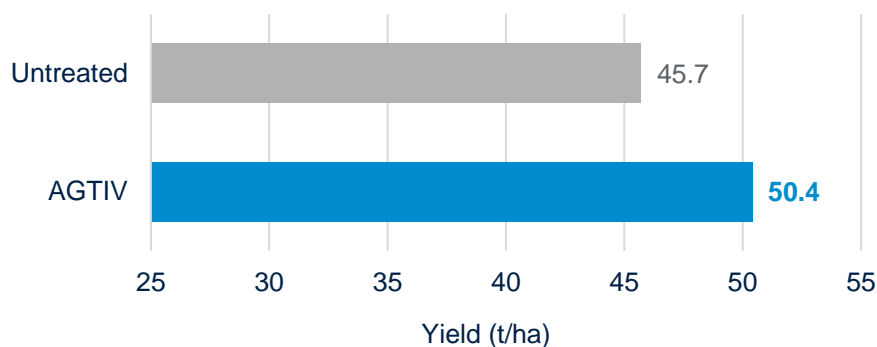
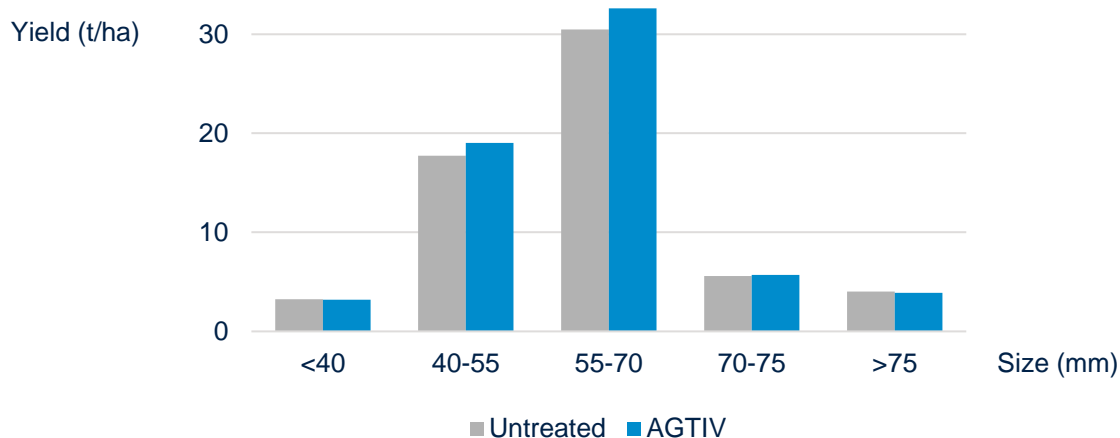


Figure 2. Potato yield (t/ha) for the tablestock market (32 plots) by marketable size (40/75 mm)



EFFICACY REPORT

2011 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Agréco

Research site: Rawdon (Lanaudière, QC), Canada

Treatments: a) Untreated;
b) AGTIV® POTATO • Liquid.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Potato variety: Goldrush

Previous crop: Potato in 2010, Wheat in 2009

Seeding details: Each plot comprised four rows of 20 seed pieces (35.6 cm apart).
Inoculant in liquid suspension applied in furrow. Planted May 21, 2011.



POTATOES

Table 1. Summary of potato yields per treatment.

Treatment	Marketable Yield (lb/plot)	Marketable Yield (kg/plot)	Average marketable potato weight (g/potato tuber)
Untreated	23.8 ^a	10.8 ^a	123 ^a
AGTIV® POTATO • Liquid	27.3 ^b	12.4 ^b	136.5 ^b

Results followed by different letters are statistically different according to Duncan (Marketable yield at $p \leq 0.1$; Marketable potato weight at $p \leq 0.05$)

Plot operational notes.

- Fertilization:
 - 206 kg/ha N;
 - 170 kg/ha P_2O_5 and 270 kg/ha K_2O .
- Pesticides:
 - Titan, Quadris and Actara at planting time;
 - Sencor (June 13), Polyram (June 15), Bravo (once a week from end of June until August 12), Reason (August 12).
- Planted manually in sandy soil.
- Harvested September 18, 2011.

EFFICACY REPORT

2010 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Agréco

Research site: Lyster (Centre-du-Québec, QC), Canada

Treatments: a) Untreated;
b) AGTIV® POTATO • Liquid.

Experimental design: 6 replicated plots per treatment in randomized complete block design.

Potato variety: Goldrush

Seeding details: Each plot of 6 m (20 feet) long with 15 seed pieces per treatment. Inoculant in liquid suspension applied in furrow. Planted May 26.



POTATOES

Table 1. Summary of potato yields per treatment.

Treatment	Yield (lb/plot)	Yield (kg/plot)	Marketable tuber number per plot
Untreated	15.4 ^a	7.0 ^a	34 ^a
AGTIV® POTATO • Liquid	20.5 ^b	9.3 ^b	48 ^b

Results followed by different letters are statistically different according to Duncan ($p \leq 0.1$)

Plot operational notes and rain fall.

- Fertilized according to recommendations by the host growers.
- Pesticides:
 - Quadris and Actara at planting time.

Month	Precipitation (mm)
May	39.8
June	104.4
July	48.8
August	112.0
September	184.8
TOTAL	489.8

Meteorological data from Québec

EFFICACY REPORT

1999 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Laval University (Qc), Canada

Research site: Lavaltrie (QC), Canada

Treatments: a) Untreated;
b) AGTIV® POTATO • Liquid.

Experimental design: 4 replicated plots per treatment in randomized complete block design

Potato variety: Goldrush

Seeding details: The trial plot consisted of 32 60-meter rows spaced at 0.9 meter.



POTATOES

Table 1. Summary of potato yields per treatment.

Treatment	Total Yield		Marketable yield	
	(cwt/ac)	(t/ha)	(cwt/ac)	(t/ha)
Untreated	446.1 ^a	49.4 ^a	417.2 ^a	46.2 ^a
AGTIV® POTATO • Liquid	466.9 ^b	51.7 ^b	442.5 ^b	49.0 ^b

Results followed by different letters are statistically different according to Duncan ($p \leq 0.05$)

Plot operational notes and rain fall.

- Fertilization:
 - 1800 kg/ha of 10-12-12 (3% Mg, 0.22% B) at planting time;
 - 336 kg/ha of 10-0-15 during the summer.
- Pesticides:
 - Fumigation: Vapam (Previous fall)
 - Insecticides: Cymbush, Admire, Furadan (during growth season)
 - Herbicides: Gramoxone, Lexone, Laroxe (during growth season)
- Irrigated twice: June & July.

Month	Precipitation (mm)
May	33.1
June	103.6
July	58.9
August	73.1
Septembre	123.6
TOTAL	392.3

Meteorological data from Trois-Rivières



8.1%

ONIONS

AVERAGE YIELD INCREASE

16 sites over 7 years, Canada and Europe

9.8%

CARROTS

AVERAGE YIELD INCREASE

11 sites over 6 years, Canada and Europe

11.1%

GREEN PEAS

AVERAGE YIELD INCREASE

13 sites over 4 years, Canada

6.8%

PEPPERS

AVERAGE YIELD INCREASE

5 sites over 3 years, Canada

7.7%

GREEN
BEANS

AVERAGE YIELD INCREASE

6 sites over 2 years, Europe

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS AND PLOT TRIALS¹

Table 1. **Average increase of marketable yields² (t/ha) with AGTIV® SPECIALTY CROPS for different years (2014-2019)**

Year	Number of sites	Yield Untreated	Yield AGTIV®	Yield increase	Yield increase (%)
2014	2	67.7	73.2	5.4	8.0
2015	4	44.3	47.6	3.3	8.7
2016	1	60.7	64.1	3.4	5.6
2017	1	18.2	20.4	2.2	12.2
2018	2	40.0	46.1	6.2	20.3
2019	6	50.3	52.6	2.2	3.3
Total	16 sites	48.3^a	51.8^b	3.5 t/ha	8.1%

¹ Split fields and trials conducted in North America and Europe

² Yields without the same letter are statistically different based on a Tukey HSD test ($p \leq 0.05$).

Table 2. **Average increase of marketable yields² (lb/ac) with AGTIV® SPECIALTY CROPS for different years (2014-2019)**

Year	Number of sites	Yield Untreated	Yield AGTIV®	Yield increase	Yield increase (%)
2014	2	60 400	65 307	4 817	8.0
2015	4	39 523	42 467	2 944	8.7
2016	1	54 155	57 188	3 033	5.6
2017	1	16 237	18 200	1 962	12.2
2018	2	35 687	41 129	5 531	20.3
2019	6	44 876	46 928	1 962	3.3
Total	16 sites	41 813^a	45 203^b	3 375 lb/ac	8.1%

¹ Split fields and trials conducted in North America and Europe

² Yields without the same letter are statistically different based on a Tukey HSD test ($p \leq 0.05$).



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EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT



S
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► PLOT TRIAL

Research department: Antédis

Research site: Issé, Loire-Atlantique department, France

Treatments: a) Untreated;
b) AGTIV® SPECIALTY CROPS • Powder*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Carrot variety: Santero F1

Previous crop: Spring barley

Seeding details: Seeded April 1 at 80 seeds/m² with 32 cm row spacing.

*Products applied according to manufacturer's recommended rate.

Table 1. Summary of onions marketable yields per treatment.

Treatment	Marketable yield (lb/ac)	Marketable yield (t/ha)
Untreated	55 315	62.0
AGTIV® SPECIALTY CROPS • Powder	56 474	63.3

Plot operational notes and rain fall

- Fertilization:
 - Liquid Solution N 39 (19-03-19)
 - AVF K4 (from 20/08 to 25/08 2019)
- Pesticides:
 - In April – Baroud SC and Lentagran
 - In May – Challenge 600, Lentagran 200 and Satarne 200
 - In June - Challenge 600, Satarne 200, Hacrobat M DG, DEFI, Bordeaux mixture and Caiman WP
 - In July – Bordeaux mixture, Dithane M 45, Scala, Acrobat M DG,
 - In August – Bordeaux mixture, Acrobat M DG, Dithane M45
 - In September – ITCAN SL 270
- Harvested September 24, 2019.

Month	Precipitations (mm)
April	36.4
May	90.6
June	34.4
July	10.6
August	42.9
September	4.6
TOTAL	219.5



UNTREATED



Better growth on the right with AGTIV®.

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright (ON), Canada

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: 8 replicated plots per treatment in randomized complete block design.

Onion variety: Catskill

Previous crop: Soybean

Seeding details: Seeded June 7 with Clean seeder at 40 seeds/m of row with 30 cm row spacing.



ONION

Table 1. Summary of onion yields per treatment.

Treatment	Yield		Marketable Yield	
	(lb/ac)	(t/ha)	(lb/ac)	(t/ha)
Untreated	20 434	22.9	18 467	21.0
AGTIV® ON SEED™ mycorrhizal inoculant	29 179	32.7	26 644	29.8

Plot operational notes and rain fall.

- Fertilization:
 - MAP - 70 kg/ha
 - Potash - 98 kg/ha
 - KMag - 125 kg/ha
 - Urea - 112 kg/ha
- Conventional till
- Pesticides:
 - Venture L (18-06-20)
 - Pardner (18-06-25)
 - Prowl H₂O (18-06-29)
 - Pardner (18-07-05)
 - Prowl H₂O (18-07-15).
- Harvested on October 18, 2018.

Month	Precipitation (mm)
June	91
July	63.1
August	116.6
September	57.8
TOTAL	328.5



UNTREATED



More developed root system on the right,
and plants are larger with AGTIV®.

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Research site: France, Europe

Treatments: a) Untreated;
b) AGTIV® mycorrhizal inoculant.

Experimental design: Every data point per field consists in an average of 3 samples each (untreated and AGTIV®).

Variety: Hytunes

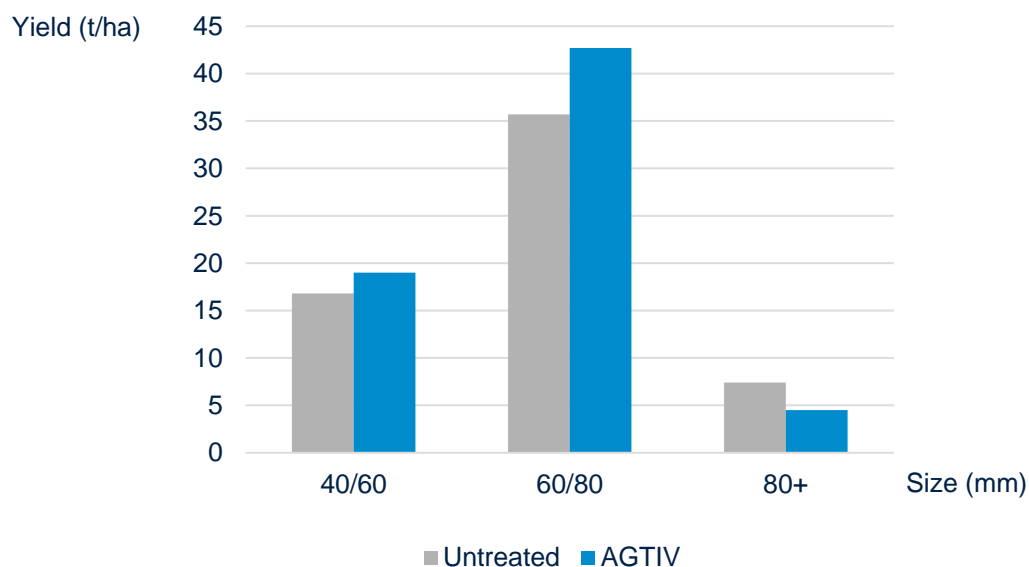


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Table 1. Marketable onion yields per treatment.

Treatment	Yield (lb/ac)	Yield (t/ha)	Bulb number / ha	Difference (%) AGTIV® vs untreated
Untreated	53 441	59.9	531 667	
AGTIV® ON SEED™ mycorrhizal inoculant	59 062	66.2	616 667	+10.5%

Figure 1. Onion yield (t/ha) by marketable size (mm)



EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

► PLOT TRIALS

Research partners: Black Creek Research and Prisme

Research sites: Bright (ON), Canada – Sandy loam soil
and Napierville (QC), Canada – Black soil, organic

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: Randomized complete block design, 8 replicates.



ONION

Table 1. 2017 summary of onion yields and % difference.

Location	Year	Variety	Untreated		AGTIV® mycorrhizal inoculant		% Yield difference
			(lb/plot)	(kg/plot)	(lb/plot)	(kg/plot)	
Ontario	2017	Frontier	32.2	14.6	34.0	15.4	+5.5%
Quebec	2017	Trailblazer	23.8	10.8	25.4	11.5	+6.3%
Average	2017		28.0	12.7	29.8	13.5	+6.2%



UNTREATED



Onion split field with AGTIV® vs untreated.
Plant growth and health is enhanced on the right.

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Research site: France, Europe

Treatments: a) Untreated;
b) AGTIV® mycorrhizal inoculant.

Experimental design: Every data point per field consists in an average of 3 samples each (untreated and AGTIV®).

Variety: SPIRIT

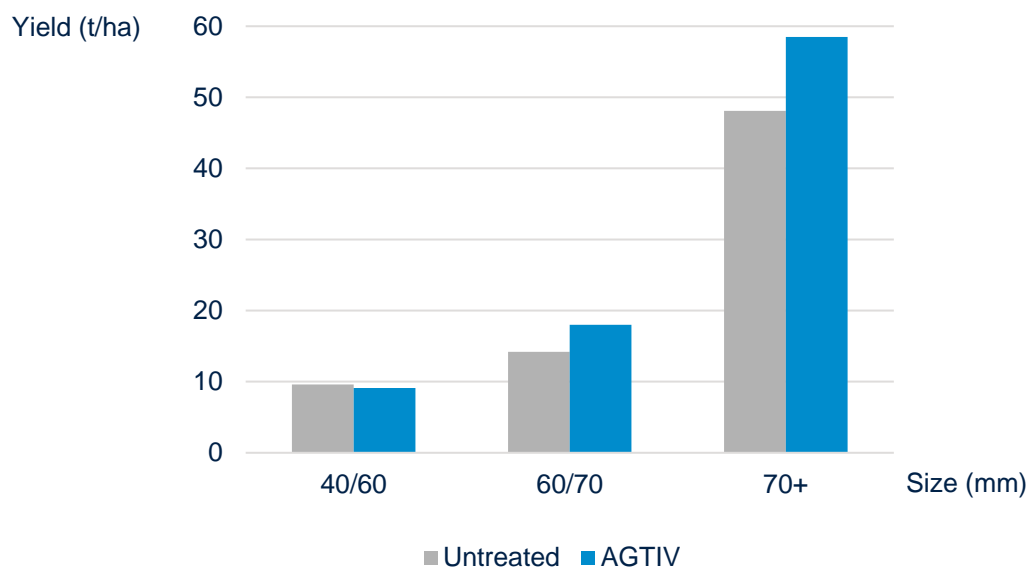


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Table 1. Marketable onion yields per treatment.

	Untreated	AGTIV® mycorrhizal inoculant	Difference (%) AGTIV® vs untreated
Yield (t/ha)	71.9	85.7	+19.2%
Bulb number / ha	409 877	459 259	+12.0%

Figure 1. Onion yields (t/ha) by marketable size (mm).



EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT



CARROTS

► PLOT TRIAL

Research partner: Antédis

Research site: Ploërmel, Morbihan department, France

Treatments: a) Untreated;
b) AGTIV® SPECIALTY CROPS • Powder*.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Carros variety: Bolero F1

Previous crop: Ray-grass

Seeding details: Seeded May 24 at 850,000 seeds/ha.

*Products applied according to manufacturer's recommended rate.

Table 1. Summary of carrot marketable yields per treatment.

Treatment	Marketable yield (lb/ac)	Marketable yield (t/ha)	Increase
Untreated	87 433 ^a	98.0 ^a	
AGTIV® SPECIALTY CROPS • Powder	96 266 ^b	107.9 ^b	+10.1%

¹ Yields with same letter are not statistically different following a Tukey HSD test at $p \leq 0.05$.

Plot operational notes and rain fall

- Fertilization:
 - 30 m³ of cattle manure (19-05-21)
- Pesticides
 - Racer ME, Baroud SC and Centium 36 CS (19-06-02)
 - Challenge 600 and DEFI (19-06-26 et 19-08-01)
 - Switch and Heliosoufre (19-08-13)
- Harvested October 28, 2019.

Month	Precipitations (mm)
May	3.0
June	144.4
July	18.4
August	57.4
September	67.8
October	172.5
TOTAL	463.5

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT



CARROTS

► PLOT TRIAL

Research partner: Eurofins Agrosience services

Research site: Meneac, Morbihan department, France

Treatments: a) Untreated;
b) AGTIV® SPECIALTY CROPS • Powder*.

Experimental design: 8 replicated plots per treatment in randomized complete block design.

Carrot variety: Bolero F1

Previous crop: Barley

Seeding details: Seeded May 24 at 600,000 seeds/ha with 60 cm row spacing.

*Products applied according to manufacturer's recommended rate.

Table 1. Summary of carrot marketable yields per treatment.

Treatment	Marketable yield ¹ (lb/ac)	Marketable yield ¹ (t/ha)	Increase
Untreated	79 047 ^a	88.6 ^a	
AGTIV® SPECIALTY CROPS • Powder	84 757 ^b	95.0 ^b	+7.2%

¹ Yields with same letter are not statistically different following a Tukey test at $p \leq 0.05$

Plot operational notes and rainfall

- Fertilization:
 - Chicken manure 2200 kg/ha (19-04-15)
 - Ammonitrate (19-02-23; 180 kg/ha and 19-03-15; 150 kg/ha)
- Pesticides:
 - Cherokee (19-04-19)
 - Keynote (19-05-08)
 - Baroud, Racer Centium (19-05-25)
 - Signum, Heliosoufre and Bordeaux mixture (19-06-25)
- Harvested October 1, 2019.

Month	Precipitations (mm)
June	181.1
July	23.3
August	53.6
September	45.7
TOTAL	303.7

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Agricultural Development Group Inc.

Research site: Eltopia (WA), USA

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Carrot variety: Envy

Previous crop: Squash

Seeding details: Direct seeded May 24 at 20 seeds/m of row;
1.3 million seeds per hectare.



CARROTS

Table 1. Summary of carrot marketable yields per treatment.

Treatment	Marketable Yield (lb/ac)	Marketable Yield (t/ha)	Marketable Yield (%)
Untreated	12 499	14.0	92
AGTIV® ON SEED™ mycorrhizal inoculant	16 941	19.0	92

Plot operational notes and rain fall.

- Conventional till
- Herbicide:
 - Two maintenance herbicide applications were made on July 13 with Lorox and August 23 with Nortron
- Harvested on October 8, 2018.

Month	Precipitation (mm)
May	9.9
June	15.25
July	0
August	0
September	0.5
October	20.8
TOTAL	46.45

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

► PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright (ON), Canada

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Carrot variety: Envy

Previous crop: Soybean

Seeding details: Seeded June 11 with Clean seeder at 50 seeds/m of row;
3.3 million seeds per hectare.



CARROTS

Table 1. Summary of carrot marketable yields per treatment.

Treatment	Marketable Yield (lb/ac)	Marketable Yield (t/ha)	Marketable Yield (%)	Reject (%)
Untreated	20 488	23.0	64%	4.75%
AGTIV® ON SEED™ mycorrhizal inoculant	23 244	26.0	69%	3.13%

Plot operational notes and rain fall.

- Conventional till
- Fertilization:
 - MAP - 70 kg/ha
 - Potash - 98 kg/ha
 - KMag - 125 kg/ha
 - Urea - 112 kg/ha
- Herbicide:
 - Lorox FL (480 g/L, 3.25 L/ha, June 12)
 - Venture L (125g/L, 2L/ha, July 10)
- Harvested on September 24, 2018.

Month	Precipitation (mm)
June	91
July	63.1
August	116.6
September	57.8
TOTAL	328.5

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

► PLOT TRIALS

Research partners: Black Creek Research and Prisme

Research sites: Bright (ON), Canada – Sandy loam soil
and Napierville (QC), Canada – Black soil, organic

Treatments: a) Untreated;
b) AGTIV® ON SEED™ mycorrhizal inoculant.

Experimental design: Randomized complete block design, 8 replicates.



CARROTS

Table 1. Summary of carrot marketable yields and % difference.

Location	Year	Variety	Untreated		AGTIV® mycorrhizal inoculant		% Yield difference
			(lb/ac)	(t/ha)	(lb/ac)	(t/ha)	
Ontario	2017	Bolero	36 579	41	38 542	43.2	+5.3%
Quebec	2017	Olympus	28 817	32.3	34 438	38.6	+19.5%
Average	2017		32 653	36.6	36 490	40.9	+11.7%



Carrot split field with AGTIV® vs untreated.
Bigger plants and quicker row closure on the right.

EFFICACY REPORT

2019 – MYCORRHIZAL & BACILLUS INOCULANT

► PLOT TRIAL

Research partner: Schreiber & Sons

Research site: Eltopia, Washington, USA

Treatments: a) Untreated;
b) AGTIV® ON SEED™ – SPECIALTY CROPS • Film coating +
AGTIV® ON SEED™ BACILLUS • Liquid *.

Experimental design: 8 replicated plots per treatment in randomized complete block design

Sweet corn variety: Nirvana

Previous crop: Fallow (2017) and wheat (2018)

Seeding details: Seeded June 4, 2019, at 30 000 seeds/ac with 75 cm row spacing.

*Products applied according to manufacturer's recommended rate.



SWEET CORN

Table 1. Summary of sweet corn yields per treatment.

Treatment	Yield (lb/ac)	Yield (t/ha)	Increase
Untreated	17 854.0 ^a	20.0 ^a	
AGTIV® ON SEED™ – SPECIALTY CROPS • Film coating + AGTIV® ON SEED™ BACILLUS • Liquid	21 067.7 ^b	23.6 ^b	+18%

¹ Yields with same letter are not statistically different following a LSD test at $p \leq 0.05$.

Plot operational notes and rain fall

- Herbicides application on June 22 (Atrazine) and July 22 (Atrazine + Impact)
- Plots were irrigated and fertilized
- Harvested on September 16, 2019.

Month	Precipitation (mm)
June	1.95
July	2.44
August	25.62
September	11.94
TOTAL	41.95

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

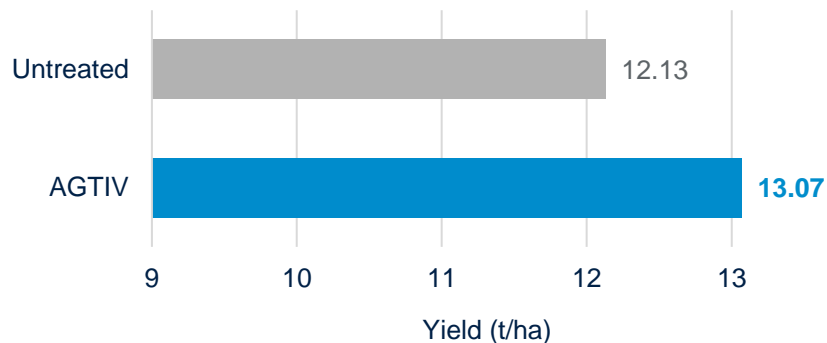
Table 1. Average yield increase with AGTIV® mycorrhizal inoculant for different years (2017 and 2018) in France, Europe.

Variety	Untreated		AGTIV® mycorrhizal inoculant		Difference (%) AGTIV® vs untreated
	(lb/ac)	(t/ha)	(lb/ac)	(t/ha)	
Stanley	13 561	15.16	14 810	16.56	+9.2
Costal	11 865	13.31	12 668	14.24	+6.9
Bamaco	15 167	16.98	16 594	18.57	+9.4
Compass	8 297	9.27	9 635	10.8	+16.5
Paloma	9 546	10.73	9 367	10.47	-2.5
Linex	6 512	7.33	6 959	7.83	+6.8
Average	10 795 lb/ac	12.13 t/ha	11 687 lb/ac	13.07 t/ha	+7.7%



GREEN BEANS

Figure 1. Yield increase with AGTIV® mycorrhizal inoculant.



EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

► GROWER SPLIT FIELDS

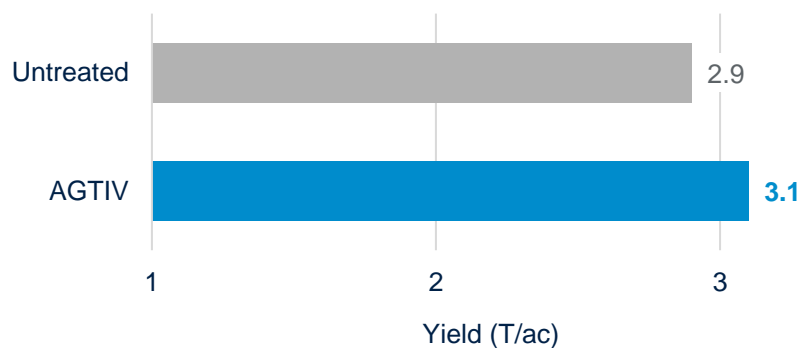
Table 1. Average yield increase with AGTIV® SPECIALTY CROPS – PEA • Powder for different years (2015 to 2019) in Ontario and Quebec, Canada.

Year	Number of sites	Average increase (t/ac)	Average increase (t/ha)	Average increase (%)
2015	4	0.31	0.77	23.3
2016	7	0.08	0.20	3.5
2017	1	0.12	0.30	3.7
2019	1	0.32	0.80	22.6
Total	13 sites	0.17 t/ac	0.42 t/ha	11.1%



GREEN PEAS

Figure 1. Average yield increase with AGTIV® SPECIALTY CROPS – PEA • Powder in Ontario and Quebec, Canada (2015 to 2019).



EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Table 1. Average yield increase with AGTIV® mycorrhizal inoculant for different years (2002 to 2016) in ONTARIO & QUEBEC, Canada.

Year	Number of sites	Average increase (lb/ac)	Average increase (t/ha)	Average increase (%)
2002	2	*	*	5.1
2015	2	2840	3.18	10.0
2016	1	2617	2.93	3.7
Total	5 sites	2766 lb/ac **	3.10 t/ha **	6.8%

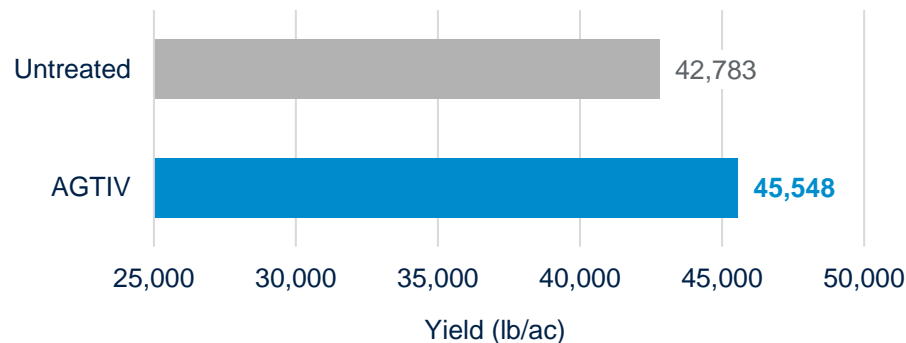
* Plot trial data for 2002: average increase of 95 g/plant.

** The 2766 lb/ac average refers only to 2015-2016 data.



PEPPERS

Figure 1. Average yield increase with AGTIV® mycorrhizal inoculant in ONTARIO, Canada (2015 to 2016).



More developed root system, more leaves and bigger fruits with AGTIV®.

Pepper split field with AGTIV® vs untreated.
Plant growth and health is enhanced, and row closure occurs sooner on the right.



Bigger root system with more fibrous roots, and more fruits per plant with AGTIV®.



EFFICACY REPORT

2016 – MYCORRHIZAL INOCULANT

► PLOT TRIALS

Research site: Saint-Eustache (QC), Canada

Treatments: a) Untreated;
b) AGTIV® mycorrhizal inoculant.

Experimental design: 3 fields. 3 plots of 7 plants per field. – New strawberry establishment

Table 1. Strawberry yields (number of fruits/plot) per treatment.

Treatment	Ripe fruits	Marketable fruits	Unmarketable fruits
Untreated	16.0	13.6	2.4
AGTIV® mycorrhizal inoculant	18.4	17.1	1.3
% difference AGTIV® vs untreated	+15%	+26%	47% reduction



Larger and bigger plants with AGTIV® on the right.



STRAWBERRIES



Making a difference, this is what we are all about at Premier Tech. One team driven by a shared passion to deliver solutions that will better the lives of people, businesses and communities.

At Premier Tech, People and Technologies connect in lasting, transformative ways, giving life to products and services that help feed, protect and improve our world.

We are committed to creating sustainable solutions that help bring beautiful gardens to life, increase crop yields, improve the efficiency of manufacturing facilities, treat and recycle water, and much more as we keep innovating.

We are Premier Tech

**PEOPLE AND TECHNOLOGIES
MAKING A DIFFERENCE**

95
year
OF PASSION

DRIVING CHANGES TO MAKE A DIFFERENCE

IN 5 BUSINESSES

HORTICULTURE AND AGRICULTURE
HOME AND GARDEN
WATER AND ENVIRONMENT
SYSTEMS AND AUTOMATION
DIGITAL



OUR BRANDS



PROMIX



CHRONOS

Ecoflo®

Ecoprocess™

OUR DESIRE TO INNOVATE IS DRIVEN BY THE TECHNOLOGIES WE MASTER

At Premier Tech, innovation is in everything we do. Every day, we invest the time and energy necessary to master the science and technology behind the products we offer. This knowledge allows us to connect our technologies with real market needs, creating products that are relevant today — and for years to come.

Here, we not only seek to create new products, we redefine the very process of innovation to deliver upon our ambitions. It's no longer only about delivering transformative solutions, it's about pushing our technologies forward to bring meaningful solutions to life. Ones that can truly make a difference for our clients.

PREMIERTECH.COM

INNOVATION

AN INTEGRAL PART OF PREMIER TECH COLLECTIVE DNA

At Premier Tech, Innovation goes beyond the concept of research and development. More than a process leading to the creation of new products, it is a **state of mind that is strongly embedded in our corporate DNA**. Always seeking to **create unique and addictive experiences** for our clients, we simply never cease to push the boundaries of our abilities, competencies and technological platforms.



Creativity is a mix of knowledge, expertise and passion for unprecedented efficient solutions. Innovation, Research & Development and biological active ingredients have combined forces to put commercial offers to the agricultural market.

We first structured our Innovation efforts and approach back in 1983, driven by the ambition of developing value-added products derived from peat moss through technological advances. Today, **more than 260 Premier Tech team members** are devoted full-time to mastering the technologies behind the next leading-edge solutions that will make a difference to our clients, helping them stand out in their marketplaces.

Driven by a collective Culture and rooted in Values which revolve around our tradition of Innovation, the entire Premier Tech team holds a restless ambition to shake up the status quo and shift industry paradigms. Through the current innovation program IPSO: Innovation in Products-Processes, Services and commercial Offers, we are **constantly challenging the way we do business and how we can improve everything we do**.

This mindset is key to how we operate on a daily basis. Contributing to the loyalty of our clients around the world, it sets the ground rules for how collaborating with Premier Tech turns out to be a contagious experience they are willing to share with others.

We deeply believe that in order to continue to be sustainable and grow our market share, it is essential to never let our innovative spirit rest — to keep pushing forward and eliminate any barriers on the path to bringing new technologies, products and services to life in the marketplace. With the agility to truly make a difference by tapping into our full potential, **we make a difference for our clients' profitability**, and ultimately ensure our continued relevance as a strategic partner.

CELEBRATING DECADES OF

35
year
OF EXPERTISE
IN ACTIVE
INGREDIENTS

Established manufacturer and marketer, Premier Tech builds on innovation and collaboration with local partners and growers to offer reliable high-quality inoculants. Every day, in our labs, facilities, and in the field, highly experienced scientists, engineers, and specialists from various domains collaborate to maximize the outcomes of research and turn them into effective products making a difference on your bottom line.



PRODUCTION

In 2000, Premier Tech set up a world-first endomycorrhizal inoculum plant, developing a new mycoreactor process for industrial scale production. Backed by more than 35 years of expertise in active ingredients, Premier Tech constantly develops and innovates in terms of production of MYCORRHIZAE, RHIZOBIUM, BACILLUS, SERENDIPITA and other active ingredients:

- ✓ No contamination through a strictly controlled and aseptic environment
- ✓ Large-scale manufacturing production
- ✓ Adapted quality control for each step of the production processes, ensuring consistent high-quality inoculum

INNOVATION AND VALUE



FORMULATION

Premier Tech's know-how makes it possible to adapt formulations with multiple active ingredients, concentrations and carriers tailored to different crops and application methods. Because a quality inoculant makes all the difference, our proven formulations are based on these important elements:

- ✓ Carrier compatible with the active ingredients
- ✓ Formulations that guarantee active ingredient viability until use
- ✓ Quality control at several key points ensuring the performance of active ingredients
- ✓ Various formulations also tailored for organic production



APPLICATION

Caring about our clients' performance, each recommendation for product use takes into consideration validation by our field experts and by farmers themselves, which ensures:

- ✓ Effective application rates, at the right time and place, with the right inoculant
- ✓ Products adapted to growers' equipment
- ✓ Easy integration into farming practices
- ✓ Validation of compatibility with other agricultural inputs



SERVICE

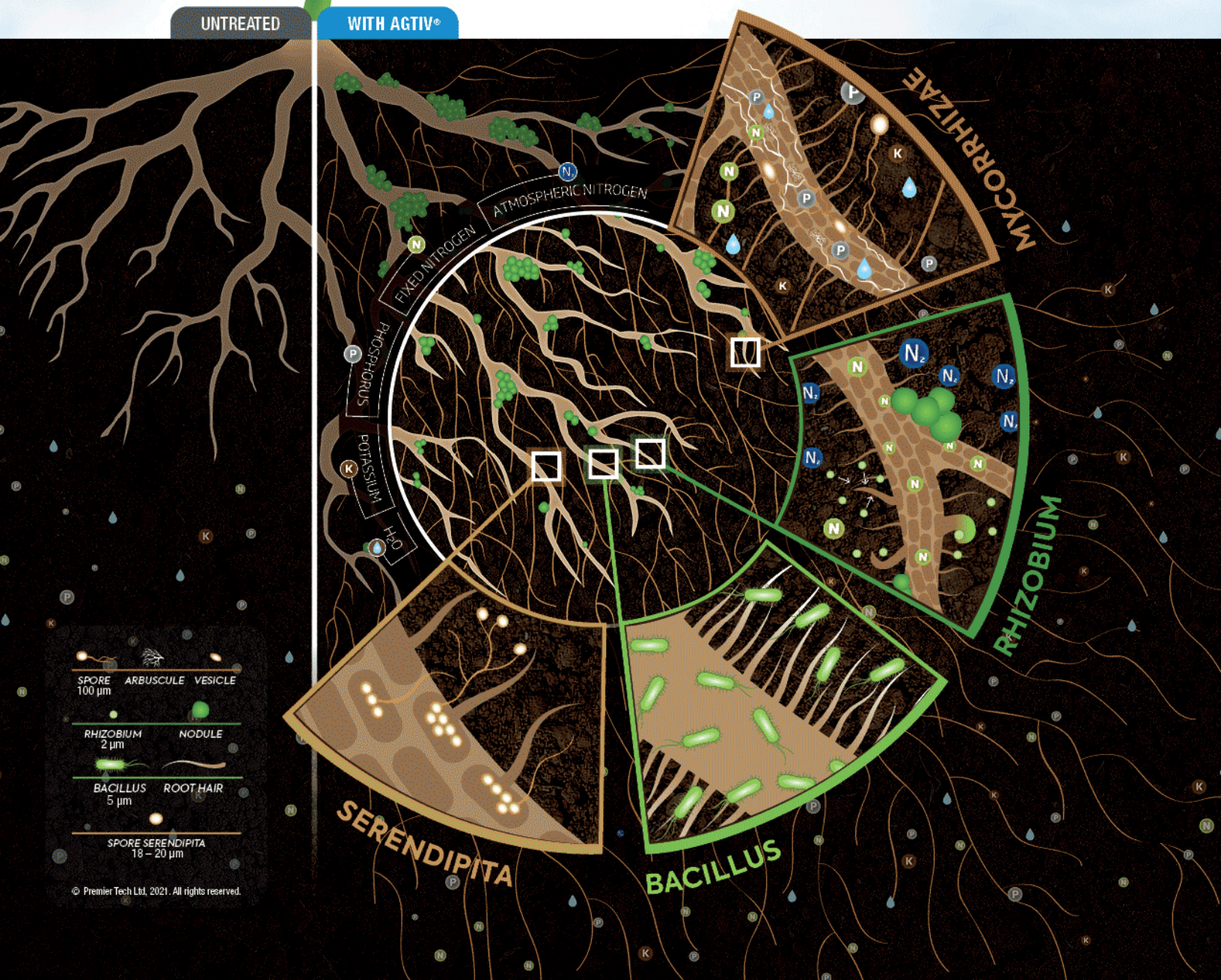
The AGTIV® experience combines highly effective value-added products and the access to a team of field experts dedicated to supporting your growth. From our management team and research project managers to our field specialists, our multidisciplinary team is listening to growers' needs to continuously improve our products and level of service:

- ✓ Technical support for product application, equipment compatibility and field demonstration
- ✓ Proud promoter of science education and knowledge sharing
- ✓ Partnership with agriculture retailers throughout Canada, the United States and Europe



P PLANT

Nutrients and water are essential components for effective plant growth. Adding biological active ingredients, such as beneficial MYCORRHIZAE, RHIZOBIUM, BACILLUS, and SERENDIPITA, allows an earlier and efficient use of water and nutrients and helps plants reach optimum crop yield.





BIOLOGICAL ACTIVE INGREDIENTS

Backed by more than 35 years of expertise in biological active ingredients, Premier Tech masters a unique large-scale manufacturing process that meets the highest quality control standards, allowing you to fully benefit from the highly effective inoculants of our AGTIV® agricultural product line. For stronger growth through better plant resistance to stresses, **higher yields** and superior **crop quality**, you can count on AGTIV®.

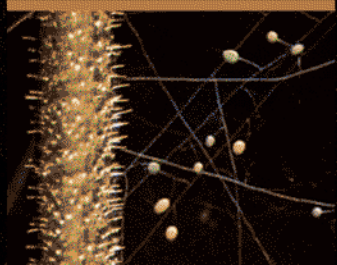
M

MYCORRHIZAE

PTB297 Technology,
Glomus intradices

Mycorrhizae are beneficial associations between a mycorrhizal fungus and roots. The mycorrhizal spores germinate in the soil and produce filaments (hyphae) which will enter into root cells. This association will allow the formation of an intra and extra-radical network of filaments that will explore the soil and access more nutrients and water, and transfer them to the plant.

- ✓ EXPAND ROOT SYSTEM GROWTH
- ✓ ENHANCE NUTRIENT & WATER UPTAKE
- ✓ INCREASE TOLERANCE TO STRESSES
- ✓ IMPROVE SOIL STRUCTURE

**R**

RHIZOBIUM

PTB160 Technology (pulses),
Rhizobium leguminosarum
biovar *viciae*

PTB162 Technology (soybean),
Bradyrhizobium japonicum
Mesorhizobium ciceri (chickpea)

Rhizobium bacteria live and thrive in symbiosis in root nodules produced by the plant. They are responsible for fixing the atmospheric nitrogen and making it available for the plant.

- ✓ FIX NITROGEN & MAKE IT AVAILABLE TO THE PLANT

**B**

BACILLUS

PTB180 Technology,
Bacillus pumilus

Bacillus stimulates the plant root system by inducing the proliferation of the root hairs, which favors the absorption of the nutrients. We have selected it for its beneficial action of growth stimulation.

- ✓ INCREASES NUMBER OF ROOT HAIRS FOR A BETTER NUTRIENTS' ABSORPTION
- ✓ ACCELERATES SEED GERMINATION
- ✓ INCREASES PLANT GROWTH

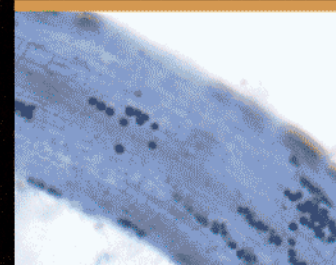
**S**

SERENDIPITA

PTB299 Technology,
Serendipita indica (formerly known as *Piriformospora indica*)

The beneficial fungus *Serendipita indica*, a natural microorganism, forms an association with roots of plants from the Brassicacea family, such as canola. It induces some of the plant gene expression and promotes phytohormone production.

- ✓ PROMOTES EARLY SEED GERMINATION
- ✓ INCREASES CHLOROPHYLL CONTENT
- ✓ BETTER PLANT ESTABLISHMENT, GROWTH AND YIELD





MYCORRHIZAE

EFFICACY – VERSATILITY – COLLABORATION

Why use Premier Tech's mycorrhizae?

Mycorrhizal fungi have existed since the first plants appeared on dry land more than 450 million years ago. AM (Arbuscular Mycorrhizae) symbiosis applies to over 80% of all plants and plays a major role in plant nutrition and productivity. "Over the last 35 years, numerous scientific studies have clearly highlighted the fundamental role that mycorrhizal fungi play in natural eco-systems, and in those managed by man." ^A

How does the technology work? Mycorrhizae develop a network that explores the soil and accesses more nutrients and water to transfer to the plant. The beneficial alliance between mycorrhizal fungi and roots accelerates root development and stimulates plant growth.

Absorption capacity

Premier Tech's mycorrhizal technology makes P more available in the soil, and actively absorbs and transfers it via its filament network (hyphae) directly to the root. The filaments in the soil also have the ability to absorb water and elements such as Cu, Zn, B, Fe, Mn which are important in nodule formation and grain filling.

Mycorrhizae have been shown to improve soil structure by releasing a "biological glue" called glomalin and to increase the presence of other beneficial micro-organisms in the root environment.

"Although mycorrhizal fungi do not fix nitrogen, they transfer energy, in the form of liquid carbon to associative nitrogen fixers." ^B

"Mycorrhiza deliver sunlight energy packaged as liquid carbon to a vast array of soil microbes involved in plant nutrition and disease suppression." ^C

"The absorptive area of mycorrhizal hyphae is approximately 10 times more efficient than that of root hairs and about 100 times more efficient than that of roots." ^D

Efficient P uptake and transfer

Thonar et al. (2010)^E compared three species of AMF and observed “*Glomus intraradices*, *Glomus claroideum* and *Gigaspora margarita* were able to take up and deliver P to the plants from maximal distances of 10, 6 and 1 cm from the roots, respectively. *Glomus intraradices* most rapidly colonized the available substrate and transported significant amounts of P towards the roots.”

Cavagnaro et al. (2005)^F found that “*Glomus intraradices* was found to be one of the arbuscular mycorrhizal fungi that was able to control nutrient uptake amounts by individual hyphae depending on differing phosphorus levels in the surrounding soils.”

Collaborating Species

The mycorrhizal species used in Premier Tech products (*Glomus intraradices*) is among the most ‘collaborative’ species in various articles.

“According to the article by Kiers et al. (2011)^G, it has been shown that the different species of mycorrhizae are not equally effective when it comes to transferring nutrients from the soil to the plant. Under controlled conditions, certain species of mycorrhizae have been shown to be more ‘cooperative’ and to transfer most of the phosphorus absorbed from the soil to the root, while other mycorrhizae species use it or store it as reserve.

“[...] Moreover, when host plants were colonized with three AM fungal species, the RNA of the cooperative species (*G. intraradices*) was again significantly more present than that of the two less-cooperative species (*G. aggregatum* and *G. custos*)”^B. “This illustrates key differences in fungal strategies, with *G. intraradices* being a ‘collaborator’ and *G. aggregatum* a less-cooperative ‘hoarder’.”^G

Glomus intraradices’ versatility in different conditions

There are more than 200 species of AMF (Arbuscular Mycorrhizae Fungi) and Premier Tech offers a versatile species. Selected more than 35 years ago, it has been tested continuously under various conditions and has performed well in a range of soil pH from 5.2 to 8.1.

“*G. intraradices* has turned out to be a “great fungus” in several surveys, and field trials so far has shown it to be equal or superior to mixtures of other fungi.”^H

Indigenous Populations

Some articles demonstrate that mycorrhizal populations in agricultural soils are highly heterogeneous or not sufficient to have the desired beneficial effect.

A survey conducted by Hamel et al. (2008)^I reported low biodiversity and occurrence of AM fungi in cultivated soils of Saskatchewan. The survey was conducted for 3 years. Dai, M. et al. (2013)^J noticed that the relative abundance as well as diversity of AM fungal communities is lower in cropland soils of the prairies compared to the roadsides environments which favors diversity.

The recommendation of Premier Tech, approved by Agriculture Canada, to add a mycorrhizal inoculant at the time of seeding stands on 4 points:

- ✓ **The right mycorrhizae for the plant**
at least 80% of plants can be colonized with *Glomus intraradices*, a collaborative species
- ✓ **Available in the right place**
on or close to the seed in order to trigger the symbiosis quickly
- ✓ **In the right quantity**
the proven and registered mycorrhizal rate
- ✓ **At the right time**
at seeding time to trigger the symbiosis quickly after seed germination

Quick colonizer

It has been shown that plants favour certain species according to their effectiveness.

“We show that order of arrival can influence the abundance of AMF species colonizing a host. These priority effect can have important implications for AMF ecology and the use of fungal inoculant in sustainable agriculture.”^K

Duan et al. (2011)^L using our *Glomus intraradices* isolate (DAOM181602) with *G. margarita* (WFVAM 21), wrote “Furthermore, *G. margarita* developed slowly compared with *G. intraradices* when they were inoculated separately and it seems likely that the latter fungus dominated the symbiosis with medic when both fungi were inoculated together.” He adds “The positive effect of *G. intraradices* was probably enhanced by its ability to colonize quickly and it may well have contributed a much larger fraction of fungal biomass than *G. margarita*, when both were inoculated together”. In conclusion, he writes “When inoculated together *G. intraradices* may have dominated the activity of symbiosis, both in terms of rapidity of early colonization and functionality, including tolerance to disturbance.”

Drought resistance

Mycorrhizae increase tolerance to various environmental stresses (diseases, drought, compaction, salinity, etc.), and play a major role in the soil particle aggregation process and contribute to improving soil structure which leads to better water penetration, better aeration, less erosion and leaching.

Benjamin Jayne and Martin Quigley of the University of Denver mentioned that “[...] our meta-analysis reveals a quantifiable corroboration of the commonly held view that, under water-deficit conditions, plants colonized by mycorrhizal fungi have better growth and reproductive response than those that are not.”^K “Most measures of growth are augmented by the symbiosis when plants are subjected to water stress; [...]”^M

It has been found that plants with AMF association display greater hydraulic conductivity in roots and reduced transpiration rate under drought stress. This may be due to their capacity to regulate their ABA levels (abscisic acid – a plant hormone) better and faster than non-AM plants. This establishes a greater balance between leaf transpiration and root water movement in drought situations and drought recovery.^N

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RHIZOBIUM

FERTILITY – PRODUCTIVITY – COLLABORATION

Why is rhizobium important?

Peas, lentils and soybeans play a big role in a crop rotation by promoting nitrogen fixation (the conversion of nitrogen gas to plant-available ammonium) and returning some nitrogen to the soil. However, these crops can't take all the credit: because it's only possible thanks to a symbiotic relationship between select legumes and rhizobium bacteria.

These bacteria can't fix nitrogen on their own. To do so, they need to colonize the root of a host plant. As in all symbiotic relationships, both the rhizobium and the pulse or soybean plant get something of value from the relationship. For the legume, it is a readily available form of nitrogen (ammonium) as well as important amino acids. The rhizobium get three things in return:

1. **A Home** – the bacteria inhabit the nodules formed by the plant
2. **Food / energy** – provided in the form of carbohydrates (heterotrophic bacteria cannot create their own food through photosynthesis)
3. **Oxygen** – which is necessary for respiration

Roots of the rhizobium relationship

Approximately 20%^A of all legumes form mutualistic relationships with rhizobium. Soybean, peas, clover, lentils and faba beans are among them. Interestingly, Rhizobium species are very plant specific. Pulses form relationships with a rhizobium called *Rhizobium leguminosarum*, while soybeans engage with another member of the family called *Bradyrhizobium japonicum*.

When a rhizobium and a host legume are present, the plant makes the rhizobium aware of its presence by sending out a chemical signal (via flavonoids and isoflavonoids) from the root. This attracts the rhizobium bacteria, which responds by sending out signals of its own, known as Nod factors.^B

How does the technology work? Rhizobium are a bacteria that live and thrive in symbiosis in root nodules produced by the plant. These nodules house the bacteria responsible for fixing the atmospheric nitrogen and makes it available for the plant.

Nodule formation & nitrogen fixation

The bacteria start the “invasion process” by penetrating the root-hair wall and enter the plant cells. This primes a gene within the plant that initiates the root nodulation. Within these nodules, the rhizobium differentiate into a non-motile form, which go to work fixing the raw atmospheric nitrogen (N₂) into plant accessible ammonium. They achieve this by producing nitrogenase enzyme, which starts the conversion process, consuming a great deal of energy. Maximum N-fixation is reached when the plant is sufficiently nodulated.

Ammonium absorption / exchange of services

After the nodule formation, the plant converts the ammonium into amino acids which are exported throughout the plant. At this point, the plant releases the simple sugars and O₂ to the rhizobium bacteria, fulfilling its end of the bargain.

This last step is important, as the presence of free oxygen can stop nitrogen fixation, preventing ammonium (NH₃) synthesis and transfer to the plant. Fortunately, the rhizobium take the oxygen and bind it using a protein called leghemoglobin (was first discovered in legumes and is very similar to the hemoglobin found in human blood). Like blood, leghemoglobins appear red in the nodules, due to the presence of iron molecules.

Legume plants are known to have a lower phosphorus use efficiency. This is a problem, because the process of nitrogen fixation is very energy-intensive for pulse and soybean plants. For this reason, they consume more phosphorus (P) than other plants.

The increased demand can be alleviated thanks to another symbiotic association, the mycorrhizal symbiosis. Mycorrhizae are symbiotic fungi that colonize the roots of most plants, and dramatically improve the plant’s ability to absorb phosphorus. The plant will photosynthesize 51%^C more and grow faster, and the rhizobium will fix more nitrogen if more phosphorus is available. For this reason, having a healthy mycorrhizal association is of particular benefit to pulses and soybeans.

What modulates / influences nodulation?

- Successful infection depends on the competitiveness, specificity, infectivity and effectiveness of the rhizobia.^D
- Infection rate & effectiveness of rhizobia are influenced by soil low N status and is a necessary requisite to trigger symbiosis.^E
- Successful infection requires the bacteria to actively colonize root-hair tips (motility) and reach the Quorum sensing of the rhizobium.^F
- N fixation relies on a cascade of effector molecules – events in multi-steps series of reactions and depend on effector availability, concentration and localization, synchronization, host specificity and environmental factors.

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THE TRIPARTITE SYMBIOSIS HELPS YOU GET BIGGER YIELD

How can the tripartite symbiosis improve crop productivity?

Each phase of the plant growth requires a lot of nutrients and energy to obtain higher yield. “[...] the tripartite interactions between legumes, AMF [Arbuscular Mycorrhizal Fungi] and rhizobia cause increases in legume productivity, and the N:P:C supply ratio as influenced by the tripartite symbiotic associations plays a fundamental role in controlling the legume’s photosynthetic rate and biomass productivity.”^A

How do the technologies work? Mycorrhizae develop a network that explores the soil and accesses more nutrients and water to transfer to the plant; rhizobium fixes nitrogen and makes it available to the plant. By working together, they influence positively the plant for increased yield.

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Help feed the plant

N and P are major nutrients for the plant. “Tripartite associations of host plants with both rhizobia and AMF [Arbuscular Mycorrhizal Fungi] benefit the host plant by increased P uptake through the mycorrhizal association balancing the high input of N through rhizobial N-fixation.”^A In addition, mycorrhizae reach more water and nutrients needed by legumes such as B, Ca, Cu, Fe, K, Mn, Mo and Zn, key components for energy production.

Higher photosynthesis

When used in combination, mycorrhizae and rhizobium increase the photosynthetic rate by 51%^B. “The rate of photosynthesis increased substantially more than the C [Carbon] costs of the rhizobial and AM [Arbuscular Mycorrhizal] symbioses.”^B The total increased sugar production by the plant far outweighs the cost to “house” the partners.

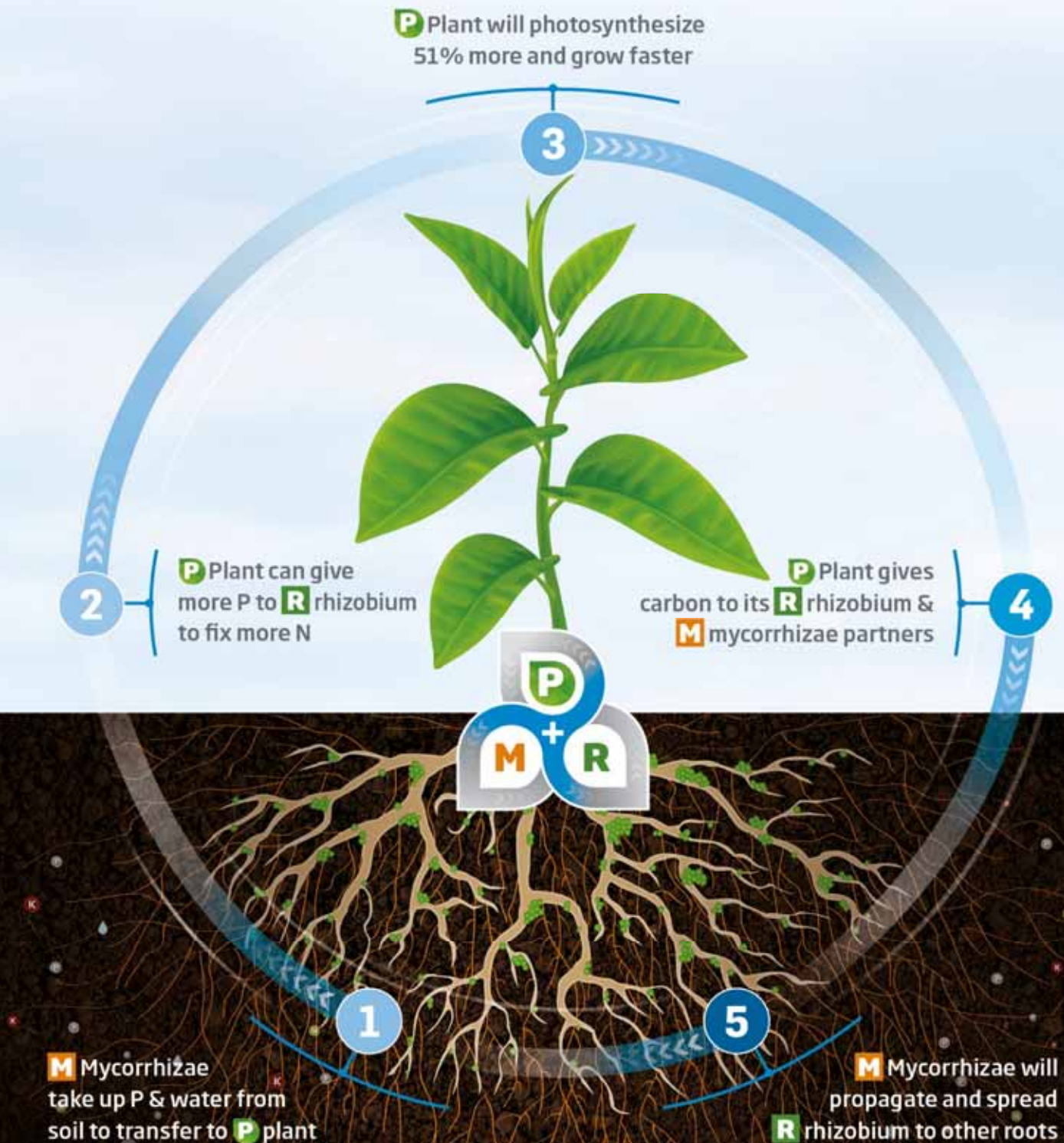
Better productivity

Better nutrient use efficiency and bigger biomass result in higher yield from each legume plant (harvest index). For example, “[...] it has been found that pea plants coinoculated with *Rhizobium leguminosarum* and AMF [Arbuscular Mycorrhizal Fungi] has shown best results regarding plant height, plant dry mass, nodule fresh weight, number of seeds, seed weight, seed yield, number of root nodules, number of pods per plant, average pod weight and pod length [...]”^C

TRIPARTITE SYMBIOSIS

BIOLOGICAL INTERACTIONS BETWEEN MYCORRHIZAE, RHIZOBIUM AND PLANTS

By enhancing root system growth and creating a network of filaments, mycorrhizae help plants to uptake more nutrients, such as phosphorus, and increase the nodulation process for the rhizobium.



AGTIVATED

THE CANOLA ROTATION INOCULANT HELPS YOU COUNTER REDUCED YIELD AFTER CANOLA



What affects your soil biology?

Many crop practices (tillage, fallow land, flooding and crop rotation) contribute to decreasing the beneficial biology, such as mycorrhizal fungi population, in your agricultural soils. For example, it is well known that crops following *Brassicaceae* plants (canola and mustard), in a rotation generally tend to demonstrate reduced yield, compared to results when seeded after another crop. It can largely be explained by the relationship (or lack of relationship) between *Brassicaceae* and beneficial microorganisms, such as mycorrhizae^A. Canola roots exude a toxic compound that reduces populations of those beneficial microorganisms in the soil. Furthermore, the “absence of a mycorrhizal host plant during the fallow period decreases mycorrhizal colonization potential for the succeeding crop and results in P deficiency symptoms in plants that are mycorrhizal dependent, such as corn, soybean, sunflower, and cotton.”^B

-
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Reach more nutrients and water

Sufficient nutrient and water uptake is critical for effective plant growth and ultimately to maximize your yield potential, especially for low mobility nutrients such as P and Zn.^C By adding a mycorrhizal inoculant, the plant develops a secondary root system (mycorrhizal hyphae) allowing it a larger soil contact surface and thus better to access to nutrients and water. “The absorptive area of mycorrhizal hyphae is approximately 10 times more efficient than that of root hairs and about 100 times more efficient than that of roots.”^D

Ensure early P uptake

“Phosphorus plays a critical role in energy reactions in the plant [such as photosynthesis. Phosphorus is also a key component in building blocs for plant.] Deficits can influence essentially all energy requiring processes in plant metabolism. Phosphorus stress early in the growing season can restrict crop growth, which can carry through to reduce final crop yield.”^E Mycorrhizae make soil phosphorus (P) more available to the plant, and actively absorb and transfer it via the mycorrhizal filament network (hyphae) directly to the root.

Increase your yield potential

By introducing mycorrhizal inoculant close to the seed at seeding, you get the association working early with the full benefits of increased nutrient and water uptake when plants need them. Therefore, get more out of the fertilizer you have already invested into the crop.

IGNITE™

WHEN IDEAS IGNITE SCIENCE

Making a difference, is Premier Tech. Our scientists, engineers, sales and marketing specialists are always testing and working on new biologicals. In 2019, one of them, *Serendipita indica*, "showed great potential to bring added value for growers to important crops such as Canola, and our teams worked to ensure its viability and performance up to the day that seed goes into the ground" says Dr. Trepanier, scientific expert director at Premier Tech Growers and Consumers. This inoculant collaborates with Canola to IGNITE transcription of plant genes related to nutrient absorption and stress tolerance.

Mitigate
water stress

Accelerate
host bolting
and flowering

Improve
seed quality

Increase
P, N, S
uptake

Improve
chlorophyll
content and
photosynthesis

2.5 bu/ac*

(total of 12 replicated trial sites)
* Statistically different vs untreated.





PTAGTIV.COM/en/products

ACTIVE INGREDIENT	ORGANIC	APPLICATION MODE						FORMULATION
		IN-FURROW	SEED-PIECE TREATMENT AT THE WAREHOUSE	MIXING WITH SEEDS	INCORPORATION INTO GROWING MEDIA	TRANSPLANTING	SEED TREATMENT	

FIELD CROPS (dry beans, cereals & flax)								
AGTIV® FIELD CROPS – O • Powder								
F: Powder (peat) S: Case of 4 x 800 g (4 x 1.75 lb) pails C: Dry beans, cereals & flax: 32 ha (80 acres) per case Alfalfa, mix forages & grass: 16 ha (40 acres) per case	M		✓		●			
AGTIV® FIELD CROPS • Powder								
F: Powder (diatomaceous earth) S: 2 kg (4.4 lb) pail C: Dry beans, cereals & flax: 16 ha (40 acres)	M		*		●			
AGTIV® FIELD CROPS • Granular								
F: Granules (zeolite) S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag C: Dry beans, cereals & flax: Bag: 3.2 ha (8 acres) – Tote bag: 64 ha (160 acres)	M		✓	●				
AGTIV® FIELD CROPS • Liquid								
F: Liquid (spores in suspension) S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles C: Beans, cereals & flax: 16 ha (40 acres) per case	M	◈	✓	●				
POTATO								
AGTIV® POTATO • Liquid								
F: Liquid (spores in suspension) S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles C: Potato: 8 ha (20 acres) per case	M		✓	●	●			
GREEN PEAS								
AGTIV® SPECIALTY CROPS — PEA • Powder								
F: Powder (peat) S: 2.4 kg (5.3 lb) pail C: Green peas: 8 ha (20 acres)	M	R	✓		●			
SPECIALTY CROPS								
AGTIV® SPECIALTY CROPS • Powder								
F: Powder (diatomaceous earth) S: Case of 4 x 500 g (4 x 1.1 lb) pails C: Vegetables, berries & garlic	M		**		●	●	●	
AGTIV® SPECIALTY CROPS • Granular								
F: Granules (peat) S: 10 kg (22 lb) pail C: Vegetables, herbs, berries & fruit trees	M		✓	●		●	●	
AGTIV® ON SEED™								
F: Treated seeds C: Vegetables and fruits Ask your representative for more details.	M	B	*					●

See last page for complete product recommendations.

F: Formulation
S: Size
C: Crop/
Coverage

ACTIVE INGREDIENTS:

M MYCORRHIZAE
PTB297 Technology

R RHIZOBIUM
PTB160 Technology (pulses)
PTB162 Technology (soybean)
Mesorhizobium ciceri (chickpea)

B BACILLUS
PTB180 Technology

S SERENDIPITA
PTB299 Technology (Brassicaceae)

N New product

C Combo
available

***** Eligible with
AGTIV® Extender

ORGANIC:

✓ For organic use

* Non eligible for organic use.
Contact us for more details.



GET THE INFO YOU NEED AT PTAGTIV.COM

TOOLS

Premier Tech offers technical support for product application, field demonstration, equipment and input compatibility, and promotes educational agronomic knowledge.

- ✓ **NEW** ON SEED™ packages for Pulses, Soybean and Canola
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- ✓ Application videos, charts and rate calculators

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EQUIPMENT & PROGRAMS

To ensure performance through efficient and precise application of its inoculants, Premier Tech recommends the use of approved equipment, supported by pay-back programs on selected AGTIV® products.

LIQUID

EQUIPMENT PROGRAM

The AGTIV® Liquid Injection Kit, integrating a Dosatron® Injection System, is easy to install on your existing in-furrow application system, it operates off the main solution flow for precise application of AGTIV® liquid products.

RETAILER FRIDGE PROGRAM

Premier Tech recommends to its retailer network the purchase of a fridge that can effectively store AGTIV® liquid products. Contact your representative to learn more.

[PTAGTIV.COM/en/program](https://ptagtiv.com/en/program)



POWDER

Premier Tech has a list of recommended applicators to use with AGTIV® powder products. Ask your representative to learn more about the applicators and the pay-back program offered.

[PTAGTIV.COM/en/blog](https://ptagtiv.com/en/blog)



AVERAGE YIELD INCREASE BY CROP

See all results at [PTAGTIV.COM/en/results](https://ptagtiv.com/en/results)



LENTILS

2.7 bu/ac

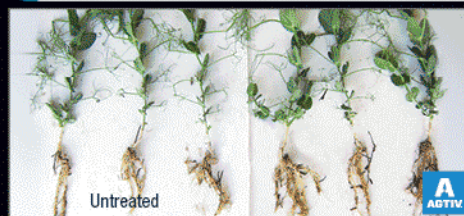
AVERAGE YIELD INCREASE
64 sites over 12 years, Canada **10.1%**



PEAS

3.6 bu/ac

AVERAGE YIELD INCREASE
22 sites over 10 years, Canada **6.3%**



SOYBEAN

3.4 bu/ac

AVERAGE YIELD INCREASE
87 sites over 8 years,
Canada and Europe **7.7%**



DRY BEANS

252 lb/ac

AVERAGE YIELD INCREASE
12 sites over 5 years,
Canada **9%**



CHICKPEA

1.5 bu/ac

AVERAGE YIELD INCREASE
2 sites over 1 year, Canada **4%**



DURUM WHEAT

3.8 bu/ac

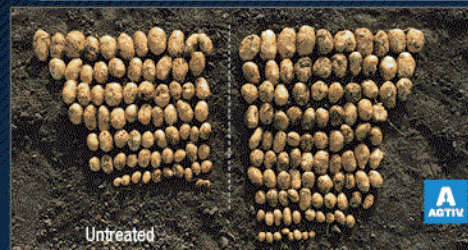
AVERAGE YIELD INCREASE
12 sites over 7 years,
North America **6.5%**



POTATO

31.6 cwt/ac

AVERAGE YIELD INCREASE
1172 sites over 11 years,
North America and Europe **10%**



BARLEY

7.3 bu/ac

AVERAGE YIELD INCREASE
28 sites over 6 years,
Canada and Europe **10.5%**





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