PREMIER TECH

AGTIV®

EFFICACY REPORT 2024

CONTENTS

2024 EDITION

LENTIL

AVERAGE YIELD INCREASE

AGTIV® THRIVE™

2.7 bu/ac

8.8%

182 kg/ha

66 sites over 14 years

Canada

EFFICACY REPORT

TRIALS PICTURES

LENTIL

AGTIV THRIVE

Lentil split field with AGTIV® THRIVE™ 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

LENTIL

AGTIV THRIVE

► PLOT & STRIP TRIALS

Research partners:
- Ag-Quest Inc.;
- GMAC's Ag Team;
- Prairie Ag Research Inc.;
- Small Plot Inc.;
- Wheatland Conservation Area.

Research sites:
- Saskatchewan;
- Alberta.

Treatments:
a) AGTIV® THRIVE™ PEA & LENTIL*;
b) Competitor inoculant A*;
c) Competitor inoculant B*;
d) Competitor inoculant C*;
e) Competitor inoculant D*.

*Products applied according to manufacturers recommended rate.

Experimental design:
- 63 replicated plots per treatment in randomized complete block design:
  - 5 trials with 6,
  - 1 trial with 7,
  - 3 trials with 8;
- 1 strip trial with 2 replicated.

Before 2022:
AGTIV® THRIVE™ PEA & LENTIL was formerly known as AGTIV® PULSES
AGTIV® FUEL™ PEA & LENTIL was formerly known as AGTIV® RHIZO

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

Location	Year	Seed variety	AGTIV® THRIVE™ PEA & LENTIL	Competitor inoculant			
				A	B	C	D
Brock	2015	N.A.	18.4	13.4	11.4		
Swift Current	2016	Small Red Lentils, Imax CL	50.1	43.3	41.1	37.7	
Coalhurst	2017	N.A.	19.5	19.1	19.2	18.5	
Vulcan	2019	Pedigree CDC Proclaim	32.6	28.8			28.4
Lethbridge	2021	Proclaim	46.8		46.4		
Vulcan	2021	Impulse	10.0		8.4		
Lethbridge	2022	Impulse	32.0		31.9		
Vulcan	2022	Impulse	38.7		38.3		
Swift Current	2022	Impulse	35.0		32.6		
Taber	2023	Impulse	30.1		25.7		27.7

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

Location	Year	Seed variety	AGTIV® THRIVE™ PEA & LENTIL	Competitor inoculant			
				A	B	C	D
Brock	2015	N.A.	1237	901	766		
Swift Current	2016	Small Red Lentils, Imax CL	3367	2910	2762	2533	
Coalhurst	2017	N.A.	1310	1284	1290	1243	
Vulcan	2019	Pedigree CDC Proclaim	2192	1937			1910
Lethbridge	2021	Proclaim	3145		3118		
Vulcan	2021	Impulse	672		564		
Lethbridge	2022	Impulse	2150		2144		
Vulcan	2022	Impulse	2601		2574		
Swift Current	2022	Impulse	2352		2191		
Taber	2023	Impulse	2024		1728		1863

EFFICACY REPORT

2023 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Ag-Quest Inc

Research site: Taber, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL;
c) Competitor inoculant B;
d) Competitor inoculant D.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 22.5m^2 plots

Variety: CDC Impulse

Previous crop: Winter rye

Seeding details: Seeded on May 26 with a cone seeder at a rate of 50 kg/ha in a clay loam soil (pH:7.5, OM:3%).
Emergence on June 9.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Rival EC (1.73 l/ha): May 25
- Solo ADV (0.80 l/ha): June 17
- Reglone Ion (2.47 l/ha): September 12 and 18
- Agral 90 (0.5% v/v): September 12 and 18

Harvesting: September 21, 2023

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	26.3	-
AGTIV® THRIVE™ PEA & LENTIL	30.1	3.8
Competitor inoculant B	25.7	-
Competitor inoculant D	27.7	1.4

Month	Precipitation (mm)	Irrigation (mm)
May	18.2	
June	54.8	127.0
July	8.7	279.4
August	18.8	152.4
TOTAL	**100.5**	**558.8**

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Prairie Ag Research Inc.

Research site: Lethbridge, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL*;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 12 m^2 plots.

Variety: Impulse

Previous crop: Fallow

Seeding details: Seeded on May 23, with a cone seeder at a rate of 50 kg/ha in a clay loam soil (pH: 7.4, OM: 4%).
Emergence on May 30.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: May 20
- Odyssey and Merge: June 30

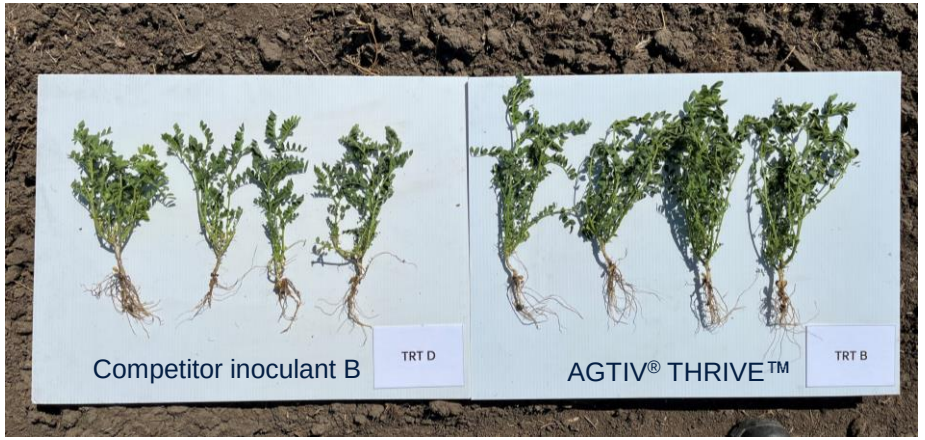
Harvesting: September 7, 2022

Month	Precipitation (mm)
May	35.8
June	114.5 *
July	57.4
August	31.7 *
TOTAL	**239.4**

* Plots were irrigated during those months

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	30.1	-
AGTIV® THRIVE™ PEA & LENTIL	32.0	1.9
Competitor inoculant B	31.9	1.8



EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL*;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 16 m^2 plots.

Variety: Impulse

Previous crop: Fallow

Seeding details: Seeded on May 12, 2022, with a plot drill machine at a rate of 89 kg/ha in a loam soil (pH: 7, OM: 3.5%). Emergence on May 30.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	37.1	-
AGTIV® THRIVE™ PEA & LENTIL	38.7	1.6
Competitor inoculant B	38.3	1.2

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-51-0-0 sidebanded at seeding

Pesticides:
- Odyssey NXT: July 3
- ZIVATA: twice

Harvesting: August 30, 2022

Month	Precipitation (mm)
May	9.8
June	136.8
July	86.0
August	18.1
TOTAL	**250.7**

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL*;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 17 m^2 plots.

Variety: Impulse

Previous crop: Wheat

Seeding details: Seeded on May 6, with a cone seeder at a rate of 67 kg/ha in a sandy loam soil (pH: 6.1, OM: 2.7%).
Emergence on May 27.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-52-0 (100 kg/ha): May 6

Pesticides:
- RT540: May 2
- Centurion: June 7
- AMIGO: June 7
- Solo ADV: June 16
- Proline GOLD: July 27
- Reglone: August 8

Harvesting: August 8, 2022

Month	Precipitation (mm)
May	51.2
June	37.7
July	90.4
August	7.5
TOTAL	**186.8**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	32.9	-
AGTIV® THRIVE™ PEA & LENTIL	35.0	2.1
Competitor inoculant B	32.6	-

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT TRIAL

Research partner: Prairie Ag Research Inc.

Research site: Lethbridge, AB

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

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 12 m^2 plots.

Variety: Proclaim

Previous crop: Barley

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: May 19
- Odyssey: June 28
- Merge: June 28

Harvesting: September 14, 2021

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

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

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan, AB

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

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 16 m^2 plots.

Variety: Impulse

Previous crop: Wheat

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

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	-

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-51-0-0 sidebanded at seeding

Pesticides: Odyssey NTX: June 13

Harvesting: 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

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan, AB

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*.

*Products applied according to manufacturers' recommended rate.

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

Variety: Pedigree CDC Proclaim

Previous crop: Canola

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

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

Treatment	Yield (bu/ac)	Yield (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*.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: ALPINE G22™

Pesticides: One herbicide: June 6

Harvesting: Dessicated September 22;
Combined October 17.

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

EFFICACY REPORT

2016 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments:
a) AGTIV® PULSES • Granular applied at 5 lb/ac*;
b) AGTIV® RHIZO • Granular for PULSES 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*.

*Products applied according to manufacturers recommended rate.

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

Variety: Small Red Lentils, Imax CL

Previous crop: Canola

Seeding details: Seeded at 68 lb/ac to obtain 12 plants/ft^2 using Fabro plot dill, Atomjet knife openers.

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- RT 540 (0.67 l/ac): preseed burnoff
- Edge (15 lb/ac): pre-seed
- Odyssey (17.3 g/ac)
- Poast Ultra (190 ml/ac)
- Merge spray solution (0.5 l/100 l)
- Priaxor (180 ml/ac): at 10% flower

Harvesting: Dessicated: Reglone + Ag Surf adjuvant (700 ml/ac + 0.1 l/100 l). Combined with Wintersteiger.

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

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

Treatment	Yield (bu/ac)	Yield (kg/ha)
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≤0.1.
[2] The difference in yield is significant at *p= 0.012*, compared with AGTIV® PULSES • Granular (dual inoculant).

Data analysis:
As noted by Wheatland Conservation Area, the lower part of the field had damaging effect on all plots of replicate 7 and the first plot of replicate 8, which was the competitor inoculant B treatment.
All data from those affected plots were removed from the analysis.

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

AGTIV THRIVE

► STRIP TRIAL

Research partner: GMAC's Ag Team

Research site: Brock, SK

Objective: 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*.

* Products applied according to manufacturer's recommended rate.

Experimental design: Complete randomized design (CRD) with a minimum of two treatment replicates. See field layout.

Seeding details: Seeded on May 9, using the growers' existing machinery.

Table 1. **Summary of 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

Field layout

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: In-season herbicide, fungicide, and insecticide, applications were all registered practices and made in accordance with product labels.

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

Harvesting: August 31, 2015, using the growers' existing machinery. Harvest data was scaled with weigh wagons then recorded.

PEA

AVERAGE YIELD INCREASE

AGTIV THRIVE

3.4 bu/ac

6.0%

229 kg/ha

27 sites over 12 years

Canada

TRIALS PICTURES

Pea split field with AGTIV® THRIVE™ PEA & LENTIL vs competitor inoculant.
Enhanced plant growth and health,
and sooner row closure in AGTIV® pea fields, on the right.

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

PEA

AGTIV THRIVE

► PLOT & STRIP TRIALS

Research partners:
- Ag-Quest Inc;
- ICMS;
- New Era Ag Technologies;
- Wheatland Conservation Area.

Research sites:
- Alberta;
- Saskatchewan;
- Manitoba.

Treatments:
a) AGTIV® THRIVE™ PEA & LENTIL*;
b) Competitor inoculant A*;
c) Competitor inoculant B*;
d) Competitor inoculant D*.

*Products applied according to manufacturers recommended rate.

Experimental design:
57 replicated plots per treatment in randomized complete block design:
- 6 trials with 6,
- 2 trials with 8,
- 1 trial with 5.

Before 2022:
AGTIV® THRIVE™ was formerly known as AGTIV® PULSES
AGTIV® FUEL™ was formerly known as AGTIV® RHIZO

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

Location	Year	Seed variety	AGTIV® THRIVE™ PEA & LENTIL	Competitor inoculant		
				A	B	D
Fort Saskatchewan	2015	Meadow	88.6	86.2	79.5	
Swift Current	2017	Amarillo	14.0	12.7	12.4	
Saskatoon	2019	AAC Ardill	65.0	52		63.2
Portage la Prairie	2021	Carver	45.2		41.3	
Josephburg	2022	Striker	45.4		46.6	
Saskatoon	2022	ACC Ardill	36.4		35.8	
Saskatoon	2022	CDC Spectrum	30.7		28.8	
Swan River	2022	Inca	91.5		87.1	
Swan River	2023	Inca	57.2		58.4	

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

Location	Year	Seed variety	AGTIV® THRIVE™ PEA & LENTIL	Competitor inoculant		
				A	B	D
Fort Saskatchewan	2015	Meadow	5958	5793	5342	
Swift Current	2017	Amarillo	941	853	833	
Saskatoon	2019	AAC Ardill	4371	3497		4250
Portage la Prairie	2021	Carver	3037		2775	
Josephburg	2022	Striker	3051		3132	
Saskatoon	2022	ACC Ardill	2446		2406	
Saskatoon	2022	CDC Spectrum	2063		1935	
Swan River	2022	Inca	6149		5853	
Swan River	2023	Inca	3847		3927	

EFFICACY REPORT

2023 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

AGTIV THRIVE

► PLOT TRIAL

Research partners: New Era Ag Technologies

Research sites: Swan River, MB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL;
c) Competitor inoculant B.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 16.95 m^2 plots

Variety: Inca treated with Insure Pulse

Previous crop: Wheat

Seeding details: Seeded on May 13 with a direct drill seeder at a rate of 240 lb/ac in a loam soil (pH: 6.9, OM:4.8%).
Emergence on May 24.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	53.6	-
AGTIV® THRIVE™ PEA & LENTIL	57.2	3.6
Competitor inoculant B	58.4	4.8

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-52-0 (38 lb/ac): May 13

Pesticides:
- Arrow-All-In-One (100 ml/ac): June 2
- Coragen (101 ml/ac): June 2
- Viper ADV (400 ml/ac): June 8
- Delaro (356 ml/ac): June 30

Harvesting: August 15, 2023

Month	Precipitation (mm)
May	19.7
June	45.3
July	33.0
August	118.2
TOTAL	**216.2**

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Josephburg, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 15 m^2 plots.

Variety: Stricker

Previous crop: Fallow

Seeding details: Seeded on June 20, with a cone seeder at a rate of 160 kg/ha in a loam soil (pH: 5.7, OM: 8%).
Emergence on July 3.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: NPKS 80-30-20-20 kg/ha: pre seeding

Pesticides:
- Merge: June 1
- Odyssey: June 1
- Roundup WeatherMax: June 1

Harvesting: September 2022

Month	Precipitation (mm)
June	109.3
July	35
August	34.4
September	10.6
TOTAL	**189.3**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Protein content (%)
Untreated check	44.1	-	21.3
AGTIV® THRIVE™ PEA & LENTIL	45.4	1.3	22.2
Competitor inoculant B	46.6	2.5	20.9

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA AGTIV THRIVE

► PLOT TRIAL

Research partners: Integrated Crop Management Services

Research sites: Saskatoon, SK

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 15 m^2 plots.

Variety: ACC Ardill

Previous crop: Wheat

Seeding details: Seeded on May 26, with a cone seeder at a rate of 225 kg/ha in a clay soil (pH: 8, OM: 8.8%).
Emergence on June 15.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 80-20-10-20 kg/ha NPKS pre seeding + 28% Urea Ammonium Nitrate on July 4

Pesticides:
- Viper ADV: July 4
- Reglone Ion: August 31

Harvesting: September 6, 2022

Month	Precipitation (mm)
May	25.8
June	38.0
July	46.5
August	25.6
TOTAL	**135.9**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Protein content (%)
Untreated check	34.8	-	17.5
AGTIV® THRIVE™ PEA & LENTIL	36.4	1.6	18.0
Competitor inoculant B	35.8	1.0	17.1

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

AGTIV THRIVE

► PLOT & STRIP TRIALS

Research partner: Ag-Quest inc.

Research site: Saskatoon, SK

Treatments: a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL ;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 8.2 m^2 plots.

Variety: CDC Spectrum

Previous crop: Oats

Seeding details: Seeded on May 27, 2022, with a cone seeder and a techno till drill opener at a rate of 160 kg/ha in a loam soil (pH: 5.8, OM: 3.5%).
Emergence on June 3.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	27.2	-
AGTIV® THRIVE™ PEA & LENTIL	30.7	3.5
Competitor inoculant B	28.8	1.6

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-52-0 side banded (72 kg/ha)

Pesticides:
- Aim EC: May 11
- Roundup WeatherMax: May 11
- Centurion: June 8
- Basagran Forté: June 21, July 4 & 12
- Assure II: June 21, July 4 & 12
- Matador herbicide: August 6
- Reglone Ion: August 16

Harvesting: August 24, 2022

Month	Precipitation (mm)
May	27.3
June	37.1
July	41.3
August	15.8
TOTAL	**121.5**

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA AGTIV THRIVE

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River, MB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ PEA & LENTIL*;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 15 m^2 plots.

Variety: Inca

Previous crop: Canola

Seeding details: Seeded on May 24, with a cone seeder at a rate of 286 kg/ha in a clay loam soil (pH: 6.5, OM: 5.3%). Emergence on June 3.

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

Treatment	Yield [1] (bu/ac)	Yield increase (bu/ac)
Untreated check	85.3 [b]	-
AGTIV® THRIVE™ PEA & LENTIL	91.5 [a]	6.2
Competitor inoculant B	87.1 [b]	1.8

[1] Yields with same letter are not statistically different according to a Tukey HSD test (p≤0.1).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: MAP 11-52-0 on May 25 (47 kg/ha)

Pesticides:
- Coragen: June 9
- Pounce: June 9
- Viper ADV: June 22
- Priaxor: July 18
- Guardsman : August 25

Harvesting: August 31, 2022

Month	Precipitation (mm)
May	14.5
June	80.0
July	32.3
August	48.8
September	58.9
TOTAL	**234.5**

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage la Prairie, MB

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

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 24.4 m^2 plots.

Variety: Carver

Previous crop: Wheat

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

Table 1. **Summary of yields 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Viper ADV: June 25
- Basagran Forte: July 14
- Assure II: July 14
- Cygon: July 27

Harvesting: September 1, 2021

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

EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Saskatoon, SK

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*.

*Products applied according to manufacturers recommended rate.

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

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.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Urea 28% (0.8 lb/ac): July 12

Pesticides:
- Viper: July 12
- Centurion: July 29
- Matador: July 8 and 13

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

Harvesting: Combined with a Small Plot Combine on October 11, 2019.

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

AGTIV THRIVE

► STRIP TRIAL

Research partner: Down to Earth + PAMI

Research site: Saskatoon, SK

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 Program**.

Experimental design: 2 replicated strips for a total of 610 ft^2 per treatment.

Variety: Meadow

Previous crop: Canola / oats split

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Seed placed 2-15-0 -0 lb/ac
Side band 17-20-15-15 lb/ac

Pesticides:
- Viper (400 ml/ac): 5 node Stage
- UAN (81 ml/ac): 5 node Stage

Harvesting: Combined on August 25, with a Wintersteiger and weighed & moisture averaged by PAMI.

Month	Precipitation (mm)
TOTAL	**100.4**

Table 1. **Summary of 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 Program**	35.8	2408

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

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

AGTIV THRIVE

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments:
a) AGTIV® PULSES • Granular applied at 5 lb/ac*;
b) AGTIV® RHIZO • Granular for PULSES 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*.

*Products applied according to manufacturers recommended rate.

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

Variety: Amarillo, seeded at 200 lb/ac.

Previous crop: Canola

Seeding details: Seeded May 24, at 9 in row spacing using Fabro plot drill. Preseed burnoff with Clean Start at 1 l/ac and Aim at 30 ml/ac.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 98 lb/ac of 11-52-0 sidebanded

Pesticides:
- Viper ADV (400 ml/ac)
- Poast Ultra (190 ml/ac)
- UAN (810 ml/ac)

Harvesting: Combined on August 17, with Wintersteiger 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

PEA

AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Fort Saskatchewan, AB

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*.

*Products applied according to manufacturers recommended rate.

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

Variety: Meadows

Previous crop: Canola

Seeding details: Seeded on May 21, at 15.2 cm row spacing.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: In season maintenance:
- Odyssey (17 g/ac – 35%)
- Equinox (67 ml/ac)
- Edge (0.5%)

Harvesting: Combined with Wintersteiger 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**

Table 1. **Summary of 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

Table 2. **Summary of 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 [1]	85.8	5770

[1] 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.

SOYBEAN

AVERAGE YIELD INCREASE

AGTIV THRIVE

3.4 bu/ac

6.9%

224 kg/ha

89 sites over 9 years
Canada and Europe

AGTIV ENRICH

1.7 bu/ac*

2.8%

* vs competitors average

7 third-party sites over 3 years
Canada

TRIALS PICTURES

SOYBEAN

AGTIV THRIVE

Split field with AGTIV® THRIVE™ SOYBEAN vs competitor inoculant.
Enhanced plant growth and health,
and sooner row closure in AGTIV® soybean fields, on the right.

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

EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

AGTIV THRIVE

► PLOT & STRIP TRIALS

Research partners:
- Ag-Quest;
- ICMS;
- New Era Ag research;
- South East Research Farm (SERF);
- Stoney Ridge Ag Services.

Research sites:
- Manitoba;
- Saskatchewan.

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

*Products applied according to manufacturers recommended rate.

Experimental design:
- 86 replicated plots per treatment in randomized complete block design;
- 1 strip trial with 2 replicated strips.

Before 2022:
AGTIV® THRIVE™ was formerly known as AGTIV® PULSES
AGTIV® FUEL™ was formerly known as AGTIV® BRADY

Table 1. **Summary of yields (bu/ac)[1] per trial[2]**

Location	Year	Seed variety	AGTIV® THRIVE™ SOYBEAN	Competitor inoculant				
				A	B	C	D	E
Morden	2015	Northstar	31.8 [a]	27.8 [b]	30.5 [a,b]			
Portage La Prairie	2015	Pride Seeds	57.3	55.4	58.2			
Oakville	2016	Legend Seeds	79.7	77.8	77.7			
Swan River	2017	Prograin	40.7 [a]	35.0 [b,c]		32.5 [c]		
Portage La Prairie	2017	Northstar	58.3	54.5	54.5	54.7		
Binscarth	2017	Pioneer	30.1 [a]	27.7 [b]	29.0 [a,b]	28.5 [b]		
Redvers	2018	Prograin	31.1	28.2	25.8			
Swan River	2018	Prograin	57.7	47.2	54.3	55.5		
Portage La Prairie	2018	Secan	49.4	47.2	47.8			
Elm Creek	2019	Gray R2	37.1	36.9			35.9	
Redvers	2019	NSC Watson	16.3	14.9		15.8		
Swan River	2019	Syngenta	35.7 [a]	29.9 [b]		35.7 [a]		
Swan River	2021	Syngenta	46.3 [b]					43.5[b]
Redvers	2021	Watson	21.0					20.0
Redvers	2022	NSC Redvers	54.9	53.7				
Portage La Prairie	2022	NSC Redvers	64.9	63.4				

[1] Average yields followed by different letters are significantly different at p≤0.05.
[2] To obtain kg/ha results, multiply bushels by 60 and then by 1.12085 (n*60*1.12085).

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: South East Research Farm

Research site: Redvers, SK

Treatments: a) Untreated check (no granular product);
b) AGTIV® THRIVE™ SOYBEAN*;
c) Competitor inoculant A*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 12 m^2 plots.

Variety: NSC Redvers (seeds pretreated with a commercial rhizobium).

Previous crop: Pea

Seeding details: Seeded on June 8, with a cone seeder at a rate of 80 kg/ha in a loam soil (pH: 7.6, OM: 4.2%).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 5-22-0 at seeding

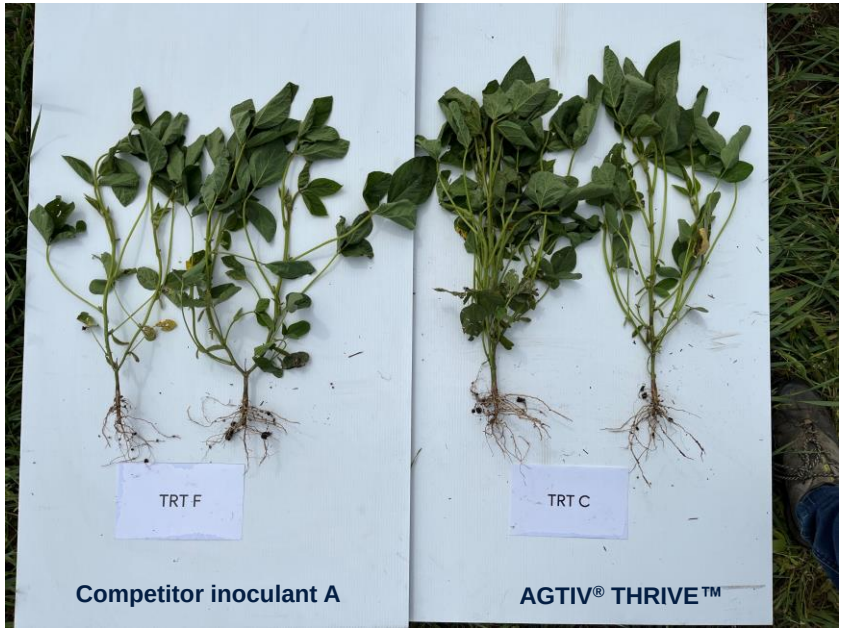
Pesticides: Roundup: June 9 and July 6

Harvesting: October 5, 2022

Month	Precipitation (mm)
May	121.0
June	75.0
July	259.0
August	25.2
September	15.0
TOTAL	**465.2**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	52.9	-
AGTIV® THRIVE™ SOYBEAN	54.9	2.0
Competitor inoculant A	53.7	0.8



EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage la Prairie, MB

Treatments: a) Untreated check (no granular product);
b) AGTIV® THRIVE™ SOYBEAN*;
c) Competitor inoculant A*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 21 m^2 plots.

Variety: NSC Redvers RR2X (seeds pretreated with a commercial rhizobium).

Previous crop: Wheat

Seeding details: Seeded on June 17, with a cone seeder at a rate of 140 kg/ha in a clay loam soil (pH: 8.2, OM: 6.7%). Emergence on June 22.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup WeatherMax: June 24 & July 14

Harvesting: October 11, 2022

Month	Precipitation (mm)
May	140.7
June	70.3
July	96.3
August	89.0
September	50.3
TOTAL	**446.6**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	63.0	-
AGTIV® THRIVE™ SOYBEAN	64.9	1.9
Competitor inoculant A	63.4	0.4

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► 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*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 20 m^2 plots.

Variety: Syngenta M2

Previous crop: Wheat

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-52-0 (86 kg/ha): May 28

Pesticides: RT 540: June 15 and July 6

Harvesting: September 28, 2021

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

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

Treatment	Yield [1] (bu/ac)	Yield increase (bu/ac)	Protein (%)
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 ($p \leq 0.05$).

EFFICACY REPORT

2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

AGTIV THRIVE

► PLOT TRIAL

Research partner: South East Research Farm

Research site: Redvers, SK

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

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 8 m^2 plots.

Variety: Watson

Previous crop: Wheat

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

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: MAP 11-48-0 (65 kg/ha): at seeding

Pesticides: Glyphosate: June 24

Harvesting: 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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Elm Creek, MB

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

*Products applied according to manufacturer's recommended rate.

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

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.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Roundup WeatherMax: June 14, July 9, and 24
- CORAGEN: August 14

Harvesting: 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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River, MB

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

*Products applied according to manufacturer's recommended rate.

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

Variety: Syngenta M2 with *Bradyrhizobium* pre-inoculated on the seed.

Previous crop: Canola stubble

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 0-20-10-0: at season start

Pesticides:
- Glyphosate: June 12, 25, and July 12
- POUNCE: August 12

Harvesting: October 7, 2019

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

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

Treatment	Yield [1] (bu/ac)	Yield [1] (kg/ha)	Protein [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).

EFFICACY REPORT

2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: South East Research Farm

Research site: Redvers, SK

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

*Products applied according to manufacturer's recommended rate.

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

Variety: NSC Watson RR2Y with *Bradyrhizobium* pre-inoculated on the seed.

Previous crop: Canola

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: June 18
- Viper and UAN: July 1

Harvesting: Combined on October 6, 2019.

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

Table 1. **Summary of 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

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: South East Research Farm

Research site: Redvers, SK

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

*Products applied according to manufacturer's recommended rate.

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

Variety: Dario

Previous crop: Canola stubble

Seeding details: Seeded May 28, at 210 000 seeds/ac with 15 cm row spacing. No tillage.

Table 1. **Summary of yields and protein 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 58 lb/ac of P

Pesticides: Glyphosate: twice during growth.

Harvesting: 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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage La Prairie, MB

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

*Products applied according to manufacturers recommended rate.

Experimental design: 8 replicated plots per treatment in randomized complete block design, 24 m² plots.

Variety: Barker

Previous crop: Fallow

Seeding details: Seeded June 6.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Round up: July 5
- Thiram: July 10, 17 and 27

Harvesting: 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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River, MB

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*.

*Products applied according to manufacturer's recommended rate.

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

Variety: Dario

Previous crop: Canola stubble

Seeding details: Seeded May 21, at 200 000 seeds/ac with 25 cm row spacing. No tillage.

Table 1. **Summary of yields and protein 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: P (30 lb/ac)
K (40 lb/ac)

Pesticides:
- Glyphosate: June 6, 25 and July 5
- Proline: July 10
- Round up: September 12
- Heat: September 12

Harvesting: Combined in October 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

SOYBEAN AGTIV THRIVE

► STRIP TRIAL

Research partner: Stoney Ridge Ag Services

Research site: Binscarth, MB

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.

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 yields per treatment**

Treatment	Yield [1] (bu/ac)	Yield [1] (kg/ha)
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)

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 5-23-23-13 (231 lb/ac): fall broadcast and incorporated

Pesticides:
- Roundup WeatherMax: Preplant application
- Express SG: Preplant application
- Roundup Transorb HC: Incrop application
- Xtendimax: Incrop application
- Roundup WeatherMax: second incrop application
- Pursuit: second incrop application

Harvesting: Combined on September 18, 2017.
Weighed using J&M Speed Tender.

EFFICACY REPORT

2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

AGTIV THRIVE

► STRIP TRIAL

Research partner: Down to Earth + PAMI

Research site: Saskatoon, SK

Treatments:
a) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac + Taurus Advanced Acre[2] (TAA) + fungicide application;
b) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac + Taurus Advanced Acre[3] (TAA) & no fungicide application;
c) AGTIV® BRADY • Granular for SOYBEAN applied at 4.0 lb/ac + designed fertility[1].

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

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 10 inches row spacing using Seed Master plot Drill by Down to Earth.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Seed placed 2-15-0 -0 lb/ac
Side band 17-20-15-15 lb/ac

Pesticides:
- Viper (400 ml/ac): 2-3 trifoliate
- UAN (81 ml/ac): 2-3 trifoliate
- Roundup (0.67 l/ac): 3-4 trifoliate

Harvesting: Combined on September 18, with a Wintersteiger. Weighed & moisture averaged by PAMI .

Month	Precipitation (mm)
TOTAL	**100.4**

1. **Designed Fertility Program:** a calculated fertility program based on soil tests and targeted yield. Target yield for Soybean was 40 bushels/ac
2. **The Taurus Advanced Acre™:** Using the Designed Fertility Program with the addition of key Taurus solutions.
3. **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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage La Prairie, MB

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*.

*Products applied according to manufacturers recommended rate.

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

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. Conventional tillage before spring.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 0-80-40-20 N-P-K-S (288 lb/ac): before seeding

Pesticides:
- Roundup TR 540 (0.7 l/ac): June 26 and July 14
- Cygon: August 8

Harvesting: Combined on October 12, with a Wintersteiger.

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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: New Era research

Research site: Swan River, MB

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.

*Products applied according to manufacturers recommended rate.

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

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.

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

Treatment	Yield [1] (bu/ac)	Yield [1] (kg/ha)
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)

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 7-34-20-0 (102 lb/ac): spring broadcast

Pesticides:
- Viper (400 ml/ac): 2-3 trifoliate
- UAN (81 ml/ac): 2-3 trifoliate
- Roundup (0.67 l/ac): 3-4 trifoliate
- Guardsman (607 ml/ac): R8

Harvesting: Combined on October 10 with Hedge 140 plot combine.

Month	Precipitation (mm)
TOTAL	**197.1**

EFFICACY REPORT

2016 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Oakville, MB

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*.

*Products applied according to manufacturers recommended rate.

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

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. The plot area was cultivated one week before planting.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup TR 540 (0.66 l/ac): one month after planting

Harvesting: Combined with Wintersteiger 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

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Morden, MB

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*.

*Products applied according to manufacturers recommended rate.

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

Variety: NORTHSTAR genetics, ANOLA variety

Previous crop: Canola

Seeding details: Seeded on June 2, at 18 cm row spacing and 100 kg/ha

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

Treatment	Yield [1] (bu/ac)	Yield [1] (kg/ha)
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]

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup TR 540 (0.61 l/ac)

Harvesting: Combined on September 30, 2015, with Wintersteiger plot combine.

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

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN AGTIV THRIVE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage La Prairie, MB

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*.

*Products applied according to manufacturers recommended rate.

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

Variety: PRIDE SEEDS genetics, PS 0035 NR2 variety

Previous crop: Canola

Seeding details: Seeded on May 29, at 15.2 cm row spacing and 100 kg/ha.

Table 1. **Summary of 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup TR 540 (0.61 l/ac)

Harvesting: Combined on October 6, 2015, with Wintersteiger plot combine.

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

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

SOYBEAN

AGTIV REACH

► PLOT TRIAL

Research partner: Blackcreek Research

Research site: Bright, ON

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

*Products applied according to manufacturers recommended rate.

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

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.

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

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Boundary Lqd (2.47 l/ha)
- Broadstrike Rc (87.5 g/ha): June 10
- Classic (36 g/ha): June 29

Harvesting: Combined on October 19, 2017, with Wintersteiger 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

SOYBEAN AGTIV REACH

► PLOT TRIAL

Research partner: Independent consultant

Research site: Saint-Simon (#1), QC

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

*Products applied according to manufacturers recommended rate.

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

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. Conventional tillage before spring. Vibro before seeding.

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Dual II Magnum (1.75 l/ha): May 25
- Firstrate (20.8 g/ha): May 25
- Pursuit (0.312 l/ha): May 25

Harvesting: 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

SOYBEAN

AGTIV REACH

► PLOT TRIAL

Research partner: Independent consultant

Research site: Saint-Simon (#2), QC

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

*Products applied according to manufacturers recommended rate.

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

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. Conventional tillage before spring. Vibro before seeding.

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Dual II Magnum (1.75 l/ha): May 25
- Firstrate (20.8 g/ha): May 25
- Pursuit (0.312 l/ha): May 25

Harvesting: 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

SUMMARY – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIALS

Research partners:
- Black Creek Research;
- ICMS;
- New Era Ag Research and Technologies;
- New Marc Research;
- Tall Pines Agricultural Research Ltd;
- Wellington Agricultural Research Ltd.

Research sites:
- Ontario;
- Manitoba;
- Quebec.

Treatments:
a) AGTIV® ENRICH™ SOYBEAN*;
b) Competitor inoculant B*;
c) Competitor inoculant C*;
d) Competitor inoculant E*.

*Products applied according to manufacturers recommended rate.

Experimental design: 48 replicated plots per treatment in randomized complete block design.

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

Location	Year	Seed variety	AGTIV® ENRICH™ SOYBEAN	Competitor inoculant		
				B	C	E
Bright	2021	Katonda R2	72.2	70.1	70.7	69.3
Portage la Prairie	2022	NCS Redvers RR2X	54.2	57.0	53.0	53.0
Swan River	2022	Syngenta D8X	57.4	56.9	57.6	55.5
Bright	2022	Pioneer 12T94E	52.8	52.8	51.9	52.4
Saint-Marc-sur-Richelieu	2022	Katonda R2	34.4	32.8	32.6	32.5
Alma	2023	Pioneer P08A44E	59.2	53.5		56.4
Rockwood	2023	Dekalb 03-25	105.1	101.1		104

Before 2022:
AGTIV® ENRICH™ was formerly known as AGTIV® BB COMBO

EFFICACY REPORT

2023 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partners: Wellington Agricultural Research Ltd

Research sites: Alma, ON

Treatments: a) AGTIV® ENRICH™ SOYBEAN;
b) Competitor inoculant B;
c) Competitor inoculant E.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized complete block (RCB), 6 repetitions, 18.04 m^2 plots

Variety: Pioneer P08A44E

Previous crop: Grain Corn

Seeding details: Seeded on May 26 with a cone seeder at a rate of 400 000 seeds/ha in a loam soil (pH: 7.6, OM: 2.6%).

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

Treatment	Yield (bu/ac)
AGTIV® ENRICH™ SOYBEAN	59.2
Competitor inoculant B	53.5
Competitor inoculant E	56.4

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup WeatherMAX: June 8

Harvesting: October 4, 2023

Month	Precipitation (mm)
May	38.7
June	79.3
July	168.6
August	115.8
September	40.3
TOTAL	**442.7**

EFFICACY REPORT

2023 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partner: Tall Pines Agricultual Research Ltd

Research site: Rockwood, ON

Treatments:
a) AGTIV® ENRICH™ SOYBEAN
b) Competitor inoculant B
c) Competitor inoculant E

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized complete block (RCB), 6 repetitions, 12.0 m^2 plots

Variety: Dekalb 03-25

Previous crop: Corn

Seeding details: Seeded on May 25 with a plot drilling machine at a rate of 200000 seeds/ac in a sandy loam (pH: 7.2 , OM: 3.4 %).
Emergence on June 4.

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

Treatment	Yield (bu/ac)
AGTIV® ENRICH™ SOYBEAN	105.1
Competitor inoculant B	101.1
Competitor inoculant E	104.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 120 – 52 – 60 (516 kg/ha): May 15

Pesticides: Roundup WeatherMAX (2.47 l/ha): June 13
Roundup WeatherMAX (2.47 l/ha): July 10

Harvesting: October 27, 2023

Month	Precipitation (mm)
May	49.2
June	75.6
July	162.8
August	86.5
September	16.2
October	31.9
TOTAL	**422.2**

EFFICACY REPORT

2022 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partner: Integrated Crop Management Service (ICMS)

Research site: Portage la Prairie, MB

Treatments:
a) AGTIV® ENRICH™ SOYBEAN;
b) Competitor inoculant B;
c) Competitor inoculant C;
d) Competitor inoculant E.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized complete block (RCB), 6 repetitions, 20.0 m^2 plots

Variety: NSC Redvers R2X

Previous crop: Spring wheat (cover crop tilled under prior to maturity)

Seeding details: Seeded on June 17 with a cone seeder at a rate of 115 kg/ha in a clay loam soil (pH: 8.2, OM: 6.7%).

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

Treatment	Yield (bu/ac)
AGTIV® ENRICH™ SOYBEAN	54.2
Competitor inoculant B	57.0
Competitor inoculant C	53.0
Competitor inoculant E	53.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup WeatherMAX (0.33 l/ac): June 24 and July 14

Harvesting: October 12, 2022

Month	Precipitation (mm)
May	140.7
June	70.3
July	95.2
August	90.1
September	50.3
TOTAL	**446.6**

EFFICACY REPORT

2022 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partner: New Marc Research

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

Treatments:
a) AGTIV® ENRICH™ SOYBEAN*;
b) Competitor inoculant B*;
c) Competitor inoculant C*;
d) Competitor inoculant E*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 18 m^2 plots.

Variety: Katonda R2

Previous crop: Corn

Seeding details: Seeded on May 26, with a CP cone planter at a rate of 60 kg/ha in a clay soil (pH: 7.4, OM: 3.7%).
Emergence on June 8.

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

Treatment	Yield (bu/ac)
AGTIV® ENRICH™ SOYBEAN	34.4
Competitor inoculant B	32.8
Competitor inoculant C	32.6
Competitor inoculant E	32.5

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Credit Xtreme: June 26

Harvesting: October 17, 2022

Month	Precipitation (mm)
May	75.5
June	123.7
July	98.3
August	140.0
September	156.9
TOTAL	**594.4**

EFFICACY REPORT

2022 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River, MB

Treatments:
a) AGTIV® ENRICH™ SOYBEAN*;
b) Competitor inoculant B*;
c) Competitor inoculant C*;
d) Competitor inoculant E*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 24 m^2 plots.

Variety: Syngenta D8X

Previous crop: Canola

Seeding details: Seeded on May 27, with a CP cone planter at a rate of 68 kg/ha in a clay loam soil (pH: 6.5, OM: 5.3%).
Emergence on June 6.

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

Treatment	Yield (bu/ac)
AGTIV® ENRICH™ SOYBEAN	57.4
Competitor inoculant B	56.4
Competitor inoculant C	57.6
Competitor inoculant E	55.5

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: MAP 4-20-24: May 26

Pesticides:
- Viper ADV: June 28
- RT540: June 28 and July 7

Harvesting: October 3, 2022

Month	Precipitation (mm)
May	14.5
June	80.0
July	32.3
August	48.8
September	58.9
TOTAL	**234.5**

EFFICACY REPORT

2022 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partner: BlackCreek Research

Research site: Bright, ON

Treatments:
a) AGTIV® ENRICH™ SOYBEAN*;
b) Competitor Inoculant B*;
c) Competitor Inoculant C*;
d) Competitor Inoculant E*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 24 m^2 plots.

Variety: Pioneer 12T94E

Previous crop: Corn

Seeding details: Seeded on May 30, with a CP cone planter at a rate of 58 kg/ha in a sandy loam soil (pH: 7.5, OM: 3.2%). Emergence on June 5.

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

Treatment	Yield (bu/ac)
AGTIV® ENRICH™ SOYBEAN	52.8
Competitor inoculant B	52.8
Competitor inoculant C	51.9
Competitor Inoculant E	52.4

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 4-20-24-6 of NPKS on May 27 prior to final cultivator pass

Pesticides:
- Boundary LQD: May 31
- Roundup Transorb: July 7

Harvesting: October 5, 2022

Month	Precipitation (mm)
May	82.0
June	56.8
July	48.2
August	83.6
Septembre	52.6
TOTAL	**323.2**

EFFICACY REPORT

2021 – RHIZOBIAL & BACILLUS INOCULANT

SOYBEAN AGTIV ENRICH

► PLOT TRIAL

Research partner: BlackCreek Research

Research site: Bright, ON

Treatments:
a) AGTIV® ENRICH™ *;
b) Competitor Inoculant B*;
c) Competitor Inoculant C*;
d) Competitor Inoculant E*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 24 m^2 plots.

Variety: Katonda R2

Previous crop: Corn

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

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

Treatment	Yield (bu/ac)	Protein content (%)
AGTIV® ENRICH™	72.2	35.3
Competitor B	70.1	35.5
Competitor C	70.7	34.9
Competitor E	69.3	35.1

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Boundary LQD: May 22
- Roundup Transorb: June 23

Harvesting: September 29, 2021

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

DRY BEANS

AVERAGE YIELD INCREASE

AGTIV REACH **236** lb/ac

8.1%

264 kg/ha

15 sites over 10 years

North America

TRIALS PICTURES

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

DRY BEAN

AGTIV REACH

► GROWER SPLIT FIELD TRIALS

Research sites: Ontario

Treatments: a) Untreated check;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

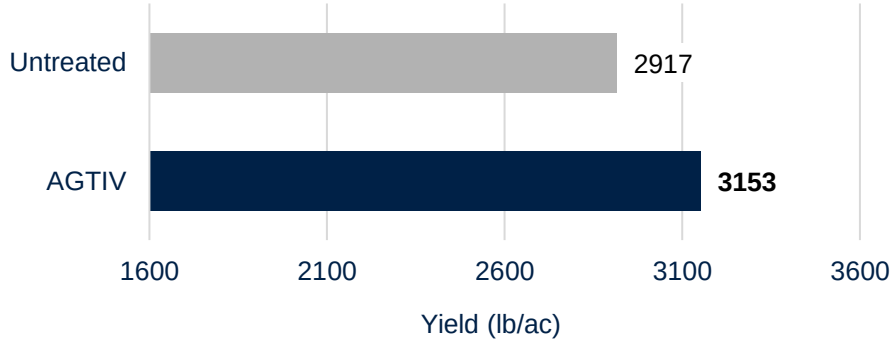
Experimental design: Grower split fields

Faster plant development, larger plants and quicker row closure.

Table 1. **Average yield increase with AGTIV® REACH™**

Year	Number of sites	Average increase (lb/ac)	Average increase (kg/ha)	Average increase (%)
2014	2	337	378	13
2015	2	482	542	17.3
2016	5	130	146	5.5
2017	2	146	164	5.1
2020	1	462	518	10.7
2023	3	163	183	6.4
Total	**15 sites**	**235.8 lb/ac**	**264.6 kg/ha**	**8.1%**

Figure 1. **Average yield with AGTIV® REACH™ in Canada (2014 to 2023).**



Before 2022:
AGTIV® REACH™ was formerly known as AGTIV® FIELD CROPS

CHICKPEA

AVERAGE YIELD INCREASE

AGTIV THRIVE

2.9 bu/ac

8.1%

195 kg/ha

5 sites over 6 years

Canada

EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

AGTIV THRIVE

► PLOT TRIALS

Research partners:
- Ag-Quest inc;
- Prairie Ag Research;
- Small Plot Inc;
- Wheatland Conservation Area.

Research sites:
- Alberta;
- Saskatchewan.

Treatments:
a) AGTIV® THRIVE™ CHICKPEA*;
b) Competitor inoculant A*;
c) Competitor inoculant B*;
d) Competitor inoculant D*.

*Products applied according to manufacturers recommended rate.

Experimental design: Total of 32 replicated plots per treatment in randomized complete block design.

Before 2022:
AGTIV® THRIVE™ was formerly known as AGTIV® CHICKPEA
AGTIV® REACH™ was formerly known as AGTIV® FIELD CROPS

Table 1. **Summary of yields (bu/ac) per trial[1]**

Location	Year	Seed variety	AGTIV® THRIVE™ CHICKPEA	Competitor inoculant		
				A	B	D
Lethbridge	2018	Alma	73.0	71.3	71.0	
Swift Current	2018	Leader	28.0	28.8	26.1	
Lethbridge	2022	Clearfield Kabuli	43.1		41.2	
Taber	2022	CDC Pearl	41.7[b]		39.4[ab]	
Vulcan	2023	CDC Orion	6.3			6.0

[1] Yields with the same letter are not statistically different according to a LSD test ($p \leq 0.05$).

EFFICACY REPORT

2023 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

AGTIV THRIVE

► PLOT TRIAL

Research partners: Small Plot Inc

Research sites: Vulcan, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ G CHICKPEA;
c) Competitor inoculant D.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 8 repetitions, 32.0 m^2 plots

Variety: CDC Orion

Previous crop: Lentil

Seeding details: Seeded on May 11 with a plot drilling machine at a rate of 215 lb/ac in a loam soil (pH: 7.9, OM: 3.3%).
Emergence on May 30.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	6.1	-
AGTIV® THRIVE™ G CHICKPEA	6.3	0.2
Competitor inoculant D	6.0	-

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 19-40-10-12 kg/ha : May 11

Pesticides: Assure II (0.75 l/ha): July 5

Harvesting: September 2, 2023

Month	Precipitation (mm)
May	4.3
June	43.4
July	37.8
August	31.5
TOTAL	**117.0**

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

AGTIV THRIVE

► PLOT TRIALS

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ CHICKPEA*;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 12 m^2 plots.

Variety: Alma Clearfield Kabuli

Previous crop: Fallow

Seeding details: Seeded on May 23, with a cone seeder at a rate of 150 kg/ha in a clay loam soil (pH: 7.4, OM: 4%). Emergence on June 3.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	36.1	-
AGTIV® THRIVE™ CHICKPEA	43.2	7.1
Competitor inoculant B	41.2	5.1

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: May 20
- Odyssey and Merge: June 30

Harvesting: September 14, 2022

Month	Precipitation (mm)
May	35.8
June	114.5*
July	57.4
August	31.7*
TOTAL	**239.4**

*Plots were irrigated during those months.

EFFICACY REPORT

2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

AGTIV THRIVE

► PLOT TRIALS

Research partner: Ag-Quest inc.

Research site: Taber, AB

Treatments:
a) Untreated check;
b) AGTIV® THRIVE™ CHICKPEA*;
c) Competitor inoculant B*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 10 m^2 plots.

Variety: CDC Pearl

Previous crop: Rye

Seeding details: Seeded on May 27, with a cone seeder at a rate of 150 kg/ha in a sandy loam soil (pH: 7.9, OM: 2.1%).
Emergence on June 13.

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

Treatment	Yield (bu/ac) [1]	Yield increase (bu/ac)
Untreated check	37.2 [a]	-
AGTIV® THRIVE™ CHICKPEA	41.7 [b]	4.5
Competitor inoculant B	39.4 [ab]	2.2

[1] Yields with the same letter are not statistically different according to a LSD test ($p \leq 0.05$).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: P_2O_5 (36 kg/ha): preseeding

Pesticides:
- Authority: May 28
- Roundup Transorb: May 28
- Select: June 27
- AMIGO: June 27
- Solo: June 28
- Merge: June 28
- TOUGH: July 2

Harvesting: September 23, 2022

Month	Precipitation (mm)
May	17.5
June	140.5*
July	204.3*
August	84.9*
September	9.7
TOTAL	**456.9**

*Plots were irrigated during those months.

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

AGTIV THRIVE

► PLOT TRIALS

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments:
a) AGTIV® THRIVE™ CHICKPEA 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*.

*Products applied according to manufacturers recommended rate.

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

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.

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-52-0 (96 lb/ac)

Pesticides: Authority (118 ml/ac): May 14

Harvesting: Combined on August 16, 2018.

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

EFFICACY REPORT

2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

AGTIV THRIVE

► PLOT TRIALS

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments:
a) AGTIV® THRIVE™ CHICKPEA 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*.

*Products applied according to manufacturers recommended rate.

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

Variety: Alma

Previous crop: Canola stubble

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

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Agral 90: May 15
- Aim: May 15
- Glyphosate: May 15
- Merge: June 5
- Odyssey: June 5

Harvesting: September 17, 2018

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

CANOLA

AVERAGE YIELD INCREASE

AGTIV IGNITE

2.4 bu/ac

6.5%

135 kg/ha

32 sites over 6 years

Canada

EFFICACY REPORT

SUMMARY – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT & STRIP TRIALS

Research partners:

- Ag-Quest Inc.;
- Integrated Crop Management Services;
- New Era Ag Research and Technologies;
- Prairie Ag Research;
- Small Plot Inc.;
- South East Research Farm;
- Wellington Agricultural Research;
- Wheatland Conservation Area.

Research sites:

- Ontario;
- Manitoba;
- Saskatchewan;
- Alberta.

Treatments:

a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design:

- 152 replicated plots per treatment in complete randomized block design:
  - 12 of 6,
  - 10 of 8;
- 5 split fields.

Table 1. **Average increase of yield for different years.**

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
2022	7	33.6	36.2	2.6
2023	5	36.0	37.7	1.7
Total	**32 sites**	**37.0[a]**	**39.4[b]**	**2.4 bu/ac ***

*Summary of means are significantly different following a combined site ANOVA and a Tukey test ($p<0.05$) $p < 0.001$

Table 2. **Average increase of canola oil content for different years.**

Year	Number of sites	Untreated check (oil%)	AGTIV® IGNITE™ L (oil%)	Oil increase (%)
2019	3	41.2	42.1	0.9
2020	4	39.2	40.6	1.4
2021	5	38.1	38.5	0.4
2022	7	35.3	36.1	0.8
Total	**19 sites**	**37.8[a]**	**38.7[b]**	**0.9%****

** Summary of means are significantly different following a combined site ANOVA and a Tukey test ($p<0.1$) $p=0.05$

EFFICACY REPORT

SUMMARY OF YIELD – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

Table 1. **Summary of canola yield trials for different sites – Ontario**

site	Year	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
Alma	2022	20	21.4	1.4

Table 2. **Summary of canola yield trials for different sites – Manitoba**

site	Year	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
Elm Creek	2021	36.2	37.2	1
	2022	46.1	48	1.9
Portage la Prairie	2019	78	78	0
	2021	36.3	38.9	2.6
	2022	29.3	32.8	3.5
Sandy Ridge Farms	2021	41.8	44.1	2.3
Swan River	2018	63.5	68	4.5
	2019	53.7	55.4	1.7
	2020	61.2	64	2.8
	2021	46.9	48.2	1.3
	2022	60	62.2	2.2
	2023	71	72.8	1.8

Table 3. **Summary of canola yield trials for different sites – Saskatchewan**

site	Year	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
Farm Beechy	2020	24.2	27.8	3.6
Moon Lake	2020	16.3	18.2	1.9
	2023	23.8	24.9	1.1
Redvers	2022	32.2	34.1	1.9
	2023	32.2	33.8	1.6
Saskatoon	2019	38.8	41.8	3
	2021	10.3	12.5	2.2
	2022	19.6	21	1.4
Swift Current	2019	25	27.1	2.1

Table 4. **Summary of canola yield trials for different sites – Alberta**

site	Year	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
Josephburg	2019	46.8	53.2	6.4
	2020	47.2	49.5	2.3
	2021	23.9	25	1.1
	2023	45.6	47.7	2.1
Lillico Farms	2021	26.4	31.5	5.1
Taber	2019	25.4	27	1.6
	2020	37.3	38.5	1.2
	2022	28.2	32.7	4.5
Westline Farms	2021	29.7	32.5	2.8
Vulcan	2023	7.3	9.3	2

EFFICACY REPORT

SUMMARY OF OIL CONTENT – SERENDIPITA INOCULANT

Table 1. **Summary of canola seed oil content trials for different sites – Ontario**

site	Year	Untreated check oil	AGTIV® IGNITE™ L oil (%)	oil increase (%)
Alma	2022	36.3	36.9	0.6

Table 2. **Summary of canola seed oil content trials for different sites – Manitoba**

site	Year	Untreated check oil	AGTIV® IGNITE™ L oil (%)	oil increase (%)
Elm Creek	2021	35.1	37.1	2
	2022	37.7	37.3	-0.4
Portage la Prairie	2019	45.5	45.7	0.2
	2021	36.6	36	-0.6
	2022	30.6	35.2	4.6
Swan River	2019	49.9	52.1	2.2
	2020	38.7	40.5	1.8
	2021	37.8	37.8	0
	2022	37.3	37.7	0.4

Table 3. **Summary of canola seed oil content trials for different sites – Saskatchewan**

site	Year	Untreated check oil	AGTIV® IGNITE™ L oil (%)	oil increase (%)
Moon Lake	2020	41.6	43.1	1.5
Redvers	2022	36.6	36.5	-0.1
Saskatoon	2021	41.8	42.1	0.3
	2022	36.6	36.3	-0.3

Table 4. **Summary of canola seed oil content trials for different sites – Alberta**

site	Year	Untreated check oil	AGTIV® IGNITE™ L oil (%)	oil increase (%)
Josephburg	2019	28.1	28.6	0.5
	2020	34.7	36.6	1.9
	2021	39.1	39.7	0.6
Taber	2020	41.7	42.1	0.4
	2022	32.1	32.9	0.8

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

► PLOT TRIAL

Research partners: Integrated Crop Management Services (ICMS)

Research sites: Moon Lake, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square (LS), 6 repetitions, 16.56 m^2 plots

Variety: InVigor L356PC treated with Helix Vibrance & Lumiderm

Previous crop: Spring wheat

Seeding details: Seeded on June 6 with a cone seeder of 7 kg/ha in a clay soil (pH: 7.9, OM: 7.2%).
Emergence on June 13.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	23.8	-
AGTIV® IGNITE™ L	24.9	1.1

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 80-30-10-20 actual kg/ha: May 29

Pesticides:
- Amigo (0.5 l/100l): June 28
- Centurion (0.075 l/ac): June 28
- Liberty 150 (1.62 l/ac): June 28
- Decis 5 EC (0.06 l/ac): August 14

Harvesting: September 25, 2023

Month	Precipitation (mm)
June	174.4
July	19.9
August	50.4
September	7.9
TOTAL	**252.6**

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partners: New Era Ag Technologies Inc

Research sites: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 33.9 m^2 plots.

Variety: InVigor L234PC treated with Helix Vibrance and Lumiderm

Previous crop: Wheat

Seeding details: Seeded on May 22, at a rate of 6.2 kg/ha with a cone seeder in a loam soil (pH: 6.9, OM: 4.8%).
Emergence on May 31.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	71.0	-
AGTIV® IGNITE™ L	72.8	1.8

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 102.5-0-0-20 (268 lbs/ac): May 21
5.3-25-0-0 (48 lbs/ac): May 22

Pesticides:
- Armory 240 (0.69 l/ac): September 12
- Arrow-All-In-One: (100 ml/ac) June 2, (150 ml/ac) June 8
- Cotegra (280 ml/ac): July 6
- Interline (1.35 l/ac): June 19
- Liberty 150 SN (1.35 l/ac) : June 8
- Pounce: (73 ml/ac) June 2, (100 ml/ac) June 8

Harvesting: September 19, 2023

Month	Precipitation (mm)
May	13.8
June	33.5
July	16.1
August	109.9
September	5.1
TOTAL	**178.4**

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partners: Integrated Crop Management Services (ICMS)

Research sites: Josephburg, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square (LS), 6 repetitions, 14.64 m^2 plots.

Variety: InVigor L343PC treated with Buteo Start and Helix Vibrance

Previous crop: Spring barley

Seeding details: Seeded on June 13 with a cone seeder of 7 kg/ha in loam soil (pH: 5.8, OM: 8%).
Emergence on July 4.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	45.6	-
AGTIV® IGNITE™ L	47.7	2.1

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Fertilizer blend of 33-8-0 actual kg/ha: June 5

Pesticides:
- Matador (0.83 l/ha): July 7
- Liberty 150 SN (3.33 l/ha): July 8
- Select (0.125 l/ha): July 8
  Amigo (0.1 l/100l): July 8
- Heat LQ (0.11 l/ha): October 5

Harvesting: October 13, 2023

Month	Precipitation (mm)
June	128.8
July	110.0
August	56.3
September	11.8
October	2.0
TOTAL	**308.9**

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partners: South East Research Farm

Research sites: Redvers, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 9.0m^2 plots.

Variety: L233P treated with Buteo Start & Helix Vibrance

Previous crop: Spring barley

Seeding details: Seeded on June 7 with a cone seeder of 4.2 lb/ac in loam soil (pH: 8.5, OM: 2.8%)

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	32.2	-
AGTIV® IGNITE™ L	33.8	1.6

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 89.31-32.82-3.16-14.29 actual kg/ha: June 7

Pesticides:
- RT 540 (0.75l/ac): May 19
- Liberty (1.35 l/ac): June 21

Harvesting: September 15, 2023

Month	Precipitation (mm)
May	70.0
June	25.0
July	11.0
August	49.4
September	22.0
TOTAL	**177.4**

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Small Plot Inc

Research site: Vulcan, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin square (LS),6 repetitions, 32.0 m^2 plots

Variety: LL variety treated with Buteo Start

Previous crop: Wheat

Seeding details: Seeded on June 7 with a direct drill at a rate of 4.5 kg/ha in a loam soil (pH: 8.1, OM: 2.9%).
Emergence on June 22.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	7.3	-
AGTIV® IGNITE™ L	9.3	2.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 60-15-15-10 : June 7

Pesticides: No pesticide applied

Harvesting: September 28, 2023

Month	Precipitation (mm)
June	43.4
July	37.8
August	31.5
TOTAL	**112.7**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Saskatoon, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: PIONEER P509-L treated with Lumiderm, LumiGen and Helix vibrance.

Previous crop: Wheat

Seeding details: Seeded on May 26, with a cone seeder at a rate of 7 kg/ha in a clay soil (pH: 8.0, OM: 8.8%).
Emergence on June 21.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 80-30-10-20 kg/ha: prior to seeding

Pesticides:
- Liberty 150: July 4
- Decis 5EC: August 18
- Reglone Ion: September 6

Harvesting: September 16, 2022

Month	Precipitation (mm)
May	25.8
June	38.0
July	46.5
August	25.6
September	6.8
TOTAL	**142.7**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	19.6	-	36.6
AGTIV® IGNITE™ L	21.0	1.4	36.3

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage la Prairie, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: DEKALB 75-65 RR treated with Prosper Evergol

Previous crop: Carrots

Seeding details: Seeded on June 17, with a cone planter at a rate of 8.2 kg/ha in a clay soil (pH: 7.7, OM: 6.9%). Emergence on June 23.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	29.3	-	30.6
AGTIV® IGNITE™ L	32.8	3.5	35.2

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Roundup WeatherMax: June 24 and July 14
- Sevin XLR: June 24

Harvesting: September 26, 2022

Month	Precipitation (mm)
May	140.7
June	70.3
July	96.3
August	89.0
September	50.3
TOTAL	**446.6**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest Inc.

Research site: Taber, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: DEKALB DKTF96 SC treated with Buteo, Prosper EverGol and Fortenza.

Previous crop: Rye

Seeding details: Seeded on May 24, with a cone seeder at a rate of 8 kg/ha in a loam soil (pH: 7.8, OM: 2.6%).
Emergence on June 6.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	28.8	-	32.1
AGTIV® IGNITE™ L	32.7	3.9	32.9

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 0-58-0-17 kg/ha: May 16

Pesticides:
- Roundup Transorb: May 18, June 9, 17 & 29
- Decis: June 22, July 6 & 15
- Sevin XLR Plus: June 22, July 6 & 15

Harvesting: August 31, 2022

Month	Precipitation (mm)
May	55.1
June	78.2
July	204.3*
August	89.3*
TOTAL	**426.9**

* Plots were irrigated during those months

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest Inc.

Research site: Elm Creek, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 34 m^2 plots.

Variety: In Vigor L233P treated with Lumiderm

Previous crop: Rye

Seeding details: Seeded on June 5, with a cone seeder at a rate of 5.5 kg/ha in a sandy loam soil (pH: 8.3, OM: 2.2%).
Emergence on June 10.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	46.1	-	37.7
AGTIV® IGNITE™ L	48.0	1.9	37.3

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 137-36-22-28 kg/ha: prior to seeding

Pesticides:
- Liberty: June 17
- AMIGO: July 1
- Centurion: July 1
- Coragen: July 1
- Reglone Ion: September 8

Harvesting: September 13, 2022

Month	Precipitation (mm)
May	131.0
June	65.6
July	92.6
August	57.6
September	30.8
TOTAL	**377.6**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Wellington Agricultural Research

Research site: Alma, ON

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 10 m^2 plots.

Variety: In Vigor L233P treated with Prosper Evergol

Previous crop: Soybean

Seeding details: Seeded on May 30, with a cone seeder at a rate of 5.5 kg/ha in a loam soil (pH: 7.5, OM: 3.7%).
Emergence on June 6.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	20.0	-	36.3
AGTIV® IGNITE™ L	21.4	1.4	36.9

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 160-20-0 kg/ha: May 10

Pesticides:
- Liberty: June 21
- Matador: June 21

Harvesting: September 17, 2022

Month	Precipitation (mm)
May	76.4
June	46.2
July	29.8
August	69.6
TOTAL	**222.0**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: South East Research Farm

Research site: Redvers, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 12 m^2 plots.

Variety: InVigor L340 PC treated with Vercoras & Poncho.

Previous crop: Pea

Seeding details: Seeded on June 1, with a cone seeder at a rate of 9 kg/ha in a loam soil (pH: 7.6, OM: 4.2%).

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	32.2	-	36.6
AGTIV® IGNITE™ L	34.1	1.9	36.5

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 100-25-0-6 (kg/ha): at seeding

Pesticides:
- Roundup: June 6
- Voliam: June 23
- Liberty: June 23

Harvesting: September 16, 2022

Month	Precipitation (mm)
May	121.0
June	75.0
July	259.0
August	25.2
September	15.0
TOTAL	**495.2**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: InVigor LL 234 PC treated with Lumiderm & Helix Vibrance.

Previous crop: Carrots

Seeding details: Seeded on June 5, with a cone seeder at a rate of 6 kg/ha in a clay loam soil (pH: 7.1, OM: 6.2%).

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content (%)
Untreated check	60.0	-	30.6
AGTIV® IGNITE™ L	62.2	2.2	35.2

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 100-25-0-6 (kg/ha): at seeding

Pesticides:
- ARROW ALL IN: June 19 & 28
- Pounce: June 23 & 28
- Cotegra: July 22

Harvesting: September 28, 2022

Month	Precipitation (mm)
May	114.0
June	59.4
July	40.6
August	41.8
September	34.7
TOTAL	**290.5**

EFFICACY REPORT

2021 – SERENDIPITA INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Josephburg, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 24.4 m^2 plots.

Variety: RR Canola 6086 CR

Previous crop: Wheat

Seeding details: Seeded on May 31, with a cone drill 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	23.9	-	39.1
AGTIV® IGNITE™ L	25	1.1	40.2

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: N-P-K 81-41-0 lb/ac

Pesticides:
- Round up WeatherMax: June 12
- Heat LQ: September 20

Harvesting: 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 INOCULANT

► PLOT TRIALS

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m^2 plots.

Variety: InVigor LL234PC

Previous crop: Wheat

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation:
- Urea (46-0-0): May 28
- MAP (11-52-0): May 28

Pesticides:
- Edge: May 7
- RT 540: May 27
- Pounce: June 13
- Arrow: June 13
- Arrow all-in-one: June 18
- Liberty: June 18
- Guardsman: August 26

Harvesting: 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 INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Portage la Prairie, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 24.4 m^2 plots.

Variety: RR Canola CS2100

Previous crop: Wheat

Seeding details: Seeded on June 2, 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).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Pounce: June 14, July 7 and August 9
- Roundup Transorb: June 19 and July 9
- Proline 480 SC: July 8

Harvesting: Combined on September 10, 2021.

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

EFFICACY REPORT

2021 – SERENDIPITA INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Saskatoon, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 24.4 m^2 plots.

Variety: LL canola P501L

Previous crop: Wheat

Seeding details: Seeded on May 20, with a cone drill 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	10.3	-	41.8
AGTIV® IGNITE™ L	12.5	2.2	42.3

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 80-40-10-20: preseeding.

Pesticides:
- Centurion: June 21
- Liberty: June 21

Harvesting: 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 INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Elm Creek, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 33 m^2 plots.

Variety: DEKALB DKTF 96 SC

Previous crop: Soybean

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Blend of Urea, MAP, MOP and AMS 94-79-90-11: at seeding
Foliar copper: June 22

Pesticides:
- Roundup WeatherMax: May 19, June 10 and 24
- Pounce: June 4, 16 and August 13
- Coragen: June 16
- Reglone: August 31

Harvesting: Combined on September 7, 2021.

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

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

EFFICACY REPORT

2020 – SERENDIPITA INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Taber, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 25.2 m^2 plots.

Variety: Pioneer 45CS40

Previous crop: Wheat

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 11-52-0 and 20-0-0-24 (116.3 kg/ha and 56.3 kg/ha): June 11

Pesticides:
- Roundup WeatherMax: May 24
- Decis: July 17
- Weed Whacker: August 20

Harvesting: 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 INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m^2 plots.

Variety: Pioneer 45CS40

Previous crop: Soybean

Seeding details: Seeded on May 21, with a cone planter 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	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 ($p \leq 0.05$).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: NH3, MAP, potash and AMS (163-30-35-60): fall 2019

Pesticides:
- Pounce: June 5 and 16
  Roundup: June 23
- Clethodim: July 10
- Proline: July 17
- Guardsman: September 5

Harvesting: 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 INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Moon Lake, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m^2 plots.

Variety: Pioneer 45CS40

Previous crop: Field pea

Seeding details: Seeded on May 19, 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 (%) [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 ($p \leq 0.05$).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Blend of 70-30-0-20: preseeding with the tillage

Pesticides: None

Harvesting: 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 INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Josephburg, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 8 repetitions, 30 m^2 plots.

Variety: Pioneer 45CS40

Previous crop: Barley

Seeding details: Seeded on May 25, 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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Blend of 51-22-26: preseeding with the tillage

Pesticides:
- Lontrel: June 12
- Roundup WeatherMax: June 12

Harvesting: 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 INOCULANT

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Saskatoon, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: In Vigor L252

Previous crop: Wheat

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Blend of 70-30-10-20: preseeding with the tillage

Pesticides:
- Centurion: July 12
- Liberty 150: July 12
- Matador: September 9

Harvesting: 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 INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Integrated Crop Management Services

Research site: Josephburg, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: Dekalb 75-42BL

Previous crop: Barley

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Blend of 31-0-10-8: : preseeding with the tillage

Pesticides: Roundup WeatherMax: June 26

Harvesting: 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 INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 30 m^2 plots.

Variety: InVigor L255PC

Previous crop: Canola stubble

Seeding details: Seeded on May 21, with a drill 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	53.7	-	49.9
AGTIV® IGNITE™ L	55.4	1.7	52.1

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 90-50-0-25: broadcast at seeding.

Pesticides:
- Avadex: May 3
- Liberty: June 6 and 27
- Pounce: June 6
- Arrow: June 11 and 27
- Proline: July 12
- Heat: September 6

Harvesting: 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 INOCULANT

CANOLA AGTIV IGNITE

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Taber, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 16 m^2 plots.

Variety: Pioneer 45M35

Previous crop: Wheat

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Broadcast of 29-37-0-30

Pesticides:
- Roundup WeatherMax: May 20 and July 3
- Pounce: July 3 and August 8

Harvesting: 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 INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 9 m^2 plots.

Variety: In Vigor L233P

Previous crop: Wheat

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

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Broadcast of 29-37-0-30: May 27

Pesticides: Roundup WeatherMax: June 25

Harvesting: 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 INOCULANT

CANOLA

AGTIV IGNITE

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 15 m^2 plots.

Variety: In Vigor L140P

Previous crop: Canola stubble

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

Table 1. **Summary of yields 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).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Midrow band 20-58-5-8 and broadcast 125-0-35-25.

Pesticides: None

Harvesting: Combined on October 4, 2018.

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

CEREALS

AVERAGE YIELD INCREASE

AGTIV IGNITE

DURUM WHEAT

9.3 %

10 sites over 3 years
Canada

AGTIV IGNITE

SPRING WHEAT

12.7 %

2 sites over 1 year
Canada

AGTIV IGNITE

BARLEY

8.8 %

3 sites over 1 year
Canada

EFFICACY REPORT

SUMMARY – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIALS

Research partners:
- Ag-Quest Inc.;
- Murphy & al.;
- Prairie Ag Research;
- Small Plot;
- Wheatland Conservation Area.

Research sites:
- Alberta;
- Saskatchewan.

Treatments:
a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design:
- 72 replicated plots per treatment in complete randomized block design:
  - 4 of 6,
  - 6 of 8.

Table 1. **Summary of durum wheat yield trials for different sites**

Year	Sites	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
2021	Lethbridge	66.7	73.3	6.6
2021	Vulcan	25.8	28.8	3
2021	Taber	39.0	40.6	1.6
2021	Swift Current	11.8	14.4	2.6
2022	Lethbridge	50.2	59.0	8.8
2022	Swift Current	54	55.8	1.8
2022	Vulcan	29.2	31.0	1.8
2022	Taber	27.3	31.8	4.5
2023	Raymond	53.0	56.1	3.1
2023	Lethbridge	32.6	34.6	2.0
Total	**10 sites**	**38.9[a]**	**42.5[b]**	**3.6 bu/ac ***

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

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partners: Prairie Ag Research

Research sites: Raymond, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 12.0 m^2 plots

Variety: Grainland

Previous crop: Spring barley

Seeding details: Seeded on May 12 with a cone seeder at a rate of 100 kg/ha in a clay loam soil (pH: 7.3, OM: 3.7%).
Emergence on May 19.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: May 11
- Pardner: June 19

Harvesting: August 30, 2023

Month	Precipitation (mm)
May	13.2
June	30.1
July	7.8
August	26.2
TOTAL	**64.3**

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	53.0	-
AGTIV® IGNITE™ L	56.1	3.1

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partners: Murphy & al.

Research sites: Lethbridge, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 12.0 m^2 plots

Variety: Stronghold Cert #1 treated with Raxil Pro

Previous crop: Canola

Seeding details: Seeded on May 31 with a cone seeder at a rate of 110 kg/ha in clay soil (pH: 8.2, OM: 1.6 %).

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	32.6	-
AGTIV® IGNITE™ L	34.6	2.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 28-10-11-3 (310 kg/ha): May 31

Pesticides:
- OcTTain XL(450 ml/ac): June 20
- 2,4-D (86 ml/ac): June 20 and July 15
- Dicamba (117 ml/ac): July 15

Harvesting: September 5, 2023

Month	Precipitation (mm)	Irrigation (mm)
May	17.8	19.1
June	36.3	69.9
July	13.3	151.3
August	10.7	50.8
TOTAL	**78.1**	**291.1**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 6 repetitions, 12 m^2 plots.

Variety: Grainland

Previous crop: Fallow

Seeding details: Seeded on May 23, with a cone seeder at a rate of 100 kg/ha in a clay loam soil (pH: 7.4, OM: 4%).
Emergence on May 30.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: May 20
- Infinity: June 30

Harvesting: September 14, 2022

Month	Precipitation (mm)
May	17.5
June	140.5 *
July	204.3 *
August	84.9 *
September	9.7
TOTAL	**456.9**

* Plots were irrigated during those months.

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

Treatment	Yield [1] (bu/ac)	Yield increase (bu/ac)
Untreated check	50.2 [b]	-
AGTIV® IGNITE™ L	59.0 [a]	8.8

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

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 17 m^2 plots.

Variety: Alloy

Previous crop: Wheat

Seeding details: Seeded on May 18, with a cone seeder at a rate of 123 kg/ha in a sandy loam soil (pH: 6.1, OM: 2.7%).

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	54.0	-
AGTIV® IGNITE™ L	55.8	1.8

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 30-15-0-6 (374 kg/ha): sidebanded on June 8.

Pesticides:
- RT540: May 2
- Achieve: June 8

Harvesting: August 16, 2022

Month	Precipitation (mm)
May	51.2
June	37.7
July	90.4
August	7.5
TOTAL	**186.8**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Small Plot

Research site: Vulcan, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 16 m^2 plots.

Variety: Spitfire

Previous crop: Rye

Seeding details: Seeded on May 16, with a plot drill machine at a rate of 130 kg/ha in a clay loam soil (pH: 7.6, OM: 3%).
Emergence on May 28.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	29.2	-
AGTIV® IGNITE™ L	31.0	1.8

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 60-15-15-6 kg/ha: sidebanded on May 16.

Pesticides:
- Epic: June 25
- Stellar XL: June 25
- ZIVATA: June 25

Harvesting: August 30, 2022

Month	Precipitation (mm)
May	9.8
June	136.8
July	86.0
August	18.1
TOTAL	**250.7**

EFFICACY REPORT

2022 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Vulcan, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete Randomized Block Design, 6 repetitions, 22.5 m^2 plots.

Variety: Strongfield

Previous crop: Rye

Seeding details: Seeded on May 17, 2022, with a cone seeder at a rate of 117 kg/ha in a sandy loam soil (pH: 7.8, OM: 2.6%). Emergence on May 20.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	27.3	-
AGTIV® IGNITE™ L	31.8	4.5

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 5-20-5 kg/ha prior to seeding

Pesticides:
- Roundup Transorb: May 18
- Achieve liquid: June 19 and July 6
- Infinity: July 6

Harvesting: August 30, 2022

Month	Precipitation (mm)
May	16.1
June	78.2
July	204.3*
August	89.3*
TOTAL	**387.9**

* Plots were irrigated during those months.

EFFICACY REPORT

2021 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 12 m^2 plots.

Variety: Grainland

Previous crop: Barley

Seeding details: Seeded on May 31, with a cone seeder at a rate of 100 kg/ha in a clay loam soil (pH: 7.4, OM: 2.9%).
Emergence on June 7.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Glyphosate: May 31
- Achieve: June 28
- Infinity: June 28
- Turbocharge: June 28

Harvesting: September 14, 2021

Month	Precipitation (mm)
May	33.1
June	76.5
July	70.3
August	35.6
TOTAL	**215.5**

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

Treatment	Yield [1] (bu/ac)	Yield increase (bu/ac)	Protein (%)
Untreated check	66.7 [b]	-	19.2
AGTIV® IGNITE™ L	73.3 [a]	6.6	20.3

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

EFFICACY REPORT

2021 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Small Plot

Research site: Vulcan, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 32 m^2 plots.

Variety: Spitfire

Previous crop: Oats

Seeding details: Seeded on May 16, with a plot drill machine at a rate of 115 kg/ha in a loam soil (pH: 7.5, OM: 3%). Emergence on May 20.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	25.8	-
AGTIV® IGNITE™ L	28.8	3.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 70-20-20-20 kg/ha sidebanded at seeding.

Pesticides: ZIVATA: July 25

Harvesting: August 30, 2021

Month	Precipitation (mm)
May	167
June	109
July	152
August	163
TOTAL	**591**

EFFICACY REPORT

2021 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Taber, AB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 22.5 m^2 plots.

Variety: Strongfield

Previous crop: Rye

Seeding details: Seeded on June 6, with a cone seeder at a rate of 130 kg/ha in a loam soil (pH: 7.8, OM: 2.2%). Emergence on June 20.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	39	-
AGTIV® IGNITE™ L	40.6	1.6

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Achieve: July 2
- Infinity: July 2
- Axial Herbicide: July 16

Harvesting: September 3, 2021.

Month	Precipitation (mm)
May	24.8
June	89.9
July	78.5
August	53.7
TOTAL	**246.9**

EFFICACY REPORT

2021 – SERENDIPITA INOCULANT

DURUM WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design: Complete randomized block design, 8 repetitions, 18 m^2 plots.

Variety: Transcend

Previous crop: Barley

Seeding details: Seeded on May 28, with a cone seeder at a rate of 130 kg/ha in a sandy loam soil (pH: 6.5, OM: 2.7%). Emergence on June 11.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	11.8	-
AGTIV® IGNITE™ L	14.4	2.6

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 30-15-06-6 sidebanded at seeding (374 kg/ha)

Pesticides:
- Aim EC: May 4
- RT540: May 4
- Achieve: June 17
- Buctril: June 17

Harvesting: August 27, 2021

Month	Precipitation (mm)
May	44.1
June	74.5
July	51.9
August	43.2
TOTAL	**213.7**

EFFICACY REPORT

SUMMARY – SERENDIPITA INOCULANT

SPRING WHEAT

AGTIV IGNITE

► PLOT TRIALS

Research partners:
- Ag-Quest Inc.;
- New Era Technologies Inc.

Research sites:
- Manitoba;
- Saskatchewan.

Treatments:
a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design:
- 12 replicated plots per treatment in complete randomized block design:
  - 2 of 6.

Table 1. **Summary of yield trials for different sites**

Year	Sites	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
2023	Swan River	68.1	74.7	6.6
2023	Saskatoon	13.9	17.6	3.7
Total	**sites**	**41**	**46.2**	**5.2 bu/ac ***

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

SPRING WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partners: New Era Technologies Inc

Research sites: Swan River, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 16.95 m^2 plots

Variety: AAC Wheatland treated with Raxil Pro

Previous crop: Peas

Seeding details: Seeded on May 11 with an air drill at a rate of 139 lb/ac in a sandy loam soil (pH: 7.0, OM: 4.1%).
Emergence on May 16.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	68.1	-
AGTIV® IGNITE™ L	74.7	6.6

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 46-0-0 (259 lb/ac): May 16
11-52-0 (67 lb/ac): May 16

Pesticides:
- Fortress: May 9
- Stellar XL (405 ml/ac): June 7
- Decis (30 ml/ac): June 7
- Miravis Neo 300SE (303 ml/ac): June 13
- Miravis Ace (405 ml/ac): July 6

Harvesting: September 3, 2023

Month	Precipitation (mm)
May	19.7
June	45.3
July	33.0
August	118.2
September	5.6
TOTAL	**221.8**

EFFICACY REPORT
2023 – SERENDIPITA INOCULANT

SPRING WHEAT

AGTIV IGNITE

► PLOT TRIAL

Research partners: Ag-Quest Inc

Research sites: Saskatoon, SK

Treatments:
a) Untreated check
b) AGTIV® IGNITE™ L

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 8.74 m^2 plots

Variety: AAC Wheatland treated with Vibrance Quattro

Previous crop: Oat

Seeding details: Seeded on May 23 with a cone seeder at a rate of 90 kg/ha in a loam soil (pH: 5.9, OM: 3.8%).

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	13.9	-
AGTIV® IGNITE™ L	17.6	3.7

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Fertilizer blend of 1-52-0 + 0-0-60 (136 kg/ha)

Pesticides:
- Glyphosate (0.67 l/ac): May 15
- Aim (30 ml/ac): May 15
- Everest 2.0 (24.3 ml/ac): June 7
- Foothills NG (376 ml/ac): June 14
- Coragen Max (83 ml/ac): June 16
- Reglone Ion (84 ml/ac): August 23

Harvesting: September 27, 2023

Month	Precipitation (mm)
May	47.9
June	52.4
July	19.0
August	41.3
September	14.7
TOTAL	**175.3**

EFFICACY REPORT

SUMMARY – SERENDIPITA INOCULANT

BARLEY

AGTIV IGNITE

► PLOT & STRIP TRIALS

Research partners:
- Ag-Quest Inc.;
- Wheatland Conservation Area.

Research sites:
- Manitoba;
- Saskatchewan.

Treatments:
a) Untreated check;
b) AGTIV® IGNITE™ L*.

*Products applied according to manufacturers recommended rate.

Experimental design:
- 12 replicated plots per treatment in complete randomized block design:
  - 2 of 6;
- 1 split field.

Table 1. **Summary of yield trials for different sites**

Year	Sites	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
2023	Elm Creek	101.9	104.0	2.1
2023	Swift Current	22.8	25.6	2.8
2023	Petruic Family farm	59.5	70.7	11.2
Total	**3 sites**	**61.4**	**66.8**	**5.4 bu/ac**

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

BARLEY AGTIV IGNITE

► PLOT TRIAL

Research partner: Ag-Quest Inc

Research site: Elm Creek, MB

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 18.0 m^2 plots

Variety: CDC Austenson treated with Sexodane and Lumivia

Previous crop: Soybean

Seeding details: Seeded on May 16 with a cone planter at a rate of 71 lb/ac in a clay loam soil (pH: 7.8, OM: 4.6%).
Emergence on May 17.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	101.9	-
AGTIV® IGNITE™ L	104.0	2.1

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 46-0-0 and 11-52- 0; May 9

Pesticides: Infinity

Harvesting: August 25, 2023

Month	Precipitation (mm)
May	38.0
June	49.8
July	20.8
August	31.0
TOTAL	**139.6**

EFFICACY REPORT

2023 – SERENDIPITA INOCULANT

BARLEY AGTIV IGNITE

► PLOT TRIAL

Research partners: Wheatland Conservation Area

Research sites: Swift Current, SK

Treatments: a) Untreated check;
b) AGTIV® IGNITE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 17.3 m^2 plots.

Variety: CDC Bow treated with Cruiser Vibrance Quattro

Previous crop: Durum Wheat

Seeding details: Seeded on May 18 with a cone seeder at a rate of 90 lb/ac in a silty loam soil (pH: 6.7, OM: 2.9%).
Emergence on May 26.

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated check	22.8	-
AGTIV® IGNITE™ L	25.6	2.8

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 30-15-0-6 (267lb/ac): May 18

Pesticides:
- RT540 (0.67 l/ac): May 12
- Liquid Achieve (200 ml/ac): June 16
- Buctril M (400 ml/ac): June 16
- Carrier (0.5 l/100L): June 16
- Decis (60 ml/ac): July 1

Harvesting: September 19, 2023

Month	Precipitation (mm)
May	48.8
June	33.8
July	76.7
August	47.5
TOTAL	**206.8**

CEREALS

AVERAGE YIELD INCREASE

AGTIV REACH

DURUM WHEAT

3.5 bu/ac

5.8%

237 kg/ha

14 sites over 12 years

Canada

AGTIV REACH

BARLEY

7.1 bu/ac*

8.4%

380 kg/ha

30 sites over 12 years

Canada and Europe

TRIALS PICTURES

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.

SUMMARY – MYCORRHIZAL INOCULANT

► SPLIT FIELD TRIALS

Research sites:
- Canada;
- France.

Treatments:
a) Untreated check;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

Experimental design:
45 grower split fields

Before 2022:
AGTIV® REACH™ was formerly known as AGTIV® FIELD CROPS

Table 1. **Average yield increase with AGTIV® REACH™ in Canada and Europe**

Number of sites	Average increase (%)
45	6.4%

Table 2. **Average yield increase with AGTIV® REACH™ in Canada**

Number of sites	Average increase (bu/ac)	Average increase (%)
14	3.5	5.8%

Table 3. **Average yield increase with AGTIV® mycorrhizal inoculant in France and Germany, Europe**

Number of sites	Average increase (bu/ac)	Average increase (%)
31	8.3	6.5%

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

DURUM WHEAT

AGTIV REACH

► PLOT TRIAL

Research partner: Eurofins Agroscience Services

Research site: Beauce, France

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

*Products applied according to manufacturers recommended rate.

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

Variety: Anvergur

Previous crop: Sugar beet

Seeding details: Seeded on November 15 at 300 seeds/m^2 with 15 cm row spacing.

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

Treatment	Yield[1] (bu/ac)	Yield[1] (t/ac)
Untreated check	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 according to a Tukey HSD test ($p \leq 0.05$).

OPERATIONAL NOTES AND RAIN FALL

Fertilisation:
- N:P+S (450 kg/ha): February 18
- Ammonitrate (290 kg/ha): March 18

Pesticides:
- Atlantis Pro: March 21
- Priori Xtra: April 21
- Bofix and Chardol: April 23
- Rubric 125 SC: May 15
- Prosaro: May 29

Harvesting: July 25, 2019

Month	Precipitation (mm)
November	96.7
December	57.9
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

DURUM WHEAT

AGTIV REACH

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

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

*Products applied according to manufacturers recommended rate.

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

Variety: Precision durum

Previous crop: Canola stubble

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

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation:
- 21-0-0-24 (58 lb/ac)
- 11-52-0 (67 lb/ac)
- 46-0-0 (111 lb/ac)

Pesticides: Clean Start: pre-seeding

Harvesting: 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

BARLEY

AGTIV REACH

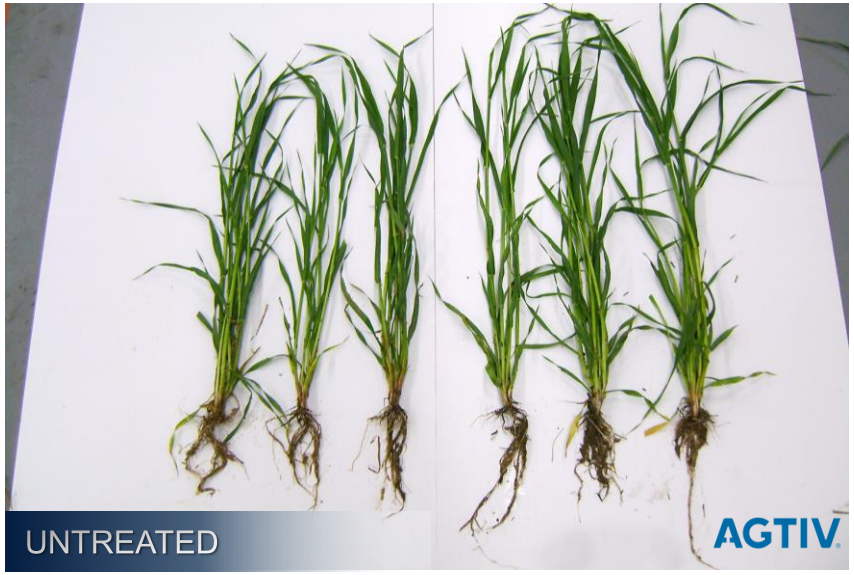
► GROWER SPLIT FIELD TRIALS

Research sites:
- Canada;
- Europe.

Treatments: a) Untreated;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

Experimental design: Grower split fields

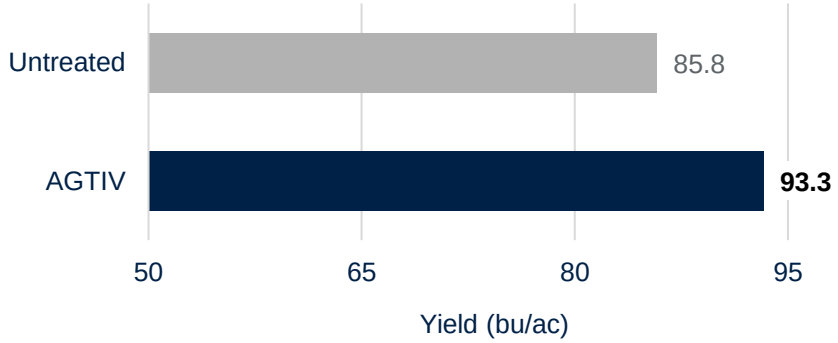


Barley plants have an increased root mass on the right with AGTIV®, which leads to enhanced plant health and growth.

Table 1. **Average yield increase with AGTIV® REACH™**

Number of sites	Average increase (bu/ac)	Average increase (kg/ha)	Average increase (%)
28	7.5	394.4	8.7%

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



Before 2022:
AGTIV® REACH™ was formerly known as AGTIV® FIELD CROPS

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

FIBRE FLAX

AGTIV REACH

► PLOT TRIAL

Research partner: Antédis

Research site: Bourbourg, North department, France

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

*Products applied according to manufacturers recommended rate.

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

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Patton M: April 26
- Lontrel: May 22
- Oil: May 22
- Nissodium: May 31

Harvesting: October 15, 2019

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

Table 1. **Summary of marketable yield (whole) per treatment**

Treatment	Yield[1] (kg/ha)	Yield[1] (lb/ac)
Untreated check	5490 [a]	4898 [a]
AGTIV® FIELD CROPS • Powder	6390 [b]	5701 [b]

[1] Yields with same letter are not statistically different according to a Tukey HSD test (p≤0.05).

Table 2. **Summary of marketable yield (fiber) per treatment**

Treatment	Yield[1] (kg/ha)	Yield[1] (lb/ac)
Untreated check	730 [a]	651 [a]
AGTIV® FIELD CROPS • Powder	856 [b]	764 [b]

[1] Yields with same letter are not statistically different according to a Tukey HSD test (p≤0.05).

FORAGES

AVERAGE YIELD INCREASE

AGTIV REACH

576 kg/ha

16.0%

47 sites over 2 years
Canada

TRIALS PICTURES

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

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

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

FORAGES AGTIV REACH

► GROWER SPLIT FIELDS

Research partners: • 15 farms

Research sites: • Quebec

Treatments: a) Untreated;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

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

Before 2022:
AGTIV® REACH™ was formerly known as AGTIV® FIELD CROPS

Table 1. **Increase in dry weight per cut over two years with AGTIV® REACH™**

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

Table 2. **Winter 2016 Alfalfa survival**[2]

Treatment	Survival winter 2016
Untreated	86.4% [a]
AGTIV®	92.2% [b]
Decrease loss	**+42.8%**

Table 3. **Two-year summary of Alfalfa dry weight yield average**[2]

Year	AGTIV®	Untreated	Difference
2016	3910	3295	615
2017	4190	3691	499
Total	**8100**[b]	**6986**[a]	**1 114**

[1] Statistically significant at $p \leqslant 0.05$ using t-test for dependent samples.
[2] Averages followed by different letters are significantly different ($p \leqslant 0.05$, t-test for dependent samples).

POTATO

AVERAGE MARKETABLE YIELD INCREASE

AGTIV REACH

31.6 cwt/ac

9.1%

3.6 t/ha

1197 sites over 13 years

North America and Europe

+ AGTIV STIMULATE

11.3 cwt/ac

more

1.3 t/ha

14 third-party sites over 3 years

North America

TRIALS PICTURES

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

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

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

POTATO

AGTIV REACH

► GROWER SPLIT FIELDS AND TRIALS

Research sites:

- Belgium;
- Canada;
- France;
- Germany;
- Mexico;
- Switzerland;
- United States.

Treatments:

a) Untreated;
b) AGTIV® REACH™ L POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design:

1197 split fields

Before 2022:
AGTIV® REACH™ L POTATO was formerly known as AGTIV® POTATO

Table 1. **Average increase of marketable yield* with AGTIV® REACH™ L POTATO**

Territory	Number of sites	Yield increase (t/ha)	Yield increase (cwt/ac)	Yield increase (%)
Canada	598	3.1	27.6	9.9
United States	67	3.3	29.8	10.8
Mexico	4	2.3	20.0	8.6
Belgium, France & Switzerland	496	4.1	36.3	9.9
Germany	32	4.2	37.4	10.0
Total	**1197 sites**	**3.5 t/ha***	**31.6 cwt/ac****	**9.1%**

Table 2. **Average increase of marketable yield* with AGTIV® REACH™ L POTATO**

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
2022	12	3.4	29.2	7.8
2023	13	2.7	23.9	8
Total	**1197 sites**	**3.5 t/ha***	**31.6 cwt/ac****	**9.1%**

* Statistically significant at $p<0.001$ following a T test.
**cwt/ac = 100 lb/ac

EFFICACY REPORT

2023 – MYCORRHIZAL INOCULANT

POTATO

AGTIV REACH

► PLOT TRIAL

Research partners: New Marc Research

Research sites: St-Marc-sur-Richelieu

Treatments: a) Untreated check;
b) AGTIV® REACH™ L POTATO.

*Products applied according to manufacturers recommended rate.

Experimental design: Split plot block, 6 repetitions, 21.6 m^2 plots

Variety: Chieftain

Previous crop: Soybean

Seeding details: Seeded on May 27 at rate of 1700 kg seeds/ha in a clay loam soil (pH: 7.3, OM: 3.7%).

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	174.0	-
AGTIV® REACH™ L POTATO	184.0	10.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 14.5-21.7-12.7 (691 kg/ha): May 26
46-0-0 (217 kg/ha): June 20

Pesticides:
- Sencor 480 (2.25 l/ha): June 1
- Dual II Magnum (1.75 l/ha): June 1
- Delegate (240 g/ha): July 8 and 26

Harvesting: September 4, 2023

Month	Precipitation (mm)
May	51.6
June	111.5
July	218.9
August	126.8
September	42.8
TOTAL	**551.6**

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

POTATO

AGTIV REACH

► STRIP TRIAL

Research partner: Willard Waugh & Sons LTD.

Research site: Bedeque, PEI

Treatments: a) Untreated check;
b) AGTIV® REACH™ L POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design: 20 acres strip

Variety: Prospect

Previous crop: Alfalfa

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

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

Treatment	Yield (cwt/ac)	Yield increase (t/ac)
Untreated check	359.1	40.2
AGTIV® REACH™ L POTATO	405.2	45.4

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 17-16-10 (392.4 kg/ac)

Pesticides:
- Titan
- Emesto

Harvesting: 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

SUMMARY – MYCORRHIZAL INOCULANT

POTATO AGTIV REACH

► GROWER SPLIT FIELD TRIALS

Research Partner: EUROCELP

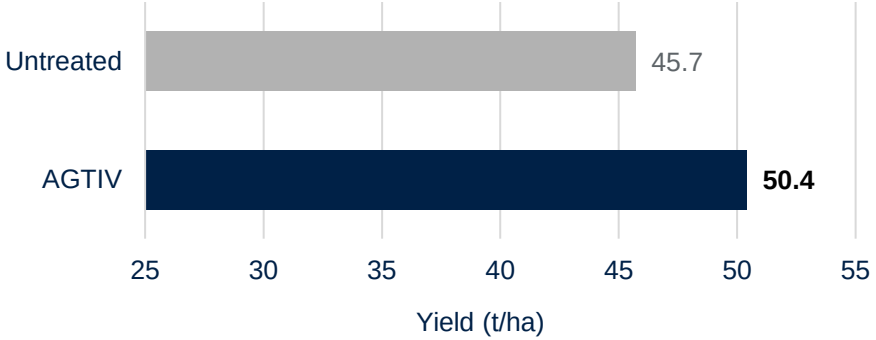
Research Sites: 75 farms (fields) in France, Europe

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

*Products applied according to manufacturers recommended rate.

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

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



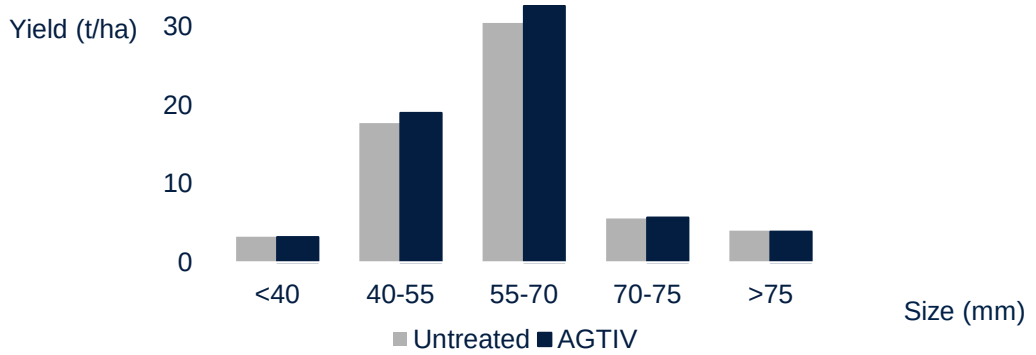
Before 2022:
AGTIV® REACH™ L POTATO was formerly known as AGTIV® POTATO

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

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

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

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



EFFICACY REPORT

2011 – MYCORRHIZAL INOCULANT

POTATO

AGTIV REACH

► PLOT TRIAL

Research partner: Agréco

Research site: Rawdon, QC

Treatments: a) Untreated check;
b) AGTIV® REACH™ L POTATO*.

*Products applied according to manufacturers recommended rate.

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

Variety: Goldrush

Previous crop: Potato in 2010, Wheat in 2009

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 206 kg/ha N;
170 kg/ha P_2O_5 and 270 kg/ha K_2O.

Pesticides:
- Actara: planting time
- Quadris: planting time
- Titan: planting time
- Sencor: June 13
- Polyram: June 15
- Bravo: once a week from end of June to August 12
- Reason: August 12

Harvesting: September 18, 2011

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

Treatment	Yield (t/ha)	Yield (cwt/ac)	Average potato weight (g/potato tuber)
Untreated	8,4	74,9	123 [a]
AGTIV® REACH™ L POTATO	9,7	96,4	136.5 [b]

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

EFFICACY REPORT

2010 – MYCORRHIZAL INOCULANT

POTATO

AGTIV REACH

► PLOT TRIAL

Research partner: Agréco

Research site: Lyster, QC

Treatments: a) Untreated check;
b) AGTIV® REACH™ L POTATO*.

*Products applied according to manufacturers recommended rate.

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

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.

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

Treatment	Yield (t/ha)	Yield (cwt/ac)	Marketable tuber number per plot
Untreated	13	115	34 [a]
AGTIV® REACH™ L POTATO	17,2	153,5	48 [b]

Results followed by different letters are statistically different according to Duncan *(p≤0.1)*

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: According to host grower's recommendations.

Pesticides:
- Actara: planting time
- Quadris: 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

POTATO

AGTIV REACH

► PLOT TRIAL

Research partner: Laval University (Qc), Canada

Research site: Lavaltrie, QC

Treatments: a) Untreated check;
b) AGTIV® REACH™ L POTATO*.

*Products applied according to manufacturers recommended rate.

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

Variety: Goldrush

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 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:
  - Admire
  - Cymbush
  - Furadan
- Herbicides:
  - Gramoxone
  - Lexone
  - Laroxe

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

Meteorological data from Québec
* Plots were irrigated during those months.

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

Treatment	Yield (cwt/ac)	Yield (t/ac)
Untreated check	446.1 [a]	49.4 [a]
AGTIV® REACH™ L POTATO	466.9 [b]	51.7 [b]

Results followed by different letters are statistically different according to Duncan *(p≤0.05)*.

Table 2. **Summary of marketable yields per treatment**

Treatment	Yield (cwt/ac)	Yield (t/ac)
Untreated check	417.2 [a]	46.2 [a]
AGTIV® REACH™ L POTATO	442.5 [b]	49.0 [b]

Results followed by different letters are statistically different according to Duncan *(p≤0.05)*.

EFFICACY REPORT

SUMMARY – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partners:
- AgriTech Inc
- Atlantic Agri Tech;
- New Marc Research;
- Prairie Ag Research;
- Progest inc.;
- Tall Pines Agricultural Research Ltd.;
- Wellington Agricultural Research Ltd.

Research sites:
- Alberta;
- Ontario;
- Prince-Edward Island;
- Quebec.

Treatments:

a) AGTIV® REACH™ L POTATO*;
b) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design:

Latin square:
- 13 trials of 6 repetitions;
- 1 trial of 5 repetitions.

Before 2022:
AGTIV® REACH™ L POTATO was formerly known as AGTIV® POTATO

Table 1. **Average increase of marketable yield* in cwt/ac per trial**

Year	Sites	AGTIV® REACH™	AGTIV® REACH™ and AGTIV® STIMULATE™	Yield increase*
2021	Sainte-Croix	320.3	319.3	-1
2021	Saint-Marc	107.8	112.8	5
2021	New Glasgow	242.1	247.4	5.3
2021	Rockwood	279.7	322.3	42.6
2021	Elmira	320.7	343.9	23.2
2022	Saint-Marc	145.4	142.2	-3.2
2022	Newton	235.9	237.8	1.9
2022	Newton	92.5	109.3	16.8
2022	Rockwood	402.5	429	26.5
2023	New Glasgow	413.1	425.6	12.5
2023	Raymond	138.5	141.1	2.6
2023	Underhills Farm	361.8	360	-1.8
2023	Newton	282.4	291.2	8.8
2023	Newton	482.7	502.3	19.6
Average	**14 sites**	**273.2**	**284.5**	**11.3 cwt/ac**

*Comparison of the double inoculation vs AGTIV® REACH™ L POTATO

EFFICACY REPORT

2023 – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIAL

Research partners: AgriTech Inc

Research sites: New Glasgow, PEI

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square (LS), 6 repetitions, 21.6 m^2 plots.

Variety: Gold Rush treated with Actara

Previous crop: Spring barley

Seeding details: Hand seeded on May 10 at a rate of 1900 kg/ha, in a sandy loam soil (pH: 6.5, OM: 2.4%).
Emergence on June 12.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 15-15-15-2Mg (970 kg/ha): May 10

Pesticides:
- Armory (2.0 l/ha): September 4
- Bravo ZN (2 l/ha): July 28 and August 24
- Dual II Magnum (1.75 l/ha): June 1
- Minecto PRO (556 ml/ha): July 15
- NIS (2 l/1000L): July 15
- Penncozeb DG 75 (2.25 kg/ha): July 6, 14, 23, August 3, 12, September 4
- Phostrol 4.17 SL (5 l/ha): July 23
- Sencor 75 DF (1.5 kg/ha): June 1
- Zampro 4.38 SL (1 l/ha): August 12

Harvesting: October 10, 2023

Month	Precipitation (mm)
May	41.2
June	113.0
July	115.0
August	147.8
TOTAL	**417.0**

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	395.6	-
AGTIV® REACH™ L POTATO	413.1	17.5
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L	425.6	30.0

EFFICACY REPORT

2023 – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIAL

Research partners: Prairie Ag Research

Research sites: Raymond, AB

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L;
d) AGTIV® REACH™ P POTATO;
e) AGTIV® REACH™ P POTATO + AGTIV® STIMULATE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 5 repetitions, 12.0 m^2 plots

Variety: Norkotah

Previous crop: Spring barley

Seeding details: Seeded on May 9 at rate of 2000 kg/ha in a clay loam soil (pH: 7.3, OM: 3.7%).
Emergence on June 2.

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	130.8	-
AGTIV® REACH™ L POTATO	138.5	7.7
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L	141.1	10.3
AGTIV® REACH™ P POTATO	139.3	8.7
AGTIV® REACH™ P POTATO + AGTIV® STIMULATE™ L	140.3	9.5

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides: Roundup WeatherMAX: May 26

Harvesting: September 12, 2023

Month	Precipitation (mm)	Irrigation (mm)
May	13.2	15.0
June	30.1	30.0
July	7.8	45.0
August	26.2	-
TOTAL	**77.3**	**90.0**

EFFICACY REPORT

2022 – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIAL

Research partner: New Marc Research

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

Treatments:
a) Untreated Check;
b) AGTIV® REACH™ L POTATO;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 21.6 m^2 plots

Variety: Chieftain

Previous crop: Spring wheat

Seeding details: Seeded on May 25 at a rate of 2250 kg/ha in a clay soil (pH: 6.3, OM: 4.2%).
Emergence on June 9.

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	138.4	-
AGTIV® REACH™ L POTATO	145.4	7.0
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L	142.2	3.8

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 16.9-22.2-12.7 (675 kg/ha): May 23
46-0-0 (109 kg/ha): June 14

Pesticides:
- Sencor 480 (2.25 l/ha): June 20
- Dual II Magnum (1.75 l/ha): June 20
- Delegate (240 g/ha): July 7

Harvesting: September 6, 2022

Month	Precipitation (mm)
May	110.6
June	121.7
July	130.4
August	114.1
September	133.8
TOTAL	**610.6**

EFFICACY REPORT

2022 – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIAL

Research partner: Atlantic AgriTech

Research site: Newton, PEI

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 6 repetitions, 24.0 m^2 plots

Variety: Gold Rush treated with Actara

Previous crop: Turnip

Seeding details: Hand seeded on May 20 at a rate of 1250 kg/ha in a sandy loam soil (pH: 5.4, OM: 2.3%).
Emergence on June 8.

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	232.2	-
AGTIV® REACH™ L POTATO	235.9	3.7
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L	237.8	5.6

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 15-15-15-4S-2Mg (1000 kg/ha): May 19

Pesticides:
- Lorox DF (3 l/ha): June 12
- Sencor 75DF (1.7 l/ha): June 12
- Coragen (350 ml/ha): July 17
- Penncozeb (2.24 kg/ha): July 17 + once a week from July 27 until August 19
- Reglone Ion (2.47 l/ha): September 3

Harvesting: September 20, 2022

Month	Precipitation (mm)
May	51.2
June	78.0
July	60.0
August	130.6
September	130.6
TOTAL	**478.6**

EFFICACY REPORT

2022 – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIAL

Research partner: Tall Pines Agricultural Research Ltd

Research site: Rockwood, ON

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square (LS), 6 repetitions, 12.0 m^2 plots

Variety: Chieftain

Previous crop: Soybean

Seeding details: Seeded on June 15 at a rate of 18000 seeds/ac in a sandy loam soil (pH: 7.2, OM: 3.4%).
Emergence on July 5.

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	395.1	-
AGTIV® REACH™ L POTATO	402.5	7.4
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L	429.0	33.9

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 120-70-90 (620 kg/ha): May 5

Pesticides:
- Lorox (2.3 l/ha): June 22
- Dual II Magnum (2.25 l/ha): June 22
- Coragen (0.2 l/ha): July 17 and August 8
- Bravo ZN (2.4 l/ha): August 5

Harvesting: October 27, 2022

Month	Precipitation (mm)
June	42.8
July	24.0
August	90.0
September	24.2
October	62.3
TOTAL	**243.3**

EFFICACY REPORT

2022 – MYCORRHIZAL & BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIAL

Research partner: Atlantic AgriTech

Research site: Newton, PEI

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin square (LS), 6 repetitions, 24.0 m^2 plots

Variety: EVA treated with Actara

Previous crop: Turnip

Seeding details: Hand seeded on May 20 at a rate of 1250 kg/ha in a sandy loam soil (pH: 5.4, OM: 2.3%). Emergence on June 8.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 15-15-15-4S-2Mg (1000 kg/ha): May 19

Pesticides:
- Lorox DF (3 l/ha): June 12
- Sencor 75DF (1.7 l/ha): June 12
- Penncozeb (2.24 kg/ha): July 7, 17 and 27, then once a week until August 19
- Coragen (350 ml/ha): July 17
- Reglone Ion (2.47 l/ha): August 20

Harvesting: October 8, 2022

Month	Precipitation (mm)
May	51.2
June	78.0
July	60.0
August	130.6
September	130.6
TOTAL	**478.6**

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	92.3	-
AGTIV® REACH™ L POTATO	92.5	0.2
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ L	109.3	17.0

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partner: Progest inc.

Research site: Sainte-Croix de Lotbinière, QC

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO*;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square, 6 repetitions, 22 m^2 plots.

Variety: Norland

Previous crop: Oat

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 12-12-15 (1333 kg/ha): at seeding

Pesticides:
- Quadris: June 4, 25 and July 5
- Titann, June 4
- Lorox: June 9
- Select and Amigo: June 24
- Manzate: June 25, July 5 and August 13
- Coragen: July 15 and 29
- Delegate: July 23
- Agrovia Top: July 29 and August 13
- Reglone: August 23 and September 10

Harvesting: September 23, 2021

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

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	313.1	-
AGTIV® REACH™ L POTATO	320.3	7.2
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	319.3	6.2

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partner: New Marc Research

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

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO*;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square, 6 repetitions, 22 m^2 plots.

Variety: Chieftain

Previous crop: Soybean

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 16.9-22.2-12.7: June 1
Urea (46-0-0): June 5

Pesticides: Coragen: June 10 and July 22
Delegate: August 27

Harvesting: September 30, 2021

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

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	103.1	-
AGTIV® REACH™ L POTATO	107.8	4.7
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	112.8	9.8

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partner: Atlantic Agri Tech

Research site: New Glasgow, IPE

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO*;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square, 6 repetitions, 16 m^2 plots.

Variety: Russet Burbank

Previous crop: Oat

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 15-15-15-4 (S)-2 (Mg): May 1

Pesticides:
- Lorox: June 2
- Sencor: June 2
- Pencozed 75DF: June 28, July 12, 28 and August 9
- Zampro: July 5
- Coragen: July 5
- Revus: July 19
- Delegate: July 19
- Echo: August 25
- Reglone: September 8

Harvesting: October 4, 2021

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

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	236.9	-
AGTIV® REACH™ L POTATO	242.1	5.2
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	247.4	10.5

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partner: Tall Pines Agricultural Research Ltd.

Research site: Rockwood, ON

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO*;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square, 6 repetitions, 18 m^2 plots.

Variety: Chieftain Red

Previous crop: Fallow

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 120-60-90 (590 kg/ha): April 20

Pesticides:
- Boundary LQD: May 28
- Bravo Zn: July 15
- Coragen: July 28

Harvesting: November 9, 2021

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

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	266.7	-
AGTIV® REACH™ L POTATO	279.7	13.0
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	322.3	55.6

EFFICACY REPORT

2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partner: Wellington Agricultural Research Ltd.

Research site: Elmira, ON

Treatments:
a) Untreated check;
b) AGTIV® REACH™ L POTATO*;
c) AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO*.

*Products applied according to manufacturers recommended rate.

Experimental design: Latin Square, 6 repetitions, 22 m^2 plots.

Variety: Chieftain Red

Previous crop: Canola

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

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

Treatment	Yield (cwt/ac)	Yield increase (cwt/ac)
Untreated check	298.2	-
AGTIV® REACH™ L POTATO	320.7	22.5
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	343.9	45.7

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Sencor DF: July 1
- Bravo: July 26, August 5, 7, 13, 19, 23 and September 9
- Revus: July 26, August 5, 7, 13, 19, 23 and September 9

Harvesting: October 9, 2021

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

ONION

AVERAGE YIELD INCREASE

AGTIV REACH

3.5 t/ha

7.4%

17 sites over 10 years

Canada and Europe

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

ONION

AGTIV REACH

► PLOT TRIAL

Research partner: Antédis

Research site: Issé, Loire-Atlantique department, France

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

*Products applied according to manufacturers recommended rate.

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

Variety: Santero F1

Previous crop: Spring barley

Seeding details: Seeded April 1 at 80 seeds/m^2 with 32 cm row spacing.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Liquid Solution N 39: March 19
AVF K4: August 20 to 25

Pesticides:

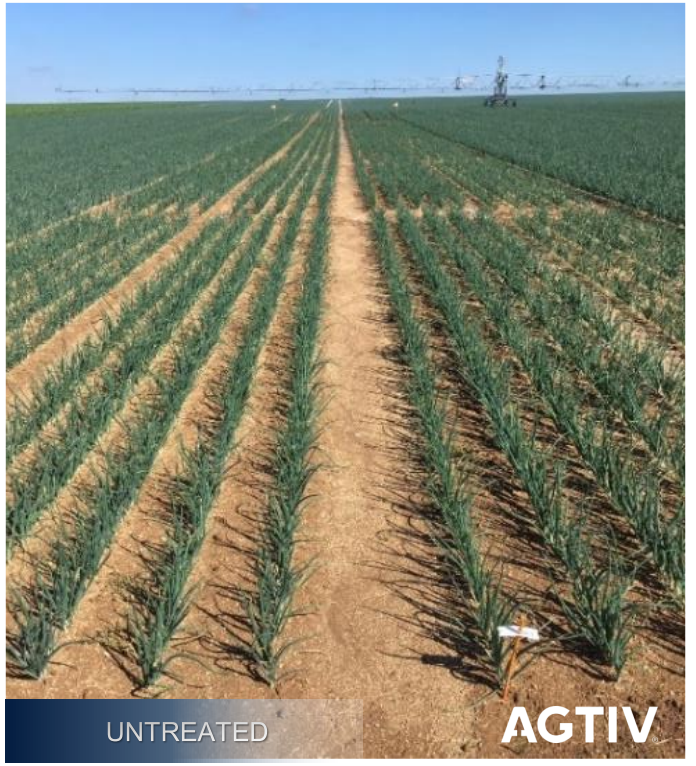
- Acrobat M DG : June, July and August
- Baroud SC :April
- Bordeaux mixture: June, July and August
- Caiman WP and DEFI : June
- Challenge 600 : May, June
- Dithane M 45 : June and August
- ITCAN SL 270 : September
- Lentagran : Aril and May
- Satarne 200 : May, June
- Scala : July

Harvesting: September 24, 2019

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

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

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated check	55 315	62.0
AGTIV® SPECIALTY CROPS • Powder	56 474	63.3



EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

ONION

AGTIV REACH

► PLOT TRIAL

Research partner: BlackCreek Research

Research site: Bright, ON

Treatments: a) Untreated check;
b) AGTIV® REACH™ P for Seed Encrusting.

*Products applied according to manufacturers recommended rate.

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

Variety: Catskill

Previous crop: Soybean

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: MAP (70 kg/ha)
Potash (98 kg/ha)
KMag (125 kg/ha)
Urea (112 kg/ha)

Pesticides:
- Venture L: June 20
- Pardner: June 25 and July 5
- Prowl H2O: June 29 and July 15

Harvesting: October 18, 2018

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

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

Treatment	Yield (lb/ac)	Yield (t/ha)
Untreated check	20 434	22.9
AGTIV® REACH™ P for Seed Encrusting	29 179	32.7

Table 2. **Summary of marketable yields per treatment**

Treatment	Yield (lb/ac)	Yield (t/ha)
Untreated check	18 467	21.0
AGTIV® REACH™ P for Seed Encrusting	26 644	29.8

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

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

ONION

AGTIV REACH

► GROWER SPLIT FIELD TRIAL

Research Sites: France, Europe

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

*Products applied according to manufacturers recommended rate.

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

Variety Hytunes

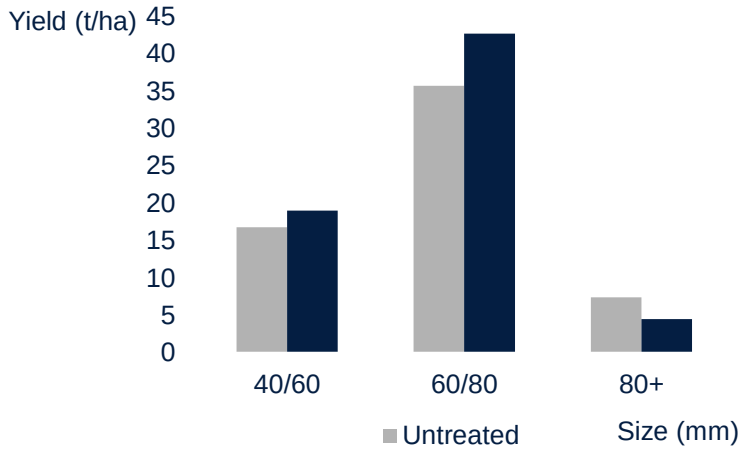
Table 1. **Marketable onion yields per treatment**

Treatment	Yield (lb/ac)	Yield (t/ha)
Untreated check	53 441	59.9
AGTIV® mycorrhizal inoculant	59 062	66.2

Table 2. **Marketable onion yields per treatment**

Treatment	Bulb number / ha	Difference (%) AGTIV® vs untreated
Untreated check	531 667	
AGTIV® mycorrhizal inoculant	616 667	+10.5%

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



EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

ONION

AGTIV REACH

► PLOT TRIAL

Research partners:
- BlackCreek Research;
- Prisme.

Research Sites:
- Bright, ON – Sandy loam soil;
  Napierville, QC – Black soil, organic.

Treatments:
a) Untreated;
b) AGTIV® REACH™ P for Seed Encrusting.

*Products applied according to manufacturers recommended rate.

Experimental design:
Randomized complete block design, 8 replicates.

Variety:
Frontier: Ontario
Trailbrazer: Quebec

Table 2. **Summary of yields per treatment and % difference**

Location	Untreated (t/ha)	AGTIV® REACH™ P for Seed Encrusting (t/ha)	Yield difference %
Ontario	41	43.2	+5.5%
Quebec	32.3	38.6	+6.3%
Average	**36.7**	**40.9**	**+6.2%**

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

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

ONION AGTIV REACH

► GROWER SPLIT FIELD TRIAL

Research Sites: France, Europe

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

*Products applied according to manufacturers recommended rate.

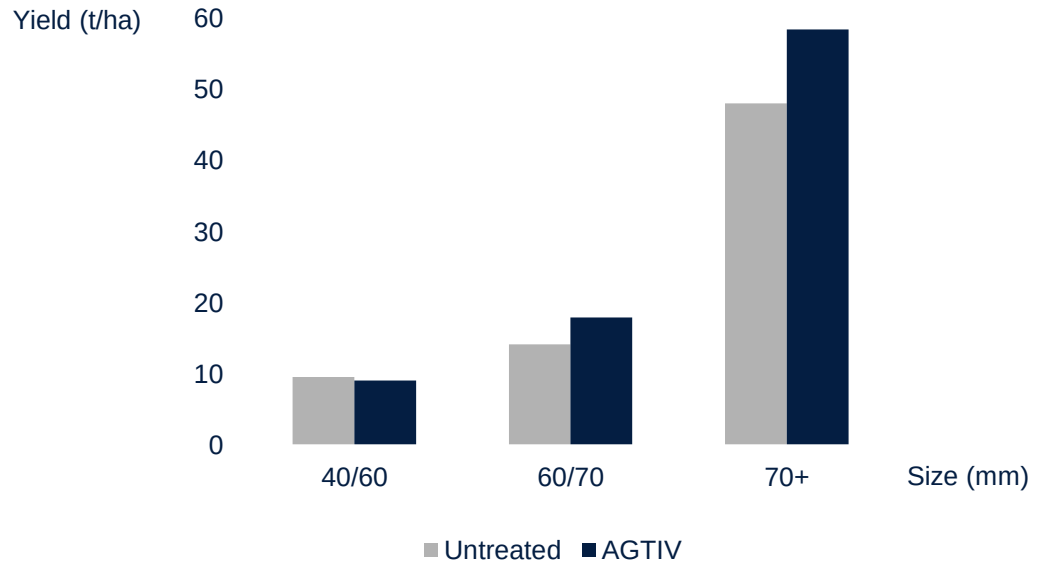
Experimental design: Every data point per field consists in an average of 3 samples each (untreated and AGTIV®).

Variety SPIRIT

Table 1. **Marketable onion yields per treatment and difference (%)**

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

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



CARROT

AVERAGE YIELD INCREASE

AGTIV REACH

3.7 t/ha

7.7%

11 sites over 6 years
Canada

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

CARROT

AGTIV REACH

► PLOT TRIAL

Research partner: Antédis

Research site: Ploërmel, Morbihan department, France

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

*Products applied according to manufacturers recommended rate.

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

Variety: Bolero F1

Previous crop: Ray-grass

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

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

Treatment	Yield [1] (lb/ac)	Yield [1] (t/ha)	Yield increase (%)
Untreated check	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≤0.05.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 30 m^3 of cattle manure: May 21

Pesticides:
- Baroud SC: June 2
- Centium 36 CS: June 2
- Racer ME: June 2
- Challenge 600: June 26 and August 01
- DEFI: June 26 and August 01
- Heliosoufre: August 13
- Switch: August 13

Harvesting: October 28, 2019

Month	Precipitation (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

CARROT

AGTIV REACH

► PLOT TRIALS

Research partners: Eurofins Agroscience services

Research sites: Meneac, Morbihan department, France

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

*Products applied according to manufacturers recommended rate.

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

Variety: Bolero F1

Previous crop: Barley

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

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

Treatment	Yield [1] (lb/ac)	Yield [1] (t/ha)	Yield increase (%)
Untreated check	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 HSD test at p≤0.05.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation:
- Chicken manure (2200 kg/ha): April 15
- Ammonitrate (180 kg/ha): February 23
- Ammonitrate (150 kg/ha): March 15

Pesticides:
- Cherokee: April 19
- Keynote: May 8
- Baroud: May 25
- Racer Centium: May 25
- Signum: June 25
- Heliosoufre: June 25
- Bordeaux mixture: June 25

Harvesting: October 1, 2019

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

EFFICACY REPORT

2019 – MYCORRHIZAL INOCULANT

CARROT

AGTIV REACH

► PLOT TRIALS

Research partners: Agricultural Development Group Inc.

Research sites: Eltopia (WA), USA

Treatments: a) Untreated check;
b) AGTIV® REACH™ P for Seed Encrusting.

*Products applied according to manufacturers recommended rate.

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

Variety: Envy

Previous crop: Squash

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

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: None

Pesticides:
- Lorox: July 13
- Nortron: August 23

Harvesting: October 8, 2019

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

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

Treatment	Yield (lb/ac)	Yield (t/ha)	Marketable yield (%)
Untreated check	12 499	14.0	92
AGTIV® REACH™ P for Seed Encrusting	16 941	19.0	92

EFFICACY REPORT

2018 – MYCORRHIZAL INOCULANT

CARROT

AGTIV REACH

► PLOT TRIALS

Research partners: BlackCreek Research

Research sites: Bright, ON

Treatments: a) Untreated check;
b) AGTIV® REACH™ P for Seed Encrusting.

*Products applied according to manufacturers recommended rate.

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

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. Conventional till.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation:
- MAP (70 kg/ha)
- Potash (98 kg/ha)
- KMag (125 kg/ha)
- Urea (112 kg/ha)

Pesticides:
- Lorox FL (480 g/l, 3.25 l/ha): June 12
- Venture L (125g/l, 2l/ha): July 10

Harvesting: September 24, 2018

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

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

Treatment	Yield (lb/ac)	Yield (t/ac)
Untreated check	20 488	23.0
AGTIV® REACH™ P for Seed Encrusting	23 244	26.0

Table 2. **Summary of yields percentage per treatment**

Treatment	Marketable yield (%)	Reject (%)
Untreated check	64%	4.75%
AGTIV® REACH™ P for Seed Encrusting	69%	3.13%

EFFICACY REPORT

2017 – MYCORRHIZAL INOCULANT

CARROT

AGTIV REACH

► PLOT TRIALS

Research partners:
- BlackCreek Research;
- Prisme.

Research sites:
- Bright, ON – Sandy loam soil;
- Napierville, QC – Black soil, organic.

Treatments:
a) Untreated check;
b) AGTIV® REACH™ P for Seed Encrusting.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized complete block design, 8 replicates.

Variety:
Bolero: Ontario
Olympus: Quebec

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

Table 1. **Summary of marketable yields for untreated check**

Location	Yield (lb/ac)	Yield (t/ha)	Total % Yield difference
Ontario	36 579	41	+5.4%
Quebec	28 817	32.3	+19.5%
Average	**32 653**	**36.6**	**+11.7%**

Table 2. **Summary of marketable yields for AGTIV® REACH™ P for Seed Encrusting**

Location	Yield (lb/ac)	Yield (t/ha)	Total % Yield difference
Ontario	38 542	43.2	+5.4%
Quebec	34 438	38.6	+19.5%
Average	**36 490**	**40.9**	**+11.7%**

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

SWEET CORN

AGTIV REACH

► PLOT TRIALS

Research partners:
- BlackCreek Research;
- Sandy Knolls Research Inc.

Research sites:
- Ontario

Treatments:
a) Untreated check;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

Experimental design:
2 randomized Complete Block (RCB), 8 repetitions each.

Table 1. **Summary of yields (lb/ac) per trial**

Location	Year	Seed variety	Untreated check	AGTIV® REACH™	Yield increase
Vienna, ON	2023	Fast Lane SE	3022.6	3274.8	252.2
Bright, ON	2023	Fast Lane SE	12618.0	13347.0	729.0

EFFICACY REPORT

2023 – MYCORRHIZAL INOCULANT

SWEET CORN

AGTIV REACH

► PLOT TRIAL

Research partner: Sandy Knolls Research Inc.

Research site: Vienna, ON

Treatments: a) Untreated check;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 8 repetitions, 18.0 m^2 plots

Variety: Fast Lane SE treated with Dividend Xtreme + Vibrance Cinco

Previous crop: Fallow

Seeding details: Seeded on July 20 with a finger pickup style planter at a rate of 32 000 seeds/ac in a loamy sand soil (pH: 7.5, OM: 1.4%). Emergence on July 24.

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

Treatment	Yield (lb/ac)	Yield increase (lb/ac)
Untreated check	3022.6	-
AGTIV® REACH™	3274.8	252.2

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 0-0-60 (150 lb/ac): May 8
46-0-0 (450 lb/ac): May 8
Corn Starter (250 lb/ac): July 20

Pesticides: None

Harvesting: October 2, 2023

Month	Precipitation (mm)
May	21.8
June	81.2
July	192.2
August	117.8
September	32.6
TOTAL	**445.6**

EFFICACY REPORT

2023 – MYCORRHIZAL INOCULANT

SWEET CORN

AGTIV REACH

► PLOT TRIAL

Research partner: BlackCreek Research

Research site: Bright, ON

Treatments: a) Untreated Check
b) AGTIV® REACH™

*Products applied according to manufacturers recommended rate.

Experimental design: Randomized Complete Block (RCB), 8 repetitions, 18.0 m^2 plots

Variety: Fast Lane SE treated with Dividend Xtreme + Vibrance Cinco

Previous crop: Soybean

Seeding details: Seeded on May 11 with a cone seeder at a rate of 10.8 kg/ha in a sandy loam soil (pH: 6.8, OM:3.5%).
Emergence on May 22.

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

Treatment	Yield (lb/ac)	Yield increase (lb/ac)
Untreated check	12618.0	-
AGTIV® REACH™	13347.0	729.0

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: 24.3-10.8-14.6-2.2S-1Mg (725 lb/ac): May 8

Pesticides:
- Primextra II Magnum (4.0 l/ha): May 16
- Callisto (0.3 l/ha): May 16

Harvesting: August 11, 2023

Month	Precipitation (mm)
May	47
June	92.8
July	227
August	130.2
TOTAL	**497**

* Plots were irrigated during those months

EFFICACY REPORT

2019 – MYCORRHIZAL & BACILLUS INOCULANT

SWEET CORN

AGTIV REACH + AGTIV STIMULATE

► PLOT TRIALS

Research partners: Schreiber & Sons

Research sites: Eltopia (WA), USA

Treatments:
a) Untreated check;
b) AGTIV® REACH™ P for Seed Film Coating + AGTIV® STIMULATE™ L*.

*Products applied according to manufacturers recommended rate.

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

Variety: Nirvana

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

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

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

Treatment	Yield [1] (lb/ac)	Yield [1] (t/ha)	Yield increase (%)
Untreated check	17 854.0 [a]	20.0 [a]	
AGTIV® REACH™ P (Seed Film Coating) + AGTIV® STIMULATE™ L	21 067.7 [b]	23.6 [b]	+18%

[1] Yields with same letter are not statistically different following a LSD test at p≤0.05.

OPERATIONAL NOTES AND RAIN FALL

Fertilisation: Plots were irrigated and fertilized.

Pesticides: Atrazine: June 22
Atrazine + Impact: July 22

Harvesting: September 16, 2019

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

AVERAGE YIELD INCREASE

AGTIV REACH

GREEN BEAN

7.8 %

6 sites over 1 year
Europe

AGTIV THRIVE

GREEN PEA

5.3 %

12 sites over 3 years
Canada

AGTIV REACH

PEPPER

6.8 %

5 sites over 3 years
Canada

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

GREEN BEAN

AGTIV REACH

► GROWER SPLIT FIELDS

Research partners: • Growers

Research sites: • France

Treatments: a) Untreated;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

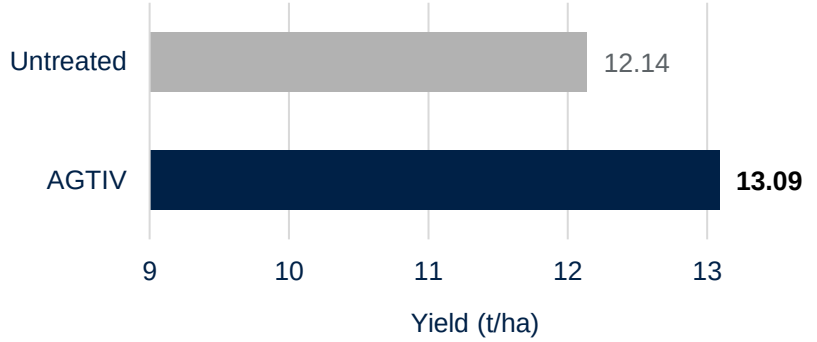
Experimental design: Split fields

Before 2022:
AGTIV® REACH™ was formerly known as AGTIV® SPECIALTY CROPS

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

Variety	Untreated		AGTIV® mycorrhizal inoculant		Increase (%) 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	7.0
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	-2.4
Linex	6 512	7.33	6 959	7.83	6.8
Average	**10 825**	**12.14**	**11 672**	**13.09**	**7.8 %**

Figure 1. **Yield increase with AGTIV® mycorrhizal inoculant.**



EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

GREEN PEA

AGTIV THRIVE

► GROWER SPLIT FIELDS

Research partners:
- Growers

Research sites:
- Ontario;
- Quebec.

Treatments:
a) Untreated;
b) AGTIV® THRIVE™ P PEA & LENTIL.

*Products applied according to manufacturers recommended rate.

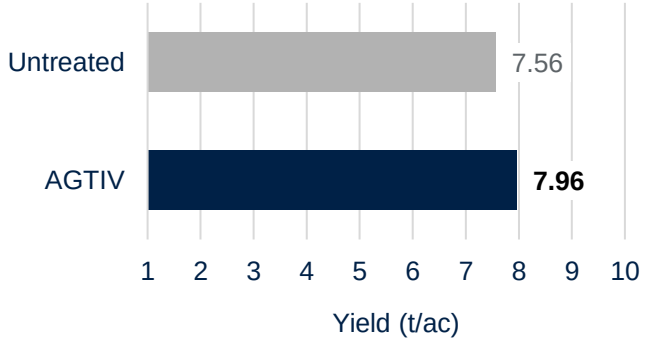
Experimental design:
Split fields

Plant growth and health is enhanced on the right, and the leaf area is increased with AGTIV®.

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

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
Total	**12 sites**	**0.16 t/ac**	**0.40 t/ha**	**5.3%**

Figure 1. **Average yield increase**



Before 2022:
AGTIV® THRIVE™ was formerly known as AGTIV® PULSES

TRIALS PICTURES

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

SUMMARY – MYCORRHIZAL INOCULANT

PEPPER

AGTIV REACH

► GROWER SPLIT FIELDS

Research partners:
- Growers

Research sites:
- Ontario;
- Quebec.

Treatments:
a) Untreated;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

Experimental design:
Split fields

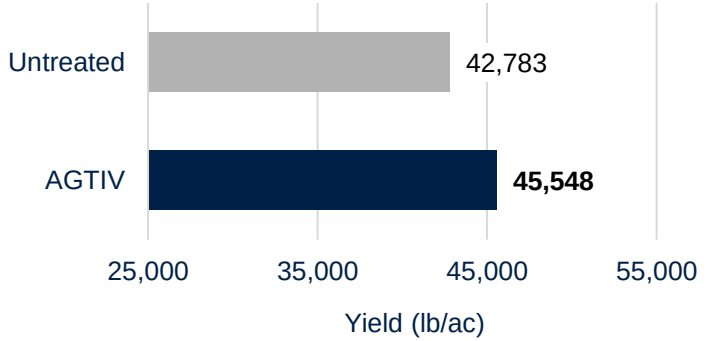
More developed root system, more leaves and bigger fruits with AGTIV®.

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

Year	Number of sites	Average increase		
		(lb/ac)	(t/ha)	(%)
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.

Figure 1. **Average yield increase**



Before 2022:
AGTIV® REACH™ was formerly known as AGTIV® SPECIALTY CROPS

EFFICACY REPORT

2016 – MYCORRHIZAL INOCULANT

STRAWBERRY

AGTIV REACH

► PLOT TRIALS

Research site: Saint-Eustache, QC

Treatments: a) Untreated;
b) AGTIV® REACH™.

*Products applied according to manufacturers recommended rate.

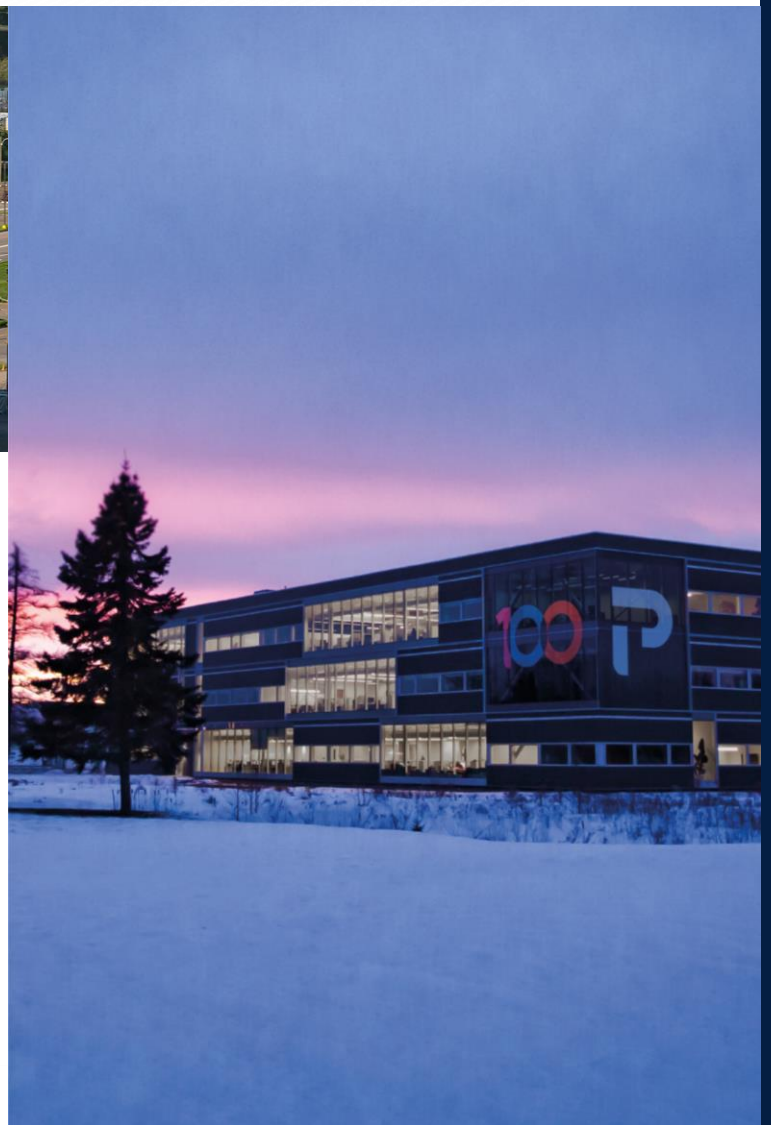
Experimental design: 3 fields. 3 plots of 7 plants per field.
New strawberry establishment.

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® REACH™	18.4	17.1	1.3
% difference AGTIV® vs untreated	**+ 15%**	**+ 26%**	**- 47%**

Larger and bigger plants with AGTIV® on the right.

PREMIER TECH



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

DRIVING CHANGES TO MAKE A DIFFERENCE

IN 5 BUSINESSES

OUR BRANDS

AGTIV
PRO-MIX
wilson
C·I·L
ALASKAN
CHRONOS
KOCKUMS
SLOOTWEG
PRAIRIE
ECOFLO
REWATEC
ECOPROCESS
CALONA
EPARCO
MIREGO
SYNCRUN
live LINE
rize LINE
virentia

GROWERS AND CONSUMERS
WATER AND ENVIRONMENT
SYSTEMS AND AUTOMATION
DIGITAL
LIFE SCIENCES

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 the 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, but we also 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.

PTAGTIV.COM/**en/innovation**

CELEBRATING DECADES OF **INNOVATION** AND **VALUE**

40
years
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.

PTAGTIV.COM/**en/quality**

PRODUCTION

In 2000, Premier Tech set up a world-first endomycorrhizal inoculum plant, developing a new mycoreactor process for industrial scale production. Backed by 40 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

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:

- Carriers 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 tailored for organic production

APPLICATION

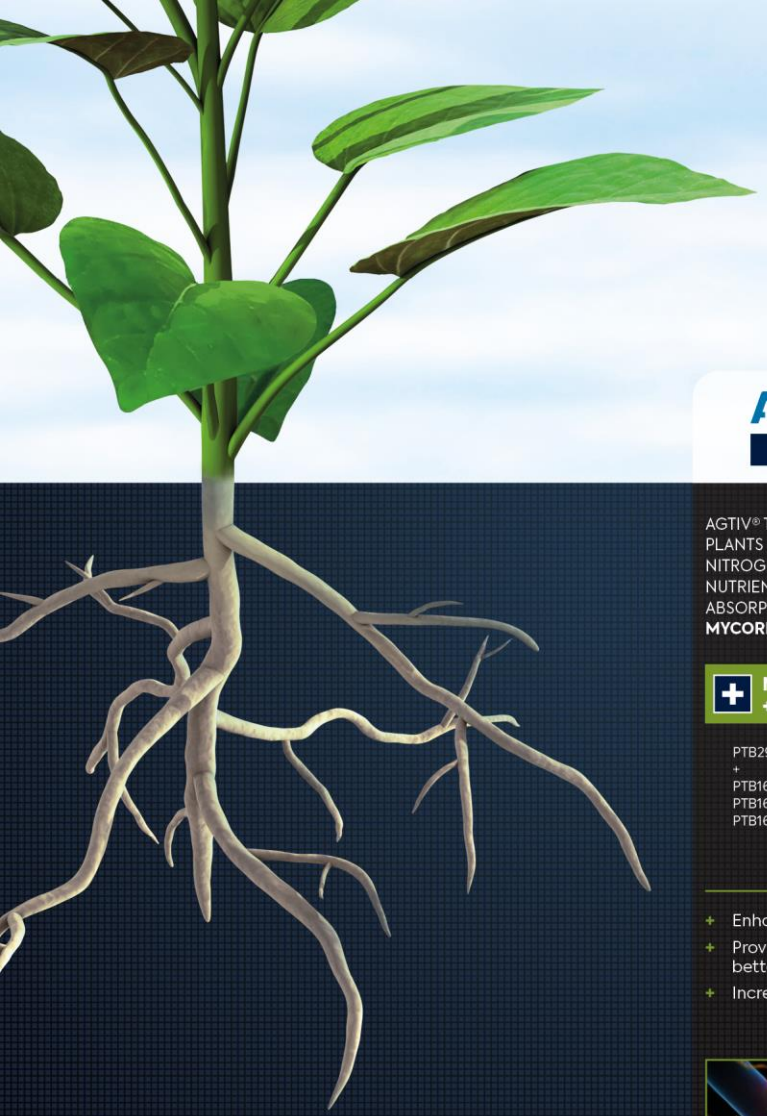
Caring about our clients' crop performance, each recommendation for product use takes into consideration validation by our field experts and by farmers themselves, which ensures:

- 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 and research teams 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



AGTIV® BIOLOGICAL ACTIVE INGREDIENTS

For more than 100 years, Premier Tech has been growing along with producers. Being a world leader in the industrial production of mycorrhizal inoculants has inspired us to go further in our search for natural technologies. Since then, we have introduced the benefits of *Bacillus*, rhizobium, and Serendipita to the agricultural market. Furthermore, we have combined these powerful technologies to improve the quality and the yield of crops for the benefit of our clients.

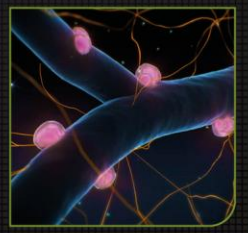
AGTIV® THRIVE

AGTIV® THRIVE™ POWERS PLANTS BY BOOSTING NITROGEN FIXATION, NUTRIENT AND WATER ABSORPTION THANKS TO **MYCORRHIZAE** & **RHIZOBIUM**

+ MYCORRHIZAE + RHIZOBIUM

PTB297 Technology
+
PTB160 (pea & lentil)
PTB162 (soybean)
PTB161 (chickpea)

- Enhances P uptake
- Provides more energy for better nitrogen fixation
- Increases photosynthesis



AGTIV® ENRICH

AGTIV® ENRICH™ STRENGTHENS LEGUME NITROGEN FIXATION AND PROVIDES A VIGOROUS ROOT SYSTEM THANKS TO **RHIZOBIUM** & **BACILLUS**

+ RHIZOBIUM + BACILLUS

PTB162 Technology
+
PTB180 Technology

- Increases nodulation and nitrogen fixation
- Improves rooting environment
- Enhances plant vigor and productivity

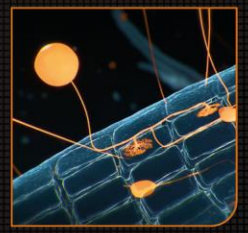
AGTIV® REACH

AGTIV® REACH™ HELPS PLANTS REACH AND ABSORB MORE NUTRIENTS AND WATER THANKS TO **MYCORRHIZAE**

M MYCORRHIZAE

PTB297 Technology, *Rhizophagus irregularis* (formerly known as *Glomus intraradices*)

- Expands root system
- Enhances nutrient and water uptake
- Promotes plant robustness and vigor



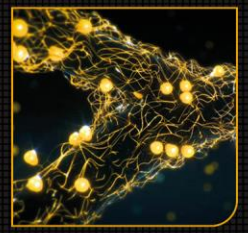
AGTIV® IGNITE

AGTIV® IGNITE™ IMPROVES PHOTOSYNTHESIS AND MITIGATES IMPACT OF ENVIRONMENTAL STRESSES THANKS TO **SERENDIPITA**

S SERENDIPITA

PTB299 Technology, *Serendipita indica*

- Mitigates abiotic stresses
- Increases photosynthesis rate
- Enhances plant establishment, growth and yield



AGTIV® FUEL

AGTIV® FUEL™ FEEDS LEGUMES BY FIXING ATMOSPHERIC NITROGEN THANKS TO **RHIZOBIUM**

R RHIZOBIUM

PTB160 Technology (pea & lentil) *Rhizobium leguminosarum* biovar *viciae*

PTB162 Technology (soybean) *Bradyrhizobium japonicum*

PTB161 Technology (chickpea) *Mesorhizobium onobrychidis*

- Increases nodulation
- Fixes nitrogen
- Provides nutrients to pulses

AGTIV® STIMULATE

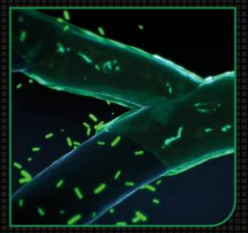
AGTIV® STIMULATE™ REINFORCES PLANTS WITH A HEALTHY ROOT ZONE THANKS TO **BACILLUS**

B BACILLUS

PTB180 Technology, *Bacillus pumilus*

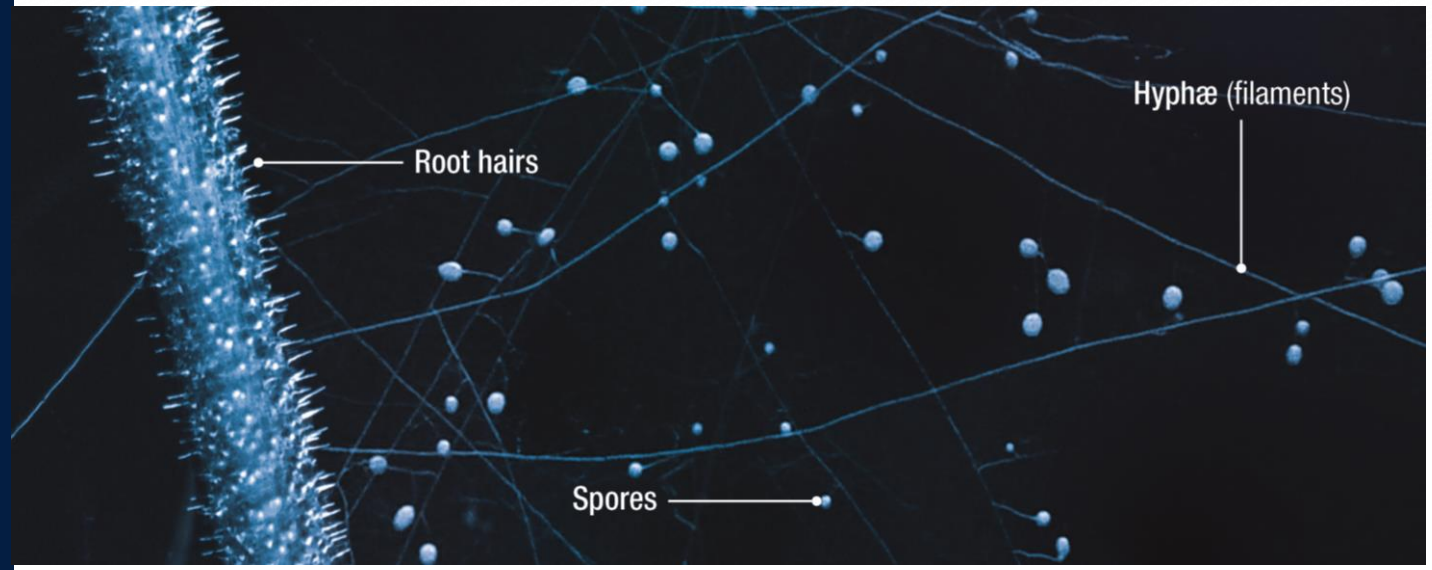
PTB185 Technology, *Bacillus inaquosorum*

- Stimulates rooting environment
- Improves plant establishment
- Increases plant vigor and productivity



Learn more at

PTAGTIV.COM/en/technologies



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]

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]

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.

PTAGTIV.COM/en/mycorrhizae

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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K. Gisjbert et al. 2014. Order of arrival structures arbuscular mycorrhizal colonization of plants. New Phytologist. pp. 10.
L. Duan et al. 2011. Differential effects of soils disturbance and plant residue retention on function of arbuscular mycorrhizal (AM) symbiosis are not reflected in colonization of roots or hyphal development in soil. Soil Biol. & Bioch. 43:571-578.
M. Jayne B., Quigley M. 2013. Influence of arbuscular mycorrhiza on growth and reproductive response of plants under water deficit: a meta-analysis. Mycorrhiza 2014. 24:109-119.
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R 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 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.

PTAGTIV.COM/en/rhizobium

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 (N_2) into plant accessible ammonium. They achieve this byproducing 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 O_2 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 (NH_3) 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.

A. Sprent, J. I., 2007. Evolving ideas of legume evolution and diversity: A taxonomic perspective on the occurrence of nodulation. New Phytol. 174:11-25.
B. Giller, K. E., 2001. Nitrogen Fixation in Tropical Cropping Systems 2nd ed. CABI.
C. Kaschuk et al. 2009. Soil Biol. Biochem. 41:1233-1244.
D. Peix A et al. 2010. Key Molecules Involved in Beneficial Infection Process in Rhizobia–Legume Symbiosis. In: Microbes for Legume Improvement, Chapter 3:55-80.
E. Bonilla, I. and L. Bolaños, 2010. Mineral nutrition for legume-rhizobia symbiosis: B, Ca, N, P, S, K, Fe, Mo, Co, and Ni: A review. In: Organic Farming, Pest Control and Remediation of Soil Pollutants, Sustainable Agriculture Reviews, pp. 253-274, E. Lichtfouse (ed.), Springer Netherlands.
F. Miller LD et al. 2007. The major chemotaxis gene cluster of *Rhizobium leguminosarum* bv. *viciae* is essential for competitive nodulation. Mol Microbiol 63:348-362.

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]

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 like B, Ca, Cu, Fe, K, Mn, Mo and Zn, key components for energy production.

Higher photosynthesis

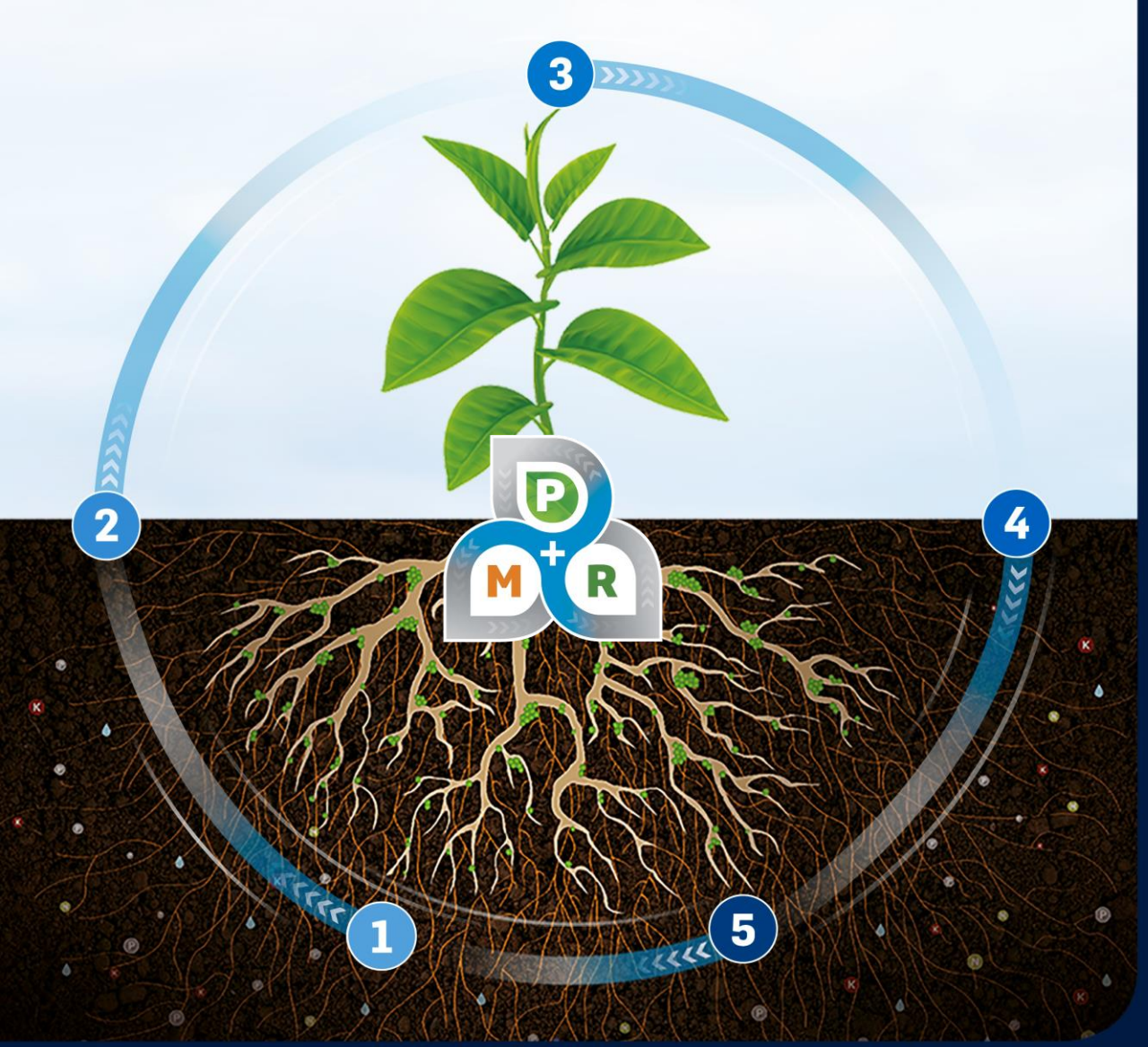
When used in combination, mycorrhizae and rhizobium increase the photosynthetic rate by 51%[B]. *"The rate of photosynthesis increased substantially more than the C* [Carbon] *costs of the rhizobial and AM* [Arbuscular Mycorrhizal] *symbioses."* [B] The total increased sugar production by the plant far 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]

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.

A Koele et al. 2014. VFRC Report 2014/1, pp. 1-57.
B Kaschuk et al. 2009. Soil Biol. Biochem. 41:1233-1244.
C Shinde et al. 2016. Int. J. Bioassays. 5:4954-4957.

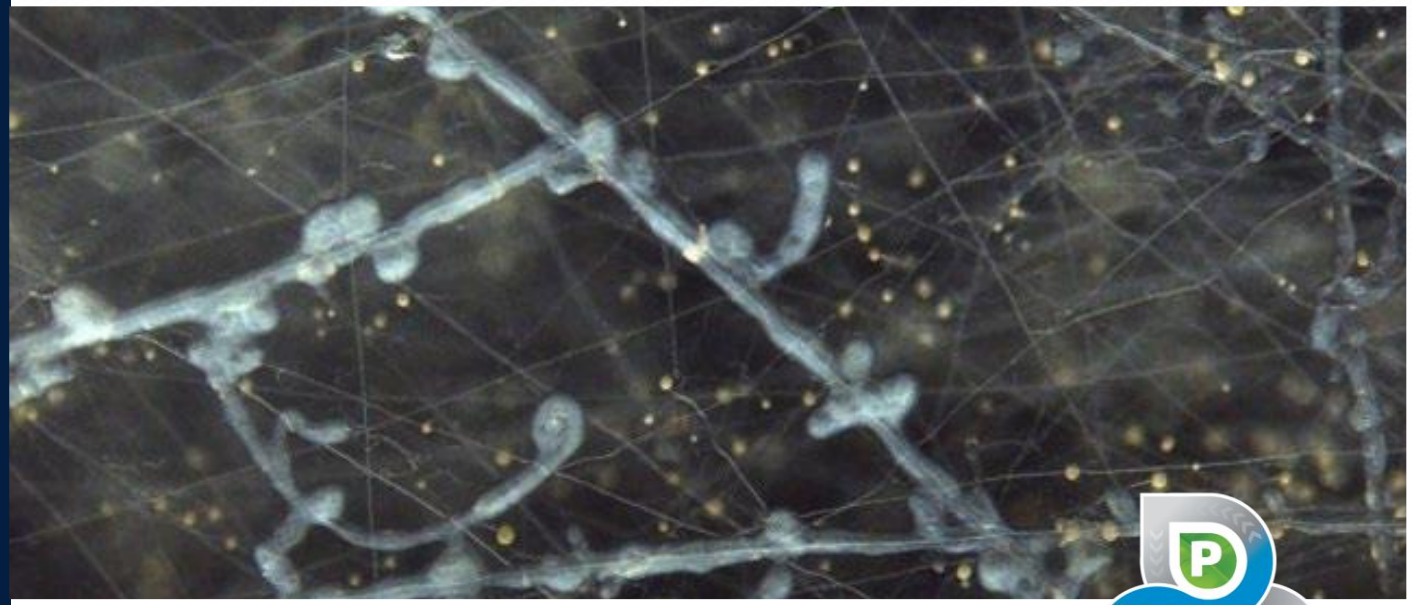


TRIPARTITE SYMBIOSIS

BIOLOGICAL INTERACTION BETWEEN MYCORRHIZAE, RHIZOBIUM & THE PLANT

1. M Mycorrhizae take up P & water from soil to transfer to P plant
2. P Plant can give more P to R rhizobium to fix more N
3. P Plant will photosynthesize 51% more and grow faster
4. P Plant gives carbon to its R rhizobium & M mycorrhizae partners
5. M Mycorrhizae will propagate and spread R rhizobium to other roots

PREMIER TECH



THE TRIPARTITE ASSOCIATION

HELPS YOU GET BIGGER YIELD

How can the tripartite association improve potato productivity?

Mycorrhizae are soil fungi that establish a symbiosis with plant roots. This combination allows better assimilation of water, phosphorus and other mineral elements, promoting better plant growth and better resistance to biotic and abiotic stresses. By exploring the soil, the intense network of hyphae of the mycorrhizal fungus also plays a major role in the physical and microbiological characteristics of soils.

Indeed, the carbon exuded into the soil by the hyphae helps support the significant growth of bacterial communities and promotes soil aggregation.

Since 2011, 1184 validation trials in real growing conditions have been carried out in Quebec, Ontario, New Brunswick, Prince Edward Island, Maine and France. The results indicate that the application of the mycorrhizal inoculant resulted in an increase in yield in 82.3% of cases. This significant yield increase averaged 9.1%, representing an average marketable yield increase of 31.6 cwt/ac.

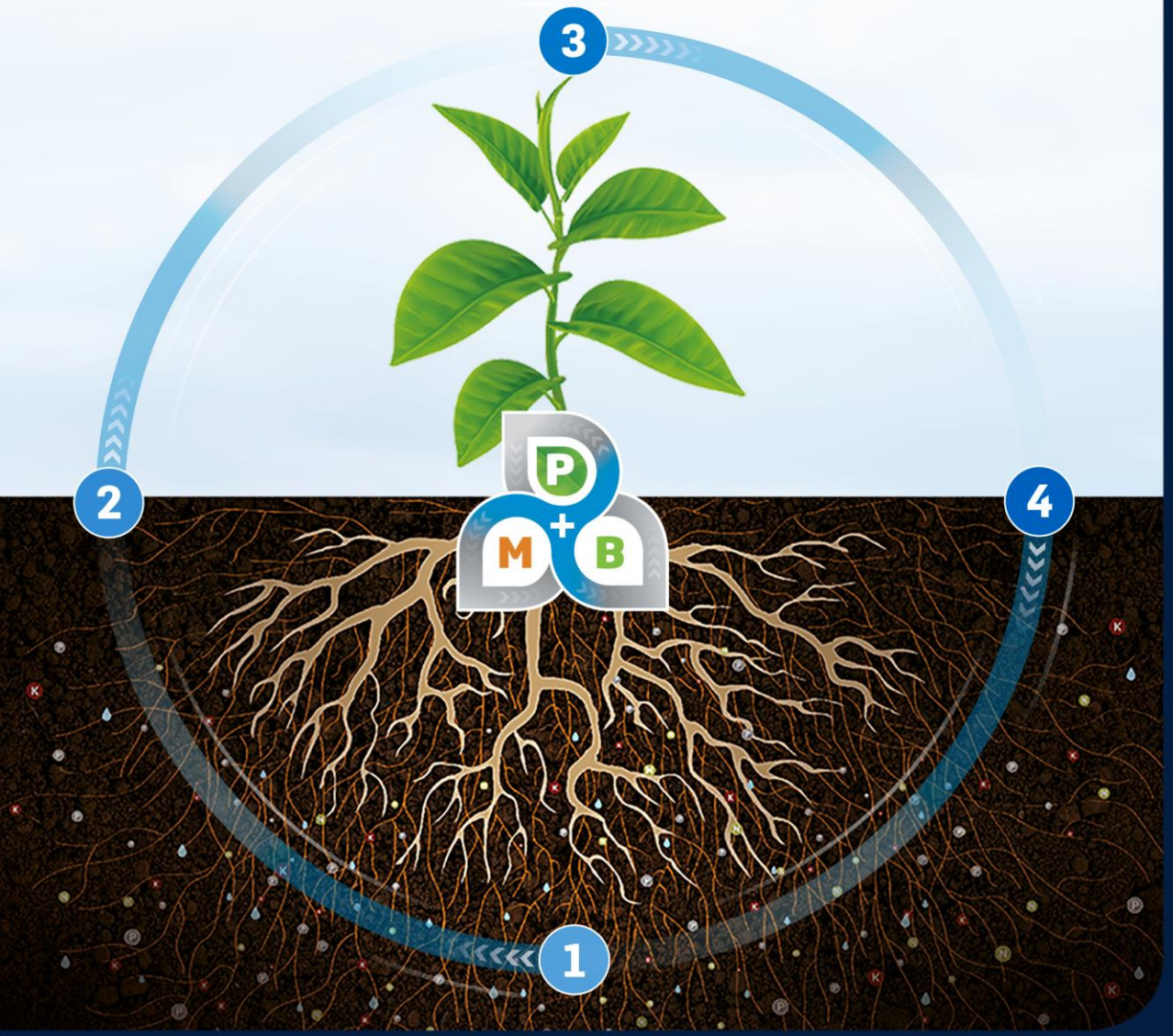
Bacillus is a bacteria that multiply by using root exudates. It forms a biofilm around the root system and secretes biostimulant molecules, such as auxin, which stimulate the plant to grow more efficiently. As the tripartite Plant-mycorrhizae-*Bacillus* has already been proven to work in the horticultural field, Premier Tech decided to test it for potato production.

Bring the research further

In 2021 and 2022, 9 experimental plots were implemented in Quebec, Ontario and Prince Edward Island. Three treatments were applied: an untreated control treatment, a treatment with a commercial mycorrhizal inoculant (AGTIV® REACH™ L POTATO) and a treatment with the same mycorrhizal inoculant supplemented with a biostimulating bacterium (*Bacillus inaquosorum*-PTB185).

The results from the experimental plots demonstrate that inoculation with the mycorrhizal fungus brings an increase of 11 cwt/ac in yield, while **simultaneous inoculation with the mycorrhizal fungus and a biostimulating bacterium results in nearly double the increase**, i.e., a significant increase of yield in potato of 20 cwt/ac when compared to the control. **The two microorganisms would therefore have additive or even synergistic effects on the improvement of the yield of marketable tubers.**

The results obtained in real growing conditions demonstrate that it is profitable for a producer to apply mycorrhizal inoculants to his field. The use of biostimulant microorganisms in agriculture fits well with a sustainable agriculture perspective, by allowing better use of the water and nutrients present in the soil.



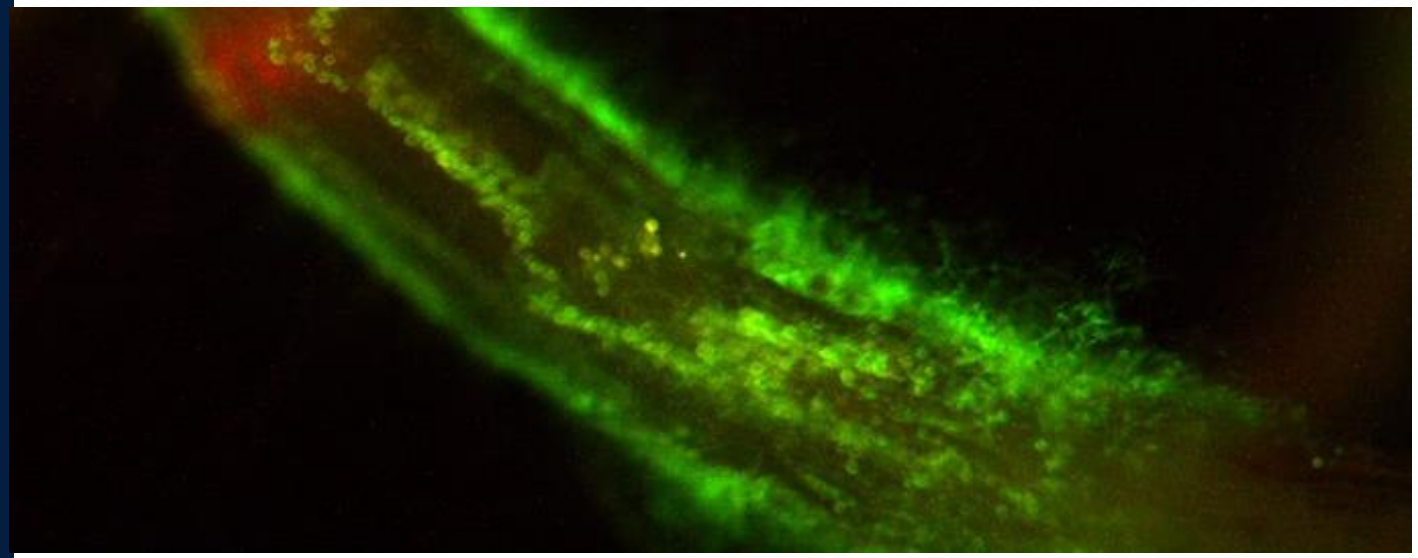
TRIPARTIE ASSOCIATION

1. Plant gives carbohydrates to the fungi
2. The hyphae explore the soil/ growing media, exuding carbon
3. Bacteria absorb this carbon and multiply along the hyphae
4. Bacteria liberate lipopeptides and/or hormones

Resulting in
Protected and Stimulated plant

PREMIER TECH

PROPAGATION OF BACTERIA BY THE MYCORRHIZAL HYPHAE



SERENDIPITA

EFFICACY – GROWTH – RESILIENCE

What is Serendipita indica?

Formerly known as *Piriformospora indica*, *Serendipita indica* is a beneficial endophytic fungus with the ability to colonize the roots of a wide range of plant species, including the Brassicaceae family (e.g., canola and mustard). When applied to seeds or directly to the soil, the spores germinate within a few days and rapidly colonize the surface of nearby roots. The hyphae of the fungus penetrate the superficial cell layer of the root (epidermis), where they activate a whole series of mechanisms in the plant.

The biostimulant effects of *Serendipita* have direct and indirect impacts on the plant. The direct effects are mainly related to better assimilation of nutrients; while the indirect effects, which are numerous, influence the transcription of specific plant genes. Thanks to the contribution of *Serendipita*, the plant becomes more efficient in performing certain functions such as nutrient absorption, water management, and photosynthesis.

Improved absorption of essential nutrients

Sulfur: Sulfur is essential for protein synthesis; a sulfur deficiency considerably reduces nitrogen efficiency and limits protein synthesis. *Serendipita* has high-affinity transporters for sulfur, allowing it to absorb sulfur from the soil[1] very efficiently, which will then be transferred to the plant, in exchange for sugar.

Phosphorus: Phosphorus, essential for energy storage and availability to cells, is also transferred directly from the fungus to the plant. On the root side, phosphate transporters are membrane proteins that allow phosphorus to enter the plant cell. Colonization by *Serendipita* stimulates higher production of these transporters by the plant, making it more efficient at absorbing phosphorus from the soil[2].

Nitrogen: Nitrogen is a key element in the plant nutrition process and is involved in protein and chlorophyll synthesis. Colonization[3] causes a higher transcription of the plant enzyme nitrate reductase. This enzyme improves the efficiency of nitrogen nutrition by the plant by promoting a more rapid conversion of nitrate to ammonia, the form of nitrogen that plants use for amino acid synthesis.

Iron: Iron plays an important role in several fundamental biological processes such as photosynthesis, respiration, nitrogen fixation and assimilation, and DNA synthesis. In iron deficiency situations, *Serendipita indica* has been shown to increase its transcription of an iron transporter, allowing for better availability of iron for the plant[4].

Improvement of water management by the plant

The plant will produce more proline in its root cells[5] . This proline will help maintain the upward movement of water in the plant, thereby keeping the stomata open. The plant can therefore continue to take up water even if there is less water or higher soil salinity.

In parallel, the presence of *Serendipita* stimulates the production of aquaporins and sodium channels in the root cells[6]. These aquaporins are channels that facilitate the absorption of water, while the sodium channels allow the expulsion of excess sodium from the root cells, particularly in saline soils.

Improvement of photosynthesis

In the aerial parts of the plant (leaves), *Serendipita* will stimulate the expression of a protective enzyme, superoxide dismutase, which plays a major role in the regulation of reactive oxygen compounds[7]. These reactive oxygen compounds accumulate under water or salt stress and can damage cell membranes and chloroplasts. This accumulation leads to a reduction in photosynthesis and decreases plant growth. The overexpression of the protective enzyme allows to limit this damage.

Genes related to chlorophyll synthesis are overexpressed in the colonized plant[8], resulting in higher chlorophyll content in the leaves, and higher photosynthetic (carbon capture) capacity, which results in improved growth and health.

Improved oil content and quality in canola seeds

At the same time, certain genes in the plant's fatty acid synthase complex are transcribed to a greater extent when the fungus is present[9]. This results in greater oil synthesis in oilseed plants, such as canola. In addition, two genes responsible for the production of erucic acid are under-expressed in colonized canola plants[9]. This molecule is an anti-nutrient, which improves the quality of the oil.

What are the differences between Serendipita and mycorrhizal fungi?

Being both beneficial root endophytes, one can wonder about the difference between *Serendipita* and mycorrhiza, which is the association between a mycorrhizal fungus and a plant. Following the colonization of the root, the mycorrhiza will extend an intense network of hyphae far into the soil, drawing water and mineral elements inaccessible by the roots, which will then be transferred to the plant in exchange for carbon.

Serendipita, on the other hand, will colonize the surface and epidermis of the root, improving the plant's DNA transcription profiles, that are linked to nutrient uptake and resistance to stress. In short, while mycorrhiza takes nutrients and water from the soil to give them to the plant, *Serendipita* stimulates the plant to be more efficient on its own. This highlights the 2 different modes of action of these biological inoculants on plants.

Yields on canola and wheat crops

Between 2018 and 2022, more than 30 field trials were conducted with the new AGTIV® IGNITE™ L on canola and wheat crops under actual production conditions. For durum wheat, the average yield increase is 10% (or 3.8 bu/acre), while for canola, the average is 6.7% (or 2.5 bu/acre). This yield increase is coupled with an absolute 0.9% increase in the oil content of canola seed, further multiplying the gain to the grower. These increases in yield and oil content observed following the application of *Serendipita* are statistically significant when compared to the untreated plants.

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[2] L. Yang, Y.N. Zou, Z.H. Tian, Q.S. Wu, K. Kuˇca, Effects of beneficial endophytic fungal inoculants on plant growth and nutrient absorption of trifoliate orange seedlings, Sci. Hortic. 277 (2021) 109815, https://doi.org/10.1016/j.scienta.2020.109815
[3] A. Serfling, S.G. Wirsel, V. Lind, H.B. Deising, Performance of the biocontrol fungus Piriformospora indica on wheat under greenhouse and field conditions, Phytopathology 97 (4) (2007 Apr) 523–531, https://doi.org/10.1094/PHYTO97-4-052
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[6] W. Chen, F. Lin, K.H. Lin, C. Chen, C. Xia, Q. Liao, S.P. Chen, Y.W. Kuo, Growth promotion and salt-tolerance improvement of gerbera jamesonii by root colonization of Piriformospora indica, J. Plant Growth Regul. (2021 Apr) 1–10.
[7] Abdelaziz, M.E.; Abdelsattar, M.; Abdeldaym, E.A.; Atia, M.A.; Mahmoud, A.W.M.; Saad, M.M.; Hirt, H. *Piriformospora indica* alters Na+/K+ homeostasis, antioxidant enzymes and LeNHX1 expression of greenhouse tomato grown under salt stress. *Sci. Hortic.* 2019, *256*, 108532
[8] J. Das, K.V. Ramesh, U. Maithri, D. Mutangana, C.K. Suresh, Response of aerobic rice to Piriformospora indica, Indian J. Exp. Biol. 52 (2014 Mar) 237–251.
[9] Z.Z. Su, T. Wang, N. Shrivastava, Y.Y. Chen, X. Liu, C. Sun, Y. Yin, Q.K. Gao, B. G. Lou, Piriformospora indica promotes growth, seed yield and quality of Brassica napus L, Microbiol. Res. 199 (2017 Jun) 29–39, https://doi.org/10.1016/j.micres.2017.02.006

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) 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]

A. Gavito, M. E., Miller M. H., 1998. Changes in mycorrhizal development in maize induced by crop management practices. Plant Soil. 198: 185-192.

B. Ellis, J. R., 1998. Plant Nutrition. Post Flood Syndrome and Vesicular-Arbuscular Mycorrhizal Fungi. J. Prod. Agric., Vol. 11, no.2: 200-204.

C. Bagyaraj, D. J. et al. 2015. Phosphorus nutrition of crops through arbuscular mycorrhizal fungi. Current Science, Vol. 108, no. 7: 1288-1293.

D. Jones, C. E. 2009. Mycorrhizal fungi - powerhouse of the soil. Evergreen Farming 8:4-5.

E. Grant, C. A. et al. 2001. The importance of early season phosphorus nutrition. Canadian Journal of Plant Science. 211-224.

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.

PTAGTIV.COM/en/canola

AGTIV® RELIABLE INOCULANTS

PEA, LENTIL & FABA BEAN

AGTIV® THRIVE™ P PEA & LENTIL
F: Powder (peat)
S: 4.7 kg (10.3 lb) pail – 2.4 kg (5.3 lb) pail
C: Pea & faba bean: Pail 4.7 kg: **16 ha (40 acres)** – Pail 2.4 kg: **8 ha (20 acres)**
Lentil: Pail 4.7 kg: **24 ha (60 acres)**

AGTIV® THRIVE™ G PEA & LENTIL
F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Pea, lentil & faba bean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

AGTIV® THRIVE™ PEA & LENTIL
F: Liquid
S: Combo box: 8 L (8 kg) bag-in-box + 4 x 950 ml (4 x 32 fl. oz) bottles
C: Pea, lentil & faba bean: **32 ha (80 acres)**

AGTIV® FUEL™ P PEA & LENTIL
F: Powder (peat)
S: 4.7 kg (10.3 lb) pail
C: Pea & faba bean: **16 ha (40 acres)** – Lentil: **24 ha (60 acres)**

AGTIV® FUEL™ G PEA & LENTIL
F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Pea, lentil & faba bean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

AGTIV® FUEL™ L PEA & LENTIL ✪
F: Liquid
S: 8 L (8 kg) bag-in-box
C: Pea, lentil & faba bean: **32 ha (80 acres)** or **6530 kg of seeds (240 bu)**

SOYBEAN

AGTIV® THRIVE™ P SOYBEAN
F: Powder (peat)
S: 4.7 kg (10.3 lb) pail
C: Soybean: **16 ha (40 acres)**

AGTIV® THRIVE™ G SOYBEAN
F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Soybean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

AGTIV® THRIVE™ SOYBEAN
F: Liquid
S: Combo box: 8 L (8 kg) bag-in-box + 2 x 950 ml (2 x 32 fl. oz) bottles
C: Soybean: **16 ha (40 acres)**

AGTIV® FUEL™ G SOYBEAN
F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Soybean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

AGTIV® FUEL™ L SOYBEAN ✪
F: Liquid
S: 8 L (8 kg) bag-in-box
C: Soybean: **16 ha (40 acres)** or **5680 kg of seeds (250 units)**

AGTIV® ENRICH™ SOYBEAN ✪
F: Liquid
S: Combo box: 8 L (8 kg) (*Bradyrhizobium*) bag-in-box + 300 ml (*Bacillus*) bottle
C: Soybean: **16 ha (40 acres)** or **5680 kg of seeds (250 units)**

CHICKPEA

AGTIV® THRIVE™ P CHICKPEA
F: Powder (peat)
S: 4.7 kg (10.3 lb) pail
C: Chickpea: **16 ha (40 acres)**

AGTIV® THRIVE™ G CHICKPEA
F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Chickpea: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

CANOLA & CEREAL

AGTIV® IGNITE™ L
F: Liquid
S: 11 L (11 kg) bag-in-box
C: Canola: **454 kg (1000 lb) or 81 ha (200 acres) of seeds**
Cereal: **9165 kg (20 205 lb) or 81 ha (200 acres) of seeds**

FIELD & SPECIALTY CROPS

AGTIV® REACH™ P
F: Powder (peat)
S: Case of 4 x 800 g (4 x 1.75 lb) pails
C: Cereal, flax & dry bean: **32 ha (80 acres)** per case
Alfalfa, mix forages & grass: **16 ha (40 acres)** per case
Vegetables, berries & garlic: see page "Specialty Crops" for details.

AGTIV® REACH™ G
F: Granules (peat)
S: 6 kg (13.2 lb) pail – 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Cereal, flax & dry bean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**
Alfalfa, mix forages & grass: Bag: **45 kg of seeds (99 lb)** – Tote bag: **720 kg of seeds (1584 lb)**
Vegetables, herbs, berries & fruit trees: see page "Specialty Crops" for details.

AGTIV® REACH™ L
F: Liquid (spores in suspension)
S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles
C: Cereal, flax & bean: **16 ha (40 acres)** per case

POTATO

AGTIV® REACH™ L POTATO
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

AGTIV® REACH™ P POTATO
F: Powder
S: Case of 2 x 300 g (2 x 10.5 oz) bag
C: Potato: **16 ha (40 acres)** per case

AGTIV® STIMULATE™ L POTATO
F: Liquid
S: 8 L (8 kg) bag-in-box
C: Potato: **8 ha (20 acres)**

ACTIVE INGREDIENTS

- **M** **MYCORRHIZAE** — PTB297 Technology
- **R** **RHIZOBIUM** — PTB160 Technology (pea & lentil); PTB162 Technology (soybean); PTB161 Technology (chickpea)
- **B** **BACILLUS** — PTB180 Technology; PTB185 Technology
- **S** **SERENDIPITA** — PTB299 Technology

LEGEND

F: Formulation
S: Size
C: Crop/Coverage

✪ Eligible with EXTENDER™ L for AGTIV® inoculants
✓ For organic use
* Non eligible for organic use. Contact us for more details.

FORMULATIONS
Liquid | Granular | Powder

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Field observations

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COMPATIBILITY

Pesticide compatibility lists
Liquid fertilizer compatibility lists

PTAGTIV.COM**/en/compatibility**

PROGRAMS

Liquid and Powder equipments
Retailer fridge program

PTAGTIV.COM**/en/program**

AGTIV AVERAGE YIELD INCREASE BY CROP

Learn more at
PTAGTIV.COM/en/results

PEA

3.4 bu/ac **6.0%**

AGTIV® THRIVE™ PEA & LENTIL
27 sites over 12 years, Canada

CHICKPEA

2.9 bu/ac **8.1%**

AGTIV® THRIVE™ CHICKPEA
5 sites over 6 years, Canada

DRY BEAN

236 lb/ac **8.1%**

AGTIV® REACH™
15 sites over 10 years, North America

LENTIL

2.7 bu/ac **8.8%**

AGTIV® THRIVE™ PEA & LENTIL
66 sites over 14 years, Canada

CANOLA & CEREAL

FOR CANOLA

2.4 bu/ac **6.5%**

AGTIV® IGNITE™
32 sites over 6 years, Canada

FOR CEREAL

4.7 bu/ac **10.2%**

AGTIV® IGNITE™
15 sites over 3 years, Canada

ONION & CARROT

3.5 t/ha **7.4%**

AGTIV® REACH™
17 sites over 10 years, Canada and Europe

3.7 t/ha **7.7%**

AGTIV® REACH™
11 sites over 6 years, North America

SOYBEAN

3.4 bu/ac **6.9%**

AGTIV® THRIVE™ SOYBEAN
89 sites over 9 years, Canada and Europe

1.7 bu/ac **2.8%**

AGTIV® ENRICH™ SOYBEAN
7 third-party trials over 3 years, Canada

POTATO

31.6 cwt/ac **9.1%**

AGTIV® REACH™ POTATO
1197 sites over 13 years, North America and Europe

+11.3 cwt/ac

AGTIV® REACH™ + AGTIV® STIMULATE™
14 third-party trials over 3 years, North America

FORAGE

576 kg/ha **16.0%**

AGTIV® REACH™ P
47 sites over 2 years, Canada

EFFICACY REPORT 2024

CONTACT OUR DEDICATED TEAM TODAY.
WE CARE ABOUT YOUR SUCCESS!

PEOPLE AND TECHNOLOGIES MAKING A DIFFERENCE

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.

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