PREMIER TECH

2023

AGTIV®

EFFICACY REPORT 2023

CONTENTS

2023 EDITION

LENTIL

2.6 bu/ac

178 kg/ha

AGTIV THRIVE

AVERAGE YIELD INCREASE

65 sites over 12 years
Canada

8.4%

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

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

PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT & STRIP TRIALS

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

Research sites: Saskatchewan and Alberta

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

Experimental design: 57 replicated plots per treatment (four trials with 6, one with 7, three with 8 and one strip trial with two replicated) in randomized complete block design

*Products applied according to manufacturers recommended rate.

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

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

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

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

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► 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*

* Granular inoculant applied according to manufacturer's 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, 2022, 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.

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

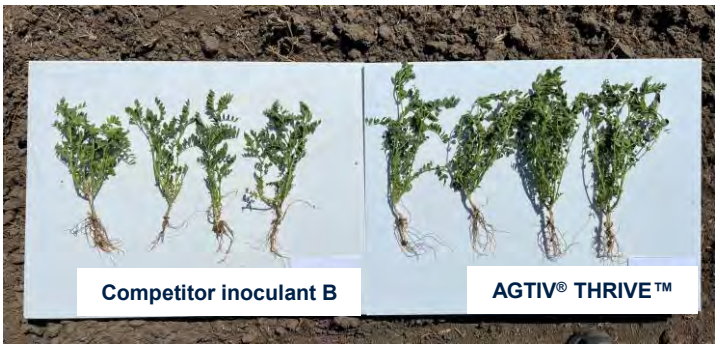
Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	30.1	-
AGTIV® THRIVE™ PEA & LENTIL	32.0	1.9
Competitor inoculant B	31.9	1.8

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - May 20, Glyphosate (pre seeding burn off)
  - June 30, Odyssey and Merge (broadleaf weeds)
- Harvested on September 7, 2022

* Plots were irrigated during those months

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



PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan, AB

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

* Granular inoculant applied according to manufacturer's 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

Plot operational notes and rain fall.

- Fertilization of 11-51-0-0 sidebanded at seeding on May 12
- Pesticides:
  - July 3: Applied Odyssey NXT for post herbicide weed control
  - Applied ZIVATA for grasshopper control twice
- Harvested on August 30, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► 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*

* Granular inoculant applied according to manufacturer's 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, 2022, 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.

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	-

Plot operational notes and rain fall.

- Fertilization of 11-52-0 sidebanded at seeding (100 kg/ha) on May 6.
- Pesticides:
  - May 2, RT540 (pre seeding burn off)
  - June 7, Centurion + AMIGO (post emergence weed control)
  - June 16, Solo ADV herbicide (broadleaf weed control)
  - July 27, Proline GOLD (sclerotinia control)
  - August 8, Reglone (desiccant)
- Harvested on August 8, 2022

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

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

* Granular inoculant applied according to manufacturer's recommended rate

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

Variety: Proclaim

Previous crop: Barley

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan, AB

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

* Granular inoculant applied according to manufacturer's recommended rate

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

Variety: Impulse

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT TRIAL

Research partner: Small Plot Inc.

Research site: Vulcan (AB), Canada

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

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

Lentil variety: Pedigree CDC Proclaim

Previous crop: Canola

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

*Products applied according to manufacturers' recommended rate

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2016 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

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

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

Lentil variety: Small Red Lentils, Imax CL variety

Previous crop: Canola

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

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

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

*Granular products applied according to manufacturers recommended rate.

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

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

[1] Average yields followed by different letters are significantly different using Duncan's multiple range test at p≤0.1.
[2] The difference in yield is significant at *p= 0.012*, compared with AGTIV® PULSES • Granular (dual inoculant).

Plot operational notes and rain fall.

- Preseed burnoff with RT 540 at 0.67 L/ac
- Applied Edge pre-seed at 15 lb/ac
- Incrop with Odyssey at 17.3 g/ac
  + Poast Ultra at190 ml/ac
  + Merge at 0.5 L/100 L spray solution.
- Priaxor at 180 ml/ac at 10% flower
- Dessicated with Reglone @ 700 ml/ac + agsurf adjuvant at 0.1 L/100 L of spray solution
- Combined with winterstieger

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

PREMIER TECH

EFFICACY REPORT

2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

LENTIL

► STRIP TRIAL

Research partner: GMAC's Ag Team

Research site: Brock (SK), Canada

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

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

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

*Products applied according to manufacturers recommended rate.

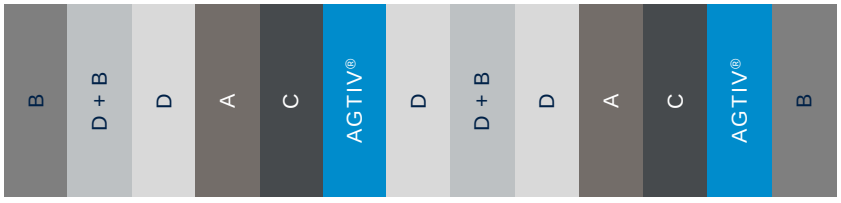
Table 1. **Summary of Lentil yields per treatment.**

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

Plot operational notes and rain fall.

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

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



Field layout

PREMIER TECH

PEA

3.4 bu/ac

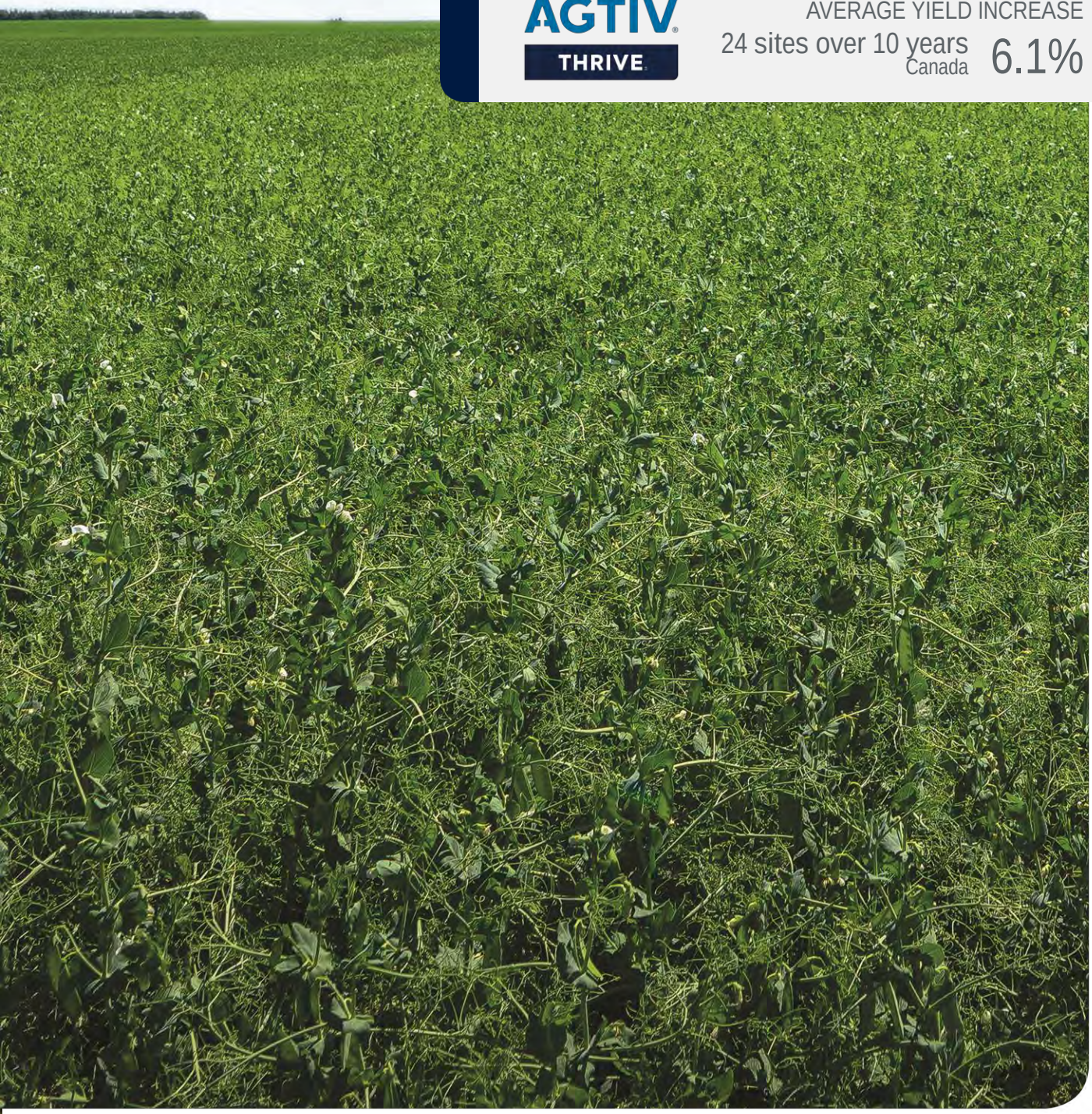
229 kg/ha

AGTIV THRIVE

AVERAGE YIELD INCREASE

24 sites over 10 years
Canada

6.1%



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

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

PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

▶ PLOT TRIALS

Research partners: ICMS, Wheatland Conservation Area and Ag-Quest inc.

Research sites: Alberta, Saskatchewan and Manitoba

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

Experimental design: 51 replicated plots per treatment (five trials with 6, two with 8 and one with 5) in randomized complete block design

*Products applied according to manufacturers recommended rate.

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

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

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

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

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

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

* Granular inoculant applied according to manufacturer's recommended rate

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

Variety: Striker

Previous crop: Fallow

Seeding details: Seeded on June 20, 2022, with a cone seeder at a rate of 160 kg/ha in a loam soil (pH: 5.7, OM: 8%). Emergence on July 3.

Table 1. **Summary of yields and protein content 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

Plot operational notes and rain fall.

- Fertilization of 80-30-20-20 kg/ha NPKS pre seeding
- Pesticides:
  - June 1, Roundup WeatherMAX (Pre seed burn off)
  - Odyssey + Merge (broadleaf weeds)
- Harvested on September 20, 2022

Month	Precipitation (mm)
June	109.3
July	35.0
August	34.4
September	10.6
TOTAL	**189.3**

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Saskatoon, SK

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

* Granular inoculant applied according to manufacturer's 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, 2022, with a cone seeder at a rate of 225 kg/ha in a clay soil (pH: 8, OM: 8.8%). Emergence on June 15.

Table 1. **Summary of yields and protein content 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

Plot operational notes and rain fall.

- Fertilization of 80-20-10-20 kg/ha NPKS pre seeding + 28% Urea Ammonium Nitrate on July 4
- Pesticides:
  - July 4, Viper ADV (to control emerged weeds)
  - August 31, Reglone Ion (Desiccant)
- Harvested on September 6, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Saskatoon, SK

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

* Granular inoculant applied according to manufacturer's 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

Plot operational notes and rain fall.

- Fertilization of 11-52-0 side banded (72 kg/ha)
- Pesticides:
  - May 11, Roundup WeatherMAX + Aim EC (Pre seed burn off)
  - June 8 , Centurion (post emergence herbicide)
  - June 21, July 4 & 12, Basagran Forté + Assure II (post emergence herbicide)
  - August 6, Matador herbicide (flea beetle control)
  - August 16, Reglone Ion (Desiccant)
- Harvested on 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

► PLOT TRIAL

Research partner: New Era Ag Research and Technologies

Research site: Swan River, MB

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

* Granular inoculant applied according to manufacturer's 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, 2022, 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 (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).

Plot operational notes and rain fall.

- Fertilization of MAP 11-52-0 on May 25 (47 kg/ha)
- Pesticides:
  - June 9, Coragen & Pounce (for cutworm & flea beetle control)
  - June 22, Viper ADV (post emergence weed control)
  - July 18, Priaxor (white mold control)
  - August 25, Guardsman (Desiccant)
- Harvested on August 31, 2022

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage la Prairie, MB

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

* Granular inoculant applied according to manufacturer's recommended rate

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

Variety: Carver

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: ICMS

Research site: Saskatoon (SK), Canada

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

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

Lentil variety: AAC Ardill

Previous crop: Wheat

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

*Products applied according to manufacturers' recommended rate

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► STRIP TRIAL

Research partner: Down to Earth + PAMI

Research site: Saskatoon (SK), Canada

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

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

Pea variety: Meadow variety seeded at 3 bu/ac

Previous crop: Canola / oats split

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

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

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

Plot operational notes and rain fall.

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

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

EFFICACY REPORT
2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

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

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

Pea variety: Amarillo, seeded at 200 lb/ac

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

PEA

► PLOT TRIAL

Research partner: ICMS

Research site: Fort Saskatchewan (AB), Canada

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

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

Pea variety: Meadows

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate

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

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

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

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

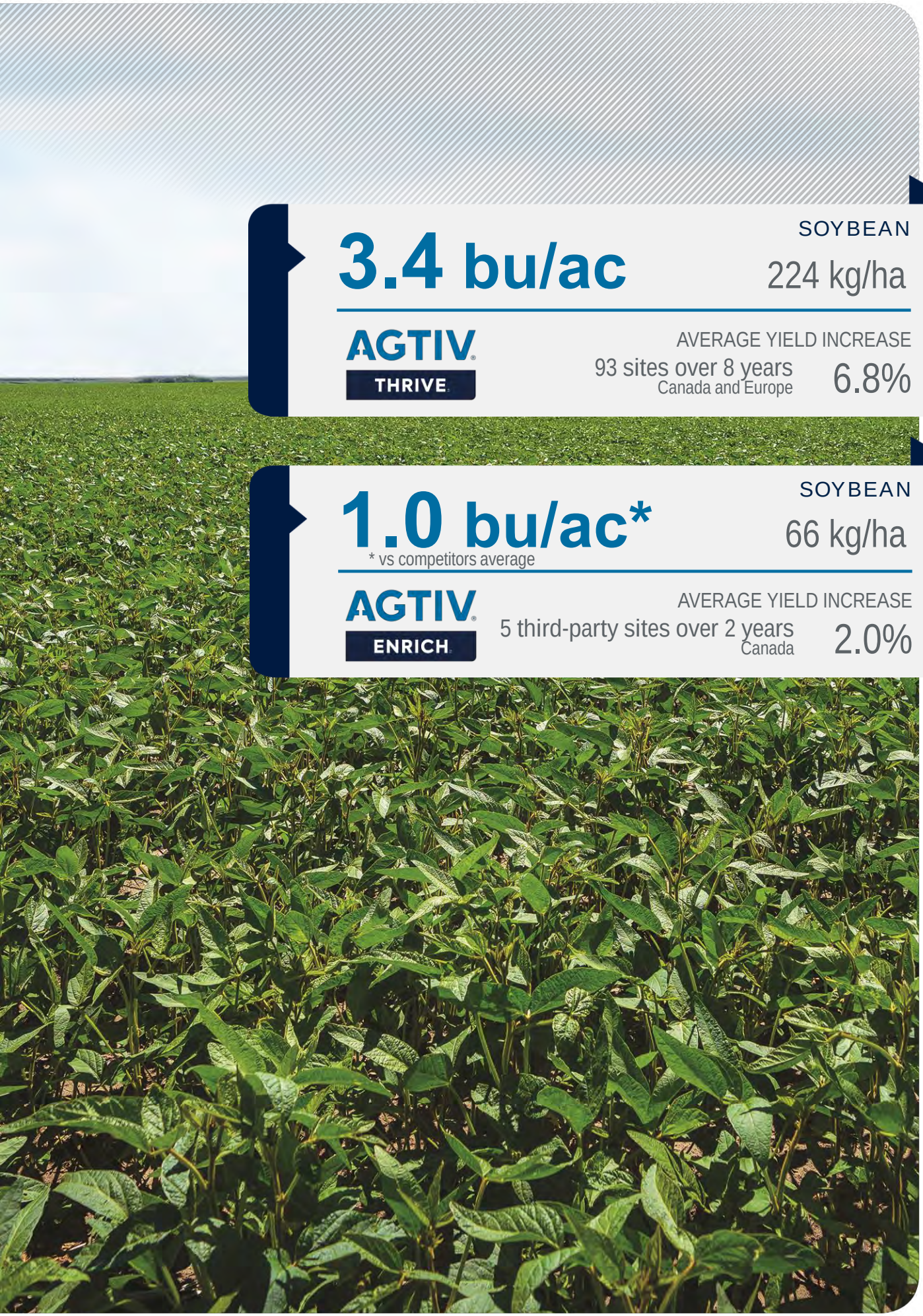
Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® PULSES • Granular (dual inoculant)	88.6	5958
Competitor inoculant A	86.2	5797
Competitor inoculant B	85.8	5770

Plot operational notes and rain fall.

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

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

PREMIER TECH



3.4 bu/ac

SOYBEAN

224 kg/ha

AGTIV THRIVE

AVERAGE YIELD INCREASE

93 sites over 8 years
Canada and Europe

6.8%

1.0 bu/ac*

* vs competitors average

SOYBEAN

66 kg/ha

AGTIV ENRICH

AVERAGE YIELD INCREASE

5 third-party sites over 2 years
Canada

2.0%

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

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

PREMIER TECH

EFFICACY REPORT

SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT & STRIP TRIALS

Research partners: ICMS, AgQuest, New Era Ag research, Stoney Ridge Ag Services and South East Research Farm (SERF).

Research sites: Manitoba and 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*.

Experimental design: Total of 86 replicated plots per treatment in randomized complete block design, and one strip trial with 2 replicated strips.

*Products applied according to manufacturers recommended rate.

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

Location	Year	Seed variety	AGTIV® THRIVE™ SOYBEAN	Competitor inoculant				
				A	B	C	D	E
Morden (MB)	2015	Northstar, Anola	31.8 [a]	27.8 [b]	30.5 [a,b]			
Portage La Prairie (MB)	2015	Pride Seeds, PS0035	57.3	55.4	58.2			
Oakville (MB)	2016	Legend Seeds, Eclipse	79.7	77.8	77.7			
Swan River (MB)	2017	Prograin, Dario	40.7 [a]	35.0 [b,c]		32.5 [c]		
Portage La Prairie (MB)	2017	Northstar, Richer	58.3	54.5	54.5	54.7		
Binscarth (MB)	2017	Pioneer Ultra Early	30.1 [a]	27.7 [b]	29.0 [a,b]	28.5 [b]		
Redvers (SK)	2018	Prograin, Dario	31.1	28.2	25.8			
Swan River (MB)	2018	Prograin, Dario	57.7	47.2	54.3	55.5		
Portage La Prairie (MB)	2018	Secan, Barker	49.4	47.2	47.8			
Elm Creek (MB)	2019	Gray R2	37.1	36.9			35.9	
Redvers (SK)	2019	NSC Watson RR2Y	16.3	14.9		15.8		
Swan River (MB)	2019	Syngenta M2	35.7 [a]	29.9 [b]		35.7 [a]		
Swan River (MB)	2021	Syngenta M2	46.3 [b]					43.5 [b]
Redvers (SK)	2021	Watson	21.0					20.0
Redvers (SK)	2022	NSC Redvers	54.9	53.7				
Portage La Prairie (MB)	2022	NSC Redvers RR2X	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).

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers, SK

Treatments: a) Untreated Check (No granular product)
b) AGTIV® THRIVE™ SOYBEAN*
c) Competitor inoculant A*

* Granular inoculant applied according to manufacturer's 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, 2022, with a cone seeder at a rate of 80 kg/ha in a loam soil (pH: 7.6, OM: 4.2%).

Table 1. **Summary of soybean 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

Plot operational notes and rain fall.

- Fertilization of 5-22-0 kg/ha at seeding
- Pesticides:
  - June 9, Roundup pre burn
  - July 6, Roundup
- Harvested on October 5, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage la Prairie, MB

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

* Granular inoculant applied according to manufacturer's 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, 2022, 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.

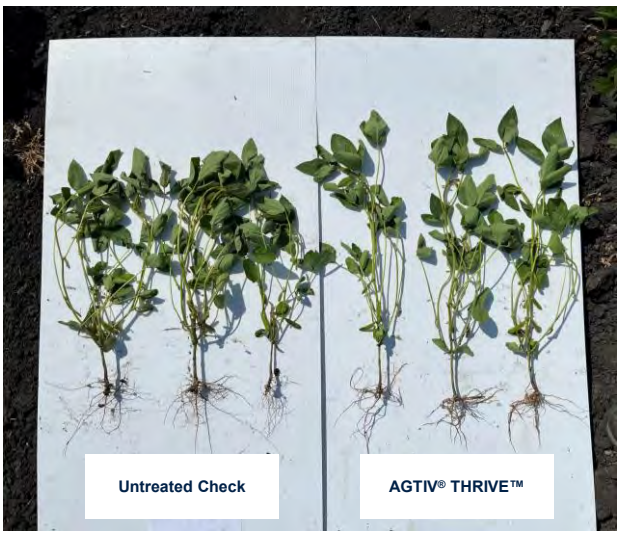
Table 1. **Summary of soybean yields per treatment.**

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

Plot operational notes and rain fall.

- No Fertilization
- Pesticides:
  - June 24 & July 14, Roundup WeatherMAX (post emergence weed control)
- Harvested on October 11, 2022

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



PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

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

* Granular inoculant applied according to manufacturer's recommended rate

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

Variety: Syngenta M2

Previous crop: Wheat

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

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers, SK

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

* Granular inoculant applied according to manufacturer's recommended rate

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

Variety: Watson

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: AgQuest

Research site: Elm Creek (MB), Canada

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

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

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

Previous crop: Barley

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

*Products applied according to manufacturers' recommended rate

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River (MB), Canada

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

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

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

Previous crop: Canola stubble

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

*Products applied according to manufacturers' recommended rate

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers (SK), Canada

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

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

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

Previous crop: Canola

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

*Products applied according to manufacturers' recommended rate

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers (SK), Canada

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

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

Soybean variety: Dario

Previous crop: Canola stubble

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

*Products applied according to manufacturers' recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage La Prairie (MB), Canada

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

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

Soybean variety: Barker

Previous crop: Fallow

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

*Granular products applied according to manufacturers' recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: New Era Ag Research

Research site: Swan River (MB), Canada

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

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

Soybean variety: Dario

Previous crop: Canola stubble

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

*Granular products applied according to manufacturers' recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► STRIP TRIAL

Research partner: Stoney Ridge Ag Services

Research site: Binscarth (MB), Canada

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

Experimental design: 2 replicated strips of 1.36 acres per treatment

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

Previous crop: Canola

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

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

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

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

Plot operational notes and rain fall.

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

EFFICACY REPORT
2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► STRIP TRIAL

Research partner: Down to Earth + PAMI

Research site: Saskatoon (SK), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac + Taurus Advanced Acre (TAA) + fungicide application;

b) AGTIV® SOYBEAN • Granular applied at 5.0 lb/ac + Taurus Advanced Acre (TAA) & no fungicide application;

c) AGTIV® BRADY • Granular for SOYBEAN applied at 4.0 lb/ac + designed fertility.

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

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

Previous crop: Canola / wheat / oats split

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

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

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

Plot operational notes and rain fall.

- Fertility - Seed placed 2-15-0 -0 actual lbs/ac
  - Side band 17-20-15-15 actual lbs/ac
- Viper+UAN applied at 400 ml/ac + 81 ml/ac at 2-3 trifoliate,
  - Roundup was applied at 0.67 L/ac at 3-4 trifoliate
- Combined on September 18 with a Wintersteiger and weighed & moisture averaged by PAMI
- Total rainfall: 100.4 mm

1. **Designed Fertility Program:** a calculated fertility program based on soil tests and targeted yield. Target yield for 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

► PLOT TRIAL

Research partner: ICMS

Research site: Portage la Prairie (MB), Canada

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

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

Soybean variety: Northstar Seeds, Richer

Previous crop: Canola

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

*Granular products applied according to manufacturers recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2017 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: New Era research

Research site: Swan River (MB), Canada

Treatments: a) AGTIV® SOYBEAN • Granular applied at 5.1 lb/ac*;
b) Competitor inoculant A applied at 5.0 lb/ac*;
c) Competitor inoculant A applied at 10 .0 lb/ac;
d) Competitor inoculant C applied at 7.1 lb/ac*;
e) Competitor inoculant C applied at 14.3 lb/ac.

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

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

Previous crop: Canola

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

*Granular products applied according to manufacturers recommended rate.

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

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

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

Plot operational notes and rain fall.

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

EFFICACY REPORT
2017 – MYCORRHIZAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Blackcreek Research

Research site: Bright (ON), Canada

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

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

Soybean variety: ELITE SEED, Katonda R2

Previous crop: Winter Wheat

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

Table 1. **Soybean yields per treatment.**

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2017 – MYCORRHIZAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Independent consultant

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

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

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

Soybean variety: ELITE SEED, Auriga

Previous crop: Corn

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

Table 1. **Soybean yields per treatment.**

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

Plot operational notes and rain fall.

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

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

EFFICACY REPORT
2017 – MYCORRHIZAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Independent consultant

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

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

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

Soybean variety: ELITE SEED, Auriga

Previous crop: Corn

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

Table 1. **Soybean yields per treatment.**

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

Plot operational notes and rain fall.

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

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

EFFICACY REPORT
2016 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: ICMS

Research site: Oakville (MB), Canada

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

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

Soybean variety: Legend Seeds, Eclipse

Previous crop: Fallow

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

*Granular products applied according to manufacturers recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: AgQuest

Research site: Morden (MB), Canada

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

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

Soybean variety: NORTHSTAR genetics, ANOLA variety

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate.

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2015 – MYCORRHIZAL & RHIZOBIAL INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: ICMS

Research site: Portage La Prairie (MB), Canada

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

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

Soybean variety: PRIDE SEEDS genetics, PS 0035 NR2 variety

Previous crop: Canola

*Granular products applied according to manufacturers recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2022 – RHIZOBIAL AND BACILLUS ON SEED INOCULANT

SOYBEAN

► 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*

* inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - June 26, Credit Xtreme (emerged weeds control)
- Harvested on October 17, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – RHIZOBIAL AND BACILLUS ON SEED INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: New Era Ag Research and Technologies

Research site: Swan River, MB

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

* Inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- Fertilization of MAP 4-20-24 on May 26
- Pesticides:
  - June 28, RT540 + Viper ADV (emerged weeds control)
  - July 7, RT540
- Harvested on October 3, 2022

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

PREMIER TECH

EFFICACY REPORT

2022 – RHIZOBIAL AND BACILLUS ON SEED INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright, ON

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

* Liquid inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- Fertilization of 4-20-24-6 of NPKS on May 27 prior to final cultivator pass
- Pesticides:
  - May 31, Boundary LQD (pre-emergence weed control)
  - July 7, Roundup Transorb (post emergence weed control)
- Harvested on October 5, 2022

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

PREMIER TECH

EFFICACY REPORT
2021 – RHIZOBIAL AND BACILLUS ON SEED INOCULANT

SOYBEAN

► PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright, ON

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

* Liquid inoculant applied according to manufacturer's 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, 2021, with a cone seeder at a rate of 60 kg/ha. Seeds pretreated with a commercial rhizobium.

Table 1. **Summary of yields and protein content 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

Plot operational notes and rain fall.

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

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

PREMIER TECH

DRY BEANS

252 lb/ac

294 kg/ha

AGTIV REACH

AVERAGE YIELD INCREASE

12 sites over 7 years
Canada

8.7%

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).

PREMIER TECH

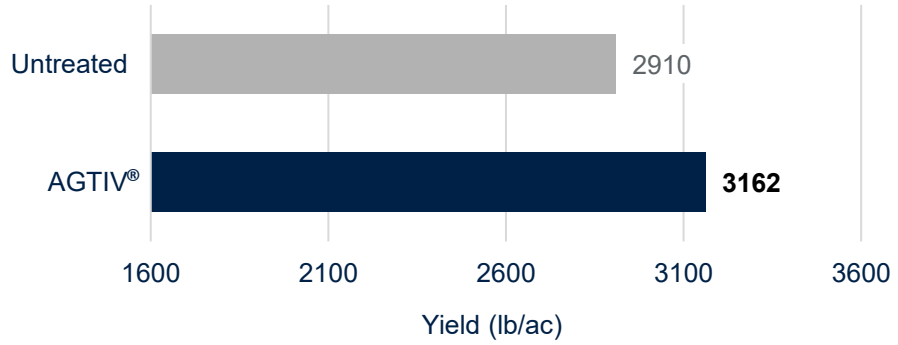
SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Table 1. **Average yield increase with AGTIV® REACH™ for different years (2014 to 2020) in Canada.**

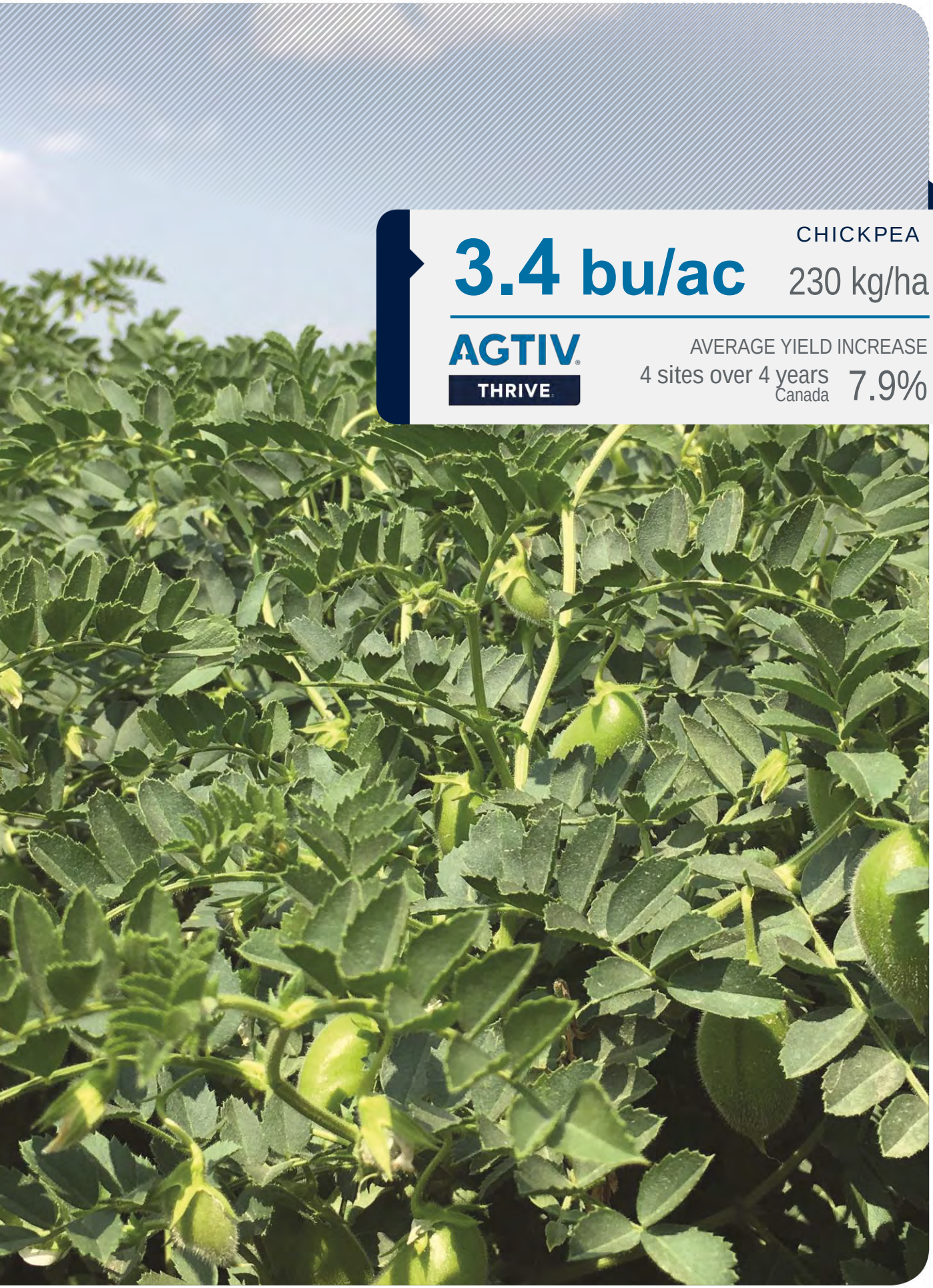
Year	Number of sites	Average increase (lb/ac)	Average increase (kg/ha)	Average increase (%)
2014	2	337	378	13
2015	2	482	542	17.3
2016	5	130	146	5.5
2017	2	146	164	5.1
2020	1	462	518	10.7
Total	**12 sites**	**252 lb/ac**	**294 kg/ha**	**8.7%**

Figure 1. **Average yield with AGTIV® REACH™ in Canada (2014 to 2020).**



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

PREMIER TECH



CHICKPEA

3.4 bu/ac

230 kg/ha

AGTIV THRIVE

AVERAGE YIELD INCREASE

4 sites over 4 years Canada 7.9%

EFFICACY REPORT
SUMMARY – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

► PLOT TRIALS

Research partners: Prairie Ag Research, Wheatland Conservation Area and Ag Quest inc.

Research sites: Alberta and Saskatchewan

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

*Products applied according to manufacturers recommended rate.

Experimental design: Total of 24 replicated plots per treatment in randomized complete block design.

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

Location	Year	Seed variety	AGTIV® THRIVE™ CHICKPEA	Competitor inoculant	
				A	B
Lethbridge (AB)	2018	Alma	73.0	71.3	71.0
Swift Current (SK)	2018	Leader	28.0	28.8	26.1
Lethbridge (AB)	2022	Clearfield Kabuli	43.1		41.2
Taber (AB)	2022	CDC Pearl	41.7[b]		39.4[ab]

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

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

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

* Granular inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - May 20, Glyphosate (pre seeding burn off)
  - June 30, Odyssey and Merge (broadleaf weeds)
- Harvested on 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

PREMIER TECH

EFFICACY REPORT
2022 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

► PLOT TRIAL

Research partner: Ag-Quest inc.

Research site: Taber, AB

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

* Granular inoculant applied according to manufacturer's 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, 2022, 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 ($p \leq 0.05$).

Plot operational notes and rain fall.

- Fertilization of P_2O_5 pre seeding (36 kg/ha)
- Pesticides:
  - May 28, Authority + Roundup Transorb (pre-emergence burn off)
  - June 27, Select + AMIGO (post emergence weed control)
  - June 28, Solo + Merge post emergence weed control)
  - July 2, TOUGH (broadleaf weeds control)
- Harvested on 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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

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*.

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

Chickpea variety: Leader

Previous crop: Canola stubble

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

*Granular products applied according to manufacturers recommended rate.

Table 1. **Summary of Chickpea 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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL & RHIZOBIAL INOCULANT

CHICKPEA

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge (AB), Canada

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*.

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

Chickpea variety: Alma

Previous crop: Canola stubble

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

*Granular products applied according to manufacturers recommended rate.

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

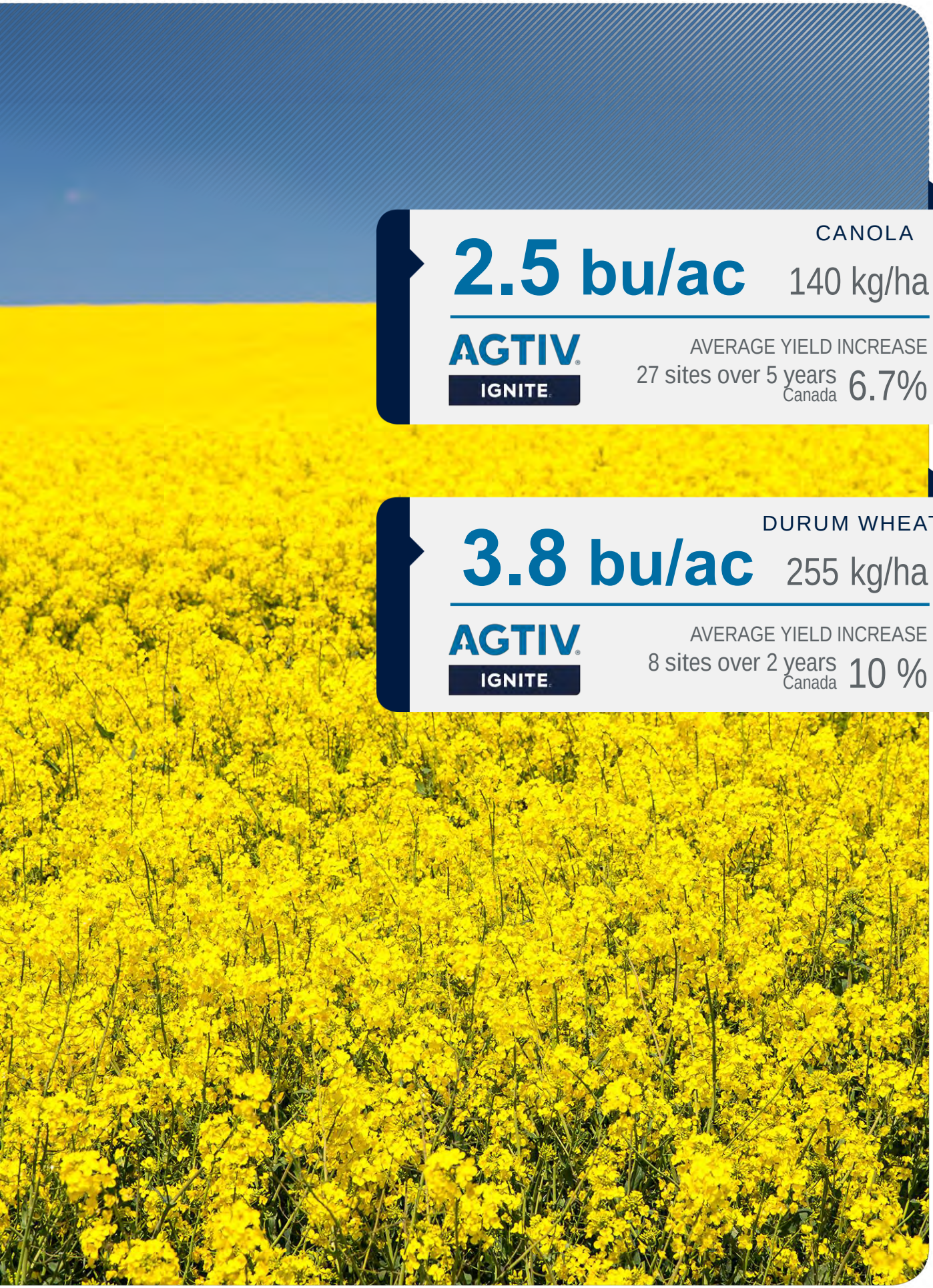
Treatment	Yield (bu/ac)	Yield (kg/ha)
AGTIV® THRIVE™ CHICKPEA	73.0	4906
AGTIV® FIELD CROPS • Granular	71.5	4805
Competitor inoculant A	71.3	4791
Competitor inoculant B	71.0	4771

Plot operational notes and rain fall.

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

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

PREMIER TECH



CANOLA

2.5 bu/ac

140 kg/ha

AGTIV IGNITE

AVERAGE YIELD INCREASE

27 sites over 5 years Canada **6.7%**

DURUM WHEAT

3.8 bu/ac

255 kg/ha

AGTIV IGNITE

AVERAGE YIELD INCREASE

8 sites over 2 years Canada **10 %**

SUMMARY – SERENDIPITA ON SEED INOCULANT

► GROWER SPLIT FIELDS AND PLOT TRIALS

Table 1. **Average increase of canola yield with AGTIV® IGNITE™ L for different years (2018-2022).**

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
Total	**27 sites**	**37.2[a]**	**39.7[b]**	**2.5 bu/ac ***

*Summary of means for **AGTIV® IGNITE™** are significantly different following a combined site ANOVA and a Tukey test ($p<0.05$) $p = 0.001$

Table 2. **Average increase of canola seed oil content with AGTIV® IGNITE™ L for different years (2019-2022).**

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 for **AGTIV® IGNITE™** are significantly different following a combined site ANOVA and a Tukey test ($p<0.1$) $p = 0.05$

EFFICACY REPORT

SUMMARY – SERENDIPITA ON SEED INOCULANT

► GROWER SPLIT FIELDS AND PLOT TRIALS

CANOLA

Table 1. **Summary of canola yield trials for different sites (2018-2022).**

Year	site	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
2018	**Swan River**	63.5	68	4.5
2019	**Josephburg**	46.8	53.2	6.4
2019	**Portage la Prairie**	78	78	0
2019	**Saskatoon**	38.8	41.8	3
2019	**Swan River**	53.7	55.4	1.7
2019	**Taber**	25.4	27	1.6
2019	**Swift Current**	25	27.1	2.1
2020	**Josephburg**	47.2	49.5	2.3
2020	**Moon Lake**	16.3	18.2	1.9
2020	**Farm Beechy**	24.2	27.8	3.6
2020	**Swan River**	61.2	64	2.8
2020	**Taber**	37.3	38.5	1.2
2021	**Josephburg**	23.9	25.0	1.1
2021	**Saskatoon**	10.3	12.5	2.2
2021	**Elm Creek**	36.2	37.2	1
2021	**Swan River**	46.9	48.2	1.3
2021	**Portage la Prairie**	36.3	38.9	2.6
2021	**Westline Farms**	29.7	32.5	2.8
2021	**Lillico Farms**	26.4	31.5	5.1
2021	**Sandy Ridge Farms**	41.8	44.1	2.3
2022	**Saskatoon**	19.6	21.0	1.4
2022	**Portage la Prairie**	29.3	32.8	3.5
2022	**Taber**	28.2	32.7	4.5
2022	**Elm Creek**	46.1	48	1.9
2022	**Alma**	20.0	21.4	1.4
2022	**Redvers**	32.2	34.1	1.9
2022	**Swan River**	60.0	62.2	2.2
Total	**27 sites**	37.2[a]	39.7[b]	**2.5 bu/ac ***

*Summary of means for **AGTIV® IGNITE™** are significantly different following a combined site ANOVA and a Tukey test ($p<0.05$) $p=0.001$

PREMIER TECH

EFFICACY REPORT

SUMMARY – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIALS

Table 1. **Summary of canola seed oil content trials for different sites (2019-2022).**

Year	Site	Untreated check oil (%)	AGTIV® IGNITE™ L oil (%)	oil increase (%)
2019	**Josephburg**	28.1	28.6	0.5
2019	**Portage la Prairie**	45.5	45.7	0.2
2019	**Swan River**	49.9	52.1	2.2
2020	**Moon Lake**	41.6	43.1	1.5
2020	**Taber**	41.7	42.1	0.4
2020	**Josephburg**	34.7	36.6	1.9
2020	**Swan River**	38.7	40.5	1.8
2021	**Josephburg**	39.1	39.7	0.6
2021	**Saskatoon**	41.8	42.1	0.3
2021	**Elm Creek**	35.1	37.1	2
2021	**Swan River**	37.8	37.8	0
2021	**Portage la Prairie**	36.6	36	-0.6
2022	**Saskatoon**	36.6	36.3	-0.3
2022	**Taber**	32.1	32.9	0.8
2022	**Redvers**	36.6	36.5	-0.1
2022	**Swan River**	37.3	37.7	0.4
2022	**Portage la Prairie**	30.6	35.2	4.6
2022	**Elm Creek**	37.7	37.3	-0.4
2022	**Alma**	36.3	36.9	0.6
Total	**19 sites**	37.8 [a]	38.7 [b]	**0.9 %***

*Summary of means for **AGTIV® IGNITE™** are significantly different following a combined site ANOVA and a Tukey test (p<0.1) p=0.05

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Saskatoon, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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.

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

Plot operational notes and rain fall.

- Fertilizer blend of 80-30-10-20 of actual kg/ha incorporated in tillage prior to seeding
- Pesticides:
  - July 4, Liberty 150 herbicide (post emergence weeds)
  - August 18, Decis 5EC (flea beetle and grasshopper control)
  - September 6, Reglone Ion (desiccant)
- Harvested on September 16, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage la Prairie, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - June 24, Roundup WeatherMAX (volunteer canola control) & Sevin XLR (flea beetle control)con
  - July 14, Roundup WeatherMAX (post emergence weeds control)
  - Harvested on September 26, 2022

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

PREMIER TECH

EFFICACY REPORT

2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Ag-Quest Inc.

Research site: Taber, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- Fertilizer blend of 0-58-0-17 of actual kg/ha harrowed on May 16, prior to seeding
- Pesticides:
  - May 18, June 9, 17 & 29, Roundup Transorb (Pre and post seeding herbicide)
  - June 22, July 6 & 15, Sevin XLR Plus & Decis (flea beetle control)
- Harvested on 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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Ag-Quest Inc.

Research site: Elm Creek, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- Broadcast fertilizer blend of actual 137-36-22-28 kg/ha prior to seeding
- Pesticides:
  - June 17, Liberty (emerged weeds control)
  - July 1, Centurion + AMIGO (grassy weeds control)
  - July 1, Coragen (grasshopper control)
  - September 8, Reglone Ion (Desiccant)
- Harvested on September 13, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Wellington Agricultural Research

Research site: Alma, ON

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- Fertilization blend 160-20-0 of actual kg/ha prior to seeding on May 10
- Pesticides:
  - June 21, Liberty (emerged weeds control) + Matador (flea beetle control)
- Harvested on September 17, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: South East Research Farm (SERF)

Research site: Redvers, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

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

Variety: InVigor L340 PC treated with Vercoras & Poncho

Previous crop: Peas

Seeding details: Seeded on June 1, 2022, 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

Plot operational notes and rain fall.

- Fertilization of actual 100-25-0-6 of actual kg/ha at seeding
- Pesticides:
  - June 6, Roundup (pre burn off herbicide)
  - June 23, Voliam (flea beetle control)
  - June 23, Liberty (post emerged weeds control)
- Harvested on September 16, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: New Era Ag Research and Technologies

Research site: Swan River, MB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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

Plot operational notes and rain fall.

- Fertilization of actual 147-115-66 of actual kg/ha in the fall of 2021
- Pesticides:
  - June 19 & 28, ARROW ALL IN (grassy weeds control post herbicide)
  - June 23 & 28, Pounce (flea beetle control)
  - July 22, Cotegra (sclerotinia stem rot control)
- Harvested on September 28, 2022

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

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

* Liquid inoculant applied according to manufacturer's recommended rate

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

Variety: RR Canola 6086 CR

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

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

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

Variety: InVigor LL234PC

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Portage la Prairie, MB

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

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

Variety: RR Canola CS2100

Previous crop: Wheat

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

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

Treatment	Yield (bu/ac)	Yield increase (bu/ac)	Oil content[1] (%)
Untreated Check	36.3	-	36.8 [ab]
AGTIV® IGNITE™ L	38.9	2.6	37.1 [a]

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Saskatoon, SK

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

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

Variety: LL canola P501L

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Ag-Quest

Research site: Elm Creek, MB

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

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

Variety: DEKALB DKTF 96 SC

Previous crop: Soybean

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2020 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Ag-Quest

Research site: Taber, AB

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

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

Variety: Pioneer 45CS40

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2020 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

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

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

Variety: Pioneer 45CS40

Previous crop: Soybean

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

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≤0.05).

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2020 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Moon Lake, SK

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

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

Variety: Pioneer 45CS40

Previous crop: Field pea

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

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 ($p \leq 0.05$).

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2020 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

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

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

Variety: Pioneer 45CS40

Previous crop: Barley

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Saskatoon, SK

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

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

Variety: In Vigor L252

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Integrated Crop Management Services (ICMS)

Research site: Josephburg, AB

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

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

Variety: Dekalb 75-42BL

Previous crop: Barley

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

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

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

Variety: InVigor L255PC

Previous crop: Canola stubble

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Taber, AB

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

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

Variety: Pioneer 45M35

Previous crop: Wheat

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2019 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: Wheatland Conservation Area (WCA)

Research site: Swift Current, SK

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

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

Variety: In Vigor L233P

Previous crop: Wheat

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – SERENDIPITA ON SEED INOCULANT

CANOLA

► PLOT TRIAL

Research partner: New Era Ag Technologies

Research site: Swan River, MB

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

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

Variety: InVigor L140P

Previous crop: Canola stubble

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

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 ($p \leq 0.05$).

Plot operational notes and rain fall.

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

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

PREMIER TECH

SUMMARY – SERENDIPITA ON SEED INOCULANT

► PLOT TRIALS

Table 1. **Summary of durum wheat yield trials for different sites (2021-2022).**

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
Total	**8 sites**	**38.0[a]**	**41.8[b]**	**3.8 bu/ac ***

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

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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, 2022, 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.

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

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - May 20, Glyphosate (pre seeding burn off)
  - June 30, Infinity (broadleaf weeds control)
- Harvested on 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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

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

Variety: Alloy

Previous crop: Wheat

Seeding details: Seeded on May 18, 2022, 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

Plot operational notes and rain fall.

- Fertilization of 30-15-0-6 (374 kg/ha) sidebanded on June 8
- Pesticides:
  - May 2, RT540 (pre burn off herbicide)
  - June 8 Achieve (post emergence weeds control)
- Harvested on August 16, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Small Plot

Research site: Vulcan, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 16 m^2 plots

Variety: Spitfire

Previous crop: Rye

Seeding details: Seeded on May 16, 2022, 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

Plot operational notes and rain fall.

- Fertilization of 60-15-15-6 kg/ha sidebanded at seeding on May 16
- Pesticides:
  - June 25: Herbicide Epic and Stellar XL
  - ZIVATA for grasshoppers control
- Harvested on August 30, 2022

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

PREMIER TECH

EFFICACY REPORT
2022 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Ag-Quest

Research site: Taber, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's 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

Plot operational notes and rain fall.

- Fertilization of 5-20-5 kg/ha prior to seeding
- Pesticides:
  - May 18, Roundup Transorb (pre emergence herbicide
  - June 19, Achieve liquid (emerged weeds)
  - July 6, Infinity and Achieve Liquid (annual grass control)
- Harvested on 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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Prairie Ag Research

Research site: Lethbridge, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

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

Variety: Grainland

Previous crop: Barley

Seeding details: Seeded on May 31, 2021, 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.

Table 1. **Summary of yields and protein content 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≤0.05).

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - May 31, Glyphosate (emerged weeds)
  - June 28, Achieve, Infinity and Turbocharge (broadleaf weeds)
- Harvested on September 14, 2021

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Small Plot

Research site: Vulcan, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 32 m^2 plots

Variety: Spitfire

Previous crop: Oats

Seeding details: Seeded on May 16, 2021, 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

Plot operational notes and rain fall.

- 70-20-20-20 kg/ha sidebanded at seeding
- Pesticides:
  - July 25, ZIVATA sprayed for grasshoppers
- Harvested on August 30, 2021

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Ag-Quest

Research site: Taber, AB

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 22.5 m^2 plots

Variety: Strongfield

Previous crop: Rye

Seeding details: Seeded on June 6, 2021, 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

Plot operational notes and rain fall.

- No fertilization
- Pesticides:
  - July 2, Infinity and Achieve Herbicide (broadleaf control)
  - July 16, Axial Herbicide (annual grass control)
- Harvested on September 3, 2021

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

PREMIER TECH

EFFICACY REPORT
2021 – SERENDIPITA ON SEED INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current, SK

Treatments: a) Untreated Check
b) AGTIV® IGNITE™ L*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Complete Randomized Block Design, 8 repetitions, 18 m^2 plots

Variety: Transcend

Previous crop: Barley

Seeding details: Seeded on May 28, 2021, 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.**

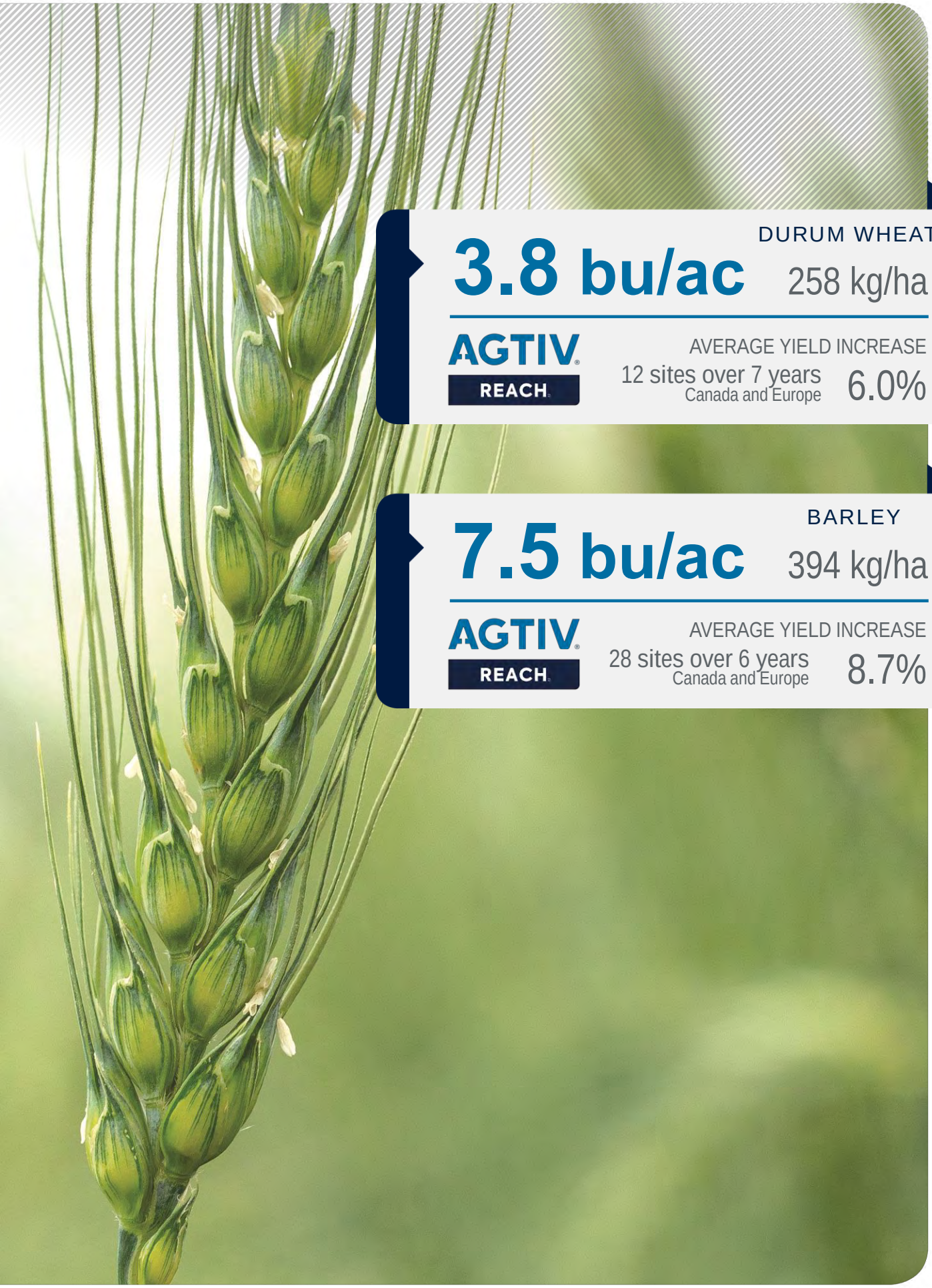
Treatment	Yield (bu/ac)	Yield increase (bu/ac)
Untreated Check	11.8	-
AGTIV® IGNITE™ L	14.4	2.6

Plot operational notes and rain fall.

- 30-15-06-6 sidebanded at seeding (374 kg/ha)
- Pesticides:
  - May 4, RT540 + Aim EC (pre emergence herbicide)
  - June 17 Achieve + Buctril (Emerged weeds)
- Harvested on August 27, 2021

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

PREMIER TECH



DURUM WHEAT

3.8 bu/ac

258 kg/ha

AGTIV REACH

AVERAGE YIELD INCREASE

12 sites over 7 years
Canada and Europe

6.0%

BARLEY

7.5 bu/ac

394 kg/ha

AGTIV REACH

AVERAGE YIELD INCREASE

28 sites over 6 years
Canada and Europe

8.7%

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.

PREMIER TECH

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

Table 1. **Average yield increase with AGTIV® REACH™ in Canada and Europe (43 sites, 2012 to 2021).**

Number of sites	Average increase (%)
43	6.4%

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

Number of sites	Average increase (bu/ac)	Average increase (%)
12	3.8	6.0%

Table 3. **Average yield increase with AGTIV® mycorrhizal inoculant in FRANCE, Europe (2012 to 2021).**

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

EFFICACY REPORT
2019 – MYCORRHIZAL INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Eurofins Agroscience Services

Research site: Beauce, France

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

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

Wheat variety: Anvergur

Previous crop: Sugar beet

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

*Products applied according to manufacturer's recommended rate.

Table 1. **Summary of wheat yield per treatment.**

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL INOCULANT

DURUM WHEAT

► PLOT TRIAL

Research partner: Wheatland Conservation Area

Research site: Swift Current (SK), Canada

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

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

Wheat variety: Precision durum

Previous crop: Canola stubble

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

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

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

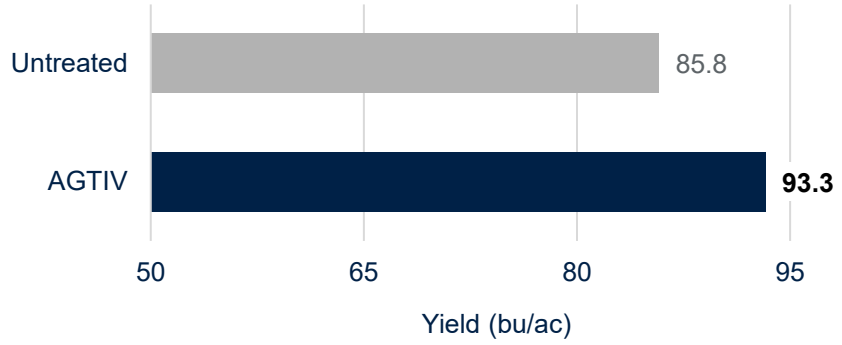
BARLEY

► GROWER SPLIT FIELDS

Table 1. **Average yield increase with AGTIV® REACH™ in Canada and Europe (2012 to 2017).**

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).**



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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL INOCULANT

FIBRE FLAX

► PLOT TRIAL

Research partner: Antédis

Research site: Bourbourg, North department, France

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

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

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

*Product applied according to manufacturer's recommended rate.

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

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

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

Plot operational notes and rain fall

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

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

PREMIER TECH

576 kg/ha

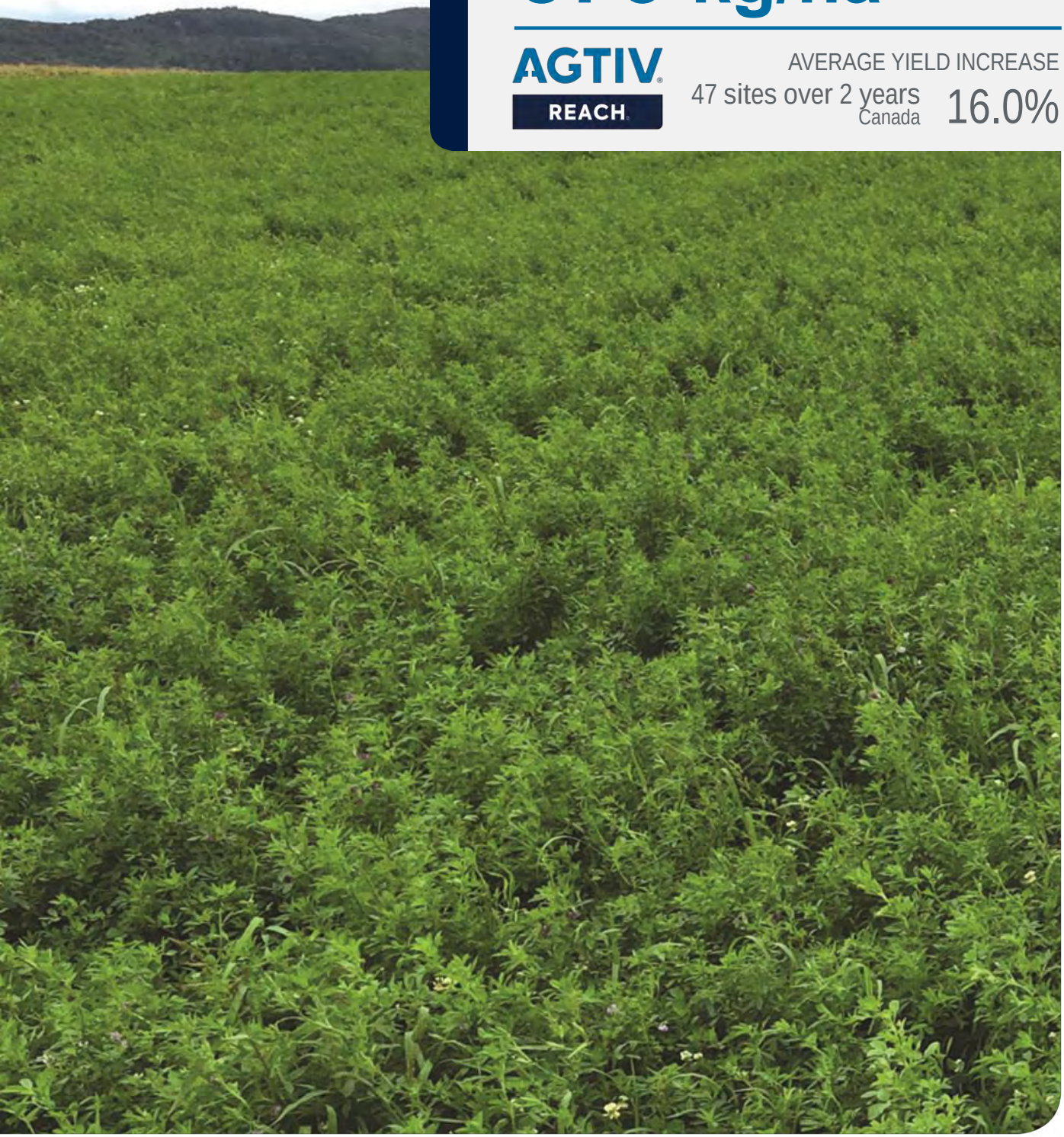
FORAGES

AGTIV REACH

AVERAGE YIELD INCREASE

47 sites over 2 years
Canada

16.0%



Greener and denser alfalfa.

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

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

PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL INOCULANT

FORAGES

► GROWER SPLIT FIELDS

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

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

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

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

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]

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

Table 2. **Winter 2016 Alfalfa survival**

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

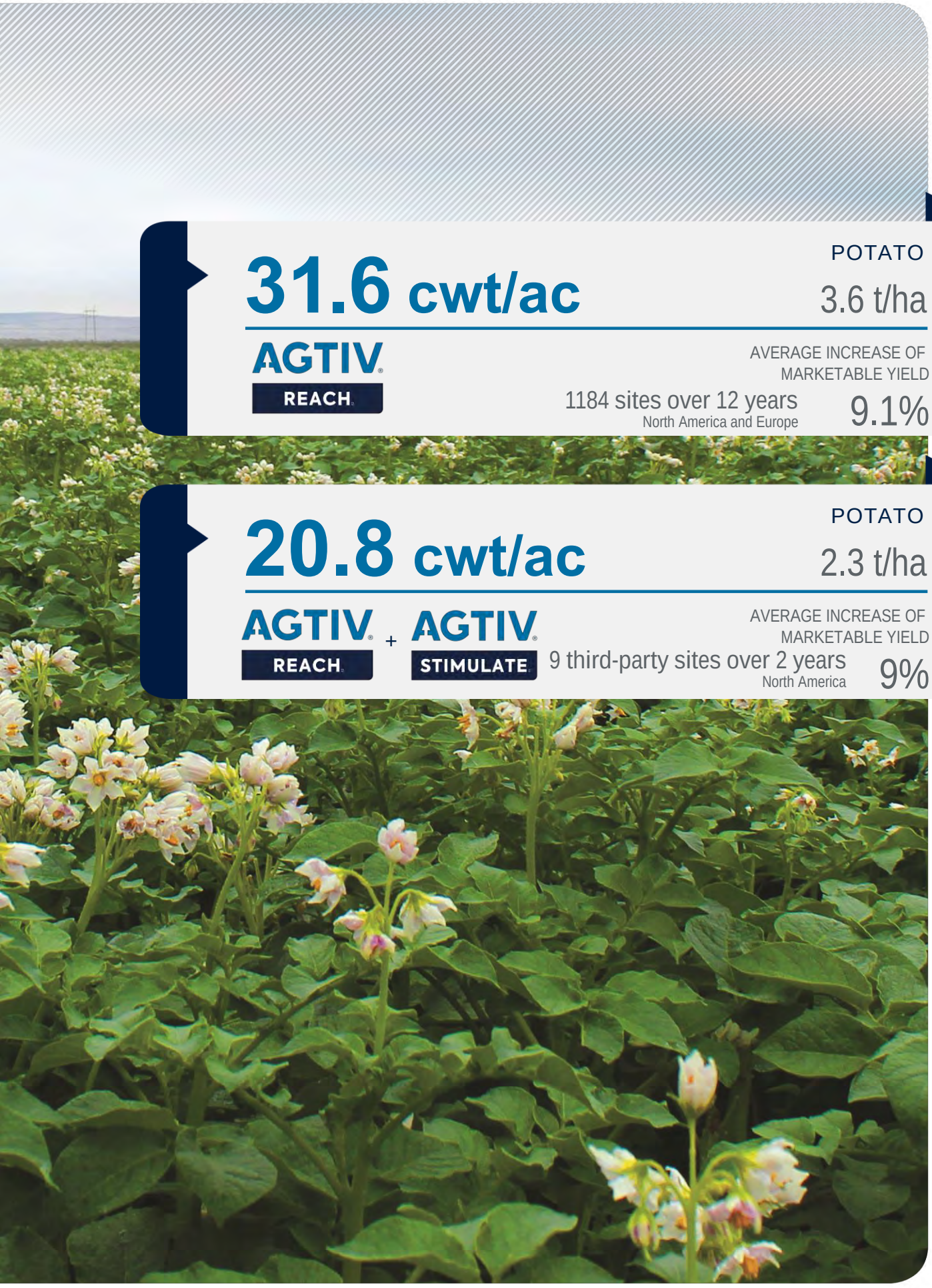
Averages followed by different letters are significantly different ($p \leqslant 0.05$, t-test for dependent samples).

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

	AGTIV®	Untreated	Difference
2016	3910 [b]	3295 [a]	615
2017	4190 [b]	3691 [a]	499
2016 + 2017			**1 114**

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

PREMIER TECH



POTATO

31.6 cwt/ac

3.6 t/ha

AGTIV REACH

AVERAGE INCREASE OF MARKETABLE YIELD

1184 sites over 12 years
North America and Europe

9.1%

POTATO

20.8 cwt/ac

2.3 t/ha

AGTIV REACH + AGTIV STIMULATE

AVERAGE INCREASE OF MARKETABLE YIELD

9 third-party sites over 2 years
North America

9%

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.

PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL INOCULANT

POTATO

► GROWER SPLIT FIELDS AND TRIALS

Table 1. **Average increase of marketable yield* with AGTIV® REACH™ L POTATO for different territories (2011 to 2022).**

Territory	Number of sites	Yield increase (t/ha)	Yield increase (cwt/ac)	Yield increase (%)
Canada	585	3.1	27.6	9.9
United States	67	3.3	29.8	10.8
Mexico	4	2.3	20.0	8.6
France & Switzerland	496	4.1	36.3	9.9
Germany	32	4.2	37.4	10.0
Total	**1184 sites**	**3.6 t/ha***	**31.6 cwt/ac****	**9.1%**

Table 2. **Average increase of marketable yield* with AGTIV® REACH™ L POTATO for different years (2011-2022).**

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
Total	**1184 sites**	**3.6 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
2019 – MYCORRHIZAL INOCULANT

POTATO

► STRIP TRIAL

Research partner: Willard Waugh & Sons LTD.

Research site: Bedeque (PEI), Canada

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

Experimental design: 20 acres strip

Potato variety: Prospect

Previous crop: Alfalfa

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

*Liquid products applied according to manufacturers' recommended rate.

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

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

Plot operational notes and rain fall.

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

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

PREMIER TECH

*cwt/ac = 100 lb/ac

EFFICACY REPORT
2016 – MYCORRHIZAL INOCULANT

POTATO

► GROWER SPLIT FIELDS

Research partner: EUROCELP

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

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

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

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

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

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

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

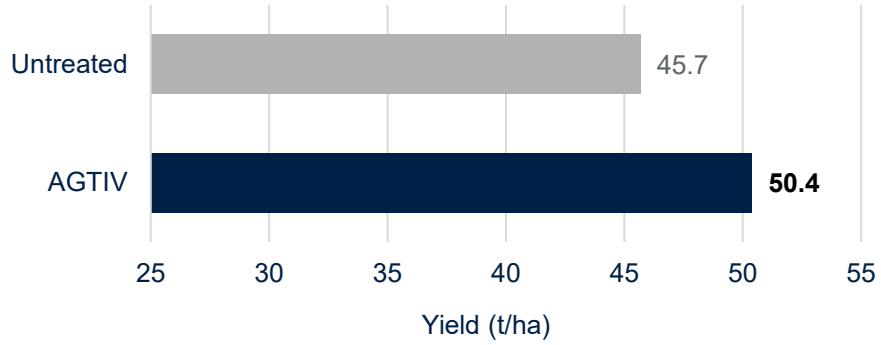
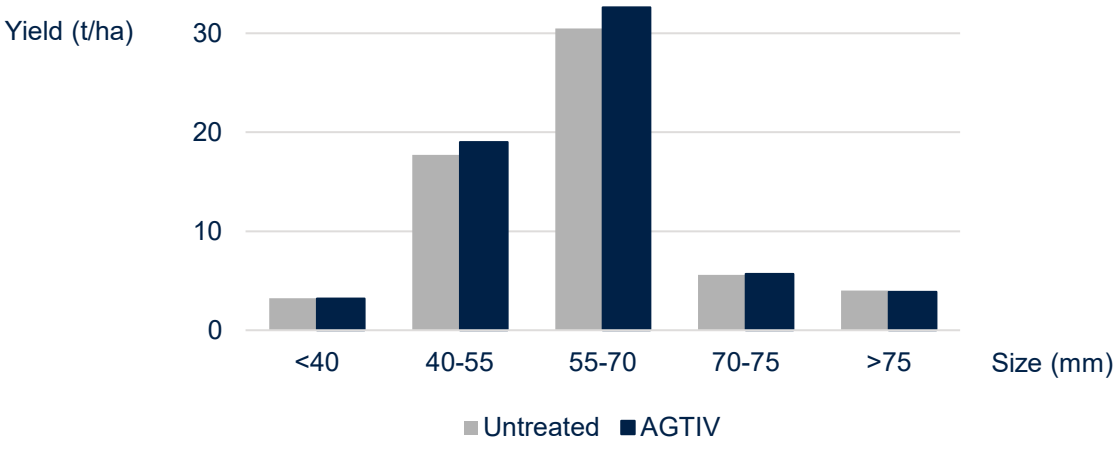


Figure 2. **Potato yield (t/ha) for the tablestock market (32 plots) by marketable size (40/75 mm)**



PREMIER TECH

EFFICACY REPORT
2011 – MYCORRHIZAL INOCULANT

POTATO

► PLOT TRIAL

Research partner: Agréco

Research site: Rawdon (Lanaudière, QC), Canada

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

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

Potato variety: Goldrush

Previous crop: Potato in 2010, Wheat in 2009

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

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

Treatment	Marketable Yield (lb/plot)	Marketable Yield (kg/plot)	Average marketable potato weight (g/potato tuber)
Untreated	23.8 [a]	10.8 [a]	123 [a]
AGTIV® REACH™ L POTATO	27.3 [b]	12.4 [b]	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)

Plot operational notes.

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

EFFICACY REPORT

2010 – MYCORRHIZAL INOCULANT

POTATO

► PLOT TRIAL

Research partner: Agréco

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

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

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

Potato variety: Goldrush

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

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

Treatment	Yield (lb/plot)	Yield (kg/plot)	Marketable tuber number per plot
Untreated	15.4 [a]	7.0 [a]	34 [a]
AGTIV® REACH™ L POTATO	20.5 [b]	9.3 [b]	48 [b]

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

Plot operational notes and rain fall.

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

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

Meteorological data from Québec

PREMIER TECH

EFFICACY REPORT

1999 – MYCORRHIZAL INOCULANT

POTATO

► PLOT TRIAL

Research partner: Laval University (Qc), Canada

Research site: Lavaltrie (QC), Canada

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

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

Potato variety: Goldrush

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

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

Treatment	Total Yield		Marketable yield	
	(cwt/ac)	(t/ha)	(cwt/ac)	(t/ha)
Untreated	446.1 [a]	49.4 [a]	417.2 [a]	46.2 [a]
AGTIV® REACH™ L POTATO	466.9 [b]	51.7 [b]	442.5 [b]	49.0 [b]

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

Plot operational notes and rain fall.

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

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

Meteorological data from Trois-Rivières

PREMIER TECH

EFFICACY REPORT

SUMMARY – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

► PLOT TRIALS

Table 1. **Average increase of marketable yield* in cwt/ac with AGTIV® REACH™ L POTATO and AGTIV® STIMULATE™ L POTATO**

Sites	Year	Untreated check yield	AGTIV® REACH™	AGTIV® REACH™ and AGTIV® STIMULATE™	Yield increase*
Sainte-Croix	**2021**	313.1	320.3	319.3	**6.2**
Saint-Marc	**2021**	103.1	107.8	112.8	**9.7**
New Glasgow	**2021**	236.9	242.1	247.4	**10.5**
Rockwood	**2021**	266.7	286.4	322.3	**55.6**
Elmira	**2021**	298.2	320.7	343.9	**45.7**
Saint-Marc	**2022**	138.4	145.4	142.2	**3.8**
Newton	**2022**	232.2	240.2	237.8	**5.6**
Newton	**2022**	92.3	92.5	109.3	**17.0**
Rockwood	**2022**	395.1	402.5	429	**33.9**
9 sites	**Average**	**230.7**	**239.8**	**251.5**	**20.8 cwt/ac**

*Comparison of the double inoculation vs untreated check

EFFICACY REPORT
2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

► PLOT TRIAL

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*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 22 m^2 plots

Variety: Norland

Previous crop: Oat

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

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

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	313.1	-
AGTIV® REACH™ L POTATO	320.3	2.2
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	319.3	4.3

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

► PLOT TRIAL

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*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 22 m^2 plots

Variety: Chieftain

Previous crop: Soybean

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

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

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	103.1	-
AGTIV® REACH™ L POTATO	107.8	4.5
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	112.8	12.8

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

► PLOT TRIAL

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*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 16 m^2 plots

Variety: Russet Burbank

Previous crop: Oat

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

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

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	236.9	-
AGTIV® REACH™ L POTATO	242.1	2.3
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	247.4	4.4

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

► 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™ POTATO*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 18 m^2 plots

Variety: Chieftain Red

Previous crop: Fallow

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

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

Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	266.7	-
AGTIV® REACH™ L POTATO	286.4	7.3
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	322.3	20.8

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2021 – MYCORRHIZAL AND BACILLUS INOCULANT

POTATO

► PLOT TRIAL

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*

* Liquid inoculant applied according to manufacturer's recommended rate

Experimental design: Latin Square, 6 repetitions, 22 m^2 plots

Variety: Chieftain Red

Previous crop: Canola

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

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

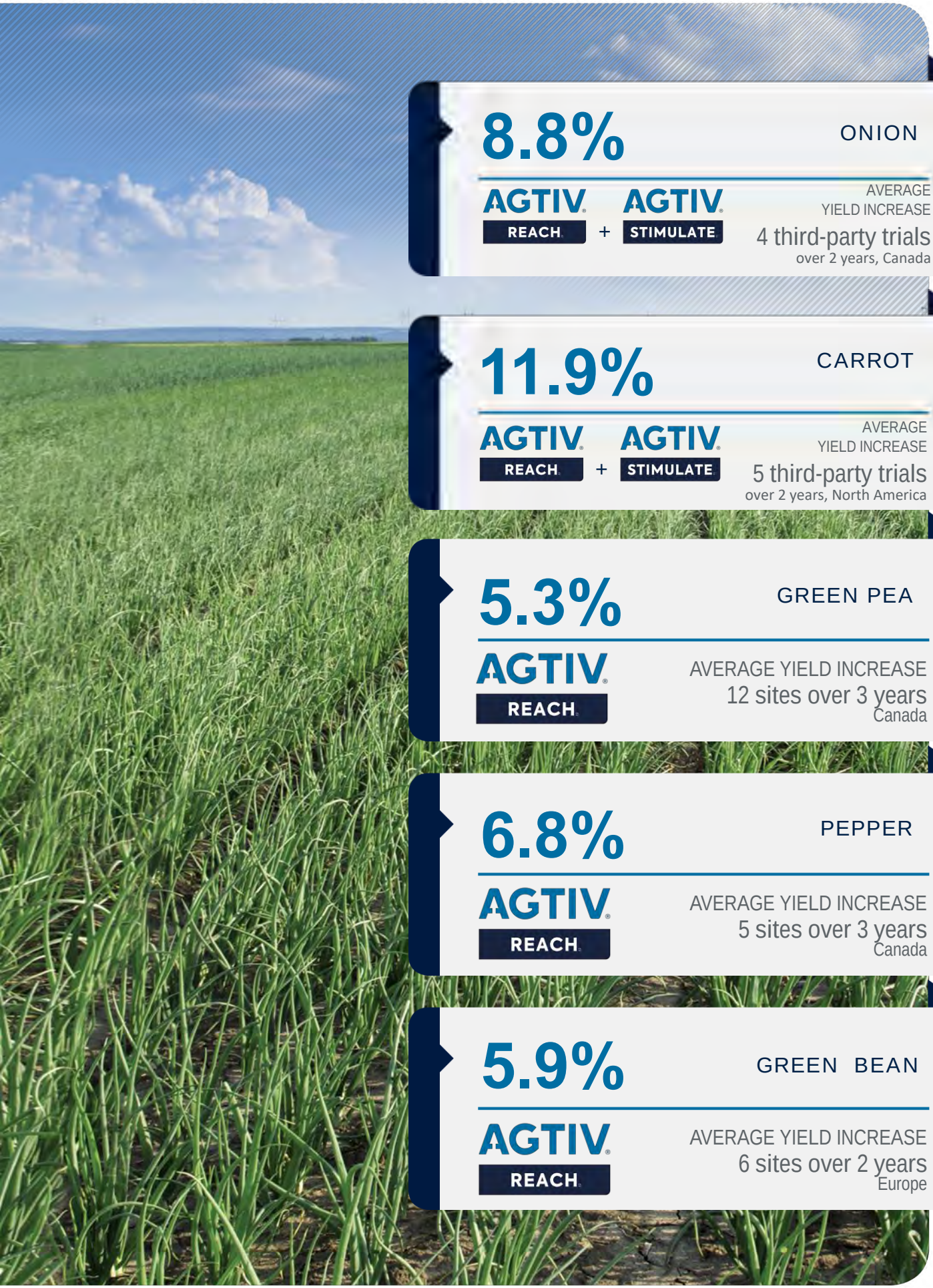
Treatment	Yield (cwt/ac)	Yield increase (%)
Untreated Check	298.2	-
AGTIV® REACH™ L POTATO	320.7	7.3
AGTIV® REACH™ L POTATO + AGTIV® STIMULATE™ POTATO	343.9	15.3

Plot operational notes and rain fall.

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

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

PREMIER TECH



8.8% ONION

AGTIV REACH + AGTIV STIMULATE

AVERAGE YIELD INCREASE
4 third-party trials
over 2 years, Canada

11.9% CARROT

AGTIV REACH + AGTIV STIMULATE

AVERAGE YIELD INCREASE
5 third-party trials
over 2 years, North America

5.3% GREEN PEA

AGTIV REACH

AVERAGE YIELD INCREASE
12 sites over 3 years
Canada

6.8% PEPPER

AGTIV REACH

AVERAGE YIELD INCREASE
5 sites over 3 years
Canada

5.9% GREEN BEAN

AGTIV REACH

AVERAGE YIELD INCREASE
6 sites over 2 years
Europe

SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS AND PLOT TRIALS[1]

Table 1. **Average increase of marketable yields[2] (t/ha) with AGTIV® REACH™ for different years (2014-2022)**

Year	Number of sites	Yield Untreated	Yield AGTIV®	Yield increase	Yield increase (%)
2014	2	67.7	73.2	5.5	7.5
2015	4	44.3	47.6	3.3	6.9
2016	1	60.7	64.1	3.4	5.3
2017	1	18.2	20.4	2.2	10.8
2018	2	40.0	46.1	6.1	13.2
2019	6	50.3	52,6	2.3	4.4
2022	1	25.8	29.9	4.1	13.7
Total	**17 sites**	**47.0 [a]**	**50.5 [b]**	**3.5 t/ha**	**7.4 %**

[1] Split fields and trials conducted in North America and Europe

[2] Yields without the same letter are statisticly different based on a Tukey HSD test (p≤0.05).

Table 2. **Average increase of marketable yields[2] (lb/ac) with AGTIV® REACH™ for different years (2014-2022)**

Year	Number of sites	Yield Untreated	Yield AGTIV®	Yield increase	Yield increase (%)
2014	2	60 400	65 307	4 817	8.1
2015	4	39 523	42 467	2 944	7.4
2016	1	54 155	57 188	3 033	5.6
2017	1	16 237	18 200	1 962	12.1
2018	2	35 687	41 129	5 531	15.2
2019	6	44 876	46 928	1 962	4.6
2022	1	22 970	26 620	3 650	15.9
Total	**17 sites**	**41 845 [a]**	**44 961[b]**	**3 116 lb/ac**	**7.4 %**

[1] Split fields and trials conducted in North America and Europe

[2] Yields without the same letter are statisticly different based on a Tukey HSD test (p≤0.05).

EFFICACY REPORT
2019 – MYCORRHIZAL INOCULANT

ONION

► PLOT TRIAL

Research department: Antédis

Research site: Issé, Loire-Atlantique department, France

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

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

Onion variety: Santero F1

Previous crop: Spring barley

Seeding details: Seeded April 1 at 80 seeds/m^2 with 32 cm row spacing.

*Products applied according to manufacturer's recommended rate.

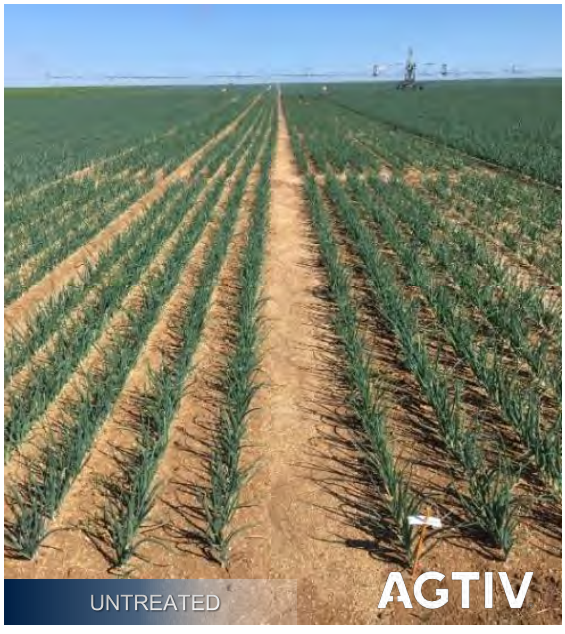
Table 1. **Summary of onions marketable yields per treatment.**

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

Plot operational notes and rain fall

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

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



Better growth on the right with AGTIV®.

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL INOCULANT

ONION

▶ PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright (ON), Canada

Treatments: a) Untreated;
b) AGTIV® REACH™ P for Seed Encrusting.

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

Onion variety: Catskill

Previous crop: Soybean

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

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

Treatment	Yield		Marketable Yield	
	(lb/ac)	(t/ha)	(lb/ac)	(t/ha)
Untreated	20 434	22.9	18 467	21.0
AGTIV® REACH™ P for Seed Encrusting	29 179	32.7	26 644	29.8

Plot operational notes and rain fall.

- Fertilization:
  - MAP - 70 kg/ha
  - Potash - 98 kg/ha
  - KMag - 125 kg/ha
  - Urea - 112 kg/ha
- Conventional till
- Pesticides:
  - Venture L (18-06-20)
  - Pardner (18-06-25)
  - Prowl H_2O (18-06-29)
  - Pardner (18-07-05)
  - Prowl H_2O (18-07-15).
- Harvested on October 18, 2018.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL INOCULANT

ONION

► GROWER SPLIT FIELDS

Research site: France, Europe

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

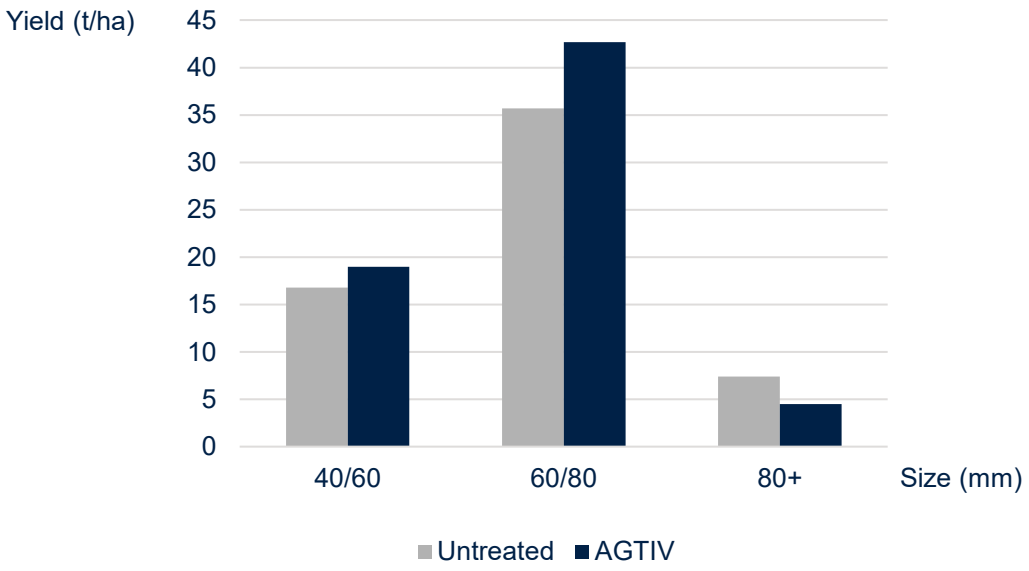
Experimental design: Every data point per field consists in an average of 3 samples each (untreated and AGTIV®).

Variety: Hytunes

Table 1. **Marketable onion yields per treatment.**

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

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



PREMIER TECH

EFFICACY REPORT
2017 – MYCORRHIZAL INOCULANT

ONION

▶ PLOT TRIALS

Research partners: Black Creek Research and Prisme

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

Treatments: a) Untreated;
b) AGTIV® REACH™ P for Seed Encrusting.

Experimental design: Randomized complete block design, 8 replicates.

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

Location	Year	Variety	Untreated (t/ha)	AGTIV® REACH™ P for Seed Encrusting (t/ha)	% Yield difference
Ontario	2017	Frontier	41	43.2	+5.5%
Quebec	2017	Trailblazer	32.3	38.6	+6.3%
Average	**2017**		**36.7**	**40.9**	**+6.2%**

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

PREMIER TECH

EFFICACY REPORT
2017 – MYCORRHIZAL INOCULANT

ONION

► GROWER SPLIT FIELDS

Research site: France, Europe

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

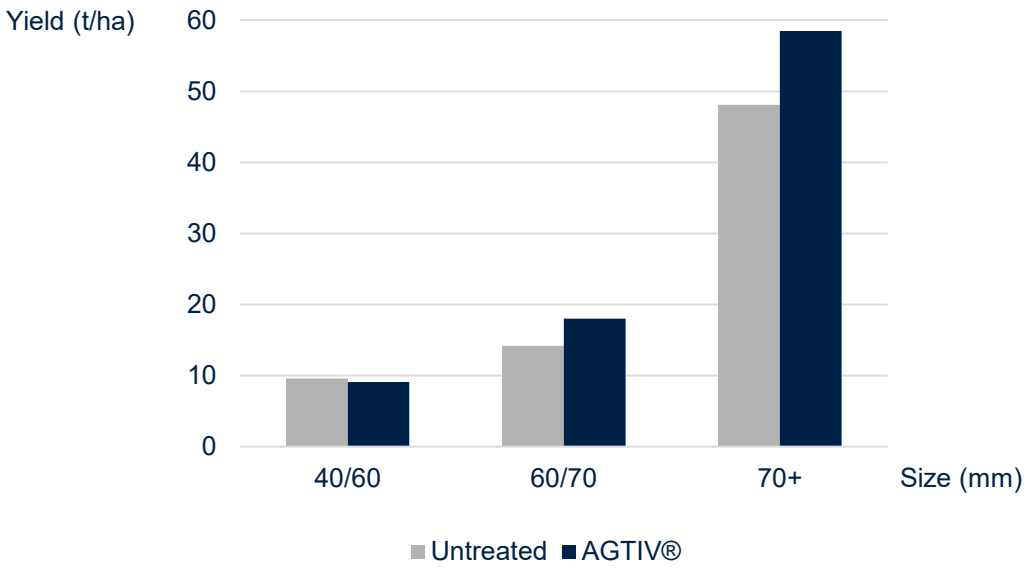
Experimental design: Every data point per field consists in an average of 3 samples each (untreated and AGTIV®).

Variety: SPIRIT

Table 1. **Marketable onion yields per treatment.**

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

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



PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL AND BACILLUS INOCULANT

ONION

► PLOT TRIAL

Research partner: Prisme, Black Creek Research, and Schreiber & Sons

Research site: Napierville, QC; Bright, ON; Eltopia, WA.

Treatments: a) Untreated Check
b) Commercial seed encrusting including the combination of AGTIV® REACH™ P for seed encrusting + AGTIV® STIMULATE™ L

Experimental design: Complete Randomized Block Design, 8 repetitions

Table 1. **Summary of onion yields per treatment for different sites.**

Year	Sites	Variety	Untreated check yield (t/ha)	AGTIV® yield (t/ha)	Yield increase (t/ha)	Yield increase (%)
2017	**Bright (ON)**	Frontier	8.1	9.9	1.8	22.2
2017	**Napierville (QC)**	Trailblazer	16.2	17.0	0.8	5.0
2018	**Bright (ON)**	Catskill	68.6	68.0	- 0.6	- 0.8
2018	**Napierville (QC)**	Catskill	20.9	29.1	8.2	39.2
Total	**4 sites**		**28.5[a]**	**31.0[b]**	**2.5 t/ha ***	**8.8%**

*Summary of means are significantly different following a combined site ANOVA and a Tukey test ($p<0.05$) $p = 0.03$

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL INOCULANT

CARROTS

► PLOT TRIAL

Research partner: Antédis

Research site: Ploërmel, Morbihan department, France

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

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

Carros variety: Bolero F1

Previous crop: Ray-grass

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

*Products applied according to manufacturer's recommended rate.

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

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

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

Plot operational notes and rain fall

- Fertilization:
  - 30 m^3 of cattle manure (19-05-21)
- Pesticides
  - Racer ME, Baroud SC and Centium 36 CS (19-06-02)
  - Challenge 600 and DEFI (19-06-26 et 19-08-01)
  - Switch and Heliosoufre (19-08-13)
- Harvested October 28, 2019.

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

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL INOCULANT

CARROTS

► PLOT TRIAL

Research partner: Eurofins Agroscience services

Research site: Meneac, Morbihan department, France

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

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

Carrot variety: Bolero F1

Previous crop: Barley

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

*Products applied according to manufacturer's recommended rate.

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

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

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

Plot operational notes and rainfall

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL INOCULANT

CARROTS

► PLOT TRIAL

Research partner: Agricultural Development Group Inc.

Research site: Eltopia (WA), USA

Treatments: a) Untreated;
b) AGTIV® REACH™ P for Seed Encrusting.

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

Carrot variety: Envy

Previous crop: Squash

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

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

Treatment	Marketable Yield (lb/ac)	Marketable Yield (t/ha)	Marketable Yield (%)
Untreated	12 499	14.0	92
AGTIV® REACH™ P for Seed Encrusting	16 941	19.0	92

Plot operational notes and rain fall.

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

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

PREMIER TECH

EFFICACY REPORT
2018 – MYCORRHIZAL INOCULANT

CARROTS

► PLOT TRIAL

Research partner: Black Creek Research

Research site: Bright (ON), Canada

Treatments: a) Untreated;
b) AGTIV® REACH™ P for Seed Encrusting.

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

Carrot variety: Envy

Previous crop: Soybean

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

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

Treatment	Marketable Yield (lb/ac)	Marketable Yield (t/ha)	Marketable Yield (%)	Reject (%)
Untreated	20 488	23.0	64%	4.75%
AGTIV® REACH™ P for Seed Encrusting	23 244	26.0	69%	3.13%

Plot operational notes and rain fall.

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

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

EFFICACY REPORT
2017 – MYCORRHIZAL INOCULANT

CARROTS

► PLOT TRIALS

Research partners: Black Creek Research and Prisme

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

Treatments: a) Untreated;
b) AGTIV® REACH™ P for Seed Encrusting.

Experimental design: Randomized complete block design, 8 replicates.

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

Location	Year	Variety	Untreated		AGTIV® REACH™ P for Seed Encrusting		% Yield difference
			(lb/ac)	(t/ha)	(lb/ac)	(t/ha)	
Ontario	2017	Bolero	36 579	41	38 542	43.2	+5.4%
Quebec	2017	Olympus	28 817	32.3	34 438	38.6	+19.5%
Average	**2017**		**32 653**	**36.6**	**36 490**	**40.9**	**+11.7%**

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

PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL AND BACILLUS INOCULANT

CARROTS

► PLOT TRIAL

Research partner: Prisme, Black Creek Research, and Schreiber & Sons

Research site: Napierville, QC; Bright, ON; Eltopia, WA.

Treatments: a) Untreated Check
b) Commercial seed encrusting including the combination of AGTIV® REACH™ P for seed encrusting + AGTIV® STIMULATE™ L

Experimental design: Complete Randomized Block Design, 8 repetitions

Table 1. **Summary of carrot yields per treatment for different sites.**

Year	Sites	Variety	Untreated check yield (t/ha)	AGTIV® yield (t/ha)	Yield increase (t/ha)	Yield increase (%)
2017	**Bright (ON)**	Bolero	41	47.3	6.3	15.4
2017	**Napierville (QC)**	Olympus	32.3	36.2	3.9	12.1
2018	**Bright (ON)**	Envy	27.4	31.4	4.0	14.6
2018	**Napierville (QC)**	Envy	32.3	32.3	-	-
2018	**Eltopia (WA)**	Envy	14	17.2	3.2	22.9
Total	**5 sites**		**29.4[a]**	**32.9[b]**	**3.5 t/ha ***	**11.9%**

*Summary of means are significantly different following a combined site ANOVA and a Tukey test ($p<0.05$) $p = 0.036$

PREMIER TECH

EFFICACY REPORT
2019 – MYCORRHIZAL & BACILLUS INOCULANT

SWEET CORN

► PLOT TRIAL

Research partner: Schreiber & Sons

Research site: Eltopia, Washington, USA

Treatments: a) Untreated;
b) AGTIV® REACH™ P for Seed Film Coating + AGTIV® STIMULATE™ L*.

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

Sweet corn variety: Nirvana

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

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

*Products applied according to manufacturer's recommended rate.

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

Treatment	Yield (lb/ac)	Yield (t/ha)	Increase
Untreated	17 854.0 [a]	20.0 [a]	
AGTIV® REACH™ P for 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.

Plot operational notes and rain fall

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

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

PREMIER TECH

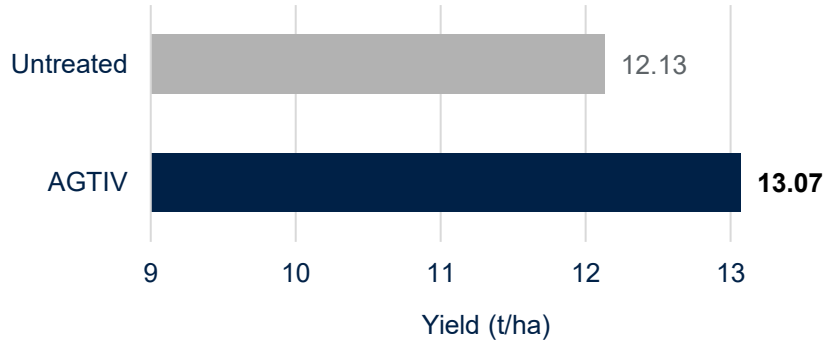
SUMMARY – MYCORRHIZAL INOCULANT

► GROWER SPLIT FIELDS

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

Variety	Untreated		AGTIV® mycorrhizal inoculant		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	**10 795**	**12.13**	**11 687**	**13.07**	**7.7 %**

Figure 1. **Yield increase with AGTIV® mycorrhizal inoculant.**



EFFICACY REPORT

SUMMARY – MYCORRHIZAL INOCULANT

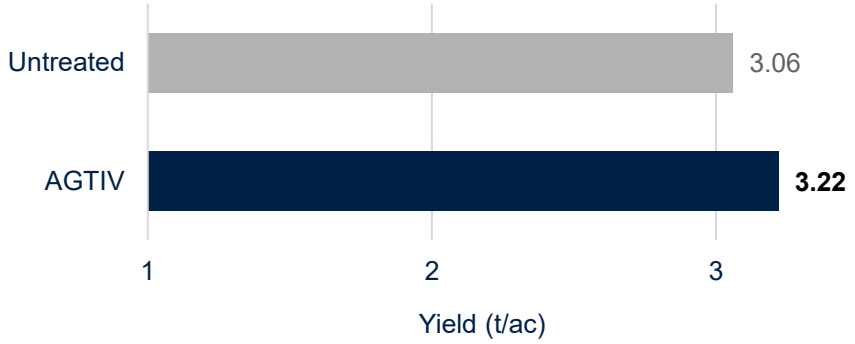
GREEN PEA

► GROWER SPLIT FIELDS

Table 1. **Average yield increase with AGTIV® THRIVE™ P PEA & LENTIL for different years (2015 to 2017) in Ontario and Quebec, Canada.**

Year	Number of sites	Average increase (t/ac)	Average increase (t/ha)	Average increase (%)
2015	4	0.31	0.77	23.3
2016	7	0.08	0.20	3.5
2017	1	0.12	0.30	3.7
Total	**12 sites**	**0.16 t/ac**	**0.40 t/ha**	**5.3%**

Figure 1. **Average yield increase with AGTIV® THRIVE™ P PEA & LENTIL in Ontario and Quebec, Canada (2015 to 2017).**



Plant growth and health is enhanced on the right, and the leaf area is increased with AGTIV®.

PREMIER TECH

EFFICACY REPORT
SUMMARY – MYCORRHIZAL INOCULANT

PEPPER

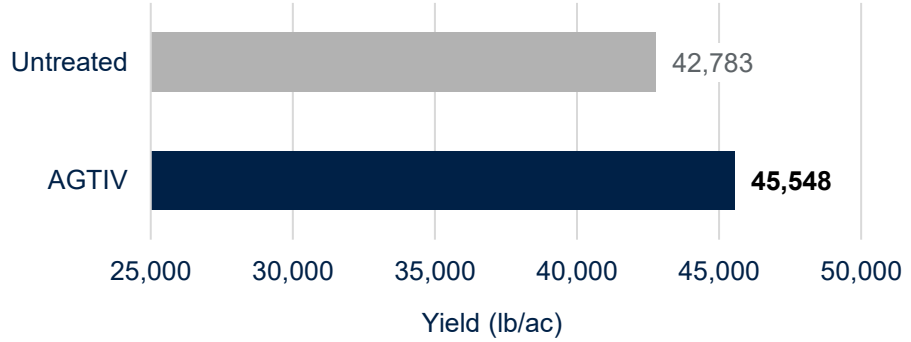
► GROWER SPLIT FIELDS

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

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

* Plot trial data for 2002: average increase of 95 g/plant.
** The 2766 lb/ac average refers only to 2015-2016 data.

Figure 1. **Average yield increase with AGTIV® REACH™ in Ontario, Canada (2015-2016).**



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

PREMIER TECH

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®.

PREMIER TECH

EFFICACY REPORT
2016 – MYCORRHIZAL INOCULANT

STRAWBERRIES

► PLOT TRIALS

Research site: Saint-Eustache (QC), Canada

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

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

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

Treamtent	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% reduction**

Larger and bigger plants with AGTIV® on the right.

PREMIER TECH

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

Ecoflo®

Ecoprocess™

OUR DESIRE TO INNOVATE IS DRIVEN BY THE TECHNOLOGIES WE MASTER

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

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

PREMIERTECH.COM

INNOVATION

AN INTEGRAL PART OF PREMIER TECH COLLECTIVE DNA

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

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

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

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

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

CELEBRATING DECADES OF

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.

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

INNOVATION AND VALUE

FORMULATION

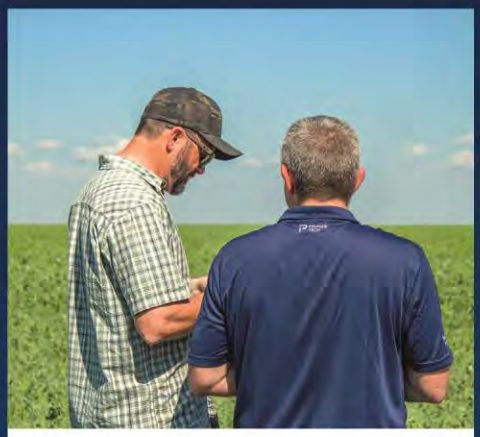
Premier Tech's know-how makes it possible to adapt formulations with multiple active ingredients, concentrations and carriers tailored to different crops and application methods. Because a quality inoculant makes all the difference, our proven formulations are based on these important elements:

- 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:

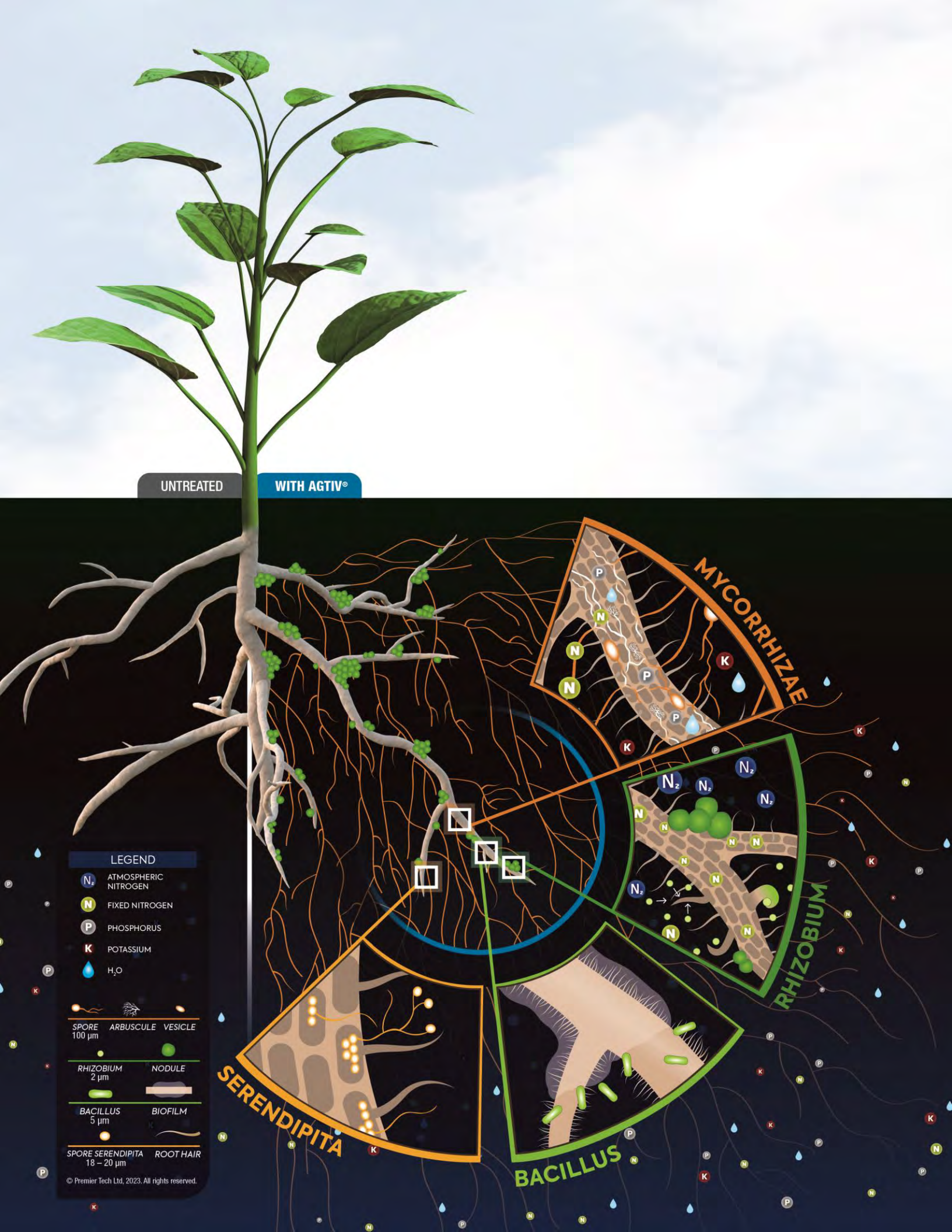
- Effective application rates, at the right time and place, with the right inoculant
- Products adapted to growers' equipment
- Easy integration into farming practices
- Validation of compatibility with other agricultural inputs



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


UNTREATED
WITH AGTIV®
MYCORRHIZAE
RHIZOBIUM
BACILLUS
SERENDIPITA
LEGEND
ATMOSPHERIC NITROGEN
FIXED NITROGEN
PHOSPHORUS
POTASSIUM
H_2O
SPORE 100 µm
ARBUSCULE
VESICLE
RHIZOBIUM 2 µm
NODULE
BACILLUS 5 µm
BIOFILM
SPORE SERENDIPITA 18 – 20 µm
ROOT HAIR
© Premier Tech Ltd, 2023. All rights reserved.

AGTIV® BIOLOGICAL ACTIVE INGREDIENTS

For 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 B*acillus*, 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.

M

MYCORRHIZAE

PTB297 Technology, *Rhizophagus irregularis* (formerly known as *Glomus intraradices)*

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

- EXPANDS ROOT SYSTEM GROWTH
- ENHANCES NUTRIENT & WATER UPTAKE
- INCREASES TOLERANCE TO ABIOTIC STRESSES
- IMPROVES SOIL STRUCTURE

R

RHIZOBIUM

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

PTB162 Technology (soybean), *Bradyrhizobium japonicum*

Mesorhizobium ciceri (chickpea)

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

- INCREASES NODULATION
- FIXES NITROGEN
- PROVIDES NUTRIENTS TO LEGUMES

B

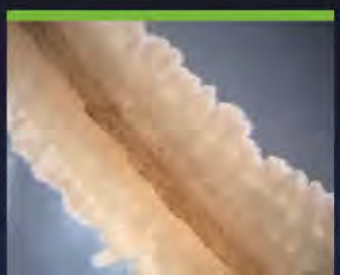
BACILLUS

PTB180 Technology, *Bacillus pumilus*

PTB185 Technology, *Bacillus inaquosorum*

B*acillus* are bacteria that provide a healthy root zone which leads to better yields. As root colonizers, they stimulate the plant to grow more efficiently. Selected for their beneficial action of growth stimulation.

- IMPROVES ROOTING ENVIRONMENT & PLANT ESTABLISHMENT
- INCREASES PLANT VIGOR & PERFORMANCE



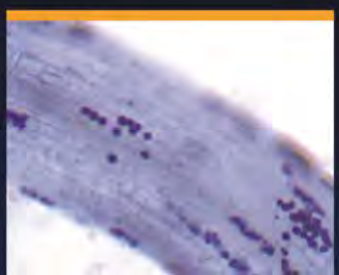
S

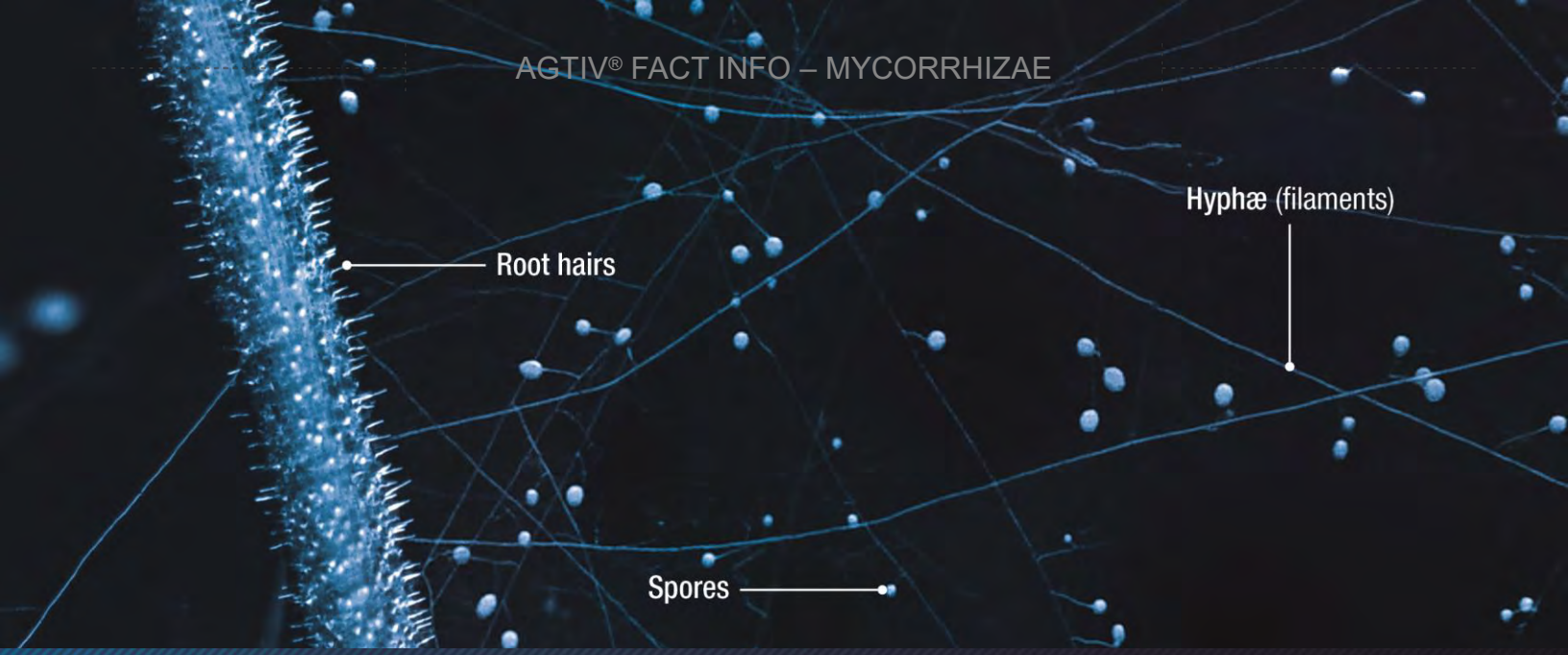
SERENDIPITA

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

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

- MITIGATES ABIOTIC STRESSES
- INCREASES PHOTOSYNTHESIS RATE
- ENHANCES PLANT ESTABLISHMENT, GROWTH AND YIELD





MYCORRHIZAE

EFFICACY – VERSATILITY – COLLABORATION

Why use Premier Tech's mycorrhizae?

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

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

Absorption capacity

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

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

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

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

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

PREMIER TECH

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

PREMIER TECH

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]

A. Fortin J. A, 2009. Mycorrhizae The new green revolution. Ed. MultiMondes. pp.140.
B. Jones, C. E. 2009. Mycorrhizal fungi -powerhouse of the soil. Evergreen Farming 8:4-5.
C. Jones, C. E. 2014. Nitrogen: the double-edge sword. Amazing Carbon. pp. 8.
D. Jones, C. E. 2009. *loc. cit.*
E. Thonar, C. et al. 2011. Traits related to differences in function among three arbuscular mycorrhizal fungi. Plant Soil. 339: 231 – 245.
F. Cavagnaro, T et al. 2005. Functional diversity in arbuscular mycorrhizas: exploitation of soil patches with different phosphate enrichment differs among fungal species. Plant, Cell and Environment 28: 642 – 650.
G. Kiers et al. 2011. Reciprocal Rewards Stabilize Cooperation in the Mycorrhizal Symbiosis. Science 333:80-882.
H. Trivedi et al. 2007. Organic farming and mycorrhizae in agriculture.I.K. International Publishing House Ltd. New Delhi, pp.290.
I. Hamel, C. et al. 2008. Mycorrhizal symbioses in soil-plant systems of the Canadian prairie. XVI International Scientific Congress of the National Institute of Agricultural Science, November 24-28, La Havana, Cuba.
J. Dai, M. et al. 2013. Impact of Land Use on Arbuscular Mycorrhizal Fungal Communities in Rural Canada. Applied and Environmental Microbiology 79 (21):6719-6729.
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.
N. Aroca et al. 2008. Mycorrhizal and non-mycorrhizal Lactuca sativa plants exhibit contrasting responses to exogenous ABA during drought stress and recovery. Journal of Experimental Botany, Vol. 59, No. 8, pp. 2029-2041. In: Raviv M. 2010. The use of mycorrhiza in organically-grown crops under semi arid conditions: a review of benefits, constraints and future challenges. Symbiosis 2010. 52-65-74.

PREMIER TECH

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.

PREMIER TECH

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 by producing nitrogenase enzyme, which starts the conversion process, consuming a great deal of energy. Maximum N-fixation is reached when the plant is sufficiently nodulated.

Ammonium absorption / exchange of services

After the nodule formation, the plant converts the ammonium into amino acids which are exported throughout the plant. At this point, the plant releases the simple sugars and 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.

PREMIER TECH

THE TRIPARTITE SYMBIOSIS
HELPS YOU GET BIGGER YIELD

How can the tripartite symbiosis improve crop productivity?

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

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

Help feed the plant

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

Higher photosynthesis

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

Better productivity

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

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.

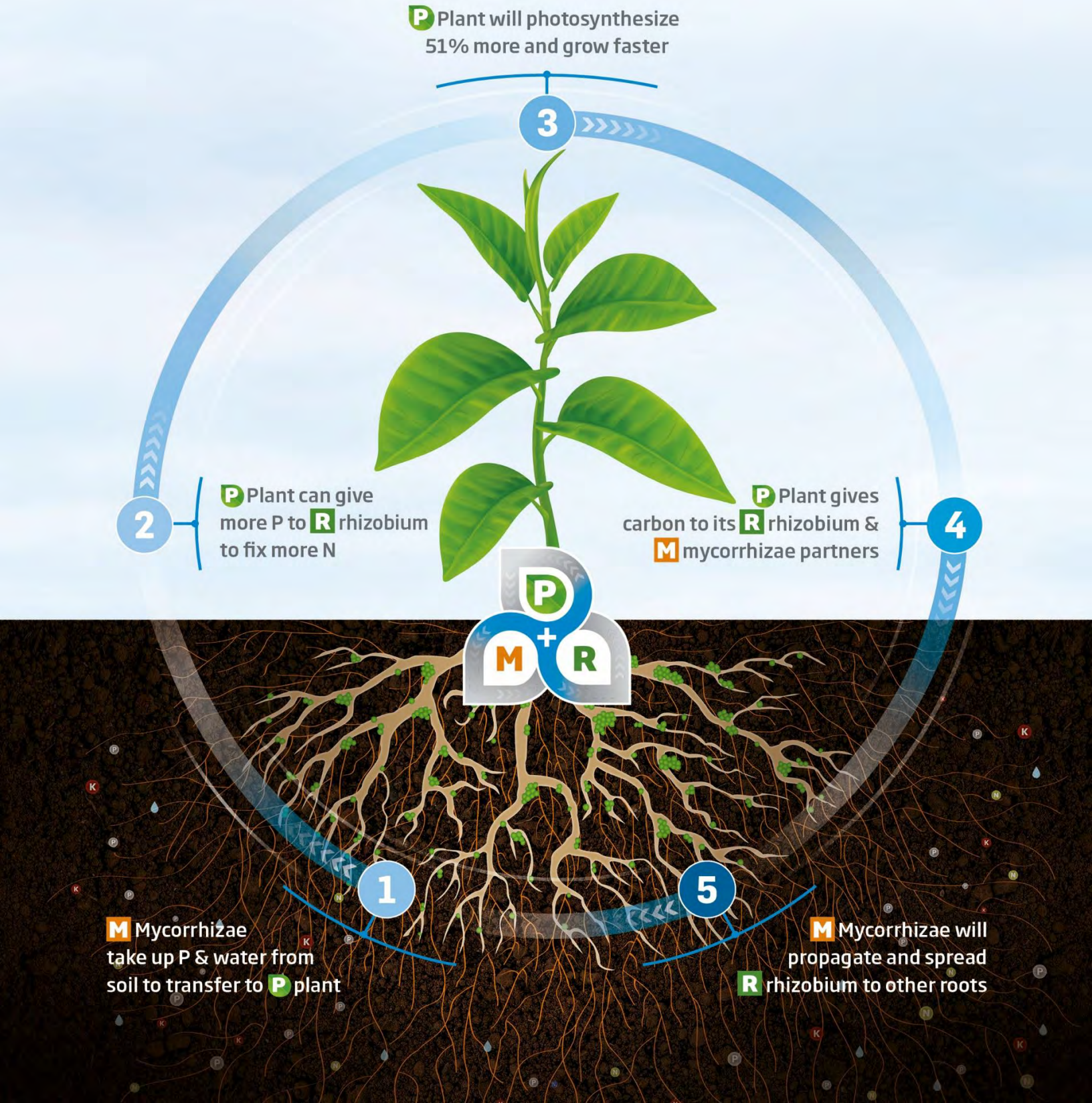
PREMIER TECH

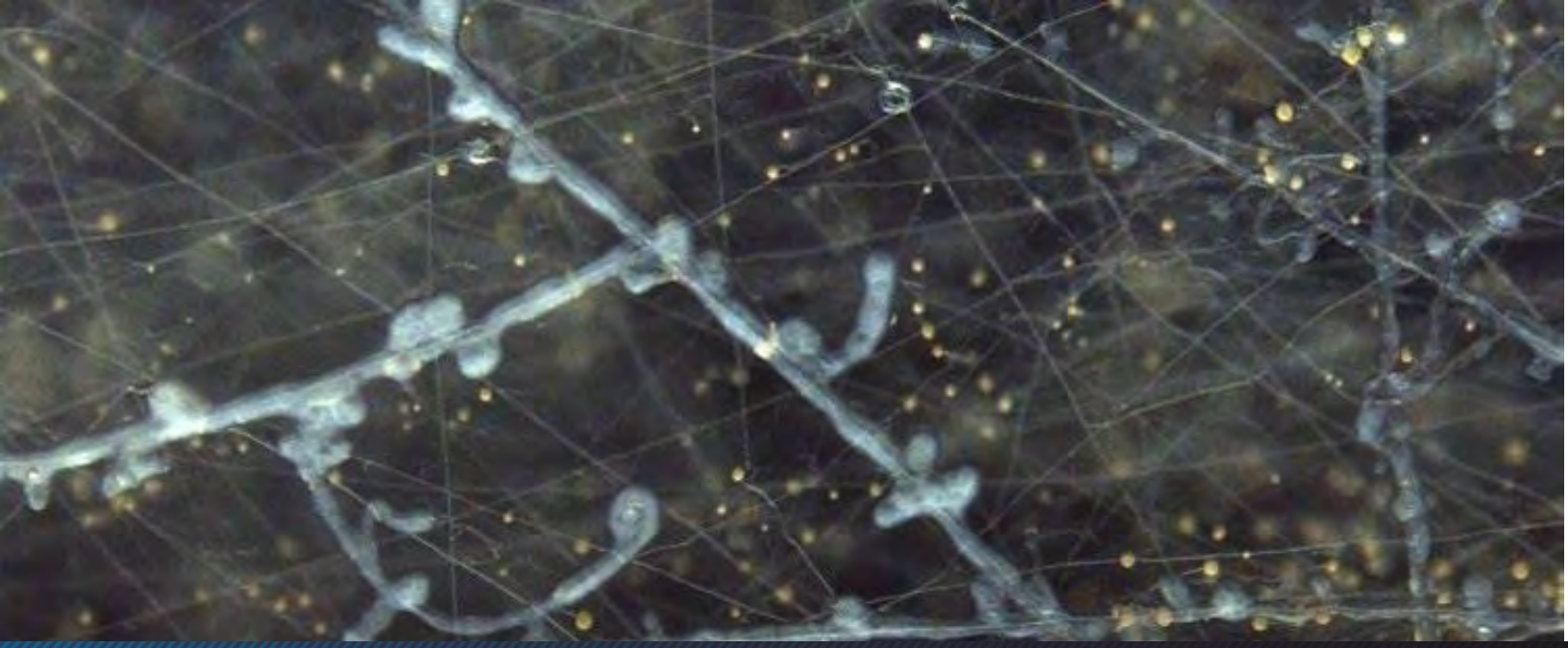
PTAGTIV.COM/en/tripartite

TRIPARTITE SYMBIOSIS

BIOLOGICAL INTERACTIONS BETWEEN MYCORRHIZAE, RHIZOBIUM AND PLANTS

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





Benefits of Tripartite Plant-Mycorrhiza-*Bacillus* Association in Potato Production

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).

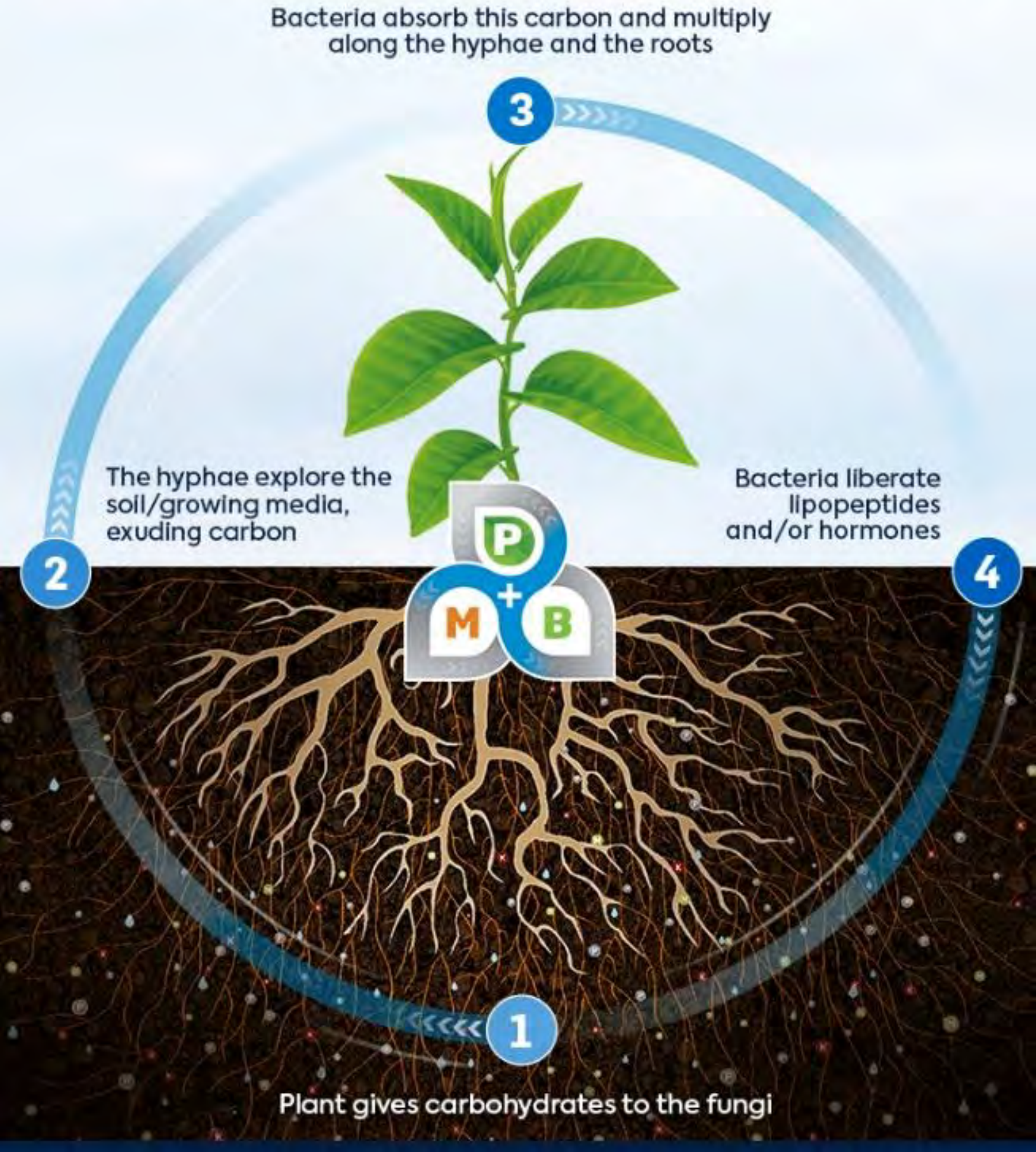
The results from the experimental plots demonstrate that inoculation with the mycorrhizal fungus brings an increase of 11 cwt/ac in yield, while **simultaneous inoculation with the mycorrhizal fungus and a biostimulating bacterium results in nearly double the increase**, i.e., a significant increase 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.**

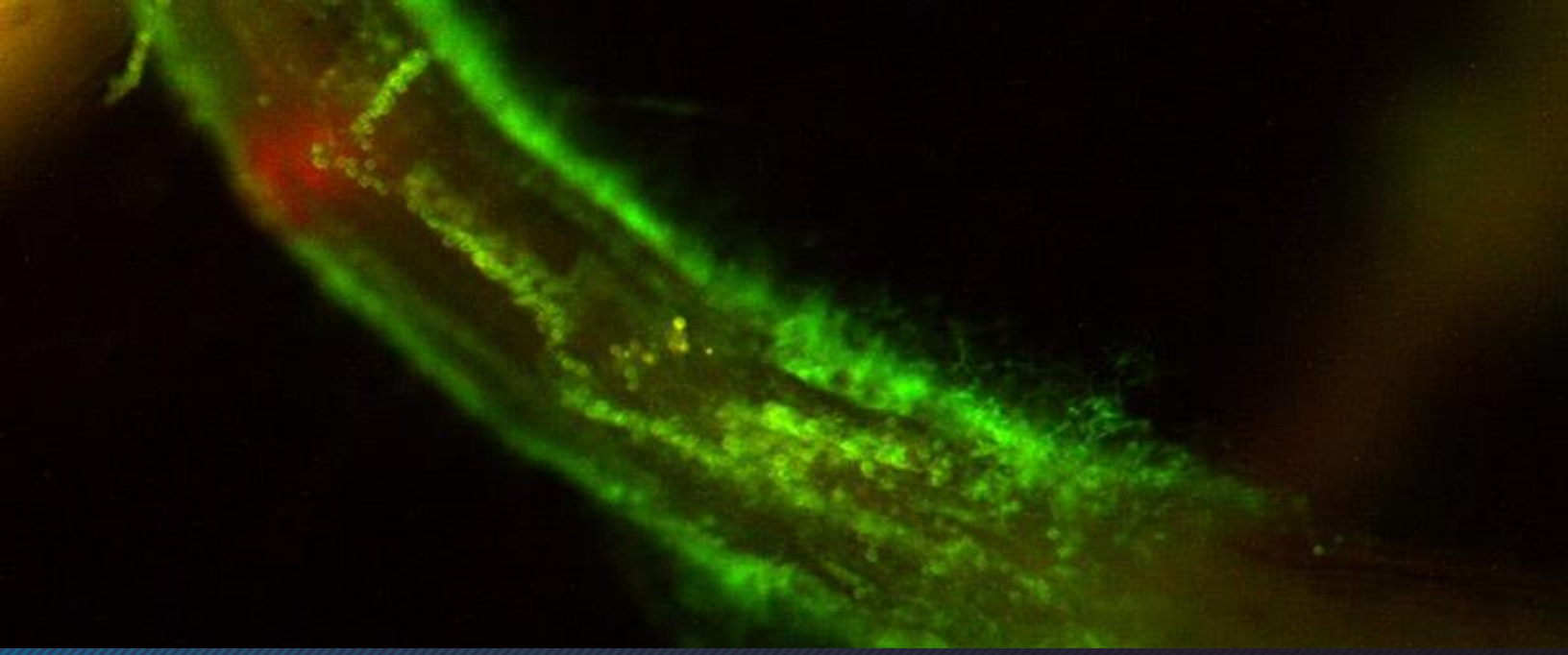
The results obtained in real growing conditions demonstrate that it is profitable for a producer to apply mycorrhizal inoculants to his field. The use of biostimulant microorganisms in agriculture fits well with a sustainable agriculture perspective, by allowing better use of the water and nutrients present in the soil.

PREMIER TECH

TRIPARTITE ASSOCIATION

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

1. 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.

2. 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].

3. 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.

4. 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].

PREMIER TECH

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

1. 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.

2. 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.

AGTIV® is proud to be the first to commercialize AGTIV® IGNITE™ L inoculant to make the many benefits of *Serendipita* available to canola and cereal growers. To learn more about AGTIV® IGNITE™ L, check out our crop guide, our product page, or contact your AGTIV® representative!

---

[1] O.P. Narayan, N. Verma, A. Jogawat, M. Dua, A.K. Johri, Role of sulphate transporter (PiSulT) of endophytic fungus Serendipita indica in plant growth and development, bioRxiv (2020 Jan).
[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
[4] N. Verma, Narayan OP, Prasad D, Jogawat A, Panwar SL, Dua M, Johri AK. Functional characterization of a high affinity iron transporter (*PiFTR*) from the endophytic fungus *Piriformospora indica* and its role in plant growth and development. Environ Microbiol. 2021.
[5] A. Jogawat, S. Saha, M. Bakshi, V. Dayaman, M. Kumar, M. Dua, A. Varma, R. Oelmüller, N. Tuteja, A.K. Johri, Piriformospora indica rescues growth diminution of rice seedlings during high salt stress, Plant Signal. Behav. 8 (10) (2013 Oct) 26891.
[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

PREMIER TECH

THE CANOLA ROTATION INOCULANT
HELPS YOU COUNTER REDUCED YIELD AFTER CANOLA

What affects your soil biology?

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

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.

PREMIER TECH

PTAGTIV.COM/en/canola

► Visit our website for product availability according to the territory and their eligibility for organic use: PTAGTIV.COM/**en/products**.

AGTIV® RELIABLE INOCULANTS

	ACTIVE INGREDIENT(S)	ORGANIC	APPLICATION MODE: GRANULAR IN-FURROW	APPLICATION MODE: MIXING WITH SEEDS	APPLICATION MODE: LIQUID IN-FURROW	APPLICATION MODE: LIQUID ON SEED	FORMULATION
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)**	M R	✓		●			⁘
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)**	M R	✓	●				⁘
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)**	M R	✓			●		💧
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)**	R	✓		●			⁘
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)**	R	✓	●				⁘
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)**	R	✓			●	●	💧
SOYBEAN							
AGTIV® THRIVE™ P SOYBEAN **F:** Powder (peat) **S:** 4.7 kg (10.3 lb) pail **C:** Soybean: **16 ha (40 acres)**	M R	✓		●			⁘
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)**	M R	*	●				⁘
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)**	M R	✓			●		💧
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)**	R	*	●				⁘
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)**	R	✓			●	●	💧
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)**	R B	✓			●	●	💧

		ACTIVE INGREDIENT(S)	ORGANIC	APPLICATION MODE: GRANULAR IN-FURROW	APPLICATION MODE: MIXING WITH SEEDS	APPLICATION MODE: LIQUID IN-FURROW	APPLICATION MODE: LIQUID ON SEED	FORMULATION
CHICKPEA	**AGTIV® THRIVE™ P CHICKPEA** **F:** Powder (peat) **S:** 4.7 kg (10.3 lb) pail **C:** Chickpea: **16 ha (40 acres)**	M R	✓		●			Powder
	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)**	M R	✓	●				Granular
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**	S	*			●		Liquid
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.	M	✓		●			Powder
	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.	M	*	●				Granular
	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	M	✓			●		Liquid
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	M	✓			●	●	Liquid
	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	M	*			●	●	Powder
	AGTIV® STIMULATE™ L POTATO **F:** Liquid **S:** 8 L (8 kg) bag-in-box **C:** Potato: **8 ha (20 acres)**	B	✓			●	●	Liquid

See last page for complete product recommendations.

ACTIVE INGREDIENTS

M **MYCORRHIZAE**
PTB297 Technology

B **BACILLUS**
PTB180 Technology
PTB185 Technology

R **RHIZOBIUM**
PTB160 Technology (pea & lentil)
PTB162 Technology (soybean)
Mesorhizobium ciceri (chickpea)

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

GET THE INFO YOU NEED AT **PTAGTIV.COM**

TOOLBOX

Labels, SDS, organic certificates, application videos, charts and rate calculators

PTAGTIV.COM/**en/toolbox**

RESULTS

Efficacy report
Field observations

PTAGTIV.COM/**en/results**

COMPATIBILITY

Pesticide compatibility lists
Liquid fertilizer compatibility lists

PTAGTIV.COM/**en/compatibility**

EDUCATION

Agronomic articles
Case studies

PTAGTIV.COM/**en/blog**

PROGRAMS

Liquid and Powder equipments
Retailer fridge program

PTAGTIV.COM/**en/program**

AGTIV® AVERAGE YIELD INCREASE BY CROP

LENTIL

2.6 bu/ac 8.4%

AGTIV® THRIVE™ PEA & LENTIL
65 sites over 12 years, Canada

DURUM WHEAT

3.8 bu/ac 6.0%

AGTIV® REACH™
12 sites over 7 years, North America

PEA

3.4 bu/ac 6.1%

AGTIV® THRIVE™ PEA & LENTIL
24 sites over 10 years, Canada

FORAGE

576 kg/ha 16.0%

AGTIV® REACH™ P
47 sites over 2 years, Canada

SOYBEAN

3.4 bu/ac 6.8%

AGTIV® THRIVE™ SOYBEAN
93 sites over 8 years, Canada and Europe

1.0 bu/ac 2%

AGTIV®ENRICH™ SOYBEAN
5 third-party trials over 2 years, Canada

DRY BEAN

252 lb/ac 8.7%

AGTIV® REACH™
12 sites over 7 years, North America

CHICKPEA

3.4 bu/ac 7.9%

AGTIV® THRIVE™ CHICKPEA
4 sites over 4 years, Canada

ONION

3.5 t/ha 7.4%

AGTIV® REACH™
17 sites over 9 years, Canada and Europe

2.5 t/ha 8.8%

AGTIV® REACH™ + AGTIV® STIMULATE™
4 third-party trials over 2 years, North America

CANOLA & CEREAL

FOR CANOLA

2.5 bu/ac 6.7%

AGTIV® IGNITE™
27 sites over 5 years, Canada

FOR CEREAL

3.8 bu/ac 10%

AGTIV® IGNITE™
8 sites over 2 years, Canada

POTATO

31.6 cwt/ac 9.1%

AGTIV® REACH™ POTATO
1184 sites over 12 years, North America and Europe

20.8 cwt/ac 9%

AGTIV® REACH™ + AGTIV® STIMULATE™
9 third-party trials over 2 years, North America

EFFICACY REPORT 2023

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.

PREMIER TECH

PT Growers and Consumers
1, avenue Premier
Campus Premier Tech
Rivière-du-Loup (Québec)
G5R 6C1 CANADA

PTAGTIV.COM
1 866 454-5867
info@ptagtiv.com

20221117