

EVERY BUSHEL HARVESTED  
HAS A CONSUMER ENJOYED STORY™

Taurus Agricultural Marketing Inc.  
**Product Portfolio**



***www.taurus.ag***





If we have learned anything in the last year or two, it is that the world is becoming a smaller and smaller place. When it comes to where raw materials are made, where finished products are made, how logistics come into play, who has the demand in which part of the world, how geopolitical influence can alter demand, a market or just pure supply, it all has a direct impact today on every grower locally, and around the world.

We are fortunate at Taurus to have home grown production and supply of many of our proven solutions. Though as we grow, we have also reached further abroad for products that fit our progressive growers, including raw materials that are made in other parts of the world. With that said, we are not immune to supply challenges or inflationary costing increases, but we have done our best on forward planning in mitigating those concerns for our customers.

When you look at individual abilities to connect socially today, the city view of living out in the boonies as an agricultural community is becoming less and less of a stereotype. This is also an opportunity socially, to tell our fantastic story of how we grow sustainable food and leverage innovations and solutions that make food production better for everyone. Taurus has worked hard to support our customers with definable, societal solutions to support that strong message towards consumers. Food and how it is grown, and food security are no longer back burner mindsets in today's world.

2023 will bring another year of growth in our business with new product launches in every pillar of focus at Taurus, along with access to more supply of existing solutions, and an expansion into new areas of a broader market. Every new solution that we are bringing into the market has been years in the making, well researched, and is ready for full commercialization. We task ourselves to understand the science and agronomy to insure the best fit for the best returns.

At times, success breeds complacency, but to us this creates opportunity. An opportunity to expand your thinking and increase your willingness to do new or different things in the way you approach plant growth. Take a hard look at the agronomy and the agronomic solutions we have on offer in our 2023 Product Portfolio, as we are confident there is something for you that will directly impact the success on your farm or in your business. Reach out to a Taurus team member as they are passionate about agricultural production and will be excited to understand more about your businesses and operations, to see if we can find a solution to impact your future success. At the end of the day, we truly know what plant health means and how to achieve it.

Healthy soils, healthy plants, healthy economics, healthy relationships — core to everything we do!



**Craig Davidson,**  
Founding Partner and  
President of Taurus



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## YOUR GROWTH. OUR FOCUS.



Helping growers do what is best for their business operations has been Taurus' priority since 2001. Today, farming is a business that demands increased attention to detail. The top, high-performance growers are maximizing production and profitability by embracing the science-based advancements, innovations and best practices that are at the heart of modern agronomy.

Taurus has spent the last 20 years working towards advancing agriculture, continually delivering the latest innovations and products to leading edge growers. By promoting solutions with proven successes and backed by solid measurable science, Taurus focuses on educating growers by defining the Why's behind the How's, providing them with the insights needed to take their crops to the next level.

Our goal is to simplify the science and explain the benefits of introducing proven agronomic practices and products in the context of your farm operation — and to demonstrate the impact on your bottom line with defined ROI's through research-based approaches to delivery.

Our highly-experienced team works with growers, retailers and leading-edge agronomic consultants throughout Western Canada and beyond.

## THE TAURUS ADVANTAGE



### CONNECT WITH US



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TaurusAgTeam



Taurus Agricultural  
Marketing Inc.



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# AGRONOMY





<b>AGRONOMY</b> .....	<b>7 - 23</b>
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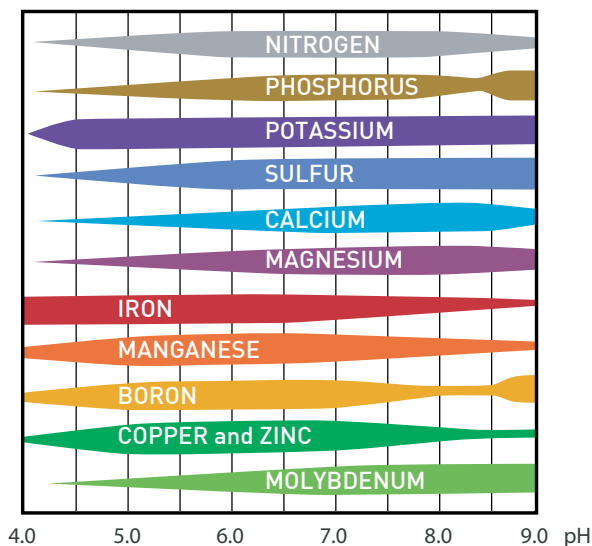


# Salt Index Chart



Fertilizer Type	Analysis	Salt Index
<b>Nitrogen / Sulphur</b>		
Ammonia	82% N	47.1
Ammonium nitrate	34% N	104.0
Urea	46% N	74.4
UAN	28-0-0-0 (39% ammonium nitrate, 31% urea)	63.0
Ammonium sulfate	21% N, 24% S	88.3
Ammonium thiosulfate	12% N, 26% S	90.4
Gypsum	23% Ca, 17% S	8.1
SUL4R-PLUS®	21% Ca, 17% S	5
<b>Phosphorus</b>		
DAP	10% N, 46% P <sub>2</sub> O <sub>5</sub>	29.2
MAP	11% N, 52% P <sub>2</sub> O <sub>5</sub>	26.7
APP	10% N, 34% P <sub>2</sub> O <sub>5</sub>	20
Crystal Green®	5% N, 28% P <sub>2</sub> O <sub>5</sub> , 10% Mg	7.7
<b>Potassium</b>		
Potassium chloride	62% K <sub>2</sub> O	120.1
Potassium sulfate	50% K <sub>2</sub> O, 18% S	42.6
Potassium thiosulfate	25% K <sub>2</sub> O, 17% S	68.0
<b>Miscellaneous</b>		
Manure salts (20%)		112.7

## pH Effect on Nutrient Availability\*



\* Width of bar represents relative availability of each nutrient

## Fertilizer Efficiency

Soil pH	% Fertilizer Efficiency			% Fertilizer Wasted
	N	P	K	
5.0	53	34	52	54
5.5	77	48	77	33
6.0	89	52	100	20
7.0	100	100	100	0

Dr. Cliff Snyder



# Crop Nutrient Uptake and Removal Chart

## Part 1 of 2

### Pounds of Actual Macronutrients

Crop System		Nitrogen	Phosphate	Potash	Sulfur	Calcium	Magnesium
Grains							
Spring Wheat (Per Bushel)	Uptake <sup>1</sup>	2.3	0.8	2	0.25	0.19	0.17
	Removal <sup>2</sup>	1.6	0.6	0.45	0.13	0.002	0.09
Winter Wheat (Per Bushel)	Uptake	1.4	0.6	1.42	0.2	0.16	0.15
	Removal	1.1	0.5	0.34	0.14	0.002	0.08
Barley (Per Bushel)	Uptake	1.4	0.55	1.35	0.16	0.11	0.08
	Removal	1	0.42	0.32	0.09	0.003	0.05
Oats (Per Bushel)	Uptake	1.1	0.4	1.45	0.13	0.13	0.07
	Removal	0.62	0.26	0.19	0.05	0.02	0.04
Corn (Per Bushel)	Uptake	1.53	0.63	1.28	0.15	0.07	0.16
	Removal	1	0.44	0.28	0.07	0.01	0.07
Fall Rye (Per Bushel)	Uptake	1.7	0.82	2.33	0.29	0.26	0.14
	Removal	1.14	0.45	0.36	0.09	0.06	0.08
Oilseeds							
Canola (Per Bushel)	Uptake	3.3	1.45	2.3	0.6	1.22	0.35
	Removal	1.92	1.05	0.52	0.34	0.13	0.15
Flax (Per Bushel)	Uptake	3	0.85	1.8	0.56	0.55	0.36
	Removal	2.2	0.65	0.6	0.23	0.14	0.22
Sunflower (1 - CWT)	Uptake	3.75	1.3	1.95	0.45	2.73	1.91
	Removal	2.7	0.8	0.6	0.25	0.16	0.35
Pulse Crops							
Peas (Per Bushel)	Uptake	3	0.83	2.75	0.25	0.48	0.16
	Removal	2.35	0.7	0.71	0.13	0.003	0.07
Lentils (Per Bushel)	Uptake	3.03	0.83	2.6	0.3	NA	NA
	Removal	2.03	0.63	1.1	0.17	NA	NA
Soybeans (Per Bushel)	Uptake	5.2	1	3.4	0.35	2.04	0.67
	Removal	3.8	0.84	0.83	0.11	0.11	0.17
Dry Beans (1 - CWT)	Uptake	4.67	1.39	3.95	0.34	3.07	0.71
	Removal	3.5	1.12	1.88	0.22	0.37	0.22
Faba Beans (1 - CWT)	Uptake	5.7	2.0	4.2	0.3	2.8	0.5
	Removal	3.4	1.2	1.0	0.1		
Forages - 1 Dry Tonne							
Alfalfa (Dry Basis)	Removal	60	15	63	6.6	30	7
Grass (Dry Basis)	Removal	37	11	47	4.67	16.25	4
Barley Silage (Dry Basis)	Removal	40	13.33	29.33	4.67	NA	NA
Corn Silage (Dry Basis)	Removal	34	14	44	2.8	5	3.25
Specialty Crops							
Potatoes (1 - CWT)	Uptake	0.56	0.17	0.75	0.05	0.12	0.09
	Removal	0.32	0.1	0.55	0.03	0.001	0.03
Sugarbeets (Per Tonne)	Uptake	10.5	3.4	19.25	1.65	NA	3
	Removal	4.45	2.05	7.25	0.65	NA	NA

\*1 - Uptake = Total nutrient taken up by the crop to grow and develop

\*2 - Removal - Nutrient removed in harvested portion of the crop (grain, seed or fruit)

- There are 454 Grams in a lb to convert on the micronutrient range

- Pulses and Legumes can achieve a high percentage of their nitrogen requirements from the atmosphere through inoculation

-1 - CWT = 100 lbs of grain. Ex 20 CWT of Sunflowers = 2000 lbs of grain production

### Conversion Factors

Tonne (metric)/hectare x 0.446 = ton/acre

Ton/acre x 2.24 = tonne/hectare

Tonne x 1.102 = ton

Ton x 0.9072 = tonne

Kilogram (kg) x 2.205 = pound

Pound x 0.454 = kilogram (kg)

Hectare x 2.472 = acre

Kilogram/hectare x 0.891 = pound/acre

Pound/acre x 1.12 = kilogram/hectare

Acre x 0.405 = hectare

P x 2.3 = P<sub>2</sub>O<sub>5</sub>

P<sub>2</sub>O<sub>5</sub> x 0.43 = P

K x 1.2 = K<sub>2</sub>O

K<sub>2</sub>O x 0.83 = K



# Crop Nutrient Uptake and Removal Chart

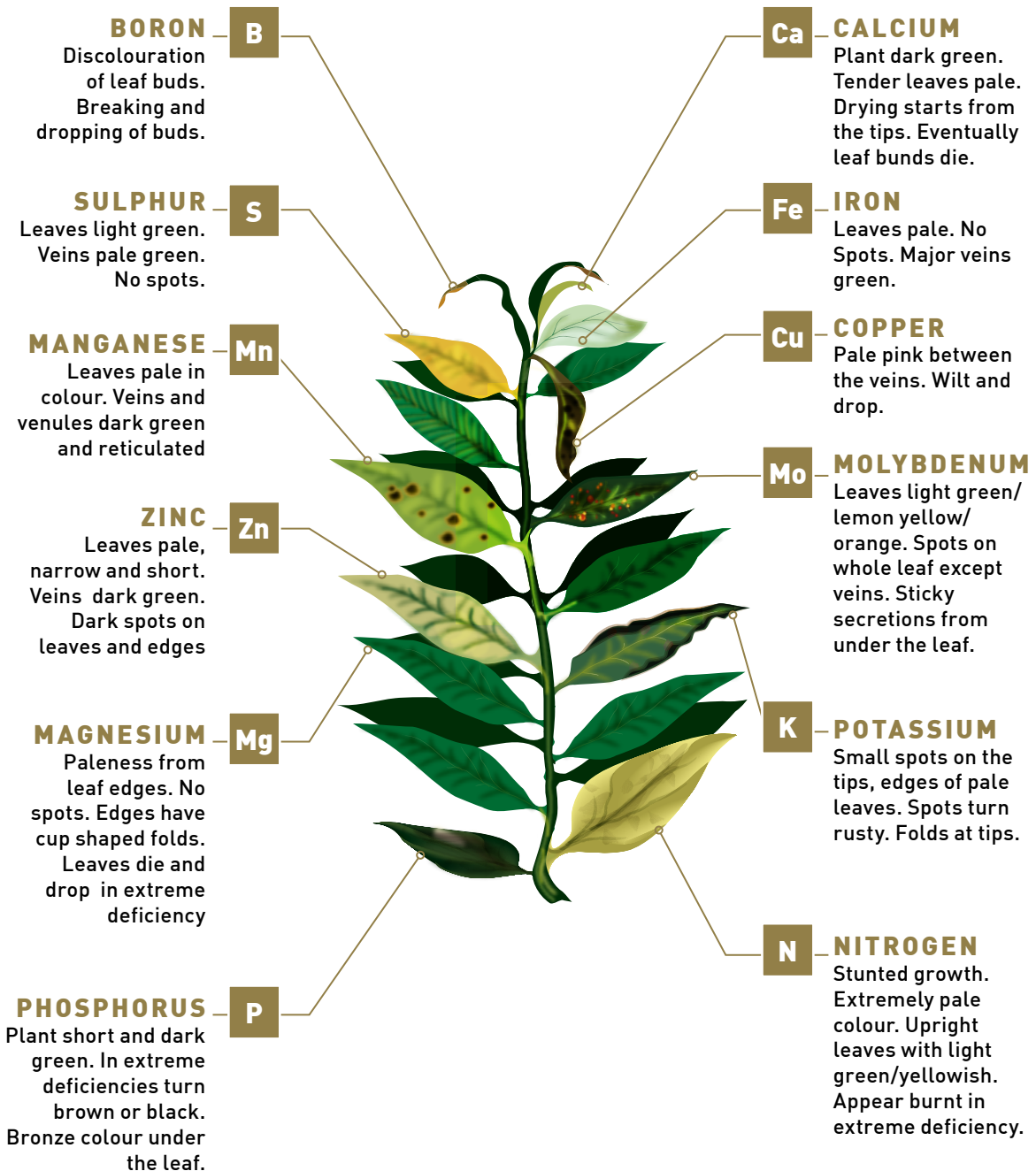
## Part 2 of 2

Crop System	Grams of Actual Micronutrients				
	Zinc	Manganese	Copper	Boron	Iron
<b>Grains</b>					
Spring Wheat (Per Bushel)	3.48	2.03	0.53	1.67	8.48
	1.55	1.08	0.15	0.48	3.58
Winter Wheat (Per Bushel)					
Barley (Per Bushel)	1.24	0.62	0.38	1.34	3.54
	0.86	0.48	0.34	0.67	2.05
Oats (Per Bushel)	0.99	1.04	0.36	1.04	9.13
	0.69	0.69	0.18	0.54	6.96
Corn (Per Bushel)	1.22	1.11	0.2	0.47	3.03
	0.96	0.12	0.06	0.15	0.76
Fall Rye (Per Bushel)					
<b>OilSeeds</b>					
Canola (Per Bushel)	3.58	1.67	0.6	3.7	20.55
	1.31	0.96	0.12	1.08	14.34
Flax (Per Bushel)	3.15	1.77	0.88	3.03	5.55
	2.4	0.63	0.25	0.76	2.65
Sunflower (1 - CWT)	2.7	4.29	1.72	6.38	12.27
	1.84	0.86	0.86	0.98	1.84
<b>Pulse Crops</b>					
Peas (Per Bushel)	4.54	0.76	0.34	1.58	4.61
	1.24	0.28	0.14	0.48	1.99
Lentils (Per Bushel)					
Soybeans (Per Bushel)	1.78	4.54	0.49	2.47	13.42
	1.18	0.69	0.3	0.79	7.11
Dry Beans (1 - CWT)	2.35	6.05	0.34	2.35	26.23
	1.68	1.01	0.24	0.67	3.36
Faba Beans (1 - CWT)					
<b>Forages - 1 Dry Tonne</b>					
Alfalfa (Dry Basis)					
Grass (Dry Basis)					
Barley Silage (Dry Basis)					
Corn Silage (Dry Basis)					
<b>Specialty Crops</b>					
Potatoes (1 - CWT)	0.8	2.04	0.16	0.31	3.54
	0.36	0.1	0.13	0.14	1.46
Sugarbeets (Per Tonne)					

The guidelines in nutrient uptake and removal values in this chart are general estimates. They are based on typical nutrient concentrations and yields for good growing conditions in Western Canada. Crop uptake and removal studies have been shown to vary 15% either way of the above listed numbers for different crops. Actual uptake and removal will vary with crop yield, crop variety and soil fertility from year to year. This chart is to accompany an in-depth soil analysis from an accredited lab. Crop fertility requirements will differ from these nutrient removal values. Crops are not able to extract all available plant nutrients from the soil, and fertilizers are not 100% efficient. For any given yield, the total nutrient supply in the soil (soil plus added fertilizer) will be somewhat greater than the amount removed by the crop. The best way to determine fertilizer requirements is regular soil and plant tissue analysis accompanied with a good Crop Nutrient Uptake and Removal Chart. Crop uptake and removal rates will vary by variety. Newer varieties and hybrid crops may have a more aggressive nutrient demand.

Chart References - CFI Nutrient Uptake and Removal - Western Canada 2001, Eastern Canada 2001 | A&L Agronomy Handbook | Nutrient Content, Uptake Pattern and Carbon: Nitrogen Ratios of Prairie Crops, Manitoba Agriculture, Food and Rural Initiatives 2007

## DEFICIENCY CHART OF NUTRIENTS



The colours represented are indicative. They may vary from plant to plant.



DEFICIENCY SYMPTOMS		MADE WORSE BY
<ul style="list-style-type: none"> <li>Foliage yellowing first</li> <li>Stunted plants</li> <li>Smaller fruit, lower yields</li> </ul>	<b>N</b>	<ul style="list-style-type: none"> <li>Extreme low or high pH</li> <li>Fast growing crops</li> </ul>
<ul style="list-style-type: none"> <li>Severe stunting, leaf die back</li> <li>Leaves, stems and veins dark green to purple</li> <li>Delayed maturity</li> <li>Poor seed development</li> </ul>	<b>P</b>	<ul style="list-style-type: none"> <li>Very acidic or calcareous condition</li> <li>Cold conditions</li> <li>Poorly developed root systems</li> <li>Low Phosphorus, high Iron</li> </ul>
<ul style="list-style-type: none"> <li>Leaf distortion &amp; curling</li> <li>Marginal leaf scorch</li> <li>Late season blotchy chlorosis</li> <li>Poorly developed root system</li> </ul>	<b>K</b>	<ul style="list-style-type: none"> <li>Acidic conditions</li> <li>High Calcium and Magnesium</li> </ul>
<ul style="list-style-type: none"> <li>Leaves are light green / yellow</li> <li>Plants are stunted</li> <li>Delayed maturity</li> </ul>	<b>S</b>	<ul style="list-style-type: none"> <li>Acidic conditions</li> <li>Poor aeration</li> </ul>
<ul style="list-style-type: none"> <li>Mottled chlorosis first on old leaves, moving to new growth</li> <li>Crop stunting</li> </ul>	<b>Mn</b>	<ul style="list-style-type: none"> <li>High pH</li> <li>Organic conditions</li> <li>Prolonged cold periods</li> </ul>
<ul style="list-style-type: none"> <li>Stunted growth, small malformed leaves</li> <li>Interval chlorosis, striping in grasses</li> <li>Twig die-back</li> </ul>	<b>Zn</b>	<ul style="list-style-type: none"> <li>Organic conditions</li> <li>High pH</li> <li>High Phosphorus fertilization</li> </ul>
<ul style="list-style-type: none"> <li>Interveinal chlorosis and necrosis especially on older leaf tips</li> <li>Drooping leaves</li> <li>Excessive premature fruit drops</li> </ul>	<b>Mg</b>	<ul style="list-style-type: none"> <li>Very acidic conditions</li> <li>High Potassium or Calcium</li> </ul>
<ul style="list-style-type: none"> <li>Poor root development</li> <li>Premature shedding of blossoms and buds</li> <li>Deformed terminal leaves / dead terminal buds</li> </ul>	<b>Ca</b>	<ul style="list-style-type: none"> <li>Acidic conditions</li> <li>High Aluminum</li> </ul>
<ul style="list-style-type: none"> <li>Death of terminal growth</li> <li>Thick brittle leaves</li> <li>Poor fruit set / malformed fruit</li> </ul>	<b>B</b>	<ul style="list-style-type: none"> <li>High Nitrogen or Calcium</li> <li>High soil pH</li> <li>Alkaline conditions</li> </ul>
<ul style="list-style-type: none"> <li>Marginal chlorosis</li> <li>Shoot die-back, stunted growth</li> <li>Necrotic areas on terminal leaves</li> </ul>	<b>Cu</b>	<ul style="list-style-type: none"> <li>Organic conditions</li> <li>High Nitrogen application</li> <li>Water stressed plants</li> </ul>
<ul style="list-style-type: none"> <li>Interveinal chlorosis, young leaves first</li> <li>Stunted growth</li> </ul>	<b>Fe</b>	<ul style="list-style-type: none"> <li>High pH</li> <li>Water logged soil</li> <li>Calcareous conditions</li> <li>High Copper, Manganese, Zinc</li> </ul>
<ul style="list-style-type: none"> <li>Reduced nodulation on legumes</li> <li>Poor growth, pale leaves</li> </ul>	<b>Mo</b>	<ul style="list-style-type: none"> <li>Low pH</li> </ul>

## FUNCTION

## Nutrient Functions in the plant

- Primary building block for amino acids, protein, & protoplasm
- Critical for flower differentiation, rapid shoot growth, bud vigor, & fruit set
- Acts as a catalyst for other elements

- Important for energy transfer & storage
- Formation of nucleic acids
- Promotes root, flower, & seed development

- Necessary for the formation of sugars & starches
- Essential for oil production
- Enzyme activator
- Improves cold weather tolerance

- Component of amino acids & proteins
- Aids in nodule formation of sugars & starches
- Stabilizes Nitrogen

- Necessary for the formation of sugars & starches
- Aids in Nitrogen utilization & assimilation
- Aids in chlorophyll synthesis

- Synthesis of Auxins & protein
- Needed for uniform maturity
- Important for Calcium translocation

N

P

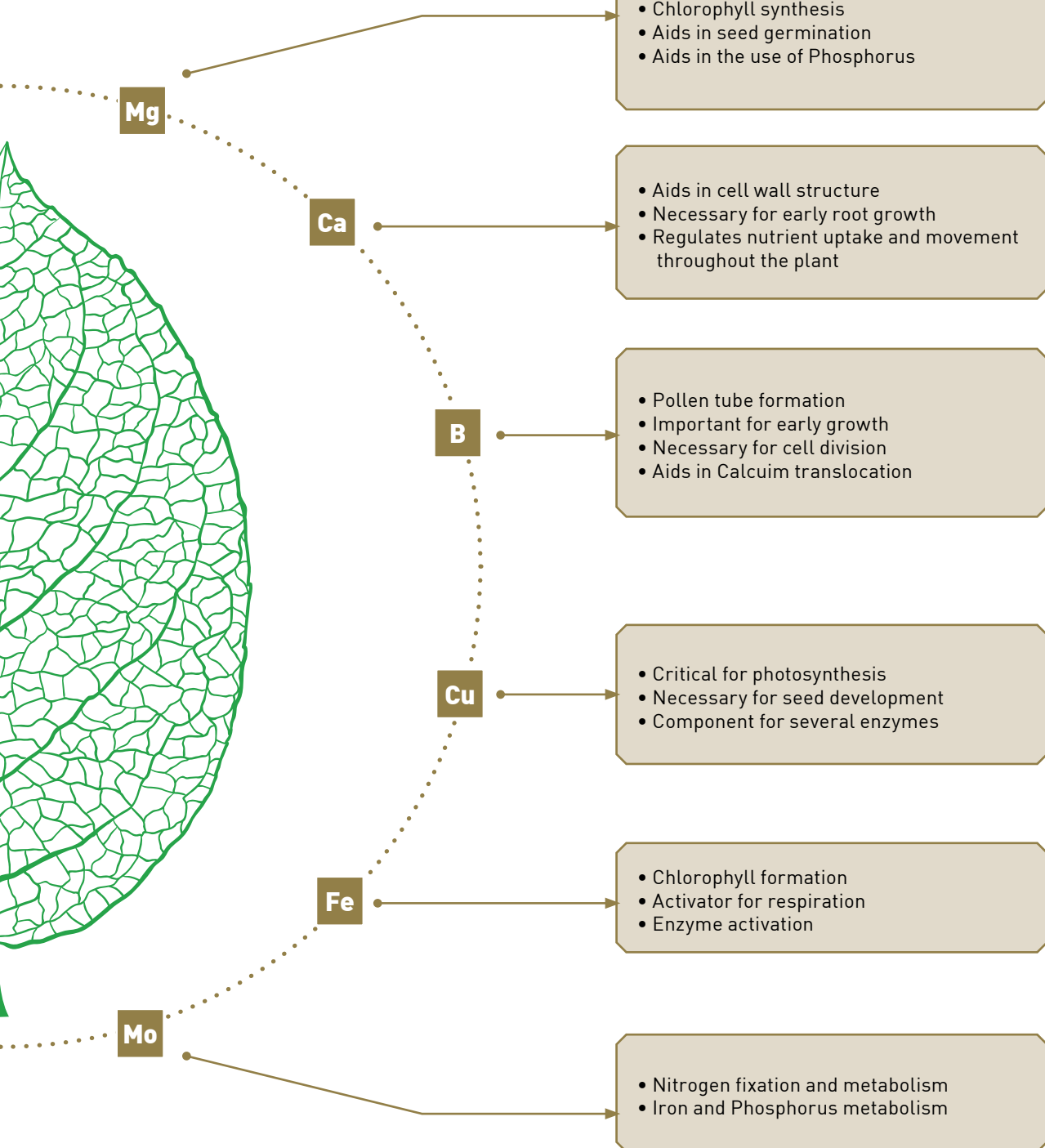
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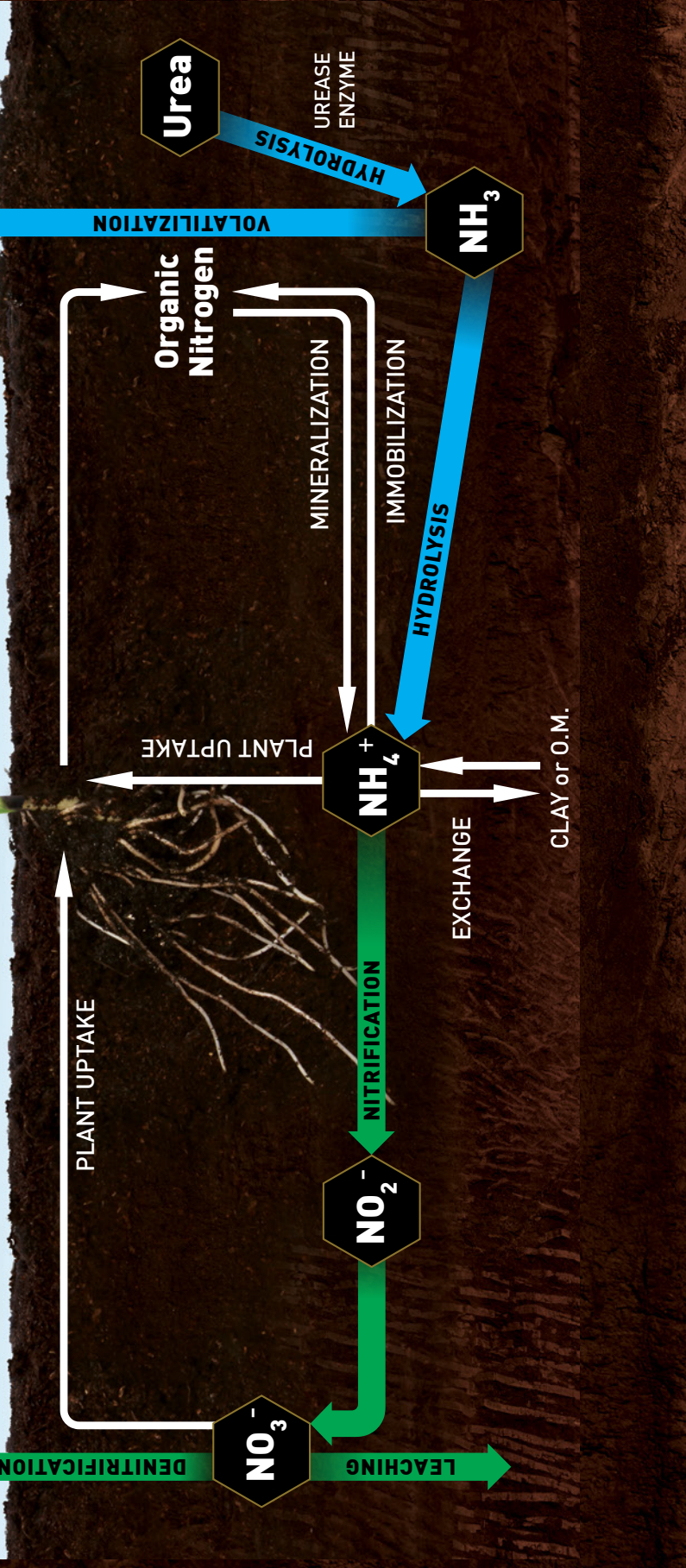
Mn

Zn

# Nutrient Functions in the plant

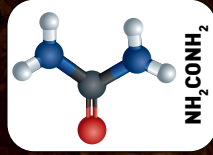




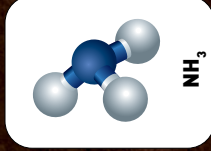




## HYDROLYSIS



Urease  
Enzyme



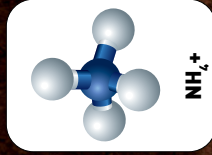
$\text{H}^+$



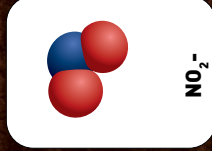
**Ammonium**

✓ BINDS TO NEGATIVELY CHARGED SOIL

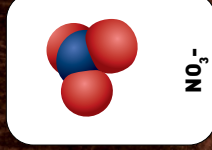
## NITRIFICATION



NitroSomonas Bacteria



NitroBacter Bacteria



**Nitrate**

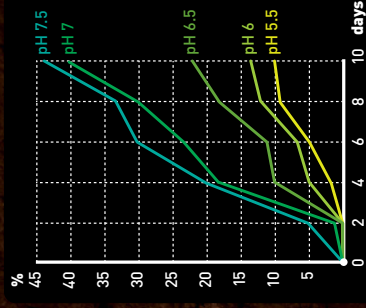
✗ DOESN'T BIND TO NEGATIVELY CHARGED SOIL

### Considerations when applying Urea, UAN, or $\text{NH}_3$

- Soil Type, pH, Moisture, Organic Matter
- Nitrogen Placement and Concentration
- Thatch Cover
- **Hydrolysis** soil temperature: Urease Enzymes remain active in the soil as cold as  $-20^\circ\text{C}$ .<sup>1</sup>
- **Nitrification** soil temperature: NitroSomonas and NitroBacter Bacteria will remain active in soils as low as  $+4^\circ\text{C}$ .<sup>2</sup>

### % Volatilization based upon soil pH <sup>3</sup>

Days	Soil pH						
	5.5	6	6.5	7	7.5		
0	0	0	0	0	0	0	0
2	0	0	0	0	1	5	
4	2	5	10	18	20		
6	5	7	11	23	30		
8	9	12	18	30	33		
10	10	13	22	40	44		



Plant Available



Not Plant Available



Unstable

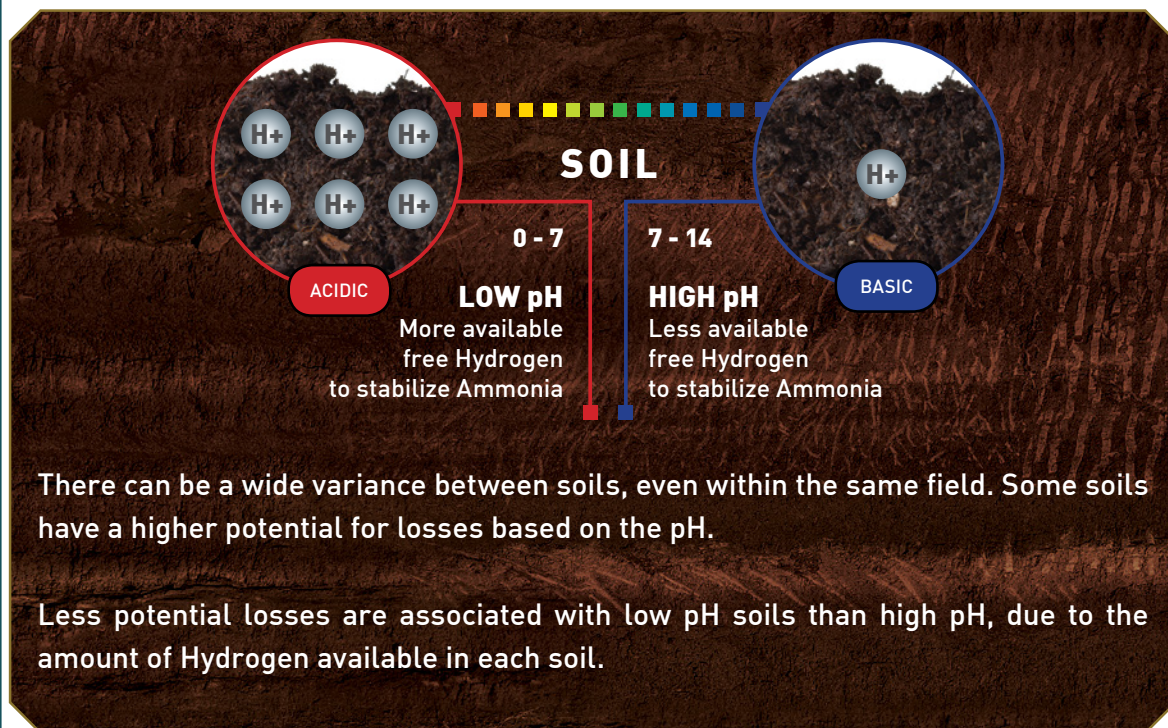


Stable

<sup>1</sup> Enzyme Activity in Soils at Subzero Temperatures, J.M. Bremner & M.I. Zantua; Stability of Urease in Soils, M.I. Zantua & J.M. Bremner  
<sup>2</sup> Ammonia Oxidation in Nitrosomonas at NH<sub>4</sub><sup>+</sup> Concentrations near K<sub>m</sub>; Effects of pH and Temperature, Joost Groeneweg et al 1994; [www.biosciences.com/bio/bact/bact.html](http://www.biosciences.com/bio/bact/bact.html)  
<sup>3</sup> Overdahl et al., 1960, Soil Sci. Soc. Am. Proc. 24:87-90



## Why Soil pH is important



## Considerations of Hydrolysis

- Soil pH
- Soil Moisture
- Soil Temperature ( - 20°C)
- Thatch Cover — 20-30 times higher urease concentration than underlying soil\*
- Placement & Concentration

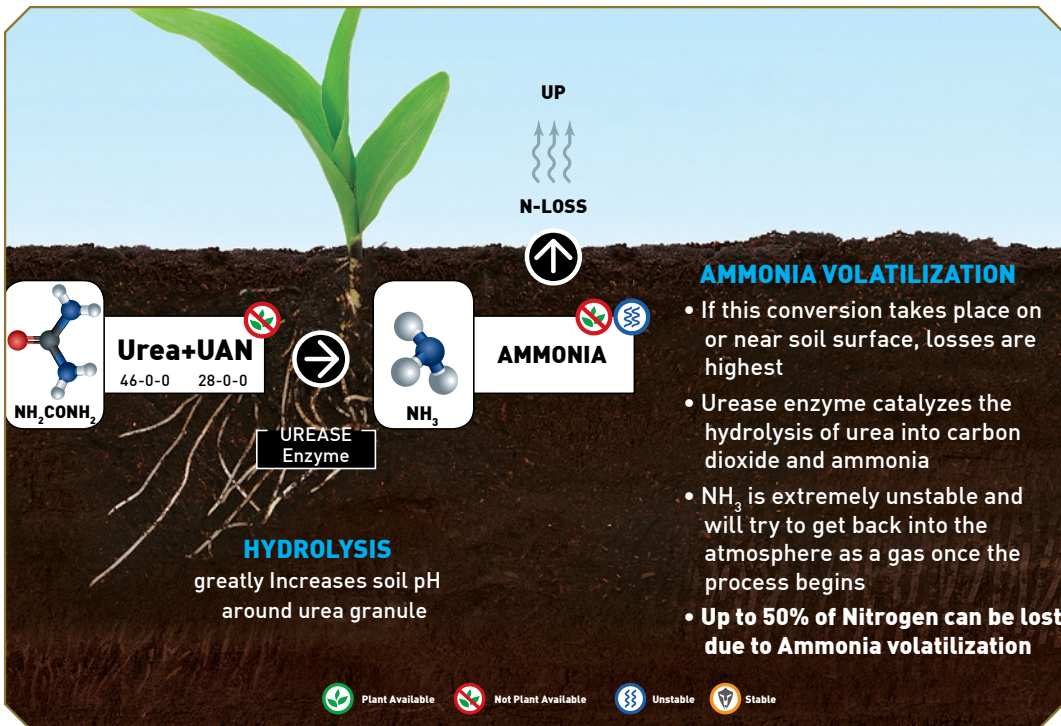
\* [https://umanitoba.ca/faculties/afs/agronomists\\_conf/media/Fernandez\\_NitrogenAdditivesWinnipegDec152016.pdf](https://umanitoba.ca/faculties/afs/agronomists_conf/media/Fernandez_NitrogenAdditivesWinnipegDec152016.pdf)

## Considerations of Nitrification losses

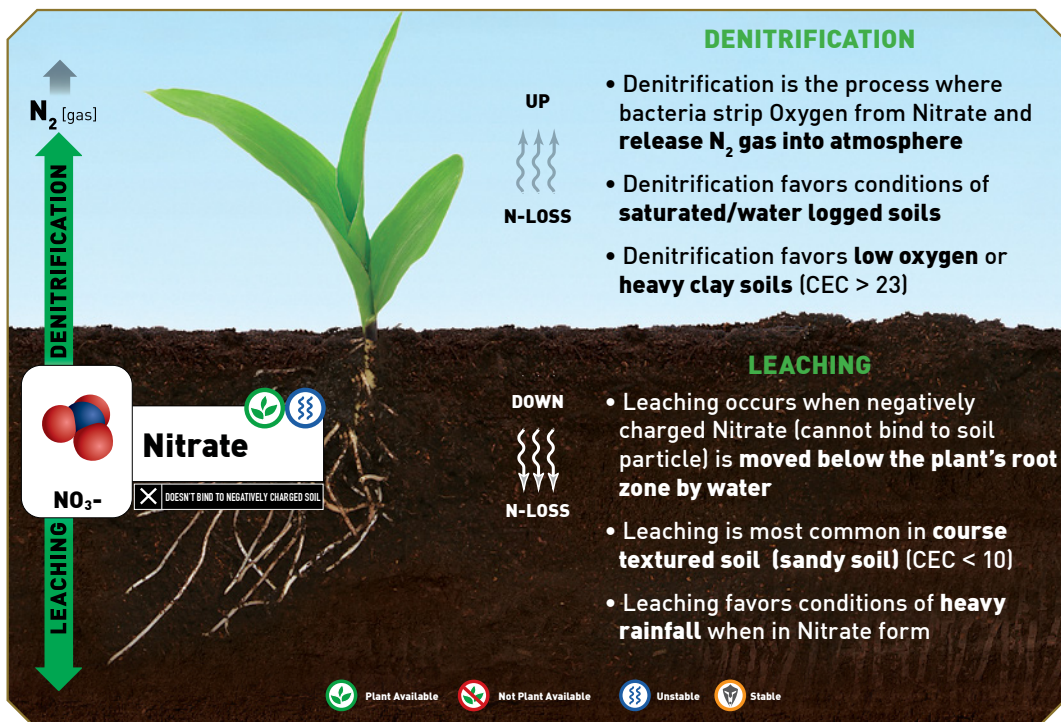
- Soil type (CEC)
- Soil moisture
- Soil temperature: Nitrosomonas and Nitrobacter bacteria will remain active in soil as low as +4°C



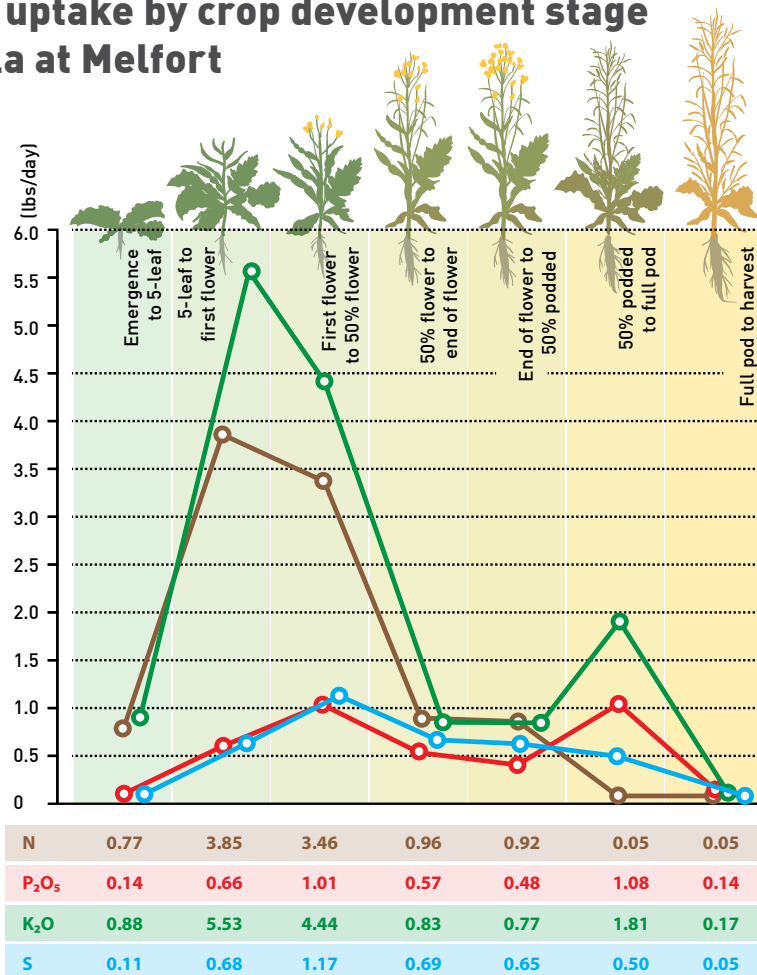
## Volatilization



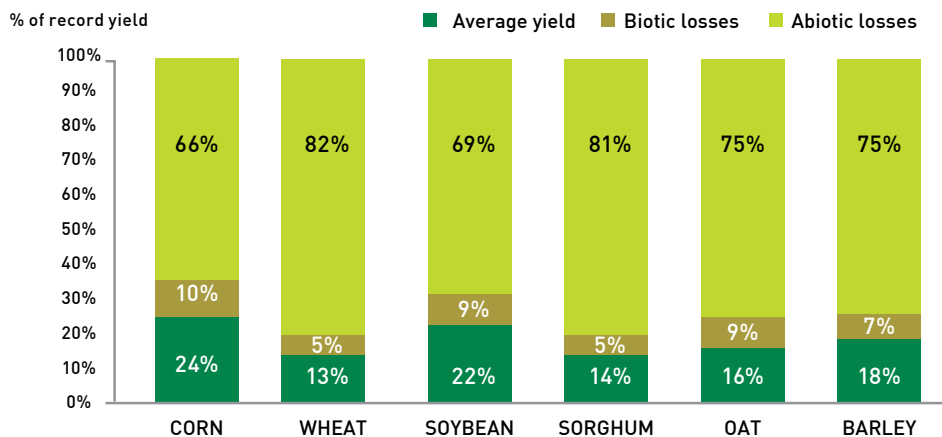
## Potential loss mechanisms of Nitrate



## Nutrient uptake by crop development stage for canola at Melfort

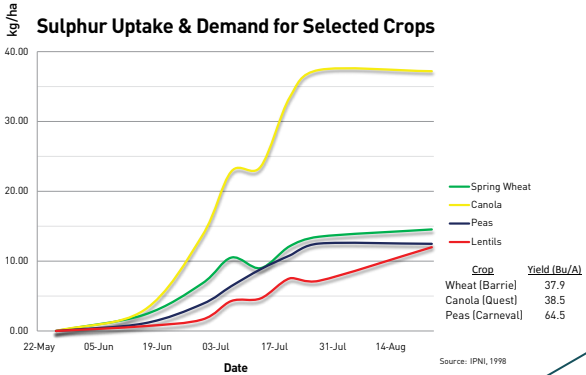
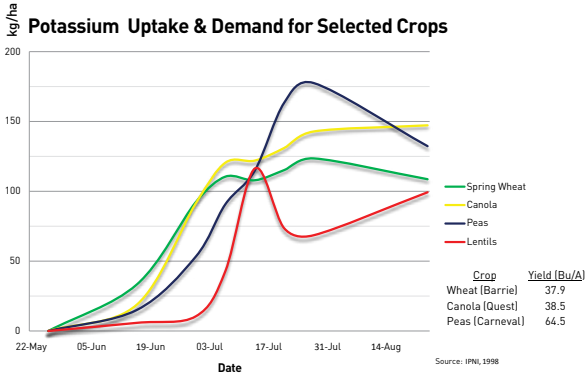
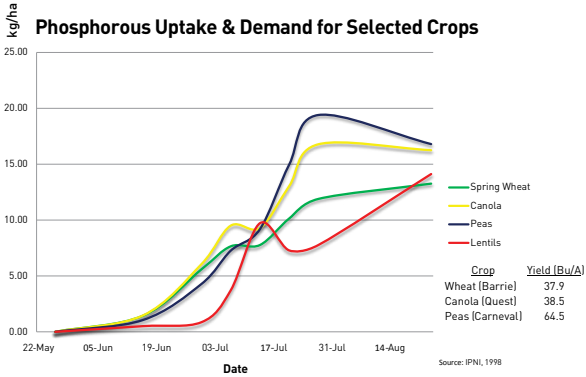
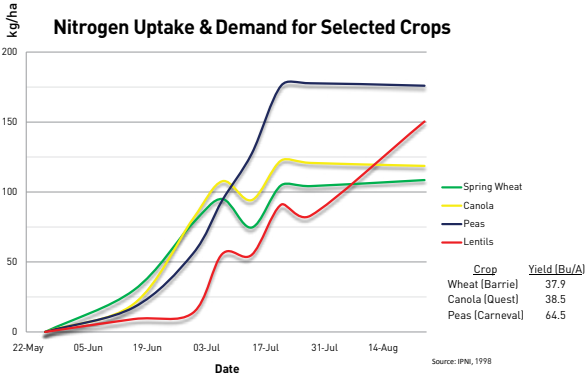
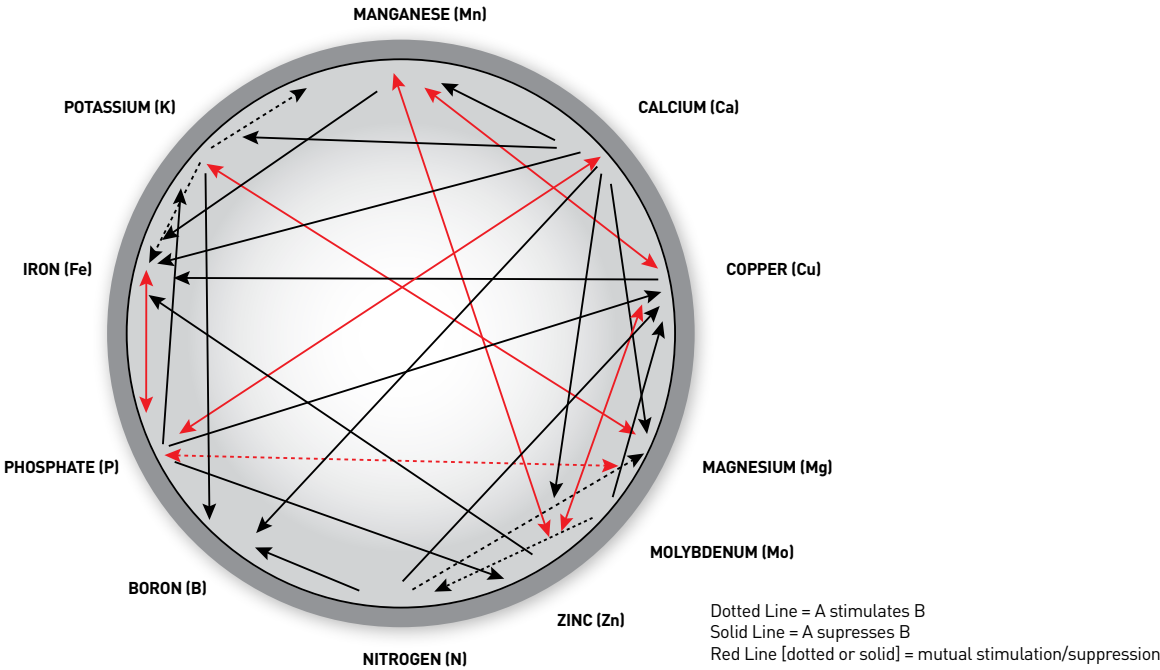


## Yield Impact from Abiotic Losses for Major Crops



Source: Biochemistry and Molecular Biology of Plants; Buchanan, Gruissem, Jones; American Society of Plant Physiologists, 2000

# Mulder's Nutrient Interaction Chart



HYDROGEN  
**H**

OXYGEN  
**O**

CARBON  
**C**

18 nutrients  
necessary for  
plant growth  
&  
human health

**K**  
**Zn**  
**P**  
**Fe**  
**Cu**  
**S**  
**Mg**  
**N**  
**Mn**

Involved in photosynthesis

**Fe** **Cu** **P** **Zn** **Ca** **N**  
Promote plant growth

Promote reproduction

**Cu** **S**

Aid translocation of photosynthesis  
from leaves to fruiting organs

**Ca** **S**

Fruit formation

**K** **Ca**

Enhances maturity of small grains

**Cl**

Quickens maturity

**S**

Fruit quality

**P**

Fruit flavour

**Cu**

Seed quality

**K**

Seed formation

**P** **S** **Zn**

Stimulates microbial activity

**Ca**

Promotes root formation & growth

**P**

**Ca** Reduces plant respiration

**Fe** Acts as an O<sub>2</sub> carrier

**K** Involved in carbohydrate metabolism  
& translocation of starches

Increases disease resistance

**Mg** Aids in enzyme functionality & plant use of Fe and P

**P** Improves winter hardiness

**Mn** Helps enzyme activity and increases  
the availability of P & Ca

**S** **Mo** Responsible for enzyme activity  
Promote nodule formation on legumes

**K** Increases water-use efficiency

Soil  
macronutrients

PHOSPHORUS  
**P**

POTASSIUM  
**K**

NITROGEN  
**N**

Secondary  
macronutrients

CALCIUM  
**Ca**

MAGNESIUM  
**Mg**

SULPHUR  
**S**

MANGANESE  
**Mn**

IRON  
**Fe**

COPPER  
**Cu**

SILICON  
**Si**

MOLYBDENUM  
**Mo**

SODIUM  
**Na**

ZINC  
**Zn**

Soil  
micronutrients

BORON  
**B**

CHLORINE  
**Cl**



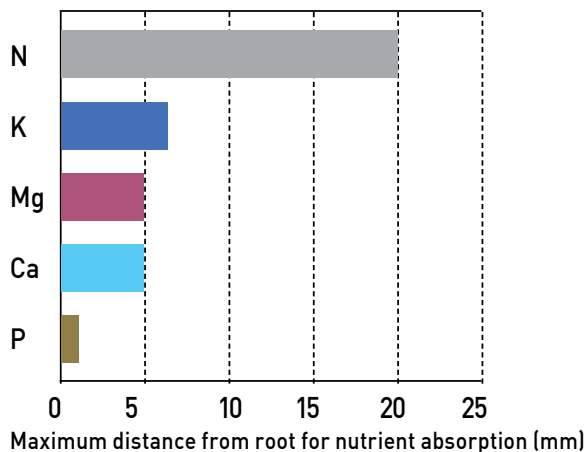


- 
- Fe** Plays a key role in brain and muscle function  
Helps deliver oxygen to the tissues
  - Zn** Contributes to perception of taste
  - Mg** Needed for immune system health
  - S** Key component of protein
  - Mg K Ca** Essential for muscle and nerve activity
  - Ca** Important in immune system health, blood clotting and pressure regulation
  - N** A component of proteins, DNA, RNA and blood
  - Cu** A component of enzymes & involved in Fe metabolism
  - Cl** Promotes digestive process
  - P** Maintains acid-base balance
  - K** Needed for proper fluid balance
  - Mn Mo** Key component of enzymes
  - Zn** Essential to fetal development & functioning of reproductive system  
A component of enzymes, DNA, RNA, proteins & promotes immune system health
  - Ca B P** Important for healthy bones

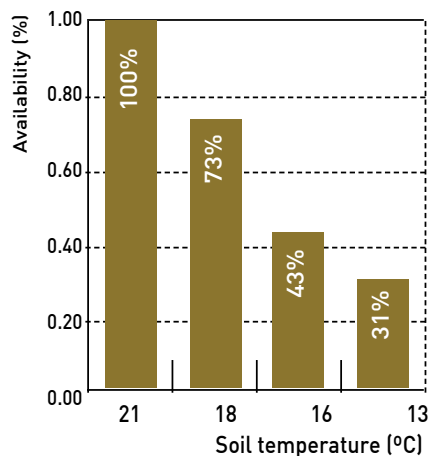
## Nutrients: The Foundation for Life

## Nutrient Availability

Plants only absorb phosphate that lies very close (1mm) to the root surface.



A drop from 21°C to 13°C reduces phosphorus availability by almost 70%.



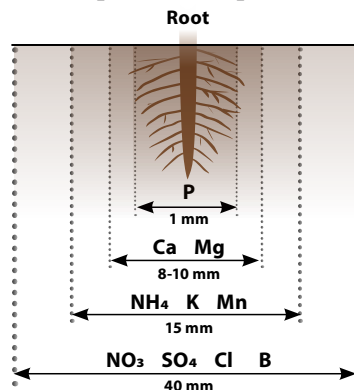
## Soil Optimum levels based on CEC

CEC					
PPM SOIL		0-6	7-15	16-25	26+
P	poor	0 - 25	0 - 23	0 - 18	0 - 13
	med	26 - 55	24 - 43	19 - 33	14 - 23
	good	56 - 93	44 - 83	34 - 55	24 - 43
	high	94 +	84+	56 +	44 +
K	poor	0 - 45	0 - 60	0 - 80	0 - 100
	med	46 - 90	61 - 120	81 - 160	101 - 200
	good	91 - 180	121 - 240	161 - 320	201 - 400
	high	181 +	241 +	321 +	401 +
Ca	poor	0 - 200	0 - 400	0 - 600	0 - 1000
	med	201 - 400	401 - 800	601 - 1200	1001 - 2000
	good	401 - 800	801 - 1600	1201-2400	2001 - 6000
	high	801 +	1600 +	2400 +	6000 +
Mg	poor	0 - 25	0 - 50	0 - 75	0 - 100
	med	26 - 50	51 - 100	76 - 150	101 - 200
	good	51 - 100	101 - 200	151 - 300	201 - 600
	high	101 +	201 +	301 +	601 +
% SATURATION of CATIONS					
% K Saturation		4 - 6	3 - 5	2 - 4	2 - 3
% Mg Saturation		10 - 20	8 - 20	5 - 20	5 - 20
% Ca Saturation		60 - 80	60 - 80	60 - 80	60 - 80

A&L Canada Labs Factsheet

**Cation Exchange Capacity:** Measures the ability of a soil to hold and release nutrients.

## Nutrient mobility and plant uptake



# Mycorrhizae

Image courtesy of Premier Tech

## WHY USE MYCORRHIZAE?

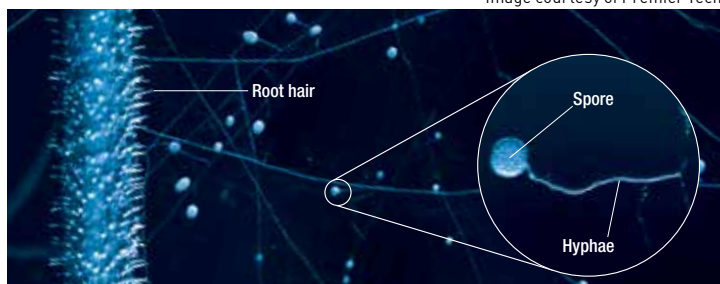
- Mycorrhizae had a symbiotic partnership with plants since they appeared on dry land more than 450 million years ago.
- Over 80% of plants on earth now have a mutual symbiotic relationship with arbuscular mycorrhizal fungi (AM).
- Play a major role in their nutritional status and productivity. Many of those plants are crop species.
- Play a role in soil structure formation and maintenance by releasing an exudate called glomalin which acts as an aggregate glue and nutrient source for other soil microbes involved in plant nutrition and disease suppression in the root environment.

## HOW DOES THE TECHNOLOGY WORK?

- Mycorrhizae spores germinate in the soil in response to plant chemical signals.
- They then enter the root to form a partnership with the plant, and produce a network of hyphae (tiny filaments much smaller in diameter than root hairs but longer).
- Hyphae grow beyond the root zone, carry nutrients and water from the soil to the plant in exchange for carbon.
- The alliance between the roots and fungi accelerates root and plant growth.

## ABSORPTION CAPACITY

- Previously thought to be primarily involved in securing phosphorus.
- Further research also reveals they absorb water, and elements such as N, S, K, Cu, Zn, B, Fe, Mn.
- Support of a variety of plant functions like nodulation and grain filling .
- *Hyphae absorptive network is about 10 times more efficient than root hairs and 100 times more efficient than roots<sup>1</sup>.*



## STRESS RESISTANCE

- Mycorrhizae increase tolerance to environmental stresses such as: disease infection, drought, compaction, salinity, etc.
- Plays a role in soil particle aggregation, leading to better water penetration, aeration, less erosion, and leaching of nutrients.
- In drought mycorrhizae move water stored in hyphae to the plant delaying the impact of drought. Plants with mycorrhizae survive, reproduce and grow better than those without the symbiosis.

## READING THE LABEL - VIALE SPORES VS. PROPAGULES

- Number of viable spores is important to the efficacy of a mycorrhizae product.
- *Viable Spores:* total amount of viable, useable spores that will germinate are included in the total; a more accurate gauge of product performance.
- *Propagules:* total amount of spores, viable and non-viable, and other materials such as pieces of hyphae are included in the total; less accurate gauge of product performance.

## FOR BEST RESULTS

- Apply the year after Canola rotation (Canola does not support arbuscular mycorrhizae and populations are negatively affected).
- Apply to crops that have a small root system (flax, potatoes, barley etc).
- Use on land that is extremely deficient in P, and metal micro-nutrients like Cu, Zn, Mn, Fe, etc.

<sup>1</sup> Jones, C. E. 2009, Mycorrhizal fungi-powerhouse of the soil. Evergreen Farming 8:4-5

# Rhizobium

## WHAT IS IT?

- Naturally occurring soil bacteria that form a symbiotic, N-fixing relationship in the roots of select legumes.
- The host plant produces root nodules after infection, that the bacteria live and thrive in.
- These nodules house the bacteria responsible for fixing the atmospheric N and make it available for the plant.
- Rhizobium can't fix N on their own. They need a host plant to colonize the roots.
- 20% of all legumes form a mutualistic relationship with rhizobium (soybean, peas, clover, lentils and faba beans among them)<sup>1</sup>.
- Rhizobium species are very plant specific: Pulses form a relationship with Rhizobium Leguminosarum/Soybeans form a relationship with Bradyrhizobium Japonicum.

## HOW DOES IT WORK?

- The plant sends out a chemical signal (flavonoids and isoflavonoids) from its roots.
- This attracts the rhizobium, which responds by sending out signals called Nod factors.
- Rhizobium start the "invasion process" by penetrating the root-hair wall and enter the plant cells.
- This turns on a gene in the plant to initiate root nodulation.
- Inside the nodules the rhizobium differentiate into a non-motile form that fix the N into plant available form.
- After nodule formation the plant converts N (ammonium form) into amino acids that are exported throughout the plant.
- Simple sugars and oxygen are released to the rhizobium from the plant. The oxygen is bound by the rhizobium to a protein called leghemoglobin, preventing loss to the atmosphere as a gas.

## BENEFITS OF RHIZOBIUM INOCULATION

- Increased N-fixing bacteria
- Enhanced N fixation
- Increased nodulation
- Increased legume productivity
- The most efficient way to supply the large amounts of nitrogen needed by legumes to produce high-yielding crops with a high protein content

<sup>1</sup>Sprent, J.I., 2007. Evolving ideas of legume evolution and diversity: A taxonomix perspective on the occurrence of nodulation. New Phytol. 174:11-25

# Tripartite Symbiosis

**Mycorrhizae** - develop a network that explores the soil and accesses more nutrients and water for the plant.

**Rhizobium** - fixes nitrogen and makes it available to the plant.

**The Plant** - wins by accessing more nutrients and water and increased nodulation equaling more yield

- Mycorrhizae take up P and water from soil to transfer to plant.
- Plant can give more P to rhizobium to fix more N.
- Plant will photosynthesize 51% more and grow faster.
- Plant gives carbon to its rhizobium & mycorrhizae partners.
- Mycorrhizae will propagate and spread rhizobium to other roots.

## 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.

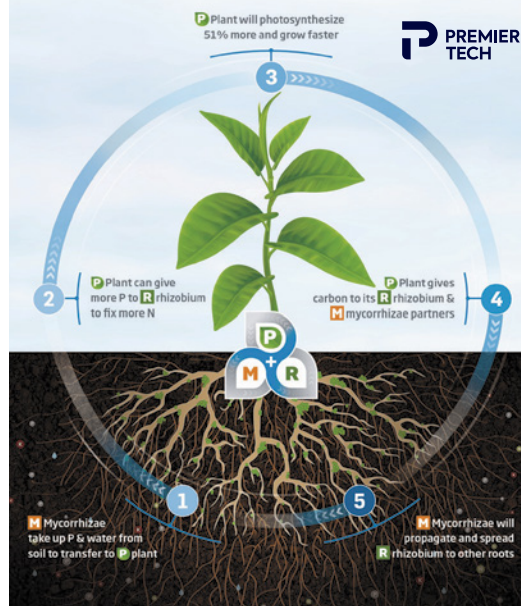
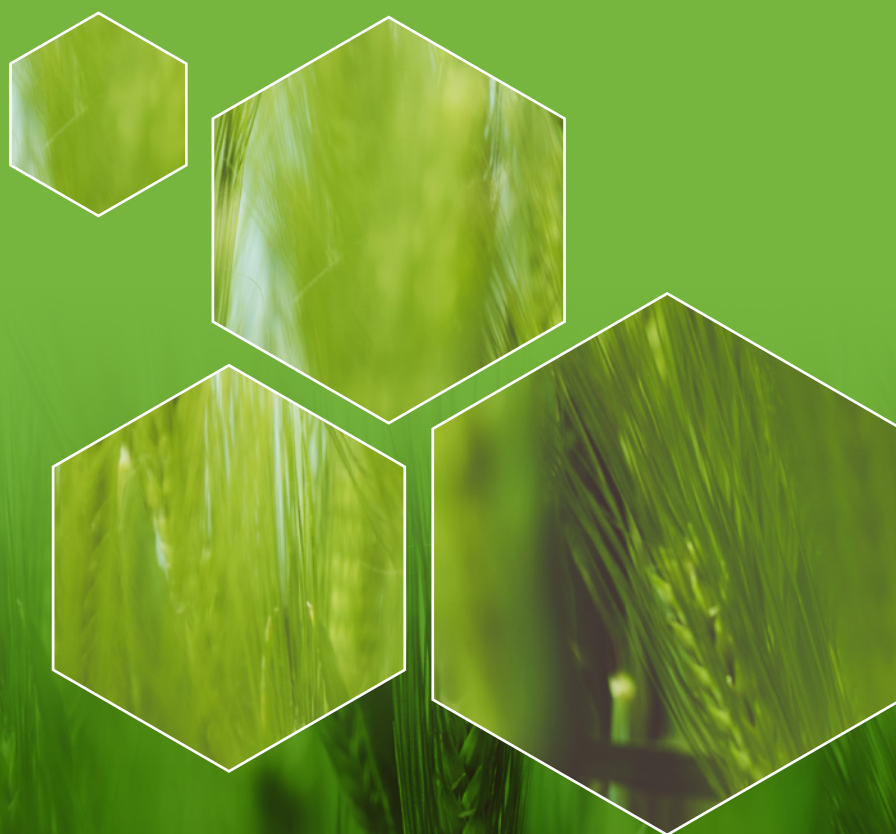


Image courtesy of Premier Tech

## FERTILITY





FERTILITY .....	27 - 37
SUL4R-PLUS® Fertilizer .....	27
2016 Texas A&M Leachate Study .....	29
Ostara Crystal Green® & Crystal Green Synchro™ .....	30
Polysulphate® Premium .....	36





### GRANULAR ANALYSIS

Calcium	21%
Sulfur	17%
pH	7 - 8
Granular Range (TSD) (SGN)	250 - 280
Crush Strength	8 lbs.
Uniformity Index (UI)	> 50
Bulk Density	58 - 60 lbs./cubic ft.
Salt Index	5
Ammonium Lignosulfonate Binder (Fluvic Acid)	10%

### RATE of APPLICATION

Optimum use rate varies according to crop need. As the chart below indicates, 100 lbs. of SUL4R-PLUS® fertilizer per acre delivers 21 lbs. of Calcium and 17 lbs. of Sulfur per acre.

SUL4R-PLUS®	Calcium	Sulfur
lbs./acre	lbs./acre	lbs./acre
100	21.0	17.0
200	42.0	34.0



# SUL4R-PLUS®

## FERTILIZER

### CONTROLLED RELEASE SULFATE

SUL4R-PLUS® fertilizer is a controlled release granular sulfate product that provides season long availability for your crops. The controlled release of plant-available sulfate allows the plant to have as much or as little as it needs during the growing season.

#### • High Purity Synthetic Calcium Sulfate

Providing immediate and season long availability, matching the nutrient uptake of crops closer than any other sulfate on the market

#### • Ammonium Lignosulfonate Binder

Contributing to controlled release and feeding the healthy soil microbiology

#### • Low Salt Index (5)

Greater seed safety benefiting soil health

#### • Soil Amendment Properties

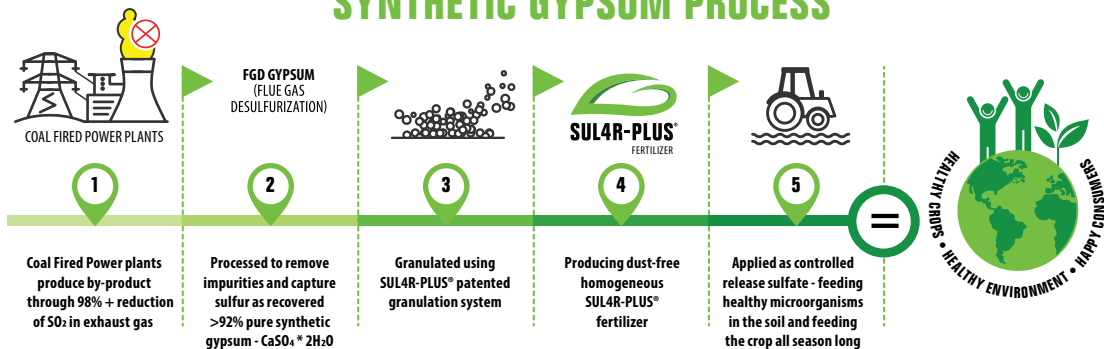
Amending the soil instead of contributing to problems in both saline and compacted soils

#### • Handling characteristics

Great handling, blending and storage qualities with a dust free design.

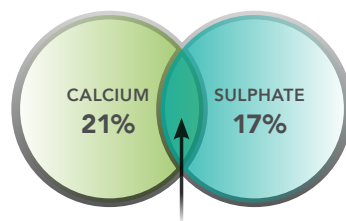
- Highly soluble granules – provides immediate and season long nutrition to all crops
- Uniform feeding across wide spread pattern – 20 to 30 granules per square foot (based on 100 lb/acre application)
- Nutrient releasing characteristics best mimic the crop nutrient uptake curves
- Uniform granule size ensures product blends well and spreads evenly

## SYNTHETIC GYPSUM PROCESS



## Agronomy of SUL4R-PLUS®

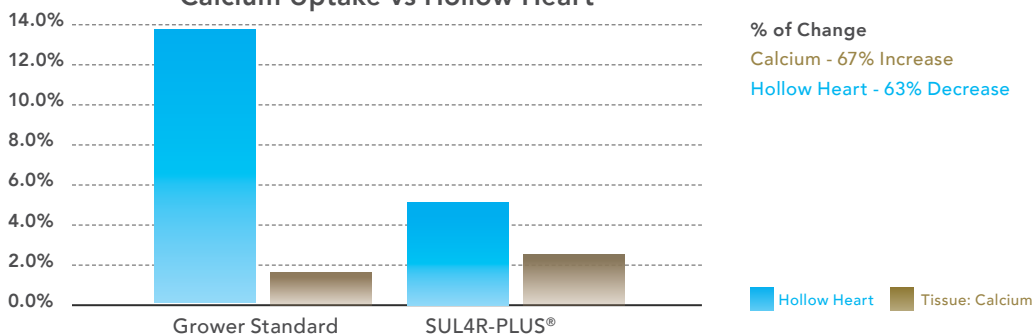
- "Value of Oxygen" in the Seed Row
- Increased Water Infiltration in Compacted Soils
- Ammonium Lignosulphonate Binder – Fulvic Acid
- Controlled Release Curve of Sulphate
- Salt Index – Salinity & Seeding Rates
- Soil Amendment Properties from Gypsum
- Calcium in the Plant



AMMONIUM LIGNOSULFONATE

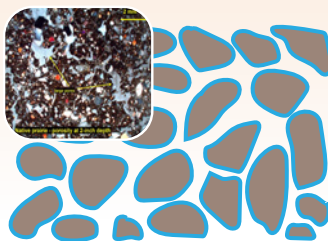
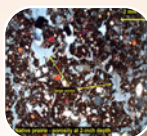
## SUL4R-PLUS® 3<sup>rd</sup> Party Potato Field Trial - 2019

### Calcium Uptake vs Hollow Heart

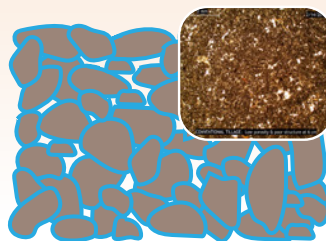


Soil compaction causes a reduction in the available space for soil air and water, and limits pathways for crop roots. If the soil is not acidic and is lacking sulphur, the best tool for removing excess magnesium or sodium is the "clay breaker"- gypsum (calcium sulphate). SUL4R-PLUS® can help mitigate compacted soils.

Soil Solid    Water    Air



IDEAL SOIL (50% solid, 25% air, 25% water)



COMPACTED SOIL



# 2016 Texas A&M Leachate Study

## • Study Analyzed Sustained Release of Sulfur From Three Products

- SUL4R-PLUS® fertilizer - 00-00-00-21Ca-17S
- Ammonium Sulfate (AMS) - 21-00-00-24S
- Elemental Sulfur - 00-00-00-90S
- No Sulfur applied - Control

## • 3 Soil Series Evaluated: Clay, Silt Loam & Sandy Loam

## • Replicated 3 Times

## • Low Rate of Sulfur (16 lb./ac) & High Rate of Sulfur (32 lb./ac)

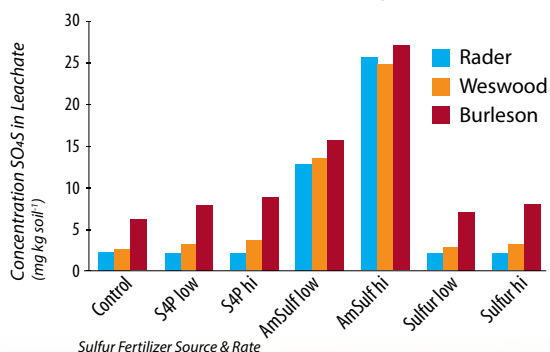
## • Leachate Collected at Following Intervals:

- Initial (0); Day 5; Day 10; Day 15; Day 20; Day 30; Day 40; Day 50; Day 60.

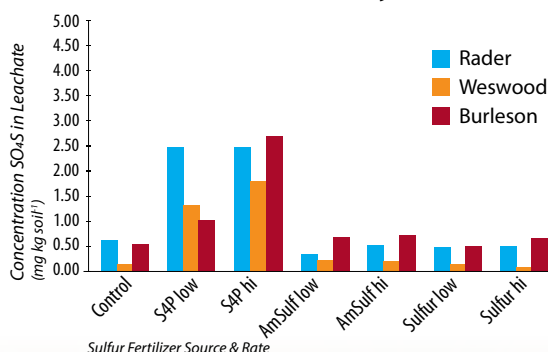
Research study showed SUL4R-PLUS® to release plant available sulphate at a rate of **2 to 5 lbs** (depending on High/low application rate) **every 10 days for a period of 60-80 days**.

Texas A&M Agrilife Extension Research Study

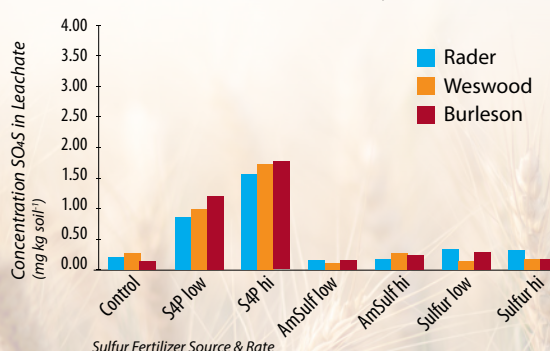
### SO<sub>4</sub>-S in Soil leachate (day 0)



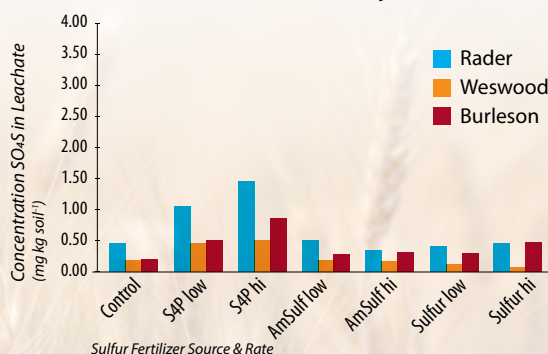
### SO<sub>4</sub>-S in Soil leachate (day 30)



### SO<sub>4</sub>-S in Soil leachate (day 15)



### SO<sub>4</sub>-S in Soil leachate (day 60)





# The Future of Phosphorus is Here

Crystal Green® is the first Root-Activated™ fertilizer to offer phosphorus, with nitrogen and magnesium, in one continuous release granule. Its 100% plant-available formulation offers a season-long release of nutrients that minimizes tie-up and reduces the risk of leaching and runoff.



## CRYSTAL GREEN GUARANTEED ANALYSIS

Total Nitrogen (N). . . . . 5%  
5% ammoniacal nitrogen  
Available Phosphate ( $P_2O_5$ ) 28%  
Magnesium (Mg). . . . . 10%

Derivation: Magnesium ammonium phosphate hexa-hydrate ( $MgNH_4PO_4 \cdot 6H_2O$ )

## SEED & ROOT SAFE

Improves seed safety over MAP or DAP with 1/4 the salt index.

Crystal Green – Canola – 7 Days



© Mike Dolinski

## SALT INDEX

	DAP	MAP	S15	Crystal Green
Salt Index	29	27	21	7.7

## HOW CRYSTAL GREEN WORKS

### Root-Activated™ Nutrients Delivered Efficiently

- ▶ Crystal Green releases nutrients in response to a plant's organic acid production. This allows Crystal Green to gradually release nutrients into the soil solution when the plant needs it most.

### Season-Long Plant Availability, Lower Environmental Impact

- ▶ Continuous release provides plant-available nutrients all season long without nutrient tie-up and runoff.

### Consistent, Dependable Release

- ▶ Crystal Green's granulated nutrients rely on plant demand; not on coatings, soil temperatures, microbes, or pH.

## USING CRYSTAL GREEN FERTILIZER

Crystal Green (CG) is meant to replace 25% of the actual phosphorus (P) supplied by highly water soluble P sources such as MAP and DAP. In a physical blend, the ratio of MAP:CG becomes 62%:38% due to CG's lower P analysis. For more details or questions ask your Taurus rep.

# 14

YEARS OF RESEARCH  
PROVE HIGH-YIELDING  
RESULTS:



Improved  
Seed Safety,  
Stand Count,  
Yield

Reduced  
Nutrient Loss,  
Tie Up, Runoff

Enhanced  
Efficiency for  
Improved ROI

## CANOLA YIELD INCREASE



### YIELD INCREASE ACROSS SOIL pH

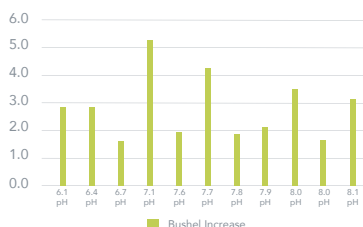
CRYSTAL GREEN vs. MAP

YIELD  
INCREASE  
↑ **2.7**  
Bushel Increase

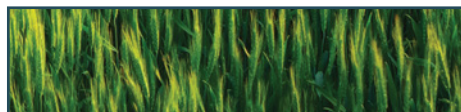
LOCATION

Manitoba  
Saskatchewan  
North Dakota

3 Year Results  
2016-18



## SPRING WHEAT YIELD INCREASE



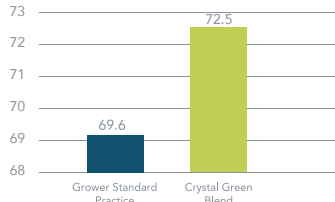
### 2 Year Results 2017-18

CRYSTAL GREEN vs. MAP  
SIX REPLICATED TRIALS

YIELD  
INCREASE  
↑ **2.9**  
Bushel Increase

LOCATION

Portage La Prairie, MB  
Minto, MB  
Saskatoon, SK  
Portage La Prairie, MB  
Northwood, ND  
Minot, ND

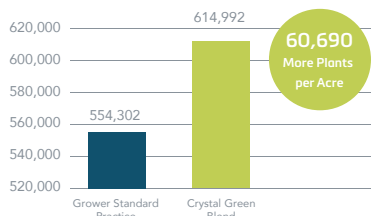


## CANOLA STAND COUNT INCREASE



### INCREASED STAND COUNT

CRYSTAL GREEN vs. MAP



RESEARCHER  
New Era  
Technologies

LOCATION  
Swan River, MB

YEAR  
2018

## FIELD PEA YIELD INCREASE



### REPLICATED TRIALS

CRYSTAL GREEN vs. MAP

YIELD  
INCREASE  
↑ **3.0**  
Bushel Increase

APPLICATION  
In-furrow

UNITS OF P  
35lbs/acre

SOIL pH

6.1

SOIL TEST P  
13 ppm

RESEARCHER  
AgQuest

LOCATION  
Saskatoon, SK

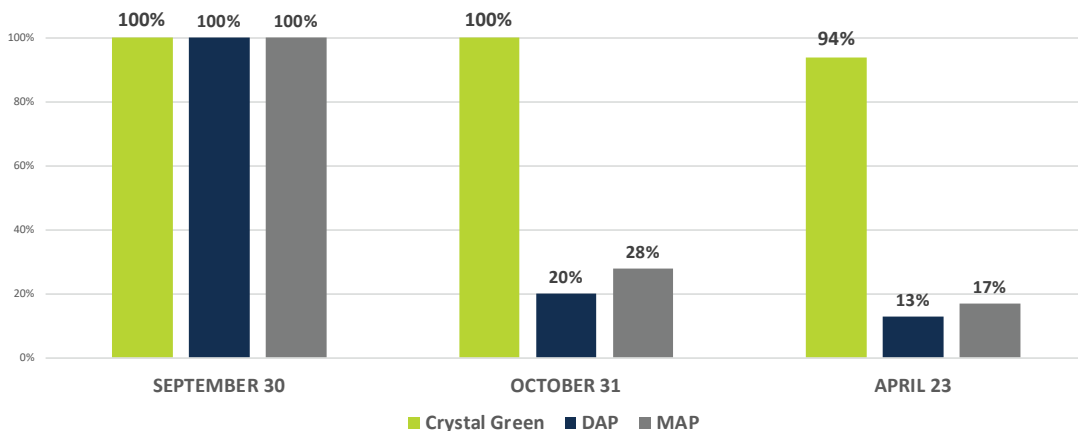
YEAR  
2018



## IMAGINE IF FEEDING THE WORLD ALSO MEANT PROTECTING IT.

Ostara's runoff reducing granulated products combine recovered nutrients with phosphorus, nitrogen and magnesium, helping communities and industries around the world clean water and grow more food, more sustainably.

### Proven Root-Activated™ Release Reduces Fixation & Impact of Runoff 94% Remains Plant-Available After Fall Fertilization



North Dakota State University, Dr. Joel Ransom, 2017-18



### University research shows the Root-Activated™ release helps protect local water resources:

- Prevents movement of P within soil, Auburn University
- Eliminates surface P runoff, UK P-Link Project

## BLENDING ATTRIBUTES

	Crystal Green®	Crystal Green Pearl®
Size (mm)	3.0	1.5
Bulk Density (lbs per ft³)	62	62
Angle of Repose	26.5	27.1
Granules per lbs	17,000	95,000
Prill Shape	Spherical	
Packaging	2000 lbs totes or bulk	2000 lbs totes





## CRYSTAL GREEN IS A FIT FOR YOU IF:

- ✓ Seed safety is a concern for your crop
- ✓ You farm in challenging pH soils, where phosphorus tie-up is common
- ✓ You broadcast, seed place or band phosphorous
- ✓ Your crops need available phosphorus for season-long uptake

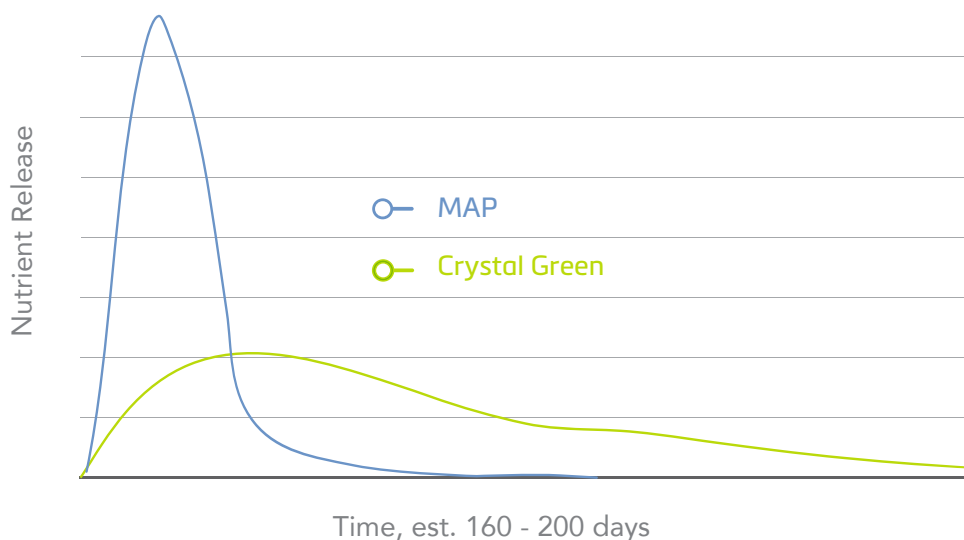


CRYSTAL GREEN® REMAINS PLANT-AVAILABLE ALL SEASON LONG EVEN AT HARVEST (\*PICTURED HERE)

## SUPERIOR YIELDS, GREATER FUTURE

Research shows greater yield results and increased efficiency when you replace 25% of your MAP or DAP with continuous release Crystal Green\*. Plants are able to take up more of the nutrients they need, when they need it, without the risk of fixation or run-off. You can blend water soluble P with Crystal Green.

## CRYSTAL GREEN SOLUTIONS OFFER SEASON-LONG RELEASE



\*In a physical blend, the ratio of MAP:CG becomes 62%:38% due to CG's lower P analysis.



## NEXT GENERATION OF PHOSPHATE

Crystal Green Synchro is the first and only phosphate fertilizer to combine the rapid availability of MAP with controlled release utilizing Root-Activated™ nutrient technology of Crystal Green.



### CRYSTAL GREEN SYNCHRO™ GUARANTEED ANALYSIS

Total Nitrogen (N) . . . . . 8%  
Available Phosphate ( $P_2O_5$ ) . . . 40%  
Magnesium (Mg) . . . . . .5%

Crystal Green Synchro™ 50 is a fully homogeneous sustainable struvite-based granular fertilizer. There's no need to blend Crystal Green and MAP. Crystal Green Synchro™ 50 is like blending a 50/50 ratio of Crystal Green and MAP, but instead of a blended fertilizer, it's a fully homogeneous granular fertilizer.

Size	SGN 300
Uniformity Index	50%
Bulk Density	55 lbs/cu. ft.



ROOT-ACTIVATED™  
TECHNOLOGY



REDUCED NUTRIENT  
LOSS, TIE UP,  
AND RUNOFF



IMPROVED  
EFFICIENCY

### HOW CRYSTAL GREEN SYNCHRO™ WORKS

#### ROOT-ACTIVATED™ TECHNOLOGY

- Nutrients are continuously released in response to weak organic acids, such as those produced by growing roots and soil microbes.
- Unique dual mode of action delivers plant-available phosphorous immediately for early plant development and continues to meet demand when the plant needs it most.

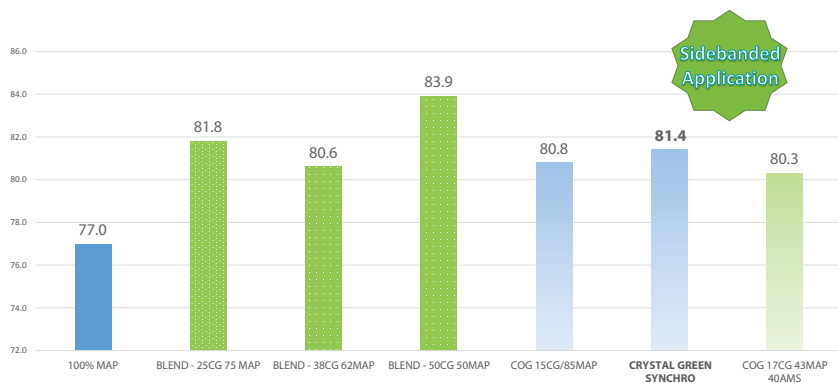
- ✓ Improve nutrient efficiency
- ✓ Reduce nutrient loss
- ✓ Potential for greater yield, uniformity of growth and quality
- ✓ Increased seed safety
- ✓ Not just good economics, sustainable and innovative agronomics



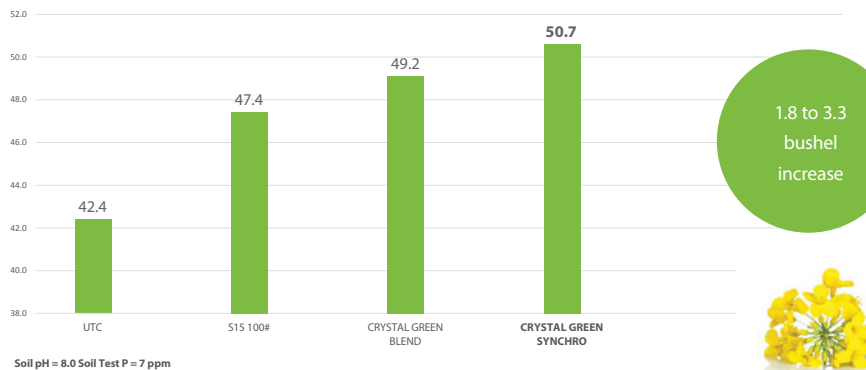
Crystal Green  
Synchro™ 50



## Canola Results – 2018 – MB – New Era



## Manitoba Replicated Trial - Minto, MB (AgQuest)



Research used to obtain Canadian CFIA Registration.

Additional research available from your Taurus Rep & online

© 2023 Taurus Agricultural Marketing Inc.

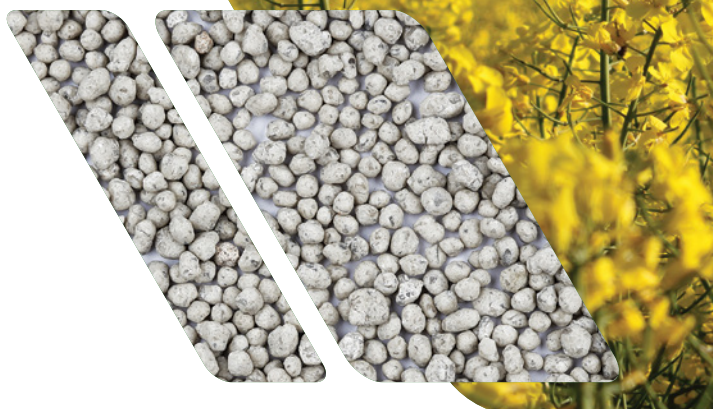
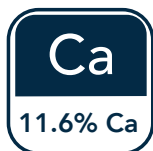
[www.taurus.ag](http://www.taurus.ag)





## POLYSULPHATE PREMIUM

4-in-1 fertilizer



A natural multi-nutrient Sulfur fertilizer, with K, Mg, and Ca, provides cost-effective, season-long release to meet peak demand.

### Main Features of Polysulphate® Premium (0-0-13.3-18.2S-11.6Ca-3.3Mg)

- **100% Natural** — Polysulphate is a naturally-mined mineral (polyhalite) containing four essential plant nutrients
- **Balanced Nutrients** — Uniform delivery of sulfur, potassium, magnesium and calcium (in sulfate form) in every granule, for consistent crop development
- **Season-Long Release** — Sustained nutrient release aligns with crop demand ensuring nutrient availability during critical development periods



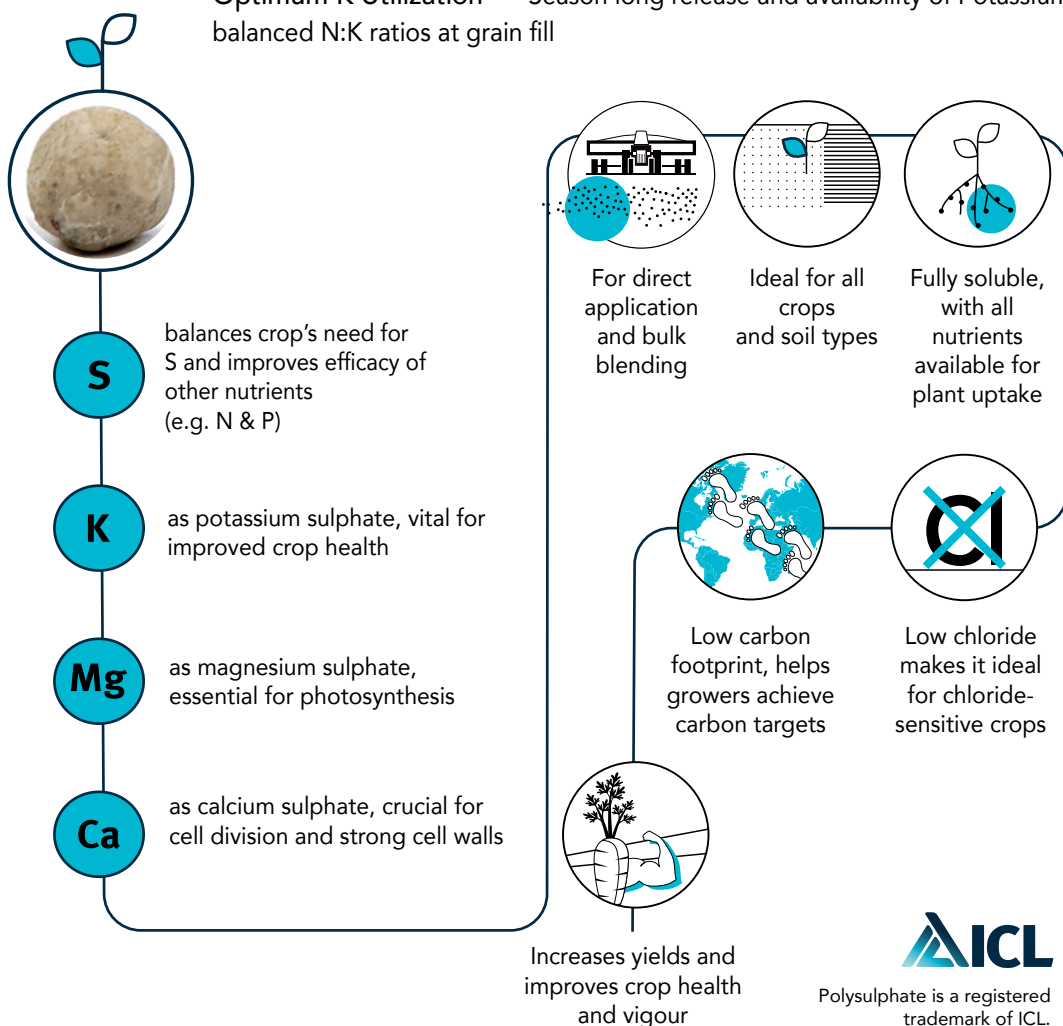
ICL is the first – and only – producer in the world to mine polyhalite, marketed as Polysulphate. [www.polysulphate.com/us](http://www.polysulphate.com/us)



Polysulphate is derived from polyhalite, a naturally occurring mineral containing elements essential to high-performance plant growth and function —  $\text{K}_2\text{Ca}_2\text{Mg}(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}$

## Key Advantages of Polysulphate Premium

- **Low Salt Index** — Increase seed & plant safety
- **All-in-One Prill** — Reduce storage & handling costs
- **Extended Sulfur Availability** — Increase uptake & improve nitrogen efficiency
- **Nourishes Soil** — Helps improve nutrient efficiency, soil structure, root development, water infiltration, and seed emergence
- **pH Friendly** — Does not change soil pH, like other traditional sulfur sources
- **Optimum K Utilization** — Season long release and availability of Potassium and balanced N:K ratios at grain fill



Polysulphate is a registered trademark of ICL.



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# BIOLOGICAL INOCULANTS





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Since entering the agriculture market 15 years ago, we are constantly widening our AGTIV® inoculant offering to suit and benefit more crops.



While staying true to the AGTIV® brand's three pillars:

**NATURE**, **SCIENCE** and **PERFORMANCE**, we are introducing new product names reflecting the actions of our inoculants for plants.

**AGTIV® FUEL**  
Single action **rhizobium** products FUEL legumes by fixing nitrogen for better growth.

**AGTIV® THRIVE**  
Dual action **mycorrhizae** and **rhizobium** products make plants THRIVE by increasing nutrient uptake.

**AGTIV® ENRICH**  
Dual action **rhizobium** and **Bacillus** collaborate to ENRICH the plant's nitrogen fixation with a healthy root system.

**AGTIV® STIMULATE**  
Single action **Bacillus** products STIMULATE the plant to grow more efficiently with a healthy root zone.

**AGTIV® IGNITE**  
Single action **Serendipita** products IGNITE plant growth and chlorophyll content for better yields.

**AGTIV® REACH**  
Single action **mycorrhizae** products REACH into the soil and help uptake more nutrients and water.

# AGTIV®

DESIGNED BY NATURE. PERFECTED BY SCIENCE.

Born from **nature** and perfected by **science**, AGTIV® is an innovative technology brand made of high-quality and proven natural active ingredients that deliver superior **performance** for agricultural producers.



Discover more at [PTAGTIV.COM/brand](https://PTAGTIV.COM/brand)

# AGTIV<sup>®</sup> RELIABLE INOCULANTS

ACTIVE INGREDIENT(S)	ORGANIC	APPLICATION MODE				FORMULATION
		GRANULAR IN-FURROW	MIXING WITH SEEDS	LIQUID IN-FURROW	LIQUID ON SEED	

## PEA, LENTIL & FABA BEAN

### AGTIV<sup>®</sup> THRIVE<sup>™</sup> P PEA & LENTIL (previously named AGTIV<sup>®</sup> PULSES • Powder)

F: Powder (peat)

S: 4.7 kg (10.3 lb) pail – 2.4 kg (5.3 lb) pail

C: Peas & faba beans: Pail 4.7 kg: **16 ha (40 acres)** – Pail 2.4 kg: **8 ha (20 acres)**

Lentils: Pail 4.7 kg: **24 ha (60 acres)**

**M R**



### AGTIV<sup>®</sup> THRIVE<sup>™</sup> G PEA & LENTIL (previously named AGTIV<sup>®</sup> PULSES • Granular)

F: Granules (peat)

S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag

C: Peas, lentils & faba beans: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

**M R**



### AGTIV<sup>®</sup> THRIVE<sup>™</sup> PEA & LENTIL (previously named AGTIV<sup>®</sup> COMBO • Liquid for PULSES)

F: Liquid

S: Combo box: 8 L (8 kg) bag-in-box + 4 x 950 ml (4 x 32 fl. oz) bottles

C: Peas, lentils & faba beans: **32 ha (80 acres)**

**M R**



### AGTIV<sup>®</sup> FUEL<sup>™</sup> P PEA & LENTIL (previously named AGTIV<sup>®</sup> ON SEED<sup>™</sup> RHIZO • Powder)

F: Powder (peat)

S: 4.7 kg (10.3 lb) pail

C: Peas & faba beans: **16 ha (40 acres)** – Lentils: **24 ha (60 acres)**

**R**



### AGTIV<sup>®</sup> FUEL<sup>™</sup> G PEA & LENTIL (previously named AGTIV<sup>®</sup> RHIZO • Granular for PULSES)

F: Granules (peat)

S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag

C: Peas, lentils & faba beans: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**

**R**



### AGTIV<sup>®</sup> FUEL<sup>™</sup> L PEA & LENTIL (previously named AGTIV<sup>®</sup> RHIZO • Liquid for PULSES)

F: Liquid

S: 8 L (8 kg) bag-in-box

C: Peas, lentils & faba beans: **32 ha (80 acres)** or **6530 kg of seeds (240 bu)**

**R**



## SOYBEAN

### AGTIV<sup>®</sup> THRIVE<sup>™</sup> P SOYBEAN (previously named AGTIV<sup>®</sup> SOYBEAN • Powder)

F: Powder (peat)

S: 4.7 kg (10.3 lb) pail

C: Soybean: **16 ha (40 acres)**

**M R**



### AGTIV<sup>®</sup> THRIVE<sup>™</sup> G SOYBEAN (previously named AGTIV<sup>®</sup> SOYBEAN • Granular)

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<sup>®</sup> THRIVE<sup>™</sup> SOYBEAN (previously named AGTIV<sup>®</sup> COMBO • Liquid for 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<sup>®</sup> FUEL<sup>™</sup> G SOYBEAN (previously named AGTIV<sup>®</sup> BRADY • Granular for 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<sup>®</sup> FUEL<sup>™</sup> L SOYBEAN (previously named AGTIV<sup>®</sup> BRADY • Liquid for 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<sup>®</sup> ENRICH<sup>™</sup> SOYBEAN (previously named AGTIV<sup>®</sup> BB COMBO • Liquid for 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**



The newly named products will be on the market in 2023.

Learn more at

PTAGTIV.COM/en/products



ACTIVE INGREDIENT(S)	ORGANIC	APPLICATION MODE				FORMULATION
		GRANULAR IN-FURROW	MIXING WITH SEEDS	LIQUID IN-FURROW	LIQUID ON SEED	

CANOLA & CEREAL	<b>AGTIV® IGNITE™ L</b> (previously named AGTIV® IGNITE • L for Brassicaceae)						
	F: Liquid S: 11 L (11 kg) bag-in-box C: Canola: 454 kg (1000 lb) or 81 ha (200 acres) of seeds Cereals: 9165 kg (20 205 lb) or 81 ha (200 acres) of seeds	S	*				
CHICKPEA	<b>AGTIV® THRIVE™ P CHICKPEA</b> (previously named AGTIV® CHICKPEA • Powder)						
	F: Powder (peat) S: 4.7 kg (10.3 lb) pail C: Chickpea: 16 ha (40 acres)	M R	✓				
	<b>AGTIV® THRIVE™ G CHICKPEA</b> (previously named AGTIV® CHICKPEA • Granular)						
	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	✓				
FIELD & SPECIALTY CROPS	<b>AGTIV® REACH™ P</b> (previously named AGTIV® FIELD CROPS • O • Powder, AGTIV® FIELD CROPS • Powder, AGTIV® FORAGES • Powder & AGTIV® SPECIALTY CROPS • Powder)						
	F: Powder (peat) S: Case of 4 x 800 g (4 x 1.75 lb) pails C: Cereals, flax & dry beans: 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	✓				
	<b>AGTIV® REACH™ G</b> (previously named AGTIV® FIELD CROPS • Granular & AGTIV® SPECIALTY CROPS • Granular)						
	F: Granules (peat) S: 6 kg (13.2 lb) pail – 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag C: Cereals, flax & dry beans: 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	*				
	<b>AGTIV® REACH™ L</b> (previously named AGTIV® FIELD CROPS • Liquid)						
	F: Liquid (spores in suspension) S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles C: Cereals, flax & beans: 16 ha (40 acres) per case	M	✓				
POTATO	<b>AGTIV® REACH™ L POTATO</b> (previously named AGTIV® POTATO • Liquid)						
	F: Liquid (spores in suspension) S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles C: Potato: 8 ha (20 acres) per case	M	✓				

See last page for complete product recommendations.

ACTIVE INGREDIENTS			LEGEND	
<b>M</b> MYCORRHIZAE PTB297 Technology	<b>B</b> BACILLUS PTB180 Technology	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.	
<b>R</b> RHIZOBIUM PTB160 Technology (pea & lentil) PTB162 Technology (soybean) <i>Mesorhizobium ciceri</i> (chickpea)	<b>S</b> SERENDIPITA PTB299 Technology			
			FORMULATIONS	
			Liquid	Granular
				Powder





# AGTIV® AVERAGE YIELD INCREASE BY CROP



**10.1%** 2.7 bu/ac

Average yield increase  
64 sites over 11 years, Canada

**LENTILS**



**6.3%** 3.6 bu/ac

Average yield increase  
22 sites over 9 years, Canada

**PEAS**



**6.5%** 3.8 bu/ac

Average yield increase  
12 sites over 7 years, North America

**DURUM WHEAT**



**9%** 252 lb/ac

Average yield increase  
12 sites over 5 years, Canada

**DRY BEANS**



**7.7%** 3.4 bu/ac

Average yield increase  
87 sites over 7 years, Canada and Europe

**SOYBEAN**

Learn more at

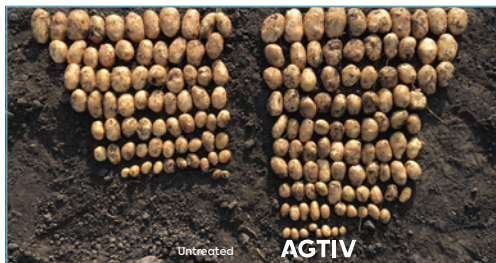
[PTAGTIV.COM/en/results](https://PTAGTIV.COM/en/results)



**6.5%** 2.5 bu/ac

Average yield increase  
20 sites over 4 years, Canada

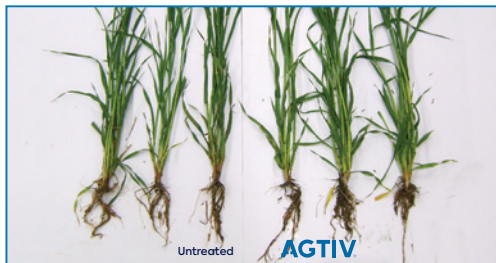
**CANOLA**



**10%** 31.6 cwt/ac

Average yield increase  
1172 sites over 11 years, North America and Europe

**POTATO**



**10.5%** 7.3 bu/ac

Average yield increase  
28 sites over 6 years, Canada and Europe

**BARLEY**

## GET THE INFO YOU NEED ONLINE

### PRODUCTS

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

### RESULTS

Efficacy report  
Field observations

### PROGRAMS

Liquid and Powder equipments  
Retailer fridge program

### COMPATIBILITY

Pesticide compatibility lists  
Liquid fertilizer compatibility lists

### EDUCATION

Agronomic articles  
Case studies



Discover more at

[PTAGTIV.COM/en/toolbox](https://PTAGTIV.COM/en/toolbox)

## ON-FARM MIXING WITH SEEDS

### AGTIV® THRIVE™ P PEA & LENTIL



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 2750 viable spores/g

**R** RHIZOBIUM – PTB160 Technology  
*Rhizobium leguminosarum biovar viciae*:  $1.6 \times 10^9$  viable cells/g

**INERT INGREDIENT:** Peat

**PARTICLE SIZE:** < 1 mm (18 mesh)

**BULK DENSITY:** 400 g/L (1 lb/US dry qt)

SIZE	COVERS	CODE
4.7 kg (10.3 lb) – pail	Peas & faba beans: 16 ha (40 acres) Lentils: 24 ha (60 acres)	710303
2.4 kg (5.3 lb) – pail	Peas & faba beans: 8 ha (20 acres)	710313

#### DIRECTIONS FOR USE

**DRY APPLICATION** — Mix evenly with seeds at the bottom of the grain auger while filling drill, or directly in the drill box. Ensure uniform seed coverage is obtained. Peas & faba beans: apply at 300 g/ha (120 g or 4.2 oz/acre). Lentils: apply at 200 g/ha (80 g or 2.8 oz/acre).

**SLURRY APPLICATION** — Pour one 4.7 kg pail in a clean container. Gradually add 8-10 liters of clean, non-chlorinated water and stir well (for one 2.4 kg pail, add only 4 - 5 liters of water). Add more water if the slurry is too thick. Pour onto the seeds and mix thoroughly to ensure even coating.

# PEA LENTIL & FABA BEAN



## ON-FARM MIXING WITH SEEDS

### AGTIV® FUEL™ P PEA & LENTIL



#### ACTIVE INGREDIENT:

**R** RHIZOBIUM – PTB160 Technology  
*Rhizobium leguminosarum biovar viciae*:  $1.6 \times 10^9$  viable cells/g

**INERT INGREDIENT:** Peat

**PARTICLE SIZE:** < 1 mm (18 mesh)

**BULK DENSITY:** 400 g/L (1 lb/US dry qt)

SIZE	COVERS	CODE
4.7 kg (10.3 lb) – pail	Peas & faba beans: 16 ha (40 acres) Lentils: 24 ha (60 acres)	710403

#### DIRECTIONS FOR USE

**DRY APPLICATION** — Mix evenly with seeds at the bottom of the grain auger while filling drill, or directly in the drill box. Ensure uniform seed coverage is obtained. Peas & faba beans: apply at 300 g/ha (120 g or 4.2 oz/acre). Lentils: apply at 200 g/ha (80 g or 2.8 oz/acre).

**SLURRY APPLICATION** — Pour one 4.7 kg pail in a clean container. Gradually add 8 - 10 litres of clean, non-chlorinated water and stir well. Add more water if the slurry is too thick. Pour onto the seeds and mix thoroughly to ensure even coating.

## GRANULAR IN-FURROW

### AGTIV® THRIVE™ G PEA & LENTIL



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 178 viable spores/g

**R** RHIZOBIUM – PTB160 Technology  
*Rhizobium leguminosarum biovar viciae*:  $1.3 \times 10^8$  viable cells/g

INERT INGREDIENT: Peat

PARTICLE SIZE: 0.5 mm to 2.5 mm (8 - 30 mesh)

BULK DENSITY: 600 g/L (37.4 lb/ft³)

SIZE	COVERS	CODE
18.2 kg (40 lb) – bag	4 ha (10 acres)	710101
364 kg (800 lb) – tote bag	80 ha (200 acres)	710102

#### DIRECTIONS FOR USE

Apply in the seed row at a rate of 4.5 kg/ha (4 lb/acre).

## COMBO LIQUID FOR IN-FURROW

### AGTIV® THRIVE™ PEA & LENTIL



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 6400 viable spores/g in liquid suspension

**R** RHIZOBIUM – PTB160 Technology  
*Rhizobium leguminosarum biovar viciae*:  $6 \times 10^8$  viable cells/g

INERT INGREDIENT: Water

PARTICLE SIZE: < 0.2 mm (70 mesh) – PTB297 Technology

< 0.1 mm (150 mesh) – PTB160 Technology

Contains non-soluble particles

SIZE	COVERS	CODE
Combo box: 4 x 950 ml (4 x 32 fl. oz) – bottles 8 L (8 kg) – bag-in-box	32 ha (80 acres)	710214

#### DIRECTIONS FOR USE

This product should be applied using the AGTIV® Liquid Injection Kit. To apply, pour 4 x 950 ml bottles of Mycorrhizae and one 8 L bladder of Rhizobium in the tank and adjust the Dosatron® injection rate following the application chart and video at [PTAGTIV.COM/en/liquid-injection-kit](http://PTAGTIV.COM/en/liquid-injection-kit).

Apply directly in the seed row at a rate of 118.75 ml/ha (47.5 ml/acre) for Mycorrhizae and 250 ml/ha (100 ml/acre) for Rhizobium, for a total of 368.75 ml/ha (147.5 ml/acre). If the mixture does not contain pesticides or fertilizers, it can be emptied, refrigerated and used within 24 hours.

## GRANULAR IN-FURROW

### AGTIV® FUEL™ G PEA & LENTIL



#### ACTIVE INGREDIENT:

**R** RHIZOBIUM – PTB160 Technology  
*Rhizobium leguminosarum biovar viciae*:  $1.3 \times 10^8$  viable cells/g

INERT INGREDIENT: Peat

PARTICLE SIZE: 0.5 mm to 2.5 mm (8 - 30 mesh)

BULK DENSITY: 600 g/L (37.4 lb/ft³)

SIZE	COVERS	CODE
18.2 kg (40 lb) – bag	4 ha (10 acres)	710111
364 kg (800 lb) – tote bag	80 ha (200 acres)	710112

#### DIRECTIONS FOR USE

Apply in the seed row at a rate of 4.5 kg/ha (4 lb/acre).

## LIQUID FOR IN-FURROW OR ON SEED

### AGTIV® FUEL™ L PEA & LENTIL



#### ACTIVE INGREDIENT:

**R** RHIZOBIUM – PTB160 Technology  
*Rhizobium leguminosarum biovar viciae*:  $6 \times 10^8$  viable cells/g

PARTICLE SIZE: < 0.1 mm (150 mesh) Contains non-soluble particles

SIZE	COVERS	CODE
8 L (8 kg) – bag-in-box	In-furrow: 32 ha (80 acres) On seed: 6530 kg of seeds (240 bu)	710204

#### DIRECTIONS FOR USE

**LIQUID IN-FURROW** — Apply directly in the seed row at a rate of 250 ml/ha (100 ml/acre). This product should be applied using the AGTIV® Liquid Injection Kit. To apply, prepare the product mixture and adjust the Dosatron® injection rate following the application chart and video at [PTAGTIV.COM/en/liquid-injection-kit](http://PTAGTIV.COM/en/liquid-injection-kit).

**LIQUID ON SEED** — Shake well before use and apply directly to the seed. Apply 33 ml per 27 kg seeds, ensure full coverage. Optimum on-seed viability for 30 days when treated seeds are stored below 12°C (54°F).

• Use EXTENDER™ L for AGTIV® inoculants for longer shelf life.



## ON-FARM MIXING WITH SEEDS

### AGTIV® THRIVE™ P SOYBEAN



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 2 750 viable spores/g

**R** RHIZOBIUM – PTB162 Technology  
*Bradyrhizobium japonicum*: 2.5 x 10<sup>9</sup> viable cells/g

**INERT INGREDIENT:** Peat

**PARTICLE SIZE:** < 1 mm (18 mesh)

**BULK DENSITY:** 400 g/L (1 lb/US dry qt)

SIZE	COVERS	CODE
4.7 kg (10.3 lb) – pail	16 ha (40 acres)	710703

#### DIRECTIONS FOR USE

**DRY APPLICATION** — Mix evenly with seeds at the bottom of the grain auger while filling drill, or directly in the drill box. Ensure uniform seed coverage is obtained. Apply at 300 g/ha (120 g or 4.2 oz/acre).

**SLURRY APPLICATION** — Pour one 4.7 kg pail in a clean container. Gradually add 8-10 litres of clean, non-chlorinated water and stir well. Add more water if the slurry is too thick. Pour onto the seeds and mix thoroughly to ensure even coating.

# SOYBEAN



## GRANULAR IN-FURROW

### AGTIV® FUEL™ G SOYBEAN



#### ACTIVE INGREDIENT:

**R** RHIZOBIUM – PTB162 Technology  
*Bradyrhizobium japonicum*: 1.9 x 10<sup>9</sup> viable cells/g

**INERT INGREDIENT:** Peat

**PARTICLE SIZE:** 0.3 mm to 2 mm (10 - 50 mesh)

**BULK DENSITY:** 650 g/L (41 lb/ft<sup>3</sup>)

SIZE	COVERS	CODE
18.2 kg (40 lb) – bag	4 ha (10 acres)	710511
364 kg (800 lb) – tote bag	80 ha (200 acres)	710512

#### DIRECTIONS FOR USE

Apply in the seed row at a rate of 4.5 kg/ha (4 lb/acre).

## GRANULAR IN-FURROW

### AGTIV® THRIVE™ G SOYBEAN



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 178 viable spores/g

**R** RHIZOBIUM – PTB162 Technology  
*Bradyrhizobium japonicum*: 1.1 x 10<sup>8</sup> viable cells/g

INERT INGREDIENT: Peat

PARTICLE SIZE: 0.3 mm to 2 mm (10 - 50 mesh)

BULK DENSITY: 650 g/L (41 lb/ft<sup>3</sup>)

SIZE	COVERS	CODE
18.2 kg (40 lb) – bag	4 ha (10 acres)	710501
364 kg (800 lb) – tote bag	80 ha (200 acres)	710502

#### DIRECTIONS FOR USE

Apply in the seed row at a rate of 4.5 kg/ha (4 lb/acre).

## COMBO LIQUID FOR IN-FURROW

### AGTIV® THRIVE™ SOYBEAN



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 6400 viable spores/g in liquid suspension

**R** RHIZOBIUM – PTB162 Technology  
*Bradyrhizobium japonicum*: 8 x 10<sup>8</sup> viable cells/g

INERT INGREDIENT: Water

PARTICLE SIZE: < 0.2 mm (70 mesh) – PTB297 Technology

< 0.1 mm (150 mesh) – PTB162 Technology

Contains non-soluble particles

SIZE	COVERS	CODE
Combo box: 2 x 950 ml (2 x 32 fl. oz) – bottles 8 L (8 kg) – bag-in-box	16 ha (40 acres)	710614

#### DIRECTIONS FOR USE

This product should be applied using the AGTIV® Liquid Injection Kit. To apply, pour 2 x 950 ml bottles of Mycorrhizae and one 8 L bladder of Rhizobium in the tank and adjust the Dosatron® injection rate following the application chart and video at [PTAGTIV.COM/en/liquid-injection-kit](http://PTAGTIV.COM/en/liquid-injection-kit).

Apply directly in the seed row at a rate of 118.75 ml/ha (47.5 ml/acre) for Mycorrhizae and 500 ml/ha (200 ml/acre) for Rhizobium, for a total of 618.75 ml/ha (247.5 ml/acre). If the mixture does not contain pesticides or fertilizers, it can be emptied, refrigerated and used within 24 hours.

## LIQUID FOR IN-FURROW OR ON SEED

### AGTIV® FUEL™ L SOYBEAN



#### ACTIVE INGREDIENT:

**R** RHIZOBIUM – PTB162 Technology  
*Bradyrhizobium japonicum*: 8 x 10<sup>8</sup> viable cells/g

PARTICLE SIZE: < 0.1 mm (150 mesh)

Contains non-soluble particles

SIZE	COVERS	CODE
8 L (8 kg) – bag-in-box	In-furrow: 16 ha (40 acres) On seed: 5680 kg of seeds (250 units)	710604

#### DIRECTIONS FOR USE

**LIQUID IN-FURROW** — Apply directly in the seed row at a rate of 500 ml/ha (200 ml/acre). This product should be applied using the AGTIV® Liquid Injection Kit. To apply, prepare the product mixture and adjust the Dosatron® injection rate following the application chart and video at [PTAGTIV.COM/en/liquid-injection-kit](http://PTAGTIV.COM/en/liquid-injection-kit).

**LIQUID ON SEED** — Shake well before use and apply directly to the seed. Apply 64 ml per 45.5 kg of seeds, ensure full coverage. Optimum on-seed viability for 30 days when treated seeds are stored below 12°C (54°F).

☛ Use EXTENDER™ L for AGTIV® inoculants for longer shelf life.

## COMBO LIQUID FOR IN-FURROW OR ON SEED

### AGTIV® ENRICH™ SOYBEAN



#### ACTIVE INGREDIENTS:

**B** BACILLUS – PTB180 Technology  
*Bacillus pumilus*: 3 x 10<sup>8</sup> viable spores/ml

**R** RHIZOBIUM – PTB162 Technology  
*Bradyrhizobium japonicum*: 8 x 10<sup>8</sup> viable cells/g

INERT INGREDIENT: Water

PARTICLE SIZE: < 0.1 mm (150 mesh)

Contains non-soluble particles

SIZE	COVERS	CODE
Combo box: 8 L (8 kg) – bag-in-box 300 ml – bottle	In-furrow: 16 ha (40 acres) On seed: 5680 kg of seeds (250 units)	710814

#### DIRECTIONS FOR USE

**ON SEED:** Mix the bladder of *Bradyrhizobium* and the bottle of *Bacillus* in the application tank. *Bradyrhizobium*: A bladder of 8 liters can treat up to 5680 kg of soybean seeds. Apply at a rate of 64 ml/45.5 kg of seeds.

*Bacillus*: Apply at a rate of 2.4 ml/45.5 kg of soybean seeds. Total volume applied for the combo is 66.4 ml/45.5 kg of seeds. Agitate constantly during application to keep bacteria in suspension. Optimum on-seed viability for 30 days when treated seeds are stored below 12°C (54°F).

**IN-FURROW:** A bladder of 8 liters and a bottle of 300 ml covers 16 ha (40 acres). Apply inoculant in the furrow, directly on the seed, at a rate of 500 ml/ha (200 ml/acre) for the *Bradyrhizobium* and 18.75 ml/ha (7.5 ml/acre) for the *Bacillus*, to reach a total of 518.75 ml/ha (207.5 ml/acre). Dilute the inoculant in the required volume of clean, non-chlorinated water.

☛ Use EXTENDER™ L for AGTIV® inoculants for longer shelf life.

## LIQUID ON SEED

### AGTIV® IGNITE™ L



#### ACTIVE INGREDIENT:

**S** SERENDIPITA – PTB299 Technology  
*Serendipita indica* (formerly known as *Piriformospora indica*)  
 2 x10<sup>6</sup> viable spores/g in liquid suspension

#### INERT INGREDIENT: Water

**PARTICLE SIZE:** < 1 mm (18 mesh)

Contains non-soluble particles

SIZE	COVERS	CODE
11 L (11 kg) – bag-in-box	Canola: 454 kg of seeds (1000 lb) Cereals: 9165 kg of seeds (20 205 lb)	714114

#### DIRECTIONS FOR USE

Ensure the seed treating equipment has been properly cleaned and calibrated and that applicator's tank is clean. Remove any filters on the treating system that are smaller than 1 mm (18 mesh) to prevent clogging. Shake the 11 liters (bag-in-box) well and add it completely to the applicator's tank.

For canola and other Brassicaceae, one bladder of 11 liters can treat up to 454 kg (1000 lb) or 81 ha (200 acres) of seeds.

For wheat and other cereals, one bladder of 11 liters can treat up to 9165 kg (20 205 lb) or 81 ha (200 acres) of seeds. It is recommended to dilute in non-chlorinated water to reach a total volume of liquid to add between 12 to 20 ml/kg of seeds.

- Spray on seeds and ensure full coverage.
- Product must be stored below 12°C (54°F). Do not freeze product.

# CANOLA & CEREAL





# CHICKPEA



## ON-FARM MIXING WITH SEEDS

### AGTIV® THRIVE™ P CHICKPEA



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 2750 viable spores/g

**R** RHIZOBIUM  
*Mesorhizobium ciceri*: 7.0 x 10<sup>8</sup> viable cells/g

INERT INGREDIENT: Peat

PARTICLE SIZE: < 1 mm (18 mesh)

BULK DENSITY: 400 g/L (1 lb/US dry qt)

SIZE	COVERS	CODE
4.7 kg (10.3 lb) – pail	16 ha (40 acres)	713103

#### DIRECTIONS FOR USE

**DRY APPLICATION** — Mix evenly with seeds at the bottom of the grain auger while filling drill, or directly in the drill box. Ensure uniform seed coverage is obtained. Apply at 300 g/ha (120 g or 4.2 oz/acre).

**SLURRY APPLICATION** — Pour one 4.7 kg pail in a clean container. Gradually add 8-10 litres of clean, non-chlorinated water and stir well. Add more water if the slurry is too thick. Pour onto the seeds and mix thoroughly to ensure even coating.

## GRANULAR IN-FURROW

### AGTIV® THRIVE™ G CHICKPEA



#### ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 178 viable spores/g

**R** RHIZOBIUM  
*Mesorhizobium ciceri*: 1.6 x 10<sup>8</sup> viable cells/g

INERT INGREDIENT: Peat

PARTICLE SIZE: 0.5 mm to 2.5 mm (8 - 30 mesh)

BULK DENSITY: 600 g/L (37.4 lb/ft<sup>3</sup>)

SIZE	COVERS	CODE
18.2 kg (40 lb) – bag	4 ha (10 acres)	712901
364 kg (800 lb) – tote bag	80 ha (200 acres)	712902

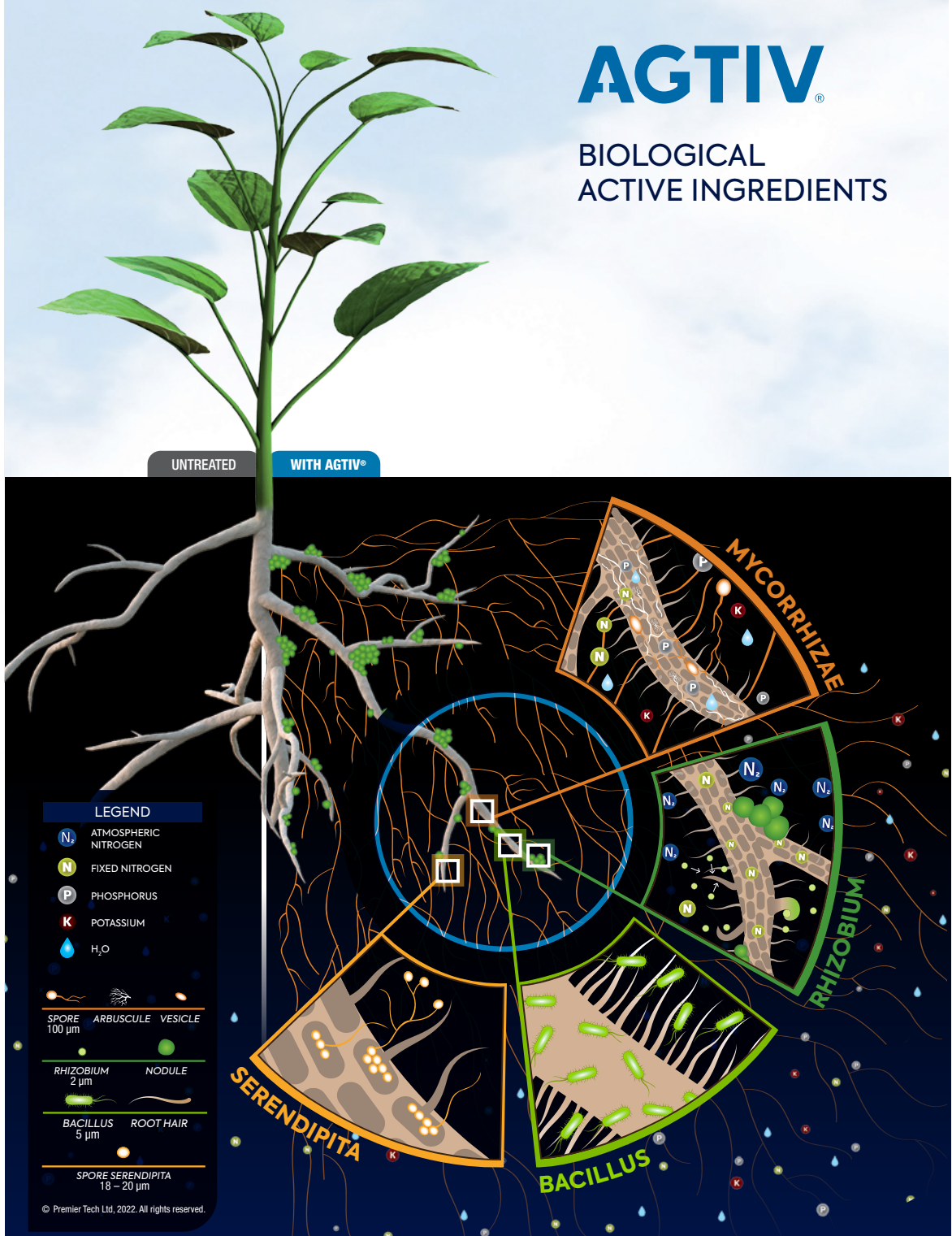
#### DIRECTIONS FOR USE

Apply in the seed row at a rate of 4.5 kg/ha (4 lb/acre).

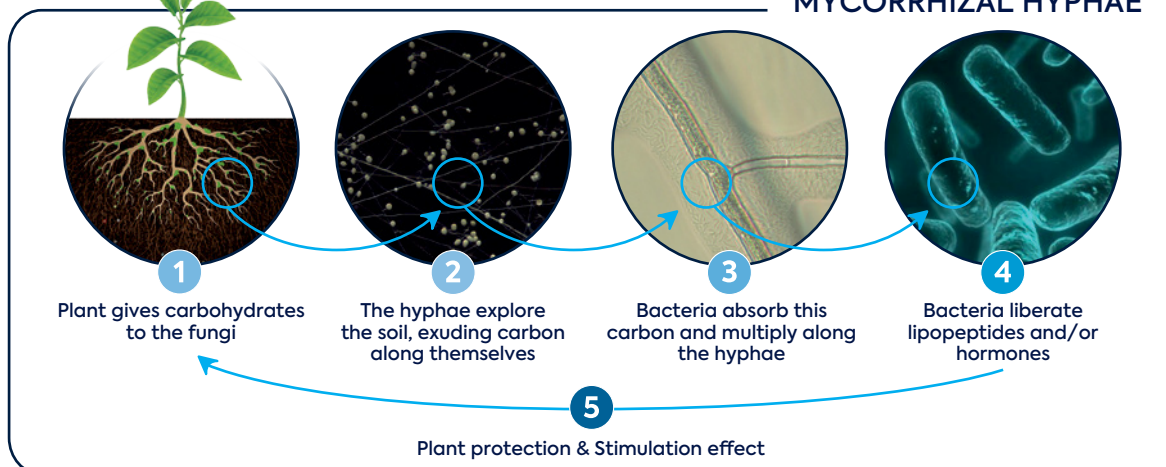


# AGTIV®

## BIOLOGICAL ACTIVE INGREDIENTS



## PROPAGATION OF BACTERIA BY THE MYCORRHIZAL HYPHAE



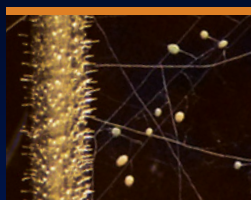
**M**

### 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.

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



**R**

### RHIZOBIUM

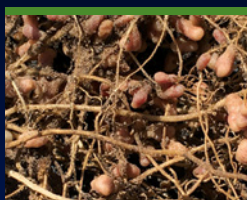
**PTB160** Technology (pulses), *Rhizobium leguminosarum* biovar *viciae*

**PTB162** Technology (soybean), *Bradyrhizobium japonicum*

*Mesorhizobium ciceri* (chickpea)

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

- ✓ FIX NITROGEN & MAKE IT AVAILABLE TO THE PLANT



**B**

### BACILLUS

**PTB180** Technology, *Bacillus pumilus*

**Bacillus is a bacteria that provides a healthy root zone which leads to better yields. As a root colonizer, it stimulates the plant to grow more efficiently.** Selected for its beneficial action of growth stimulation.

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



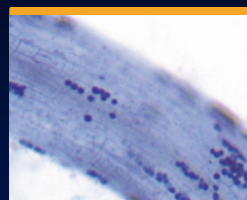
**S**

### 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 CHLOROPHYLL CONTENT
- ✓ BETTER PLANT ESTABLISHMENT, GROWTH AND YIELD



## ON-FARM MIXING WITH SEEDS

### AGTIV® REACH™ P



#### ACTIVE INGREDIENT:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 8000 viable spores/g

#### INERT INGREDIENT:

Peat  
**PARTICLE SIZE:** < 1 mm (18 mesh)

**BULK DENSITY:** 400 g/L (1 lb/US dry qt)

SIZE	COVERS	CODE
4 x 800 g (4 x 1.75 lb) – pails	Cereals, flax & dry beans: 32 ha (80 acres) Alfalfa, mix forages & grass: 16 ha (40 acres)	712324

#### DIRECTIONS FOR USE

Mix evenly with seeds at the bottom of the grain auger while filling drill, or directly in the drill box. Ensure uniform seed coverage is obtained.

Cereals, flax & dry beans: apply at 100 g/ha (40 g or 1.4 oz/acre).

Alfalfa, mix forages & grass: apply at 200 g/ha (80 g or 2.8 oz/acre).

Refer to the list of compatible pesticides at [PTAGTIV.COM/en/compatibility](http://PTAGTIV.COM/en/compatibility).

# FIELD CROPS



## GRANULAR IN-FURROW

### AGTIV® REACH™ G



#### ACTIVE INGREDIENT:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 178 viable spores/g

**INERT INGREDIENT:** Peat

**PARTICLE SIZE:** 0.5 mm to 2.5 mm (8 - 30 mesh)

**BULK DENSITY:** 600 g/L (37.4 lb/ft³)

SIZE	COVERS	CODE
18.2 kg (40 lb) – bag	4 ha (10 acres)	712101
364 kg (800 lb) – tote bag	80 ha (200 acres)	712102

#### DIRECTIONS FOR USE

Apply in the seed row at a rate of 4.5 kg/ha (4 lb/acre).

## LIQUID FOR IN-FURROW

### AGTIV® REACH™ L



#### ACTIVE INGREDIENT:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 6400 viable spores/g

**INERT INGREDIENT:** Water

**PARTICLE SIZE:** < 0.2 mm (70 mesh)

Contains non-soluble particles

SIZE	COVERS (1 case)	CODE (case)
2 x 950 ml (2 x 32 fl. oz) – bottles	16 ha (40 acres)	712204

#### DIRECTIONS FOR USE

One 950 ml bottle covers 8 ha (20 acres). Dilute the product in the required volume of clean, non-chlorinated water, according on the product label. Shake the bottle well before use and maintain a constant agitation in the tank during application to avoid settling and clogging. Apply directly in the seed row.

**LIQUID INJECTION:** To apply using the AGTIV® Liquid Injection Kit, prepare the product mixture and adjust the Dosatron® injection rate following the application chart and video at [PTAGTIV.COM/en/liquid-injection-kit](http://PTAGTIV.COM/en/liquid-injection-kit). If the mixture does not contain pesticides or fertilizers, it can be emptied, refrigerated and used within 24 hours.

**TANK MIX:** Refer to [PTAGTIV.COM/en/REACH-L](http://PTAGTIV.COM/en/REACH-L) for application details.





## GRANULAR

### AGTIV® REACH™ G



#### ACTIVE INGREDIENT:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 178 viable spores/g

#### INERT INGREDIENT: Peat

**PARTICLE SIZE:** 0.5 mm to 2.5 mm (8 - 30 mesh)

**BULK DENSITY:** 600 g/L (37.4 lb/ft³)

SIZE	CODE
6 kg (13.2 lb) – pail	712103

#### DIRECTIONS FOR USE

**IN-FURROW:** Apply directly in-furrow at a rate of 40 g (1/4 cup) per 100 m row length (0.26 lb/1000 ft).

**INCORPORATION INTO GROWING MEDIA:** Mix thoroughly into the growing media before filling the trays.

Quantity of AGTIV® to use per volume of growing media		
Cell or container volume	Qty of product to add/m³ of media	Qty of product to add/yd³ of media
40-200 ml	3.4 kg (5.6 L)	5.7 lb (18 cups)
200-500 ml	2.2 kg (3.7 L)	3.8 lb (12 cups)
500 ml-1500 ml	1.1 kg (1.9 L)	1.9 lb (6 cups)
1500 ml or more	0.8 kg (1.4 L)	1.4 lb (4.5 cups)

**TRANSPLANTING:** Apply the product at the bottom and on the sides of the planting hole. Product must be in direct contact with roots.

BERRIES	FRUIT TREES
1.7 g (1 tsp)	8 g (1 Tbsp)

# SPECIALTY CROPS



## AGTIV® REACH™ P



## ACTIVE INGREDIENT:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 8000 viable spores/g

INERT INGREDIENT: Peat

PARTICLE SIZE: < 1 mm (18 mesh)

BULK DENSITY: 400 g/L (1 lb/US dry qt)

SIZE	CODE
4 x 800 g (4 x 1.75 lb) – pails	712324

## DIRECTIONS FOR USE

## TRANSPLANTING

**VEGETABLE TRANSPLANTS OR BARE-ROOT BERRIES** — Right before planting, coat the root plugs or the bare roots with the product. A 800 g pail of product can treat up to 117 000 transplants or 21 300 bare roots (according to plant size).

**ASPARAGUS** — Right before planting, coat the bottom of the crown with the product. The recommended quantity is 38 g (80 ml) for 1 000 crowns.

## INCORPORATION INTO GROWING MEDIA

Mix the quantity of product into the growing media. For application chart, visit [PTAGTIV.COM/en/REACH-P](https://PTAGTIV.COM/en/REACH-P). For a better homogeneity, it is preferable to premix the recommended quantity of product to a part of the growing media (or one of the dry ingredient used in its composition). For application onto tray surface, contact your local representative for application details depending on your practices.

## MIXING WITH SEEDS

At planting time, mix evenly with seeds (Table 1). Ensure uniform seed coverage is obtained. The product formulation may “bulk up” seeds. It is important to calibrate the planter to ensure correct planting rate is attained. Avoid using AGTIV® with wet equipment. When seeding, ensure full seed-soil contact to minimize any desiccation of the inoculant.

Table 1 – Quantity of AGTIV® to use per 1 000 seeds

Type of seed	g	oz	ml
Nantes carrot	0.34	0.012	0.7
Market carrot	0.33	0.012	0.7
Spanish onion	0.56	0.020	1.2
Yellow onion	0.41	0.015	0.9
Lettuce	0.42	0.015	0.9
Pea/bean	0.38	0.013	0.8
Cucumber	1.98	0.070	4.2
Squash/pumpkin	4.95	0.170	10.4
Garlic	37.5	1.320	78.9

1 cup equals 240 ml (96 g) of product.

## TREATED SEEDS

AGTIV® REACH™  
AGTIV® STIMULATE™

## ACTIVE INGREDIENTS:

**M** MYCORRHIZAE – PTB297 Technology  
*Rhizophagus irregularis*: 6 400 viable spores/g

**B** BACILLUS – PTB180 Technology  
*Bacillus pumilus*: 3 x 10<sup>9</sup> viable spores/ml

## Ask for AGTIV® REACH™ (Mycorrhizae) &amp; AGTIV® STIMULATE™ (Bacillus) combined on your treated seeds

AGTIV® inoculants are specially designed seed applied technologies integrating biological active ingredients to promote healthy emergence and greater seedling vigor that increases: UNIFORMITY • YIELD • QUALITY.

With the AGTIV® proven technologies, you have access to certified inoculants backed by a close partnership with seed treaters for technology integration, compatibility with other inputs and quality control.

Validate with your representative which active ingredients are currently available for your specialty crops.

The following plant families cannot be colonized (no effect on plant) by the mycorrhizal fungi contained in AGTIV®: *Brassicaceae* (broccoli, cabbages, cauliflower, radish, rutabaga, watercress), *Chenopodiaceae* (beets, spinach), *Ericaceae* (blueberries, cranberries).

## AGTIV® REACH™ L POTATO



### ACTIVE INGREDIENT:



**MYCORRHIZAE** – PTB297 Technology

*Rhizophagus irregularis*: 10 500 viable spores/g in liquid suspension  
(315 000 viable spores/fl. oz)

### INERT INGREDIENT: Water

**PARTICLE SIZE:** < 0.2 mm (70 mesh)

Contains non-soluble particles

SIZE	COVERS (1 case)	CODE (case)
2 x 950 ml (2 x 32 fl. oz) – bottles	8 ha (20 acres)	711004

# POTATO



## IN-FURROW APPLICATION

### DIRECTIONS FOR USE

Dilute the product in the required volume of clean, non-chlorinated water. Refer to the application charts available at [PTAGTIV.COM/en/potato](https://www.ptagtiv.com/en/potato). **Shake the bottle well before use and maintain a constant agitation in the tank during application to avoid settling and clogging.** Apply directly on seed pieces into furrow.

See recommendations below based on the application mode:

#### LIQUID INJECTION:

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

- Ensure the tank and the liquid injection system are clean and free of chemical residues, and agitation system is operational.
- On the planter, remove all cylinder screens by the nozzles or use filters with openings of at least 50 mesh (0.28 mm).
- Prepare your product mixture and adjust the Dosatron® injection rate following the calculation chart and application video at [PTAGTIV.COM/en/liquid-injection-kit](https://www.ptagtiv.com/en/liquid-injection-kit).
- Spray band width should be limited to 7 in (18 cm) or less.
- If the mixture does not contain pesticides or fertilizers, it can be emptied, refrigerated and used within 24 hours.

#### TANK MIX

- Use filters with openings of at least 50 mesh (0.28 mm).
- Use a diaphragm (or peristaltic) pump for product application.
- Up and down agitation at all times in the tank.
- Spray band width should be limited to 7 in (18 cm) or less.
- Apply within 6 hours after mixing into the liquid tank.
- See the application video at [PTAGTIV.COM/en/potato](https://www.ptagtiv.com/en/potato).

## SEED-PIECE TREATMENT

### DIRECTIONS FOR USE

In a clean tank, pour the content of **one** 950 ml (32 fl. oz) bottle in the volume of liquid required to treat the amount of seed pieces for 4 hectares (10 acres) of seedbed (110 000 – 170 000 seed pieces). **Shake the bottle well before use and maintain a constant agitation in the tank during application to avoid settling and clogging.** Apply directly on seed pieces. Do not treat seed pieces more than 48 hours before seeding (could activate seed-piece sprouting).

See recommendations below based on the application mode:

#### MILESTONE TREATER:

- Validate that the atomizing head and the mixing paddles correspond to the approved specifications.  
Visit [PTAGTIV.COM/en/equipment](https://www.ptagtiv.com/en/equipment) for more details or contact your representative.

#### OTHER MODELS:

- Validate that the atomizing head and the mixing paddles correspond to the approved specifications (ask your representative for more info).
- Use filters with openings of at least 50 mesh (0.28 mm).
- Use a diaphragm (or peristaltic) pump for product application.
- Up and down agitation at all times in the tank.





Area with horizontal dotted lines for notes.



## PRIMERS & FOLIARS



PRIMERS & FOLIARS .....	63 - 79
Active AgriScience Patented Biostimulant Technology .....	63
Foliar Fertility Program .....	64
Active PRIME™ .....	66
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# Active AgriScience Patented BIOSTIMULANT TECHNOLOGY



## BENEFITS COMPARED to COMPETITIVE PRODUCTS

1. Everything is produced in a laboratory ensuring consistent quality while humic/fulvic products are obtained from various natural sources with variable quality profiles.
2. Application rates are at least 100 times lower than competing products.
3. Compatible with fertilizer and other agrochemicals.
4. Non-hazardous with no transportation or usage restrictions.
5. Produces consistent results.



Active AgriScience Patented Biostimulant Technology is designed to enhance seed germination, root growth, seedling vigor, stress resistance and yield.

## STRONGER ROOT GROWTH

Induces the Indole Butyric Acid (IBA) pathway resulting in higher levels of IBA in tissues and earlier, quicker, root growth and development. In addition, it induces synthesis of zeatin, a cytokinin that promotes shoot growth. The resulting more robust treated plants are better able to maintain strong growth under drought stress.

## REDUCED TRANSPIRATION

Helps regulate stomatal function to reduce excess water loss. It also helps increase xylem pressure through positive water potential and enhanced xylem elasticity.

## INCREASED WATER USE EFFICIENCY

Combats drought induced changes in plants by inhibiting both ethylene synthesis and free radical formation. Ethylene and free radicals destabilize plant membranes, through fluidization and lipid peroxidation, resulting in water leakage and quicker wilting. Treated plants exhibit greater water use efficiency and inherent resistance to these drought-induced changes.

## INCREASED NUTRIENT MOBILIZATION & ABSORPTION

Increases secretion of root exudates into the rhizosphere leading to increased bound nutrient mobilization, availability, and root interception. Treated plants also show increased uptake of nutrients mobilized by mass flow.

## INCREASED PERFORMANCE UNDER ENVIRONMENTAL STRESS CONDITIONS

Its ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways allows plants to maximize their genetic potential under cold, wet or drought conditions.

## INCREASED FUNCTION OVER a WIDE pH RANGE

Acts as either weak acids or bases to pH buffer solutions. This property ensures function and efficacy are preserved over various pH ranges.

# FOLIAR FERTILITY PROGRAM

	CANOLA	CEREALS
		
SEEDING	 <b>Active PRIME</b> 4ml/1kg seed  110 bags per 10L jug (90ml/bu)	 <b>Active PRIME</b> 4ml/1kg seed  <b>WHEAT:</b> 92 bu treated per 10L jug (108ml/bu) <b>BARLEY:</b> 115 bu treated per 10L jug (87ml/bu) <b>OATS:</b> 162 bu treated per 10L jug (61ml/bu)
HERBICIDE	 <b>Active BUILD</b> 0.5 L to 1L/acre  3-4 weeks between applications	 <b>Active BUILD</b> 0.5 L to 1L/acre  3-4 weeks between applications
FUNGICIDE	 <b>Active FLOWER</b> 1L/acre  3 weeks between applications	 <b>Active GRAINFILL</b> 1L/acre
HAIL EVENT	  Always use <b>Active BUILD</b> until oilseed flowering. If the plant has already begun to flower use <b>Active FLOWER</b>	 Always use <b>Active BUILD</b> until cereal heading

## APPLY AS CROP DEFICIENCIES ARE APPARENT

Active Singles: Active BORON • Active COPPER • Active MANGANESE • Active ZINC • Active KONNECT • Proform N

active **BORON**

active **ZINC**

active **COPPER**

active **MANGANESE**

active **KONNECT**

Proform **N**

# FOLIAR FERTILITY PROGRAM

## PULSES



### SEEDING



**Active PLS**  
2ml/1kg seed

**Active PRIME**  
4ml/1kg seed



**SOYBEAN:** 200 units/10L jug (50ml/unit)  
**PEAS:** 183 bu/10L jug (54 ml/bu)  
**LENTIL:** 183 bu/10L jug (54 ml/bu)

**PEAS:** 92 bu/10L jug (108 ml/bu)  
**LENTIL:** 92 bu/10L jug (108 ml/bu)

### HERBICIDE



**Active VPR**  
1L/acre



**Active VPR PLUS**  
1L/acre

### FUNGICIDE



**Active PODFILL**  
1L/acre

3 weeks between applications

### HAIL EVENT



Always use  
**Active BUILD**  
until pulse flowering.  
If the plant has already  
begun to flower use  
**Active PODFILL**



Active AgriScience Inc. supports the farming community by providing innovative, effective and economical products that increase yields. A leader in plant nutrient and bioactive compound research and technology, Active AgriScience uses rigorous scientific methods to develop and enhance products to improve farm production and profits.



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### APPLY AS CROP DEFICIENCIES ARE APPARENT

Active Singles: Active BORON • Active COPPER • Active MANGANESE • Active ZINC • Active KCONNECT • Proform N







Active PRIME™ is a seed coating that contains nutrients and bioactive molecules to get your newly seeded crop off to a strong, healthy start. It improves germination, boosts root growth, and protects seeds and seedlings from unfavourable environmental conditions. The resulting robust young plants are primed to produce a greater yield.

### DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE.

1. Apply Active PRIME™ as a seed nutrient dressing at 4 ml / kg of seed.
2. Seed coating can be done simultaneously with Active PRIME™ and compatible agrochemicals (see Compatibility Chart).
3. If using Active PRIME™ without additional agrochemicals, use equal amounts of water and Active PRIME™ (1:1) to sufficiently coat seeds. Calibrate equipment to release the required amount of the Active PRIME™ mixture based on seed flow rate.
4. Thoroughly mix seeds with the Active PRIME™ mixture. A colouring additive allows a visual check to ensure all seeds are uniformly coated.
5. Let the treated seeds air dry for 5-10 min before seeding.

### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N) .....	3.75%
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ) .....	15%
Soluble Potash (K <sub>2</sub> O) .....	4.5%
Boron (B) (actual) .....	0.05%
Iron (Fe) (actual) .....	0.01%
Manganese (Mn)(actual) .....	0.8%
Zinc (Z) (actual) .....	0.9%

### ENHANCED GERMINATION:

Active PRIME™ induces synthesis of zeatin, a cytokinin, to promote shoot growth, resulting in faster and higher rates of germination.

### STRONGER ROOT GROWTH:

Active PRIME™ induces the indole-3-butyric acid (IBA) pathway resulting in higher levels of IBA in tissues leading to earlier and quicker root growth and development. As a result, Active PRIME™ treated plants are better able to maintain strong growth under drought stress.

### INCREASED WATER USE EFFICIENCY:

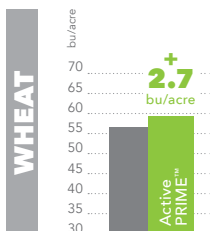
Active PRIME™ combats drought induced changes in plants by inhibiting both ethylene synthesis and free radical formation. Ethylene and free radicals destabilize plant membranes, through fluidization and lipid peroxidation, resulting in water leakage and quicker wilting. Active PRIME™ treated plants exhibit greater water use efficiency and inherent resistance to these drought-induced changes.

### INCREASED NUTRIENT MOBILIZATION and ABSORPTION:

Active PRIME™ increases secretion of root exudates into the rhizosphere leading to increased bound nutrient mobilization, availability, and root interception. Active PRIME™ treated plants also show increased uptake of nutrients mobilized by mass flow.

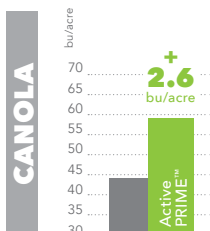
### INCREASED PERFORMANCE UNDER STRESS CONDITIONS:

Active PRIME™ benefits are unaffected by unfavourable conditions. It maintains the ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways, allowing plants to maximize their genetic potential under cold, wet or drought conditions.



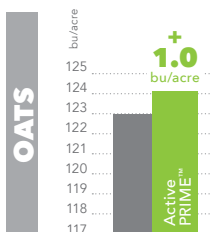
### WHEAT • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	77.0	63.3	50.9	45.3	68.2	37.5	57.0	0
Active PRIME™	81.0	66.1	54.2	47.3	70.9	38.8	59.7	4.7



### CANOLA • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	45.0	52.0	42.3	33.8	57.7	38.85	44.1	0
Active PRIME™	49.0	59.6	44.7	35.7	58.4	39.9	46.7	5.9



### OATS • 3 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	3 YEAR AVERAGE (bu/acre)	% CHANGE
Check	138.1	159.6	70.6	123.0	0
Active PRIME™	143.5	157.7	71.2	124.0	0.8



### INCREASE YOUR VIGOUR BY UP TO 9%

CROP	UNTREATED	TREATED %	% DIFFERENCE
Wheat-Durum	69	74	5
Wheat-Common	71	78	7
Pea	76	85	9
Lentil	88	91	3



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With its brand new formulation, Active PLS™ contains a higher nutrient load compared to its predecessor for the same purchasing cost. A better balanced pH optimizes synergy with the roots and rhizobial inoculants to maximize Biological Nitrogen Fixation (BNF). This seed nutritional coating supplies seeds with the macronutrients and trace elements required to improve germination and early growth, leading to stronger plants with higher yields.

## DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE.

Apply as a seed nutrient dressing to soybeans, faba beans, peas, lentils, chickpeas and other beans using 2 ml / kg of seed.

Seed coating can be done simultaneously with Active PLS™ and compatible agrochemicals. If using Active PLS™ without additional agrochemicals, dilute with water (1:1 ratio) to ensure uniform coverage of seeds.

- Calibrate equipment to release the required amount of Active PLS™ and other agrochemicals based on seed flow rate.
- Thoroughly mix seeds with the Active PLS™ (and other agrochemicals) mixture. A coloring additive allows a visual check to ensure all seeds are uniformly coated.
- Allow treated seeds to air dry for 5-10 min before seeding.
- Application rates exceeding recommended rates can negatively affect seed germination. Always follow label directions.

**COMPATIBILITY:** Compatible with Rhizobium and Bradyrhizobium inoculants. This product is compatible with most other pesticides and fertilizers. If compatibility is uncertain, conduct a jar test prior to use. Add tank mix partners in the following order: Seed, Agrochemical, Active PLS™, Inoculants.

## LEGUME NUTRITIONAL SEED TREATMENT

### IMPROVED FORMULATION

Active PLS™ provides a superior nutrient composition compared to its predecessor and is an economical option to support legume seed germination, vigorous early growth, and rhizobial bacterial growth.

### BALANCED pH FOR ENHANCED BNF

Active PLS™ has a pH ideally balanced to promote rhizobacterial growth on legumes and fosters better communication between the root and the inoculant.

### INCREASED PERFORMANCE UNDER STRESS CONDITIONS

Active PLS™ maintains the ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways, allowing plants to maximize their genetic potential under cold, wet or drought conditions.

### ADAPTABLE PRODUCT WITH A FLEXIBLE APPLICATION

Active PLS™ has a flexible formula which can be mixed either simultaneously or sequentially with rhizobial inoculants and compatible agrochemicals.

#### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N) .....	2.0%
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ) .....	10.0%
Soluble Potash (K <sub>2</sub> O) .....	10.0%
Boron (B) .....	0.1%
Iron (Fe) .....	0.005%
Manganese (Mn) .....	0.1%
Molybdenum (Mo) .....	0.05%
Zinc (Z) .....	0.2%



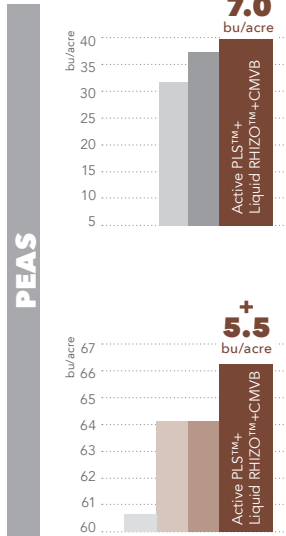
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Liquid RHIZO™ PULSE +  
ACTIVE PLS™



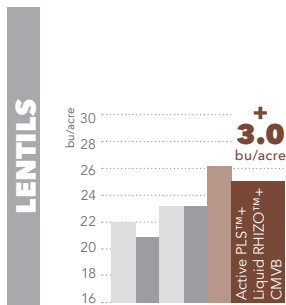
Liquid RHIZO™ SOY +  
ACTIVE PLS™



#### PEAS • YIELD DATA, SK - 2018 <sup>1</sup>

TREATMENT	YIELD (bu/acre)	% CHANGE
Liquid RHIZO™	32	
Liquid RHIZO™ + CMVB	37	16
Active PLS™ + Liquid RHIZO™ + CMVB	39	22

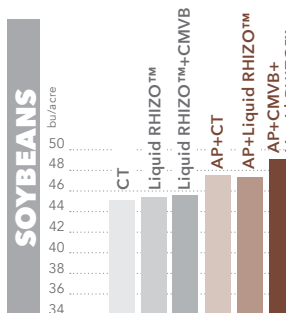
CMVB = Cruiser Maxx® Vibrance® Beans Seed



#### PEAS • YIELD DATA, MB - 2018 <sup>2</sup>

TREATMENT	YIELD (bu/acre)	% CHANGE
Liquid RHIZO™	60.6	
Active PLS™ + Cell-Tech®	64.1	6
Active PLS™ + Liquid RHIZO™	64	6
Active PLS™ + Liquid RHIZO™ + CMVB	66.1	9

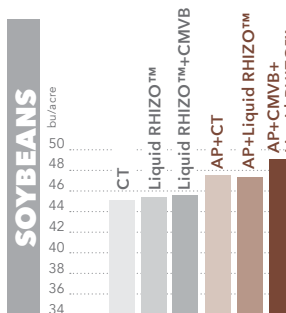
CMVB = Cruiser Maxx® Vibrance® Beans Seed



#### LENTIL • YIELD DATA, SK • 2018 <sup>3</sup>

TREATMENT	YIELD (bu/acre)	% CHANGE
Check (Cell-Tech®)	22	
Liquid RHIZO™	21	
Active PLS™ + Cell-Tech®	23	5.0
Active PLS™ + N-Rhizo™	26	18.0
Active PLS™ + Liquid RHIZO™ + CMVB	25	14.0

CMVB = Cruiser Maxx® Vibrance® Beans Seed



#### SOYBEANS • YIELD DATA - 2018 <sup>4</sup>

TREATMENT	YIELD (bu/acre)	% CHANGE
Check (Cell-Tech®)	45.2	
Liquid RHIZO™ SOY	45.4	0.4
Liquid RHIZO™ SOY + CMVB	45.8	1.3
Active PLS™ + Cell-Tech®	47.7	5.5
Active PLS™ + Liquid RHIZO™ SOY	47.1	4.1
Active PLS™ + Liquid RHIZO™ SOY + CMVB	48.8	8.0

CMVB = Cruiser Maxx® Vibrance® Beans Seed

<sup>1</sup> 3<sup>rd</sup> party field research with Ag-Quest, Saskatoon, SK - 2018

<sup>2</sup> 3<sup>rd</sup> party field research with New Era Ag, Swan River, MB - 2018

<sup>3</sup> 3<sup>rd</sup> party field research with Ag-Quest, Saskatoon, SK - 2018

<sup>4</sup> 3<sup>rd</sup> party field research with Ag-Quest, Elm Creek, MB - 2018





Active BUILD™ provides the nutrients that young plants need to continue strong, healthy growth and overcome the stress caused by rapid growth, herbicides, and unfavourable environmental conditions. Roots continue to deepen, while stalks strengthen and foliage increases, ultimately resulting in higher yields.

#### Formulated with Patented Biostimulant Technology

### DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE.

General Crop Use: apply at herbicide timing as a foliar spray using 1 L per acre with a minimum of 20 L of water per acre for ground applications and 12 L of water per 1 acre for aerial applications. Allow at least 3-4 week between applications. Wheat, oats: apply at BBCH 13-15 (3-5 leaf stage). Canola: apply at BBCH 12-14 (2-4 leaf stage). Soybean apply at V1-V2 (first-second trifoliate). Peas, lentils, and other pulse crops, potato, corn: apply at the 4-5 leaf stage. Flax: apply when plants have

3 sets of true leaves. Spray early morning or late afternoon when the sun is lower in the sky. Do not apply when air temperatures are above 29°C (85°F). Avoid spraying on windy days.

COMPATIBILITY: This product is compatible with most pesticides and fertilizers. If compatibility is uncertain, conduct a jar test prior to use. Add tank mix partners in the following order: water, agrochemical, Active BUILD™.

#### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N) .....	2%
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ) .....	30%
Potassium (K <sub>2</sub> O) .....	6%
Boron (B) .....	0.3%
Manganese (Mn) .....	1.0%
Zinc (Z) .....	2.3%
Molybdenum (Mo) .....	0.13%

### STRONGER GROWTH:

The high N-P-K concentration in Active BUILD™ is supplemented with boron, manganese, zinc, and molybdenum supporting additional root growth, stronger stalks and increased leafing, even under drought stress.

### INCREASED WATER USE EFFICIENCY:

Active BUILD™ combats drought induced changes in plants by inhibiting both ethylene synthesis and free radical formation. Ethylene and free radicals destabilize plant membranes, through fluidization and lipid peroxidation, resulting in water leakage and quicker wilting. Active BUILD™ treated plants exhibit greater water use efficiency and inherent resistance to these drought-induced changes.

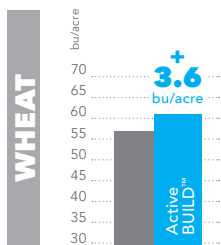
### INCREASED NUTRIENT MOBILIZATION and ABSORPTION:

Active BUILD™ provides nitrogen and potassium in easy-to-absorb complexes, and phosphorous is in two different forms. It increases secretion of root exudates into the rhizosphere to improve bound nutrient mobilization, availability, and root interception. Treated plants show increased uptake of nutrients.

### INCREASED PERFORMANCE UNDER STRESS CONDITIONS:

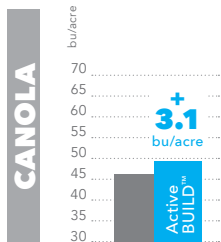
Active BUILD™ benefits are unaffected by unfavourable conditions. It maintains the ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways, allowing plants to maximize their genetic potential under cold, wet or drought conditions.





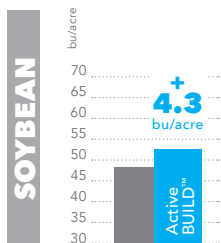
### WHEAT • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	77.0	63.3	54.2	45.3	68.2	37.5	57.0	0
Active BUILD™	81.0	69.3	57.2	47.8	69.0	39.1	60.6	5



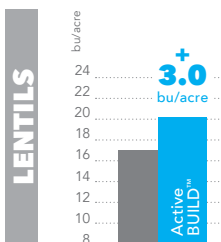
### CANOLA • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	45.0	52.0	44.7	33.8	57.7	42.5	46.0	0
Active BUILD™	49.5	55.7	46.2	38.4	61.9	43.0	49.1	7



### SOYBEAN • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	68.0	10.1	60.6	68.7	38.3	42.0	48.0	0
Active BUILD™	72.0	17.6	62.1	72.6	46.0	43.6	52.3	9



### LENTILS • 3 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	10.4	19.8	22.0	17.0	0
Active BUILD™	11.9	23.0	24.0	20.0	13.0





Although post emergent herbicides kill weeds without visibly harming the growing crop, plants still undergo stress as they go through the process of breaking down the herbicide into less toxic components. Active VPR™ acts as a post-emergent herbicide stress reliever while acting synergistically with the herbicide to increase its efficacy on weeds. Loaded with Phosphorous and Potassium, key elements for root and shoot growth, Active VPR™ contains molecules that enhance plants' ability to better respond to abiotic and biotic stressors. Plants treated with Active VPR will have minimal herbicide stress and a quicker recovery. This leads to better utilization of resources and higher yields.

## DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE.

Apply as a foliar spray. Field Peas and Succulent Peas: apply at the 4-5 leaf stage (herbicide timing). Soybean and other Dry Edible Beans: apply at V1-V2 (first-second trifoliate/herbicide timing) stage.

## MIXING RATES:

Active VPR is compatible with Viper ADV, Basagran Forte, or Basagran (see below chart for possible compatible mixtures). Most compatible herbicides recommend adding UAN 28% to the tank mixture. Please refer to your chosen herbicide's instructions for UAN/agrochemical mixing rates. Mix one of the compatible agrochemical combinations followed with UAN at the recommended rate, then add Active VPR at the rate of 1 L per acre with a minimum of 20 L of water per acre for ground applications and 12 L of water per 1 acre for aerial applications.

Active VPR is compatible with Viper ADV, Python A, Python B, and Basagran Forte or Basagran.

## FASTER RECOVERY FROM HERBICIDE STRESS

Active VPR™ treated plants are able to regulate the biochemical pathways related to protein, carbohydrate and ATP production to help reduce plant respiration and prevent energy loss. This allows plants to better allocate energy to the recovery processes.

## INCREASED ROOT GROWTH and IMPROVED DROUGHT RESISTANCE

Active VPR™ helps regulate the opening and closing of the stomata controlling water vapor, oxygen and carbon dioxide exchange. Some of the molecules included in Active VPR™ can act as anti-oxidants and can scavenge toxic compounds produced within the plant. In addition, these molecules are able to control the elasticity of membranes to reduce water loss.

## ENHANCES TRANSLOCATION of SUGARS and STARCH

Potassium is key to carbohydrate metabolism and translocation of sugars and starch. After herbicide application, the potassium in Active VPR™ ensures that the plant gives priority to the essential tissues first ensuring a fast recovery from herbicide stress.

## IMPROVED CROP MATURITY, UNIFORMITY and INCREASED YIELD

Active VPR™ improves root growth, accelerates recovery from herbicide and other abiotic/ biotic stressors. It also helps the crop establish quicker and gives it an advantage of a few more days of photosynthesis compared with the untreated crop. This leads to increased yield.

Active VPR™ was developed at the University of BC.

### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N) .....	2%
Available Phosphate (P <sub>2</sub> O <sub>5</sub> ) .....	10%
Potassium (K <sub>2</sub> O) .....	10%



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Active VPR™ PLUS is an essential tank mix partner with your post-emergent herbicide application. Crops undergo stress as they go through the process of breaking down herbicide into less toxic components. Active VPR™ PLUS acts as a herbicide stress reliever with added Urea-Potassium Phosphate to effectively replace UAN as tank mix partner. Loaded with the three essential nutrients (N-P-K) Active VPR™ PLUS improves herbicidal activity on weeds and improves stress resistance, root growth and overall yield of the crops.

## DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE. Apply as a foliar spray. Field Peas and Succulent Peas: apply at the 4-5 leaf stage (herbicide timing). Soybean and other Dry Edible Beans: apply at V1-V2 (first-second trifoliate/herbicide timing) stage.

## MIXING RATES:

Active VPR™ PLUS is compatible with Viper ADV, Python A, Python B, and Basagran Forte or Basagran (see compatibility chart for possible mixtures). Mix one of the compatible agrochemical combinations at the recommended rate, then add Active VPR™ PLUS at the rate of 1 L per acre with a minimum of 40 L of water per acre for ground applications and 24 L of water per 1 acre for aerial applications.

**GUARANTEED MINIMUM ANALYSIS:**  
Total Nitrogen (N) ..... 14.0%  
Available Phosphate ( $P_2O_5$ ) ..... 10.0%  
Potassium ( $K_2O$ ) ..... 10.0%

## SUPERIOR TANK MIX PARTNER VS UAN:

Active VPR™ PLUS provides a superior nutrient composition (14-10-10) versus UAN (28-0-0) and is an economical option to provide all three macro elements during the early stage of crop growth. Independent testing has shown Active VPR PLUS out performs UAN as a tank mix partner to achieve optimum weed control with significantly less crop stress.

## SUPERIOR CHEMISTRY VS UAN:

Presence of Urea-Potassium-Phosphate complex allows Bentazon and Imazamox molecules to better bind and penetrate through cuticles to reach target sites.

## REDUCED HERBICIDE STRESS & ENHANCED CROP GROWTH:

Active VPR™ PLUS mitigates herbicide stress by reducing electrolyte leakage and acts as a metabolic switch for the crop to maintain its growth. Potassium plays a major role while nitrogen and phosphorous help maintain growth as well as providing the energy needed to metabolize herbicide active molecules.

## IMPROVED ROOT GROWTH & DROUGHT RESISTANCE:

Active VPR™ PLUS helps regulate the opening and closing of the stomata controlling water vapor, oxygen and carbon dioxide exchange. Potassium present in Active VPR™ PLUS is key for cell wall strength and cellulose production that enhance disease resistance and the ability of the crop to maintain firm, healthy stalks. Some of the molecules included in Active VPR™ PLUS can act as antioxidants and scavenge toxic compounds produced within the plant. In addition, these molecules are able to control the elasticity of membranes to reduce water loss.

## IMPROVED CROP MATURITY, UNIFORMITY, & YIELD:

Active VPR™ PLUS improves root growth while accelerating recovery from herbicide and other stressors. It also helps the crop establish quicker giving it an advantage of a few more days of photosynthesis compared with an untreated crops. Adequate P and K levels are required to enhance shoot and root growth and promote early maturity. These effects often increase water use efficiency and yield potential.



Active FLOWER™ provides nutrients, polyamines and organic acids to support and enhance plant fertility. It improves pollen hydration, germination, pollen tube growth and viability, and encourages bee foraging activity which increases fertilization. Plants produce more fruit sets and an increased number of larger and more uniform pods and seeds, ultimately resulting in greater yields.

## DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE.

**General Crop Use:** apply at fungicide timing as a foliar spray using 1 L per acre with a minimum of 20 L per acre for ground applications. Allow a minimum of 3 weeks between applications.

Canola, soybean, peas, lentils and other pulse crops: apply once at the 5% - 30% bloom stage.

Corn: apply once at the tassels stage.

Flax: apply 1-2 times, once beginning at the 5% blooming stage. Repeat once more as needed.

Hops: apply once at the 5-30% bloom stage.

Add tank-mix partners in the following order: water, agrochemical, Active FLOWER™.

### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N)	8.0%
Available Phosphate ( $P_2O_5$ )	4.0%
Potassium ( $K_2O$ )	12.0%
Boron (B)	2.0%
Copper (Cu)	0.05%
Iron (Fe)	0.09%
Manganese (Mn)	0.1%
Zinc (Zn)	0.05%

## INCREASED POLLEN TUBE GROWTH:

Active FLOWER™ contains nitrogen, potassium, and a polyamine complex to support pollen tube growth and accumulation of secretory vesicles in pollen tubes.

## INCREASED FERTILIZATION:

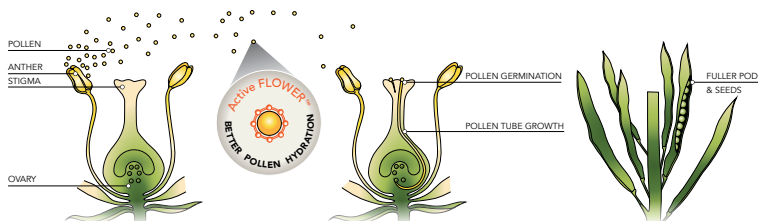
Active FLOWER™ helps regulate anther dehiscence and pollen hydration, and increases pollen volume and viability.

## INCREASED VOLUME and SIZE of FRUIT SETS, PODS, and SEEDS:

Active FLOWER™ increases fertilization and supports carbohydrate and nucleic acid metabolism, sugar transport, cell differentiation and maturation. This results in a higher volume of larger, more uniform, high quality fruits, pods, and seeds.

## INCREASED BEE VISITATIONS:

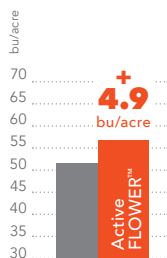
The polyamines present in Active FLOWER™ help attract bees, resulting in greater fertilization and minimal abortive flowers.



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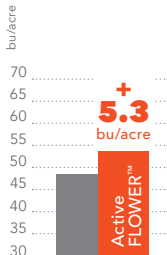
## CANOLA



### CANOLA • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	45.0	52.0	44.7	33.8	57.7	38.85	51.8	0
Active FLOWER™	49.5	63.1	48.0	38.8	59.3	40.85	56.7	9

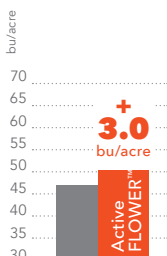
## SOYBEAN



### SOYBEAN • 6 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2013 (bu/acre)	YIELD - 2014 (bu/acre)	YIELD - 2015 (bu/acre)	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	6 YEAR AVERAGE (bu/acre)	% CHANGE
Check	68.0	10.1	60.6	68.7	38.3	42.0	48.0	0
Active FLOWER™	74.0	20.8	61.9	72.1	46.5	44.6	53.3	11

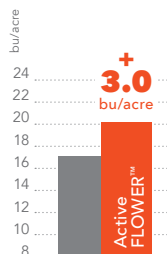
## PEAS



### PEAS • 3 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	3 YEAR AVERAGE (bu/acre)	% CHANGE
Check	51.8	54.5	35.0	47.0	0
Active FLOWER™	56.0	56.9	37.0	50.0	6.2

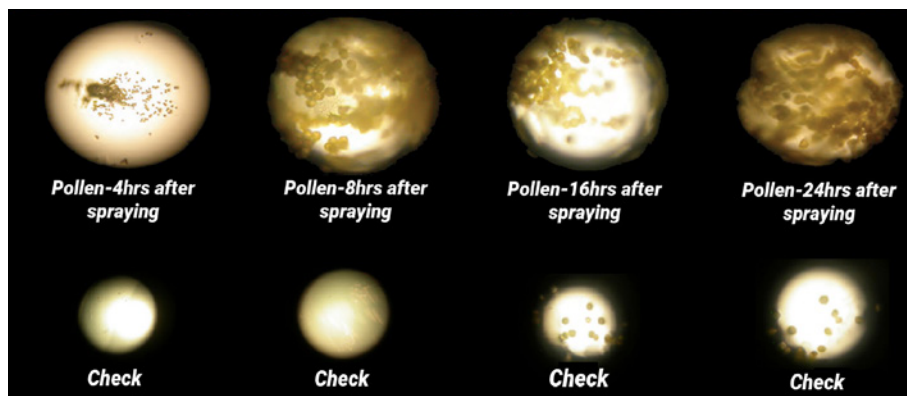
## LENTILS



### LENTILS • 3 YEAR AVERAGE YIELD DATA \*

TREATMENTS	YIELD - 2016 (bu/acre)	YIELD - 2017 (bu/acre)	YIELD - 2018 (bu/acre)	3 YEAR AVERAGE (bu/acre)	% CHANGE
Check	10.4	19.8	22.0	17.0	0
Active FLOWER™	11.8	23.8	24.0	20.0	14.4

## Active FLOWER™ EFFECT



\* 3<sup>rd</sup> party field research with Ag-Quest, BC Grain, ICMS, Mara and New-Marc Research





Grain yield is determined by a combination of crop genetics, duration of the grain filling stage and nutrition during that stage. Active GRAINFILL™ contains nitrogen, potassium sulphur, 12 amino acids and 3 vitamins that optimizes grain size and weight.

## DIRECTIONS for USE:

Wheat, barley, oats: apply during fungicide and fusarium timing (flag leaf to end of flowering BBCH stage 39 to 65) as a foliar spray at 1 L / acre with a minimum of 20 L / acre for ground applications.

Spray early morning or late afternoon when the sun is lower in the sky. Do not apply when air temperatures are above 27°C. Avoid spraying on windy days.

Add tank-mix partners in the following order: water, fungicide, Active GrainFILL™. Keep agitator running while mixing.

### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N) .....	10%
Potassium (K <sub>2</sub> O) .....	14%
Sulphur (S) .....	6.5%
Iron (Fe) .....	0.005%

## Formulated with Patented Biostimulant Technology

### EXTENDED DURATION of GRAIN FILLING

Active GrainFILL™ provides potassium in an easily absorbed form. Potassium is a key element in remobilization of food reserves to developing grains during the grain filling stage. Potassium helps extend the grain filling duration.

### LARGER and HEAVIER GRAINS

Both Nitrogen and Potassium help build new tissues after pollination and fertilization. Nitrogen plays a role in achieving high grain yield with adequate protein content. Nitrogen remobilization to grains after flowering naturally occurs in the form of amino acids. The 12 amino acids in Active GrainFILL™ help enhance this process.

### GROWTH MAINTENANCE UNDER STRESS CONDITIONS

Amino acids help plants during stress situations by acting as osmolytes (cell pressure regulators), regulating ion transport, modulating stomatal opening, and detoxifying heavy metals. Plants supplied with Active GrainFILL™ contains many amino acids, including proline, to help the plant mitigate abiotic stress.

### INCREASED YIELD

Better nutrition and extended grain filling helps maintain yields during stress conditions or improve yields during normal growing conditions.



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Active PODFILL™ enhances pollen development, fertilization, and yield of peas, lentils, soybeans and other beans. It improves pollen hydration, germination, pollen tube growth and viability. Active PODFILL™ encourages bee foraging activity which increases fertilization. Plants produce more fruit sets and an increased number of larger, more uniform and higher quality pods and seeds, ultimately resulting in greater yields.

## DIRECTIONS for USE:

ALWAYS READ LABEL BEFORE USE.

**General Crop Use:** apply at fungicide timing as a foliar spray using 1 L per acre with a minimum of 20-40 L water per acre for ground applications and 12-24 L of water per acre for aerial applications. Allow a minimum of 3 weeks between applications.

**Canola, soybean, peas, lentils and other pulse crops:** apply once at the pre-bloom - 30% bloom stage.

**COMPATIBILITY:** This product is compatible with most fertilizers, and pesticides. If compatibility is uncertain, conduct a jar test prior to use. Add tank-mix partners in the following order: water, agrochemical, Active PODFILL™.

### GUARANTEED MINIMUM ANALYSIS:

Total Nitrogen (N) .....	8.0%
Available Phosphate ( $P_2O_5$ ) .....	4.0%
Soluble Potash ( $K_2O$ ) .....	12.0%
Boron (B) (actual) .....	2.0%

## TAILORED FORMULA SPECIFIC TO PULSES:

More economical formula compared to other nutrient solutions tailored specifically to the enhance the pollination and fertilization of peas, lentils, soybeans and other beans.

### INCREASED POLLEN TUBE GROWTH:

Pollen tube growth is essential for sexual reproduction to occur in plants. Active PODFILL™ contains nitrogen, potassium, and a polyamine complex to support pollen tube growth and accumulation of secretory vesicles in pollen tubes.

### INCREASED FERTILIZATION:

Active PODFILL™ helps regulate anther dehiscence and pollen hydration. It also increases pollen volume and viability while the polyamines present in Active PODFILL™ help attract bees, resulting in greater fertilization and minimal abortive flowers.

### INCREASED SIZE AND QUALITY OF FRUITS, PODS AND SEEDS:

Active PODFILL™ increases fertilization and supports carbohydrate and nucleic acid metabolism, sugar transport, cell differentiation and maturation. This results in a higher volume of larger, more uniform, high quality fruits, pods, and seeds.

### INCREASED NUTRIENT MOBILIZATION AND ABSORPTION:

Active PODFILL™ boosts the uptake of calcium, magnesium, and potassium.

### INCREASED PERFORMANCE UNDER STRESS CONDITIONS:

Active PODFILL™ benefits are unaffected by unfavourable conditions. It maintains the ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways, allowing plants to maximize their genetic potential under cold, wet or drought conditions.



Active KONNECT™ is a potassium supplement plus a plant growth regulator that is particularly beneficial during the development or early growth of fruit, grain and nuts. Use throughout the growing season to increase potassium levels.

#### INCREASED VOLUME AND QUALITY

Active KONNECT™ supports fruit, grain and nut development, resulting in a higher volume of larger, higher quality product.

#### INCREASED BRANCHING

The Cytokinins present in Active KONNECT™ enhance cell division and expansion and activate lateral or axillary bud growth allowing crops to have more branches. This leads to more flowers and pods.

#### INCREASED SUGAR LEVELS and FLAVOUR

Potassium regulates sugar translocation and metabolism. By providing extra potassium in chelated form, Active KONNECT™ helps enhance fruit sugar and flavour.

#### Active KONNECT™ with 0.05% kinetin

CFIA registration number: 2016149A

**GUARANTEED MINIMUM ANALYSIS**  
Soluble Potash (K<sub>2</sub>O) ..... 29.0%  
Sulphur (S)..... 12.0%



Proform N™ provides both readily available and slow release nitrogen, allowing it to be absorbed through the plant leaves efficiently. Proform N™ is also specially formulated to protect leaves from burning.

#### INCREASED CHLOROPHYLL

By allowing the absorption of nitrogen, the development of chlorophyll is supported, fostering photosynthetic energy production and storage for increased health and growth.

#### INCREASED PROTEIN

Increased nitrogen absorption supports the production of plant proteins, including DNA and RNA, allowing plants to manifest their full genetic potential.

#### INCREASED GROWTH and YIELD

By supporting the production of chlorophyll, protein, and nucleic acids, plants grow faster, stronger, and healthier, producing an overall higher yield.

#### Proform N™

**GUARANTEED MINIMUM ANALYSIS:**  
Total Nitrogen (N) ..... 21%  
Magnesium (Mg) actual ..... 0.15%  
Iron(Fe) actual..... 0.05%  
Sulfur (S)..... 0.02%



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## active 6% B BORON™

Boron is essential for strong, healthy growth, particularly at and beyond the pollination phase.

- PHOTOSYNTHESIS AND SUGAR TRANSLOCATION
- ROOT AND ROOT NODULE GROWTH
- POLLEN TUBE GROWTH
- FLOWER, SEED AND FRUIT DEVELOPMENT

CFIA registration numbers: 2016125B

## active 7% Mn MANGANESE™

Manganese is essential for strong, healthy growth and is particularly beneficial in small grains, soybeans, sweet corn, and vegetable crops.

- STRONG, HEALTHY GROWTH
- ROOT GROWTH
- PHOTOSYNTHESIS
- POLLINATION
- RESPIRATION
- DISEASE AND STRESS RESISTANCE

CFIA registration numbers: 2016123B

## active 5.5% Cu COPPER™

The availability and sufficiency of copper in the soil is essential to strong, healthy growth and high yields.

- PHOTOSYNTHESIS
- STRUCTURAL STRENGTH
- MITOCHONDRIAL RESPIRATION
- ENZYMATIC PROCESSES
- POLLEN VIABILITY
- FLAVOUR OF FRUITS
- CARBOHYDRATE & PROTEIN METABOLISM

CFIA registration numbers: 2016124B

## active 9.8% Zn ZINC™

Zinc is essential for plant enzymatic processes, including photo-synthesis and the production of indoleacetic acid, that affect stem length, leaf size, and overall yield. If soil temperatures remain cool during spring planting and early growth, zinc supplementation may be particularly beneficial. It also supports stress management. Some crops however, may not require additional zinc, and caution is needed to avoid zinc toxicity.

- ENZYMATIC PROCESSES
- STEM LENGTH, LEAF SIZE AND OVERALL YIELD
- PHOTOSYNTHESIS
- PRODUCTION OF INDOLEACETIC ACID

CFIA registration numbers: 2016122B



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# NITROGEN MANAGEMENT



NITROGEN  
MANAGEMENT

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Active STABILIZER™ PLUS prevents nitrogen loss due to ammonia volatilization, nitrification and denitrification processes ensuring applied fertilizer is not wasted. Depending on a farmer's goals, Active STABILIZER™ PLUS gives farmers a choice: higher yield using the same amount of urea based nitrogen or same yield but using less urea based nitrogen. In comparison to DCD products, the DMPP in Active STABILIZER™ PLUS offers superior efficacy and no bio-accumulation. With its low cost and unique variable application rate, farmers can treat as necessary to maximize their return on investment.



#### NOT TREATING COSTS YOU

Stop wasting fertilizer! Without treatment, up to 50% of the nitrogen applied as soil fertilizer is converted to ammonia gas and released into the atmosphere.

#### TREATMENT PAYS FOR ITSELF

The cost of applying Active STABILIZER™ PLUS is guaranteed to pay for itself in nitrogen savings alone, reducing the amount of urea fertilizer required.

#### YIELD IS 100% PROFIT

With 1.2 L/mt of urea, Active STABILIZER™ PLUS is able to produce a ROI >1% in Nitrogen savings alone. Everything after that is profit.

#### NOVEL FORMULATION

Formulation includes components to maximize your crops' genetic potential, enhancing nutrient uptake and their ability to thrive in unfavourable conditions.

#### SUPERIOR HANDLING QUALITIES

Active STABILIZER™ PLUS has a superior composition that enhances coverage and spread-ability, reduces dust, smell, caking, and can be used below freezing temperatures.



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#### ACTIVE INGREDIENTS:

12% N-(n-butyl) thiophosphoric triamide (NBPT).

2% 3,4-Dimethyl pyrazol Phosphate (DMPP).

#### INACTIVE INGREDIENTS:

86 % (preservative, colorant, spreading agents, surfactant, product performance enhancer).

VARIABLE APPLICATION: UAN: 1 - 2 L / mt; Urea: 1.2 - 2.4 L / mt



Active STABILIZER™ helps prevent nitrogen loss through ammonia volatilization ensuring applied fertilizer is not wasted. With its low cost and unique variable application rate farmers can treat as necessary to maximize their return on investment.



#### ECONOMICAL CHOICE

Less than a 1% yield advantage is all that is required with most applications before realizing a return on investment.

#### VARIABLE APPLICATION RATE

Novel formulation provides a variable application rate allowing farmers to treat urea and urea-based nitrogen only as necessary while maximizing their return on investment.

#### SUPERIOR COMPOSITION

Superior composition enhances coverage and spread-ability, penetration of active molecules, and handling qualities.

#### NITROGEN STABILIZER TECHNOLOGY

Nitrogen stabilizer technology inhibits nitrogen loss through ammonia volatilization, significantly reducing fertilizer requirements.



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ACTIVE INGREDIENTS:  
12% N-(n-butyl) thiophosphoric triamide (NBPT),  
CAS No. 94317-64-3.  
INACTIVE INGREDIENTS:  
88 % (preservative, colorant, spreading agents, surfactant).  
PATENT NUMBERS:  
USA: 9422203 B2 Canada: 2889430





Two-part nitrogen saving technology that inhibits both ammonia volatilization and nitrification. ARM U™ ADVANCED is a soil fertilizer additive that utilizes two mechanisms to ensure that plants are able to absorb sufficient nitrogen for healthy, rapid growth.

### DIRECTIONS for USE:

BLENDING INSTRUCTIONS: ALWAYS READ LABEL BEFORE USE.

ARM U™ Advanced consists of two parts:

1) Part A 2) Part B.

PREPARATION INSTRUCTIONS: Use Part A & Part B in a 1:0.5 ratio by volume.

Premixing - Pour Part B into Part A.

Mixing is not required; however, if mixing equipment is available, agitate mixture for 1-2 minutes. Use prepared mixture immediately - do not store. Treating System - Direct Part A and Part B toward the fertilizer in a 1:0.5 ratio.

FERTILIZER BLENDING INSTRUCTIONS:

Blending with UAN: Use 1.1 L of prepared mixture / 1000 kg of UAN solution. Fill spray tank with half the desired amount of UAN. Add the ARM U™ Advanced mixture to the tank. Add other products at this stage, if needed. Add the second half of the UAN solution. Mix well.

Blending into Urea: Use 1.8 L of prepared mixture / 1000 kg of urea. For uniform blending, use a blender with impregnation equipment. Blend ARM U™ Advanced / urea mixture thoroughly before adding other fertilizer materials; urea granules should be a uniform orange colour at this stage. If mixture is wet or sticky, a drying agent may be added at this time.

### INCREASED NBPT EFFICACY & EFFICIENCY

ARM U™ and ARM U™ ADVANCED reduce nitrogen loss better than any other products on the market.

### HAS BETTER FLOWABILITY AND MIXABILITY MINIMAL SMELL

ARM U™ and ARM U™ ADVANCED are buffered formulas that stabilize NBPT molecules and prevent odorous ammonia emissions.

### ACTS AS A DUST CONTROL AGENT

ARM U™ and ARM U™ ADVANCED contains bio-polymers and spreaders that quickly cover urea granules, allowing for a smooth flow and reduction in dust.

### GREAT FOR COLDER CLIMATES

Stays in liquid form up to -15°C, making it easy to handle and store in cooler conditions.

### INCREASED CHLOROPHYLL

By allowing the absorption of nitrogen, the development of chlorophyll is supported, fostering photosynthetic energy production and storage for increased health and growth.

### HAS LOW APPLICATION RATES

### WORKS EQUALLY ON DRY UREA & UREA SOLUTIONS (UAN)

Active ingredient: two-part product. Jugs must be mixed prior to use.  
Part A: 30% N-(n-butyl) thiophosphoric triamide (NBPT)  
Part B: 15% 3,4-Dimethylpyrazole phosphate (DMPP)  
10L, 500L, 1000L.



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The patented ARM U™ formula makes our products one of the most advanced Nitrogen management technologies on the market.

### DIRECTIONS for USE:

#### BLENDING INTO UREA-AMMONIUM NITRATE (UAN) SOLUTIONS:

Use 1.2 L ARM U™/1000 kg UAN solution. Fill spray tank with half the desired amount of UAN, Measure the recommended quantity of Arm U™ and add to the tank. Mix well. Add other products at this stage, if needed. Add the second half of the UAN solution. Continue mixing until well blended.

#### BLENDING INTO UREA:

Use 2 L ARM U™/1000 kg Urea. For uniform blending, use a blender with impregnation equipment. Weigh the urea and transfer to blender. Add the required amount of ARM U™ to the urea in the blender. Blend until the ARM U™ is uniformly mixed into the urea. Do not add any other fertilizer materials until ARM U™ is thoroughly distributed. If mixture appears wet or sticky, a drying agent may be added at this time.

#### Active ingredient:

18% N-(n-butyl) thiophosphoric triamide (NBPT), CAS No. 94317-64-3.

#### Total inactive ingredients:

82 % (preservative, colorant, spreading agents, surfactant).

### INCREASED NBPT EFFICACY & EFFICIENCY

ARM U™ and ARM U™ ADVANCED reduce nitrogen loss better than any other products on the market.

### REDUCED REQUIREMENT FOR UREA/UAN

By reducing nitrogen loss as ammonia by 96%, the requirement for nitrogen fertilizer can be reduced by 20-30%.

### MINIMAL SMELL

ARM U™ and ARM U™ ADVANCED are buffered formulas that stabilize NBPT molecules and prevent odorous ammonia emissions.

### ACTS as a DUST CONTROL AGENT

ARM U™ and ARM U™ ADVANCED contains bio-polymers and spreaders that quickly cover urea granules, allowing for a smooth flow and reduction in dust.

### GREAT FOR COLDER CLIMATES

Stays in liquid form up to -15°C, making it easy to handle and store in cooler conditions.

### INCREASED CHLOROPHYLL

By allowing the absorption of nitrogen, the development of chlorophyll is supported, fostering photosynthetic energy production and storage for increased health and growth.

### ARM U LIQUID MANURE RATE

Manure type	Liquid swine manure	Liquid dairy	Liquid chicken
Volume (L)	1000	1000	1000
Arm U (18%) rate (L)	1.5	1.5	2

### ARM U SOLID MANURE RATE

Manure type	Solid dairy	Solid beef	Solid chicken
Weight (kg)	1000	1000	1000
Arm U (18%) rate (L)	2	2	2.5

# EQUIPMENT



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# “AGRONOMY”

is an all-encompassing word, similar to sustainability. Where does it start and where does it stop? When we consider bringing equipment solutions to growers that increase efficiency and improve the overall production of an operation, it makes sense to leverage another level of agronomy through strategic equipment to improve a farming system.

With any innovation that finds its way into our portfolio, we expect a high level of testing, backed by sound science to support a valuable return for any grower. Our Equipment Solutions portfolio encompasses just that. Proven solutions that provide a quick return on investment for growers, whether it be from seeding all the way through to best management practices at harvest. Every offer in this innovative group of equipment solutions comes from likeminded individuals to Taurus, who initially set out to help growers be better at what they do. All while thinking of ease of use with a positive impact to the bottom line.



We trust there a fit here for your operation!





## TREATING SYSTEM



**THE BULL TREATING SYSTEM** has been designed to give you the upmost flexibility. There is no need to compromise on which products you apply as this treating system allows you to treat directly out of a bulk tote or make batches of multiple products. Protect your seed with the right agronomic products for your farm, in product packaging that fits your operation.

### THE BULL TREATING SYSTEM

- Fast & Easy Set-up
- Batch or Bulk
- Targeted Coverage
- Compatible with an 8" Auger
- Pressurized System for Improved Accuracy
- Simple & Flexible





## FERTILIZER & GRAIN SCREENS



### TAURUS DFS SCREEN

- Dry Fertilizer Screen
- Fully stainless steel
- Light & easy to use
- 3x3 ft to fit most hoppers

### HANGING SCREEN

- Adjustable screen that hangs right from your auger
- No more clumps, no more plugged runs



## Duck Foot Parts

The Trusted Name in  
Header Precision &  
Harvest Efficiency



- Award-winning patented farm innovation
- Fast and easy to install and remove
- Field-tested with proven data to reduce header loss
- Clears the cutter bar and feeds the crop more evenly for better threshing
- Slower reel speed for less crop damage
- Increases ground speed

Duck Foot Parts is committed to manufacturing the highest quality product for farmers. The paddle tines are made from resin with physical, mechanical, and thermal properties tested to withstand the stress and strain in extreme temperatures. The paddles also contain a vehicle grade UV protectant.

The Duck Foot paddle tine is protected by issued and pending patents and industrial designs - see <https://duckfootparts.ca/patents/>

Duck Foot is a trademark of Duck Foot Parts Inc.

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## Duck Foot offers Header Solutions for the following brands:

**MacDon**

**JOHN DEERE**

**CASE IH**  
AGRICULTURE

**AGCO**  
Your Agriculture Company

**CLAAS**

**NEW HOLLAND**  
AGRICULTURE

**MASSEY FERGUSON**

**GERINGHOFF**

**GTS**  
DO BRASIL

## DUCK FOOT™ USED IN THESE CROPS



Lentils



All Cereals



Edible Beans



Hay



Soybeans



Straight  
Cut Canola



Flax



Peas



Chickpeas



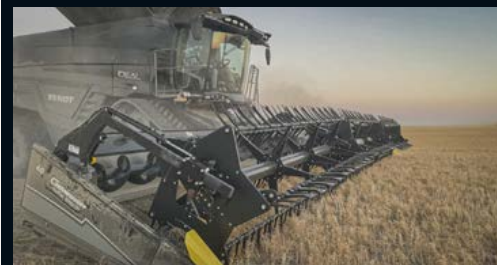
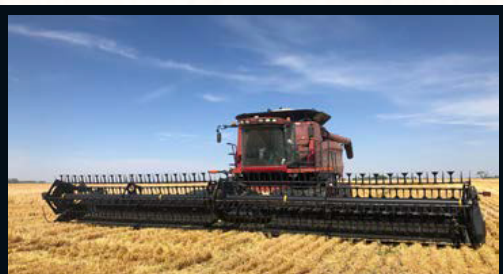
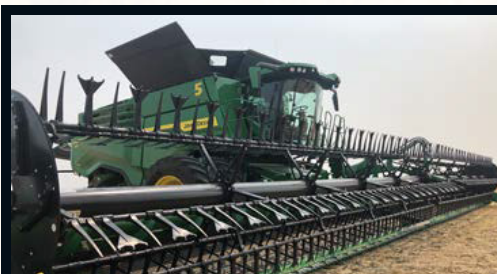
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Lupins



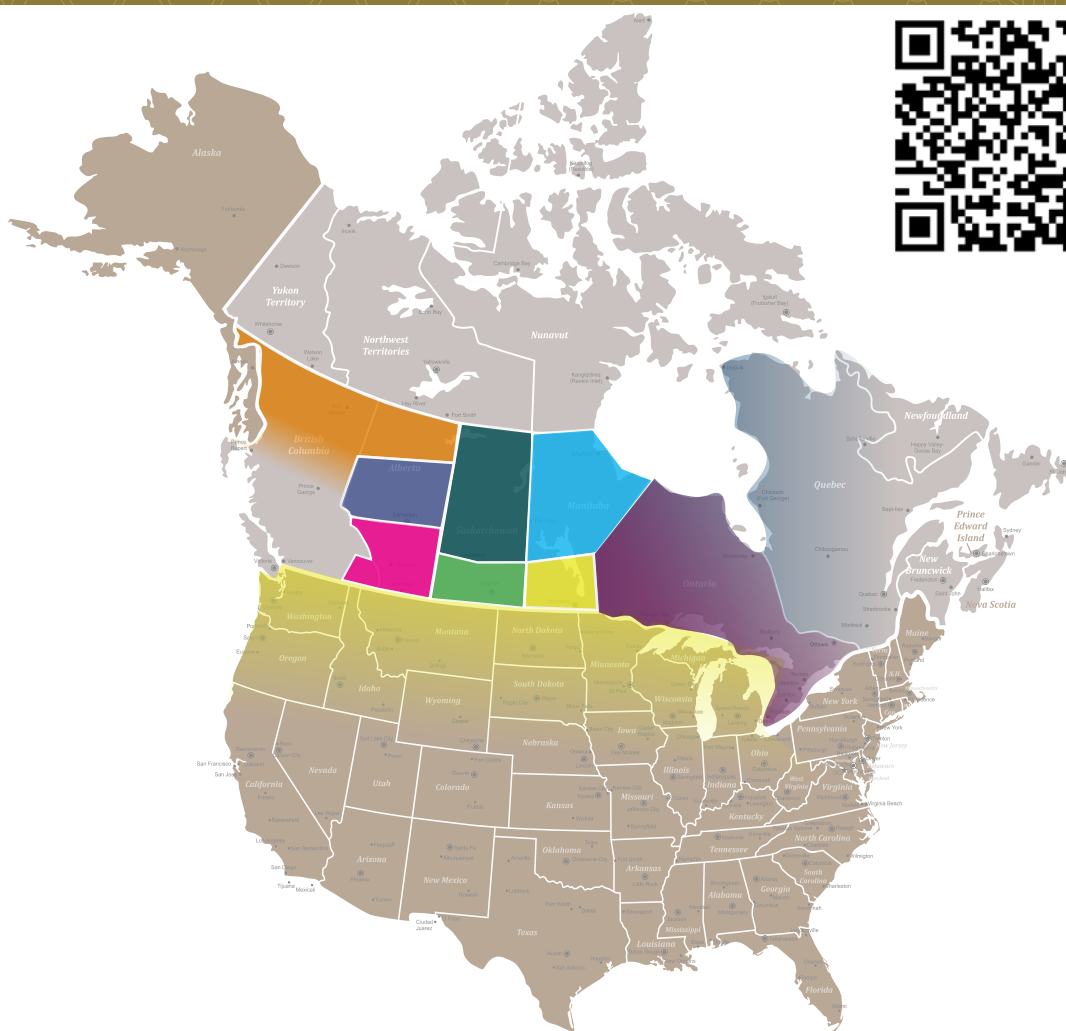
Rice





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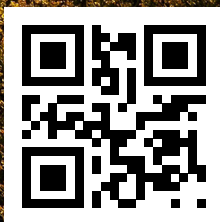
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