

The Fertility Company



Taurus Agricultural Marketing Inc.

Product Portfolio



Do you ever take a moment to slow down, catch your breath, or stop to appreciate the beauty around you? In a world that moves at a breakneck pace, where everything is readily available and the agricultural industry operates non-stop, it can be challenging to savor the fruits of your labor or even the small victories of the day. There's something truly remarkable about taking ideas, formulating plans, implementing strategies, managing uncertainties, and ultimately finding success. This is the essence of agriculture and why we cherish being part of it.

As with every new year at Taurus, change is not only inevitable but also welcomed. We strive to embrace and leverage change to create lasting impact across the diverse market we serve. The year 2024 will be no different. Our Product Portfolio provides insights into what will become common practices in agriculture in the coming years. Our goal is not to complicate your life or make your agricultural practices more laborious, but rather to make them more defined and less stressful (for both you and your plants), while still pursuing economic success.

What if we told you that your understanding of your soil could be deeper than ever before? That every decision you make regarding your land could be informed by DNA-level data? That agronomics could move from a level of belief to a level of certainty? Are you interested? We believe Metagenomics is the next disruptive technology in agriculture. We are thrilled to help launch Trace Genomics™ across Canada, leveraging their years of work in defining living soil at the genomic level. Today, Trace can DNA sequence hundreds of pathogens, beneficial soil organisms that aid in nutrient conversion and plant health, long-standing organisms like rhizobium and mycorrhizae, and nutrient loss organisms like Urease enzymes and Nitrobacter bacteria. Crop rotations, varietal selections, fungicidal treatments, nutrient cycling and loss, and populations of beneficials will now all factor into the decision-making process based on a soil report! You'll want to know.

Thinking from the perspective of your plants, imagine stress-free plant nutrition available all day, every day with just the right proportions of each nutrient. It almost sounds like human nutrition. In reality, they are very similar and cannot be separated. Take some time to read up on our newly launched strategy, TAPP. TAPP is a fertility strategy currently comprised of a unique blend of Crystal Green® and Polysulphate® Premium. It offers growers optimal agronomics for multiple nutrients with options for placement and season-long feeding for maximum nutrient use efficiency in pursuit of higher yield and quality. If growers had boxes to check off, TAPP would be the checkmark... Delve deeper into our portfolio of innovative solutions that are seeing widespread commercial success. AGTIV® Ignite™ is a new biological product that consistently delivers economic results on canola and cereals with endophytic properties finding their way into plant cells. Our Nitrogen Stabilizer portfolio from Active AgriScience™ is extensive and backed by Canadian University research to define the best agronomics, economics, and logistical fit for every grower. Don't underestimate calcium as both a plant nutrient and soil amendment tool; we believe it's where sulfur was 20 years ago in terms of agronomic understanding. Our must-haves of seed safety, season-long feeding, and high nutrient use efficiency are all covered with Sul4R-Plus® which is rapidly gaining acceptance and usage across the North American market.

Feel free to reach out to any member of the Taurus team. They are passionate about agricultural production and would be excited to learn more about your businesses and operations to see if we can find a solution that will contribute to your future success.

Healthy soils lead to healthy plants which lead to healthy economics and healthy relationships — this is at the core of 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 23 years advancing agriculture, continually delivering the latest innovations and products to leading edge growers. 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 from British Columbia to Ontario.

CONNECT WITH US



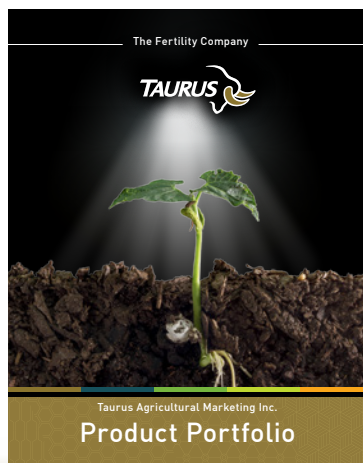
WHAT PLANT IS THIS?

WIN \$1,000.00

SUBMIT YOUR BEST GUESS AS TO WHAT PLANT IS
FEATURED ON THIS YEARS PRODUCT GUIDE COVER.



All entries are added to a draw to win a \$1,000.00 credit to a Taurus Product. Winner will be drawn November 8th 2024. Must be a Canadian Citizen to qualify.



AGRONOMY



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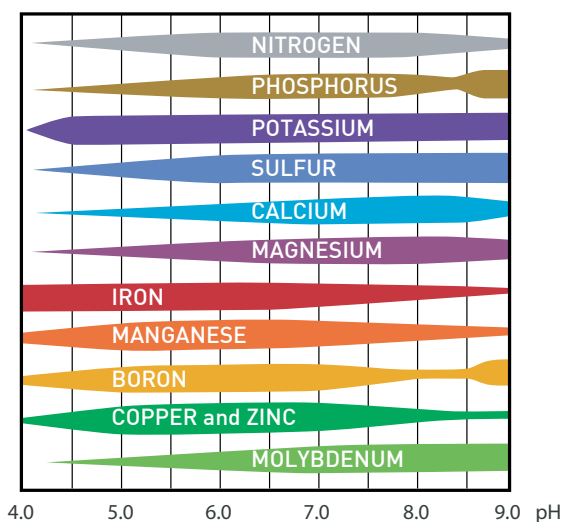


Salt Index Chart



Fertilizer Type	Analysis	Salt Index
Nitrogen / Sulphur		
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
Polysulphate® Premium	13.3% K, 18.2% S, 3.3% Mg, 11.6% Ca	34*
Phosphorus		
Crystal Green® Synchro	5% N, 28% P ₂ O ₅ , 10% Mg	8
DAP	10% N, 46% P ₂ O ₅	29.2
MAP	11% N, 52% P ₂ O ₅	26.7
APP	10% N, 34% P ₂ O ₅	20
Crystal Green®	5% N, 28% P ₂ O ₅ , 10% Mg	7.7
Potassium		
Potassium chloride	62% K ₂ O	120.1
Potassium sulfate	50% K ₂ O, 18% S	42.6
Potassium thiosulfate	25% K ₂ O, 17% S	68.0
Polysulphate® Premium	13.3% K, 18.2% S, 3.3% Mg, 11.6% Ca	34*
Miscellaneous		
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 ¹	2.3	0.8	2	0.25	0.19	0.17
	Removal ²	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 = P₂O₅

P₂O₅ x 0.43 = P

K x 1.2 = K₂O

K₂O x 0.83 = K

Crop Nutrient Uptake and Removal Chart

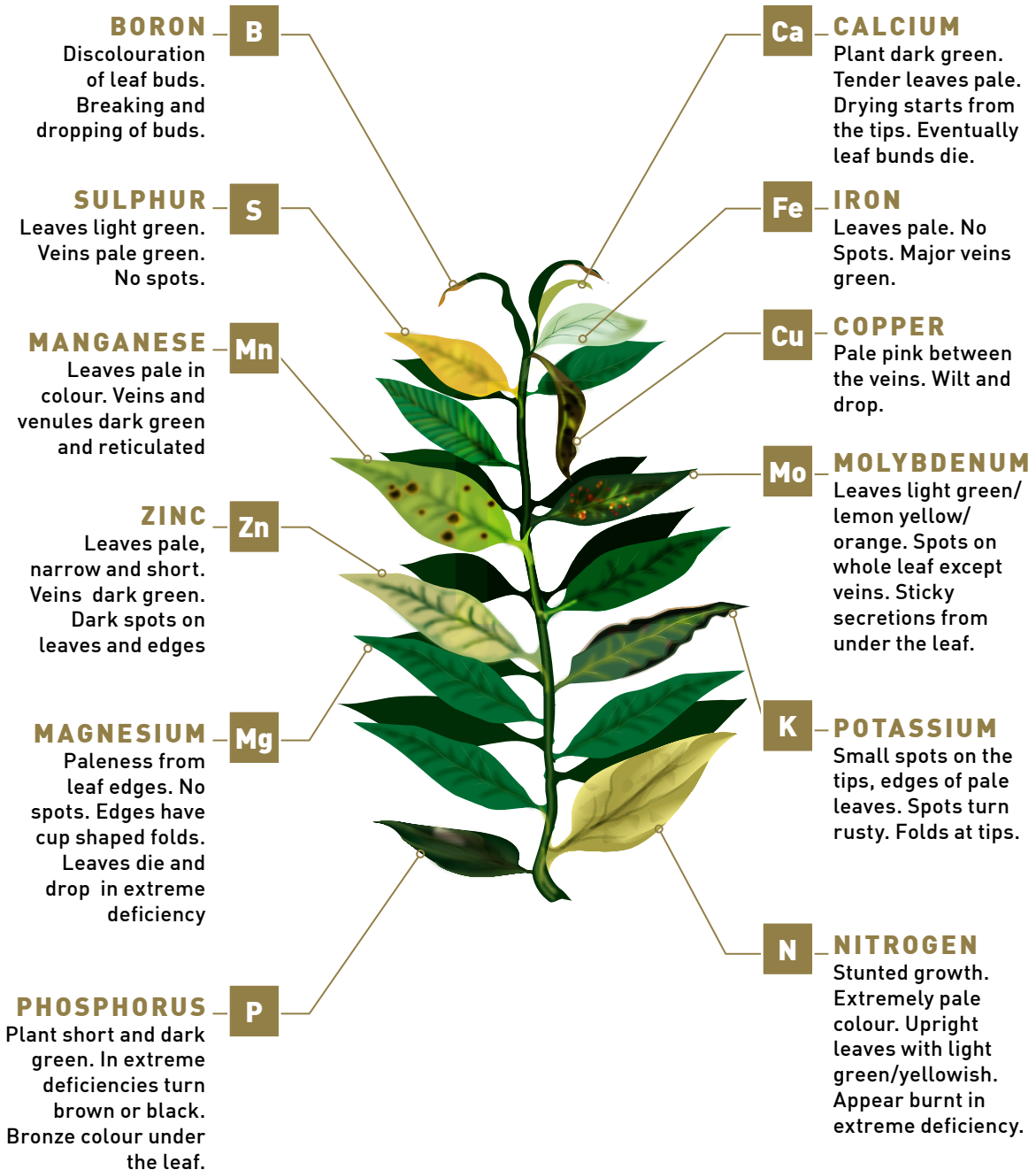
Part 2 of 2

Crop System	Grams of Actual Micronutrients				
	Zinc	Manganese	Copper	Boron	Iron
Grains					
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)					
OilSeeds					
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
Pulse Crops					
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)					
Forages - 1 Dry Tonne					
Alfalfa (Dry Basis)					
Grass (Dry Basis)					
Barley Silage (Dry Basis)					
Corn Silage (Dry Basis)					
Specialty Crops					
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"> Foliage yellowing first Stunted plants Smaller fruit, lower yields 	N	<ul style="list-style-type: none"> Extreme low or high pH Fast growing crops
<ul style="list-style-type: none"> Severe stunting, leaf die back Leaves, stems and veins dark green to purple Delayed maturity Poor seed development 	P	<ul style="list-style-type: none"> Very acidic or calcareous condition Cold conditions Poorly developed root systems Low Phosphorus, high Iron
<ul style="list-style-type: none"> Leaf distortion & curling Marginal leaf scorch Late season blotchy chlorosis Poorly developed root system 	K	<ul style="list-style-type: none"> Acidic conditions High Calcium and Magnesium
<ul style="list-style-type: none"> Leaves are light green / yellow Plants are stunted Delayed maturity 	S	<ul style="list-style-type: none"> Acidic conditions Poor aeration
<ul style="list-style-type: none"> Mottled chlorosis first on old leaves, moving to new growth Crop stunting 	Mn	<ul style="list-style-type: none"> High pH Organic conditions Prolonged cold periods
<ul style="list-style-type: none"> Stunted growth, small malformed leaves Interval chlorosis, striping in grasses Twig die-back 	Zn	<ul style="list-style-type: none"> Organic conditions High pH High Phosphorus fertilization
<ul style="list-style-type: none"> Interveinal chlorosis and necrosis especially on older leaf tips Drooping leaves Excessive premature fruit drops 	Mg	<ul style="list-style-type: none"> Very acidic conditions High Potassium or Calcium
<ul style="list-style-type: none"> Poor root development Premature shedding of blossoms and buds Deformed terminal leaves / dead terminal buds 	Ca	<ul style="list-style-type: none"> Acidic conditions High Aluminum
<ul style="list-style-type: none"> Death of terminal growth Thick brittle leaves Poor fruit set / malformed fruit 	B	<ul style="list-style-type: none"> High Nitrogen or Calcium High soil pH Alkaline conditions
<ul style="list-style-type: none"> Marginal chlorosis Shoot die-back, stunted growth Necrotic areas on terminal leaves 	Cu	<ul style="list-style-type: none"> Organic conditions High Nitrogen application Water stressed plants
<ul style="list-style-type: none"> Interveinal chlorosis, young leaves first Stunted growth 	Fe	<ul style="list-style-type: none"> High pH Water logged soil Calcareous conditions High Copper, Manganese, Zinc
<ul style="list-style-type: none"> Reduced nodulation on legumes Poor growth, pale leaves 	Mo	<ul style="list-style-type: none"> Low pH

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

K

S

Mn

Zn

Nutrient Functions in the plant

FUNCTION

Mg

- Enzyme activator
- Chlorophyll synthesis
- Aids in seed germination
- Aids in the use of Phosphorus

Ca

- Aids in cell wall structure
- Necessary for early root growth
- Regulates nutrient uptake and movement throughout the plant

B

- Pollen tube formation
- Important for early growth
- Necessary for cell division
- Aids in Calcium translocation

Cu

- Critical for photosynthesis
- Necessary for seed development
- Component for several enzymes

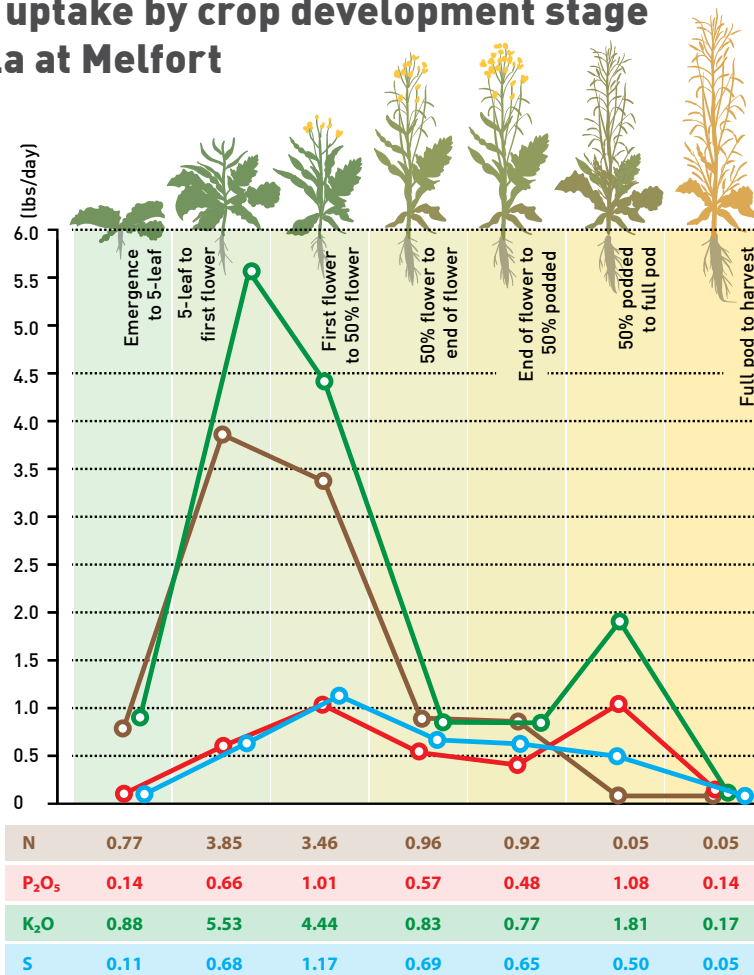
Fe

- Chlorophyll formation
- Activator for respiration
- Enzyme activation

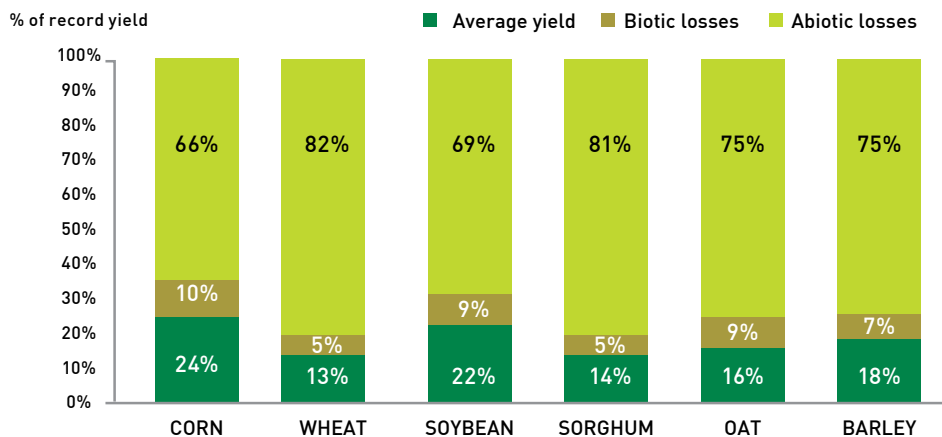
Mo

- Nitrogen fixation and metabolism
- Iron and Phosphorus metabolism

Nutrient uptake by crop development stage for canola at Melfort

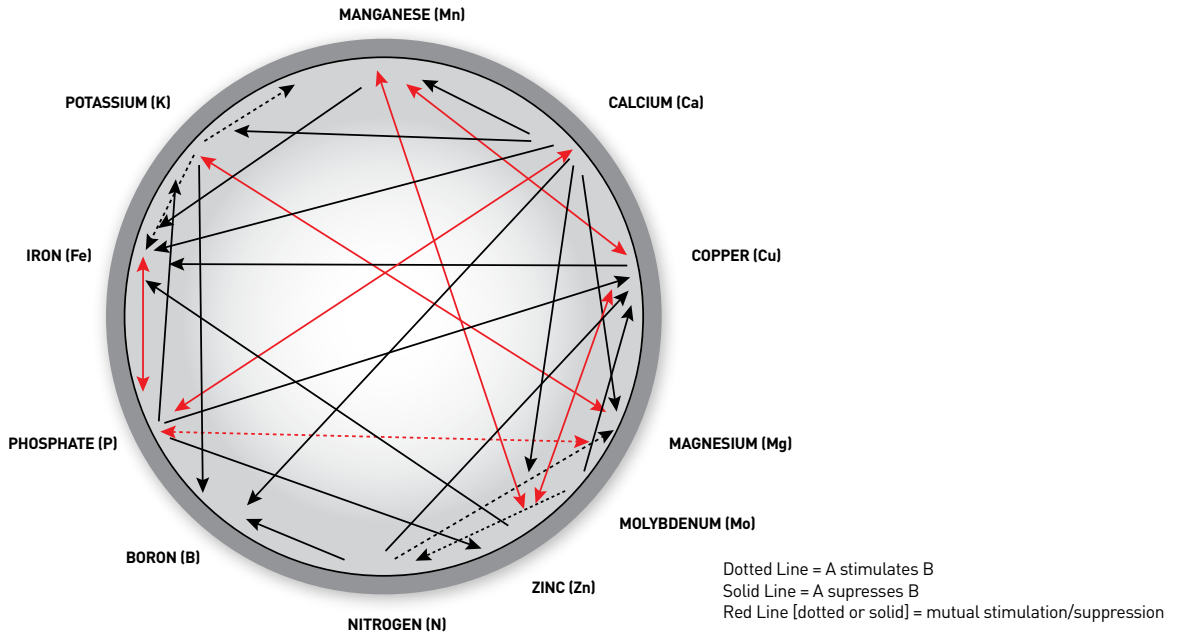


Yield Impact from Abiotic Losses for Major Crops



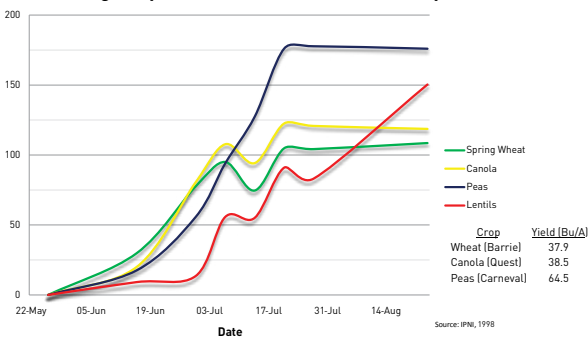
Source: Biochemistry and Molecular Biology of Plants; Buchanan, Gruissem, Jones; American Society of Plant Physiologists, 2000

Mulder's Nutrient Interaction Chart

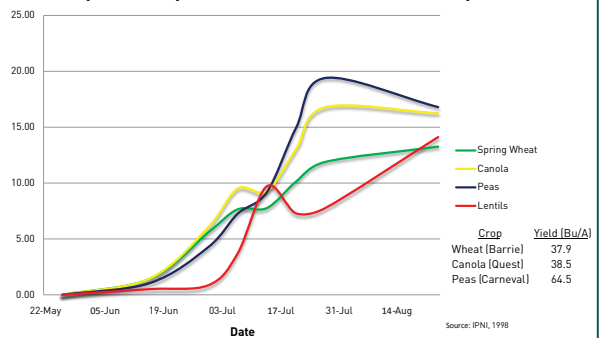


Nutrient Demand By Crop

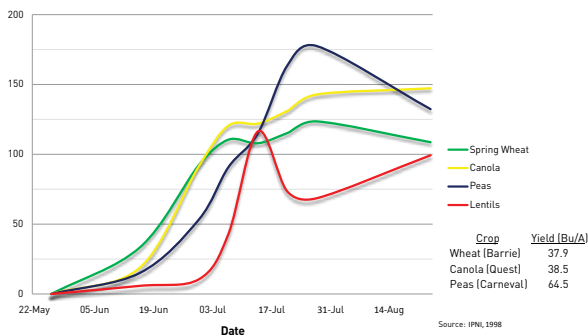
Nitrogen Uptake & Demand for Selected Crops



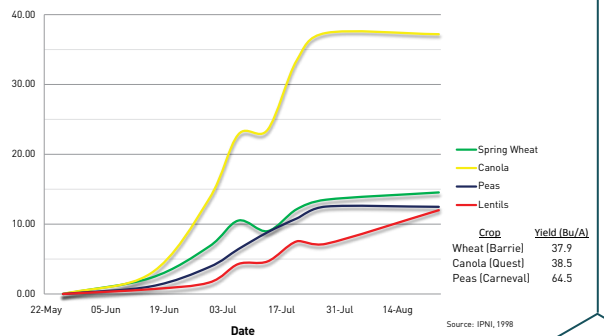
Phosphorous Uptake & Demand for Selected Crops



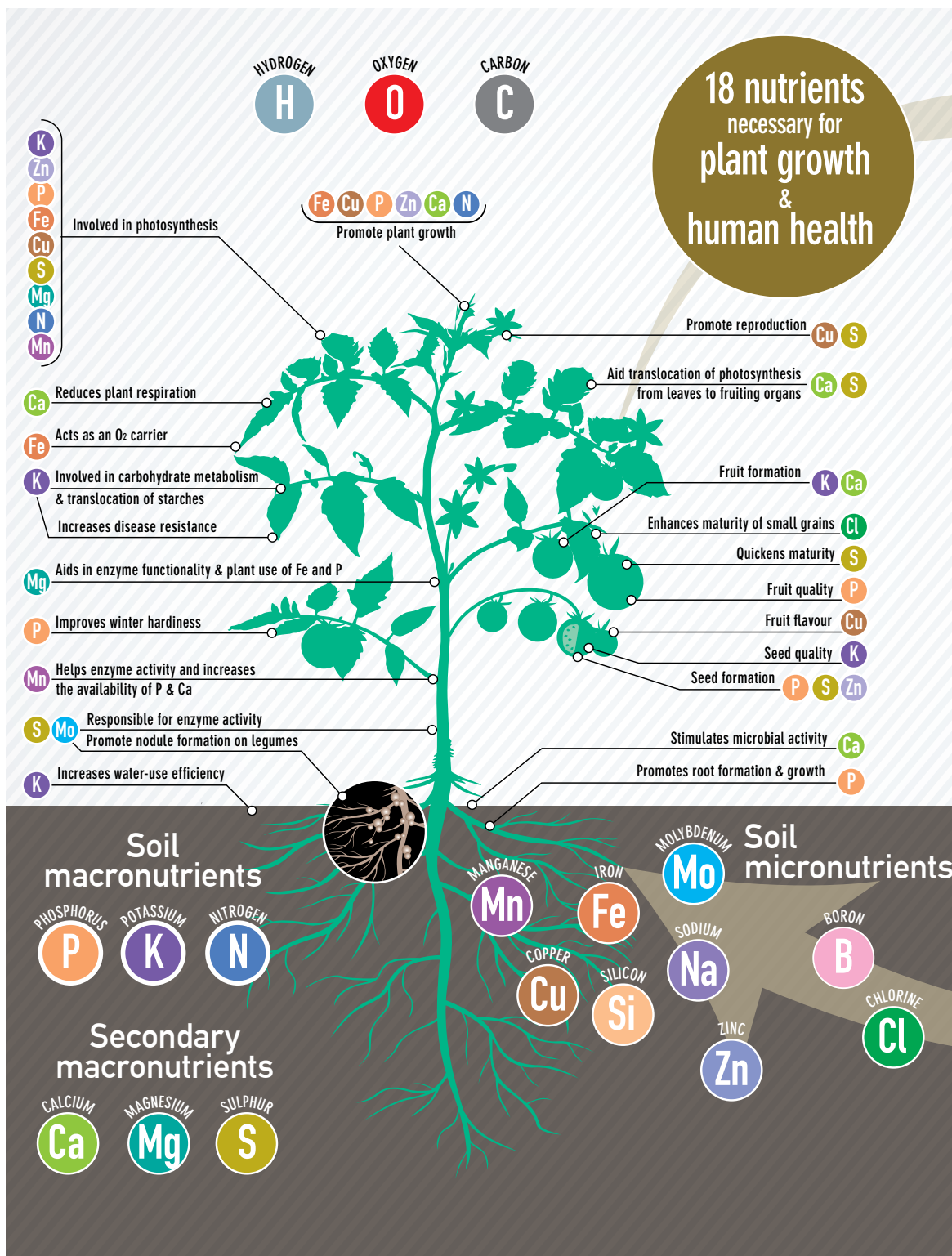
Potassium Uptake & Demand for Selected Crops



Sulphur Uptake & Demand for Selected Crops



Nutrients: The Foundation for Life





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

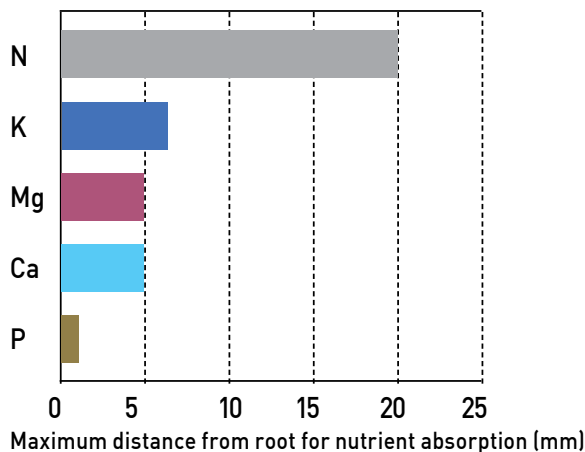
Zn Essential to fetal development &
functioning of reproductive system

A component of enzymes, DNA, RNA,
proteins & promotes immune system health

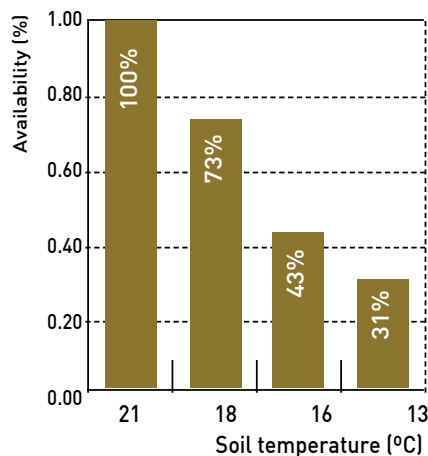
Ca B P Important for healthy bones

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%.



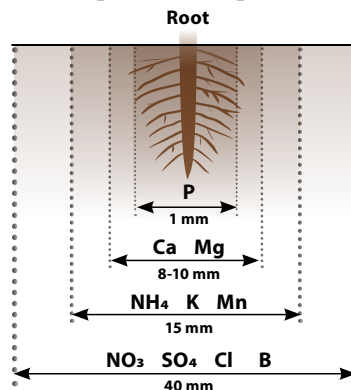
Soil Optimum levels based on CEC

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?

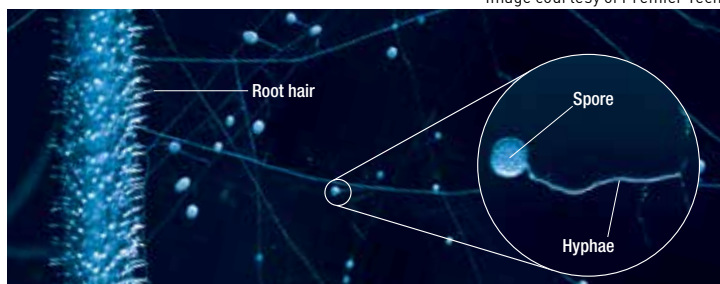
- Mycorrhizae had a symbiotic partnership with plants since they appeared on dry land more than 450 million years ago.
- Over 80% of plants on earth now have a mutual symbiotic relationship with arbuscular mycorrhizal fungi (AM).
- Play a major role in their nutritional status and productivity. Many 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 roots¹.*



STRESS RESISTANCE

- Mycorrhizae increase tolerance to environmental stresses such as: disease infection, drought, compaction, salinity, etc.
- Play a role in soil particle aggregation, leading to better water absorption, soil 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 and pulses)
- Use on land that is extremely deficient in P, and metal micro-nutrients like Cu, Zn, Mn, Fe, Mo, etc.

¹ 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)¹.
- 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

¹ Sprent, J.I., 2007. Evolving ideas of legume evolution and diversity: A taxonomic 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.

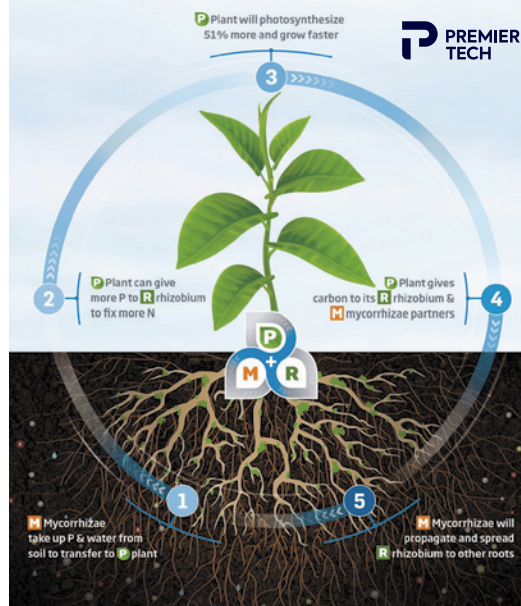
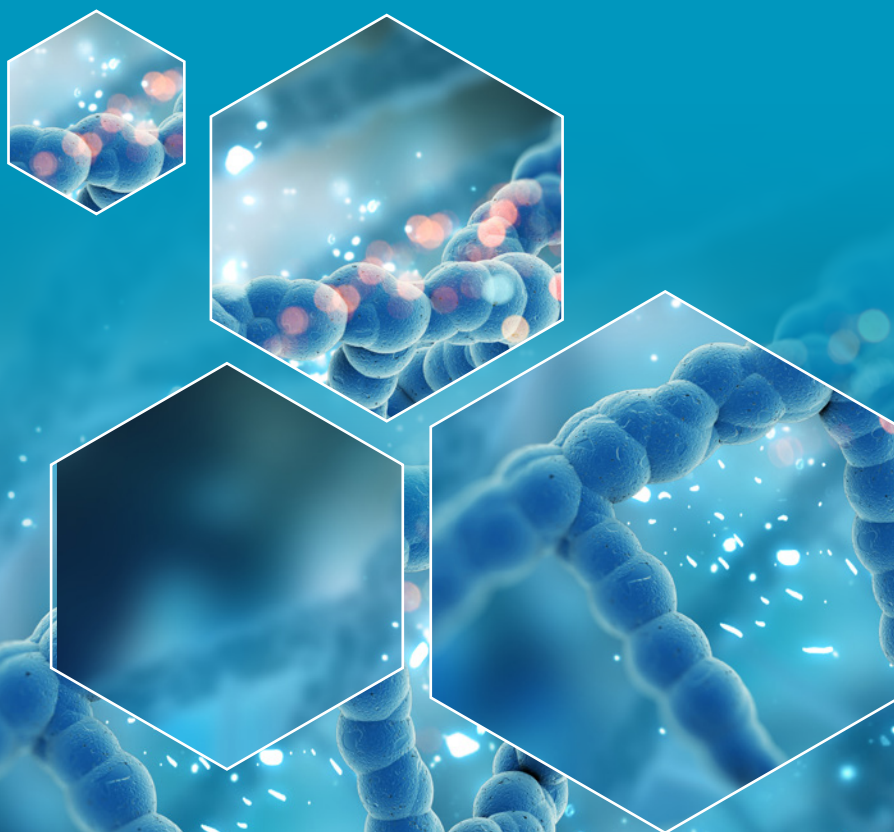


Image courtesy of Premier Tech

GENOMICS & ANALYTICS



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Agronomy Insights. Activated.

TaurusCOMPLETE™ pairs unmatched soil analysis with hi-definition genomic sequencing to deliver pathogen and nutrient insights that drive agronomic action in.



Pathogen Management

Get a detailed assessment of +225 pathogens covering more than 70 crop types with our Seed Solution Guide. Our national and regional benchmarks provide context to enable meaningful interpretation of the pathogen levels in your fields.

Seed Selection

Take action with our Seed Solution Guide

Seed Treatment

Take action with our Seed Solution Guide

In-season Disease Management

Take action with our Seed Solution Guide

Nitrogen Stabilizers

Take action with TraceN

Phosphorus Fertilizers

Take action with TracePHOS

Phosphorus Liberating Agents

Take action with TracePHOS

Biologicals

Take action with TracePHOS

Nutrient Management

Our phosphorus and nitrogen diagnostic tools, TracePHOS™ and TraceN™, help you optimise biological performance and nutrient management. Identify which fields are saturated or deficient, and make decisions about allocating your input resources based on the unique conditions in your fields.

TaurusCOMPLETE includes all the functionality and insights available from our Seed Solution Guide, TracePHOS, TraceN and other tools, as well as our full complement of diagnostic capabilities for soil biology and chemistry. Through our advanced genomics, unmatched data and built-in product solutions, we provide the information you need to take action and make meaningful management decisions.

To get started with TaurusCOMPLETE connect with your local Taurus Rep.



WWW.TAURUS.AG

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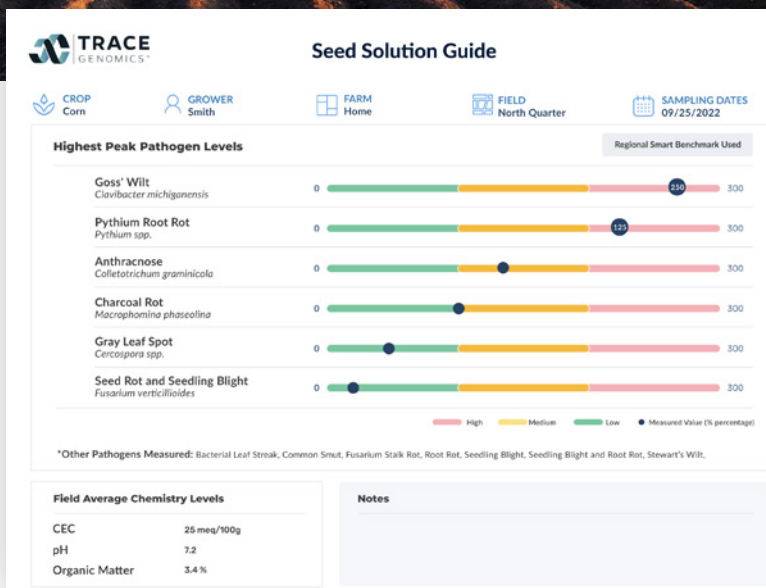
Activate Your Soil's Insights

The Trace Genomics Seed Solution Guide provides in-depth information on your soil environment, enabling you to make smart choices for seed selection, seed treatment and disease management.



The Trace Genomics Seed Solution Guide pairs unmatched soil analysis with hi-definition genomic sequencing so you get accurate, actionable information about the relevant pathogen levels and key chemistry parameters in your fields.

Your Seed Solution Guide is available in your Trace account and will also be emailed to you as soon as test results are available. As an added benefit, Seed Solution Reports are generated for all historical orders.



EASY-TO-FOLLOW FORMAT

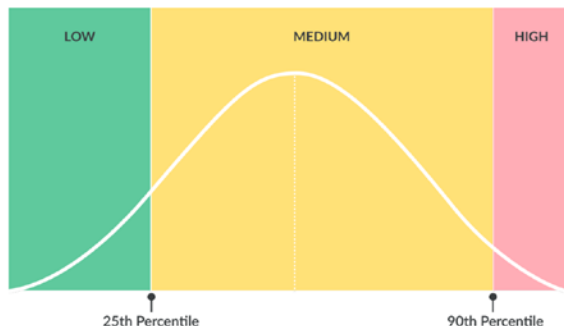




Seed Solution Guide

The science behind it

Pathogen Abundance Distribution



What does the Measured Value mean?

The 90th percentile pathogen abundance level is assigned a Measured Value of "100%" based on the benchmark used. Values above 100% are in the high range and values below 100% are in the low or medium range, depending on the abundance level.

Benchmarks

Groups of samples from the same crop type are used to determine if the pathogen abundance levels are high/low/medium. Values above the 90th percentile value are classified as high and values below the 25th percentile are classified as low.

Localized "Smart" benchmarks are generated if there are enough samples from a particular region, providing local, customized insights. If there are not enough samples from a region, National benchmarks are used.

With the Trace Genomics Seed Solution Guide, you can make faster, smarter management decisions and informed product recommendations based on your field's specific pathogen levels and chemical characteristics.

- Configurable and customisable
- Choose up to 6 crop types from more than 70 options
- Receive a detailed assessment spanning 172 pathogens
- Leverage the Power of TESS™, our exclusive soil environment analytics engine



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SUPPORT@TRACEGENOMICS.COM

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Phosphorus Management. Activated.

TracePHOS™ delivers soil diagnostics that help you take action to optimise soil biology performance and phosphorus use efficiency.

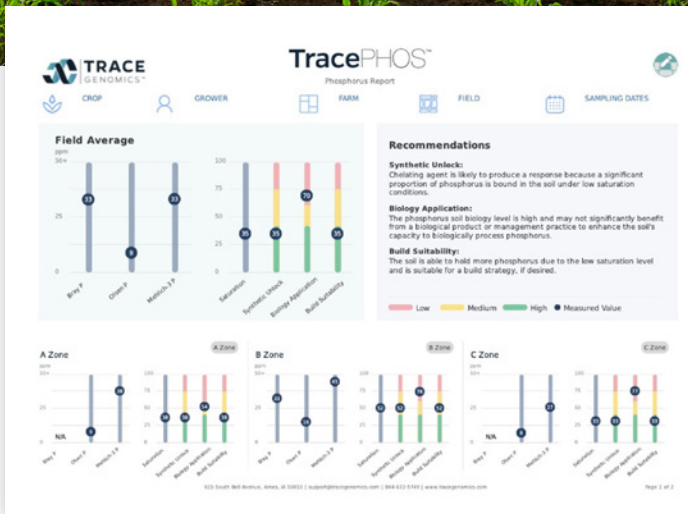


What's in Your Report?

Your results come from hi-definition DNA sequencing of your soil combined with soil chemistry. The full report is available in your Trace account and will also be emailed to you as soon as test results are available.

- **Chemistry:** Bray, Olsen and Mehlich-3
- **Saturation:** A score for how much phosphorus is in your soil relative to how much it can hold
- **Biology:** A score that measures the potential of microorganisms in your soil to make phosphorus plant-available

Your report also includes a summary page, *The Science Behind It*—a scientific dive into how phosphorus cycles from the soil into your crops.



EASY-TO-FOLLOW FORMAT



Actionable Recommendations

Custom recommendations are listed on your report based on your TracePHOS scores.

Synthetic Unlock:

Application of a phosphorus liberating agent is optimal when the soil is not saturated with P. This frees up inaccessible P bound in the soil.

Biology Application:

Use of a biological product may be recommended if the biology level is not high. Microorganisms are able to free up two types of inaccessible P (organic and mineral).

Build Suitability:

Low Saturation: A build strategy is appropriate

Medium Saturation: A maintenance strategy is appropriate

High Saturation: Added P may be subject to runoff/leaching



With TracePHOS, you can take action to help improve and refine phosphorus management. Use the data and insights from TracePHOS to:

- Recommend appropriate biologicals
- Identify areas for phosphorus fertilizers or liberating agents
- Determine opportunities to reallocate input resources



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Carbon. Quantified.

Evaluate your soil health with TraceCARBON. Understand your carbon stock and soil carbon sequestration to reduce your environmental impact and optimize your soil quality.



Service Options

Discover a comprehensive view of your carbon stock through various measurement options.

Total Organic Carbon (TOC)

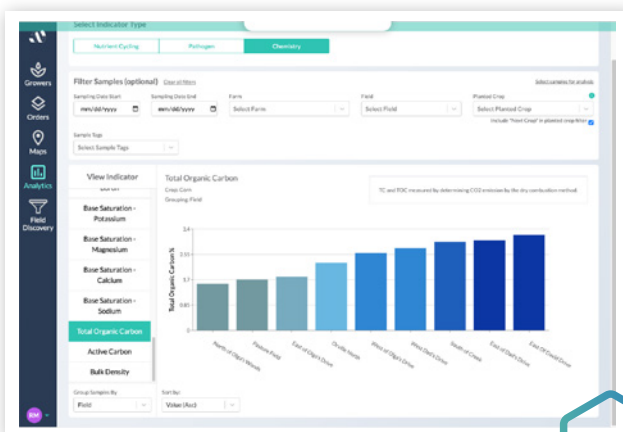
- TOC is measured by calculating TC minus the inorganic fraction; TC is measured by dry combustion
- Impacts soil fertility, aggregate stability and CO2 emissions
- Can be used to inform overall soil quality

Active C

- Also known as Permanganate Oxidizable Carbon (POXC)
- Measured through a colorimetric test
- Quantifies the carbon available to be used for energy in the soil microbiome
- Responds quickly to changes in soil management practices (reduced tillage, cover cropping, etc.)
- Can be used to track improvement in soil quality

Bulk Density

- Measured by taking the dry mass of soil and dividing by its known volume, adjusted with its coarse fragmentation
- Provides information on the suitability for root growth and permeability
- Used to calculate total carbon stock



Simple Collection, Powerful Insights

Make impactful management decisions and evaluate soil management techniques, including reduced tillage, cover cropping and crop rotations.

For TOC and Active Carbon samples, follow standard soil collection methods. For accurate Bulk Density samples, employ a specialized probe, which prevents compaction.

Samples should be taken within a plant row to avoid compaction caused by equipment. For a detailed sampling guide, visit our TraceVIEW customer portal or contact Trace Genomics directly.

Quantify your carbon with TraceCARBON™

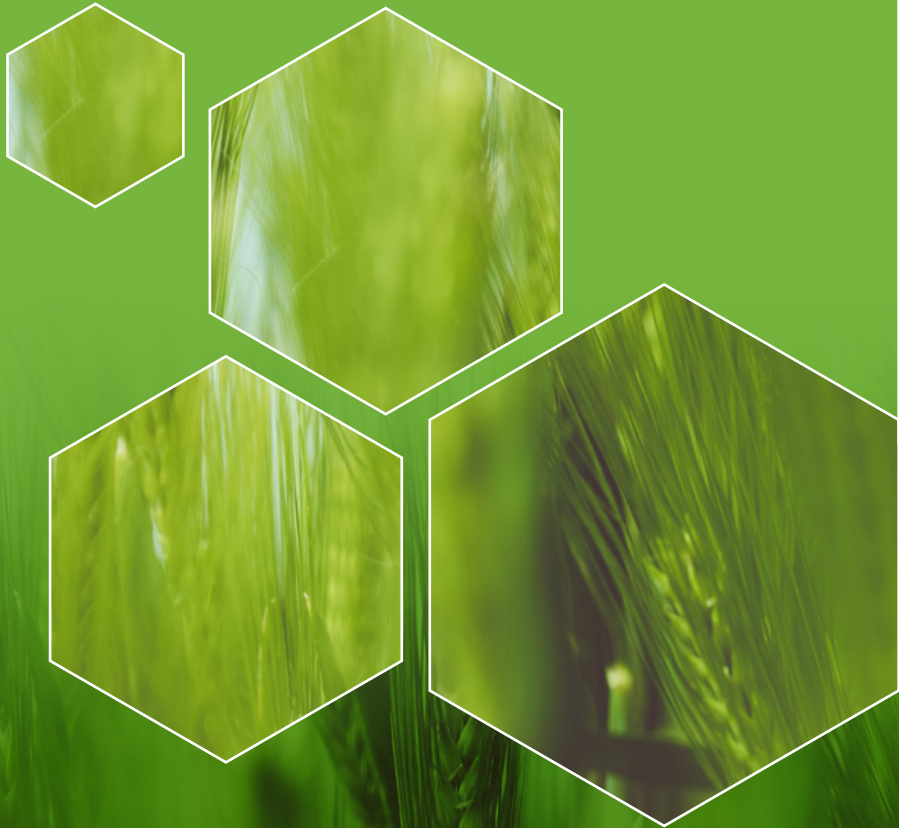


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FERTILITY



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INTRODUCING A NEW STRATEGY IN FERTILITY



Taurus Ag Poly Phosphate (TAPP) is a unique combination of **essential plant nutrients**, strategically designed to ensure **season-long** plant nourishment.

Currently, it is a special blend of Crystal Green Synchro 50 or Crystal Green & Polysulphate Premium.

TAPP ensures optimal delivery of **Nitrogen, Phosphorus, Potassium, Sulfur, Calcium, Magnesium, Chloride Boron & Zinc** - right where the plant needs them most.

LEARN MORE

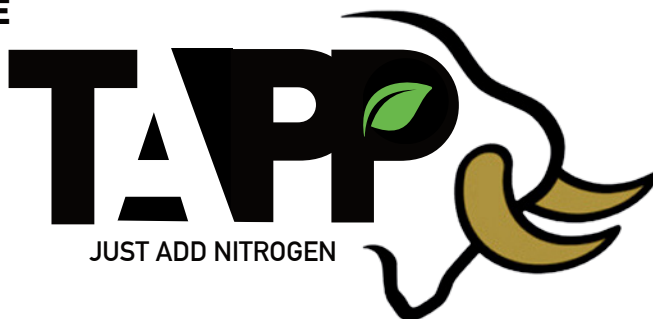


TAILORED NUTRIENT RELEASE

TAPP provides a season-long feed, ensuring your plants never run out of essential nutrients.

TAPP's unique formulation allows for a sustained release of nutrients, providing a steady supply throughout the growing season.

TAPP offers a plant-activated nutrient release, feeding plants only when they need it. This ensures that the nutrients aren't wasted and are used efficiently by the plants.



4N-20P-6.7K-9.9S-5.9Ca-4Mg

*Applied at 100lbs per acre

Crystal Green Synchro™ 50
8N-40P-0 with 5%Mg

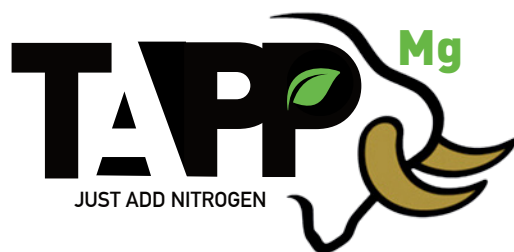
50:50

13.5K- 18.3S-3.3Mg-11.8Ca
Polysulphate Premium



STRESS-FREE PLANT NUTRITION

"Stop bringing stress to plants early." With TAPP, you can live up to this by safely placing critical nutrients near the seeds. With its low Salt Index, TAPP ensures that the plants are not stressed, leading to healthier plant growth and enhanced yield.



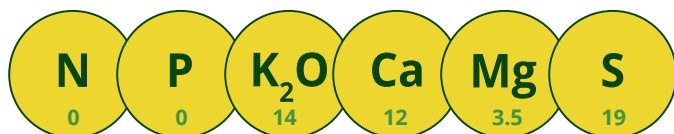
2.5N-14P-6.75K-9.9S-5.9Ca-6.65Mg

*Applied at 100lbs per acre

Polysulphate[®]



The new 4-in-1 fertility solution from Taurus Ag



Key advantages

- Controlled multi nutrient release curve
- Neutral pH
- Low Chloride, low salt index- improved seed/ crop safety
- Low Dust: Improved handling, flowability and blending ability
- Natural Mineral
- OMRI listed for organic use

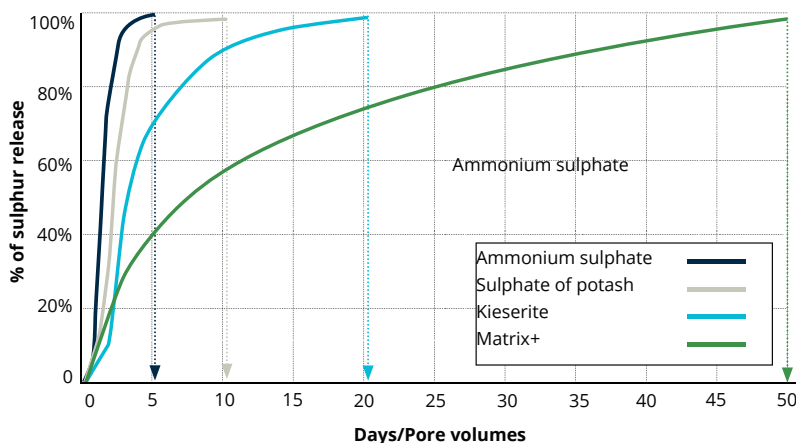


Main features

- **Multi-nutrient fertilizer:** sulfur, potassium, magnesium, and calcium
- Single crystal structure; all nutrients released together
- **Constant feeding of nutrients throughout the season**
- Fully soluble, with all nutrients available for plant uptake
- Versatile product; suitable for all kind of crops and all types of soils

Product/ Minerals	S	K	Mg	Ca
POLYSULPHATE	+	+	+	+
Potassium-Magnesium -sulphate	+	+	+	
Kieserite	+		+	
Potassium Sulphate (SOP)	+	+		
Ammonium Sulphate	+			

Release of sulphate Polysulphate vs. other sources



Reduces the potential for sulphate leaching

Sulphur is an essential macro-nutrient so there is usually a need for fertilization. Like nitrate, sulphate is prone to leaching and needs be managed carefully to minimize that risk. Polysulphate helps reduce the risk of leaching due to its prolonged release characteristics.

What's in Polysulphate?

Polyhalite, a naturally occurring mineral with the chemical formula: $K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$

14 K₂O
as potassium sulphate, vital for improved crop health

12 Ca
as calcium sulphate, crucial for cell division and strong cell walls

3.5 Mg
as magnesium sulphate, essential for photosynthesis

19 S
balances crop's need for S and improves efficacy of other nutrients (e.g N and P)

Mined By:



Mined in the UK, ICL is the first – and only – producer in the world to mine polyhalite, marketed as Polysulphate through Taurus Agricultural Marketing Inc.

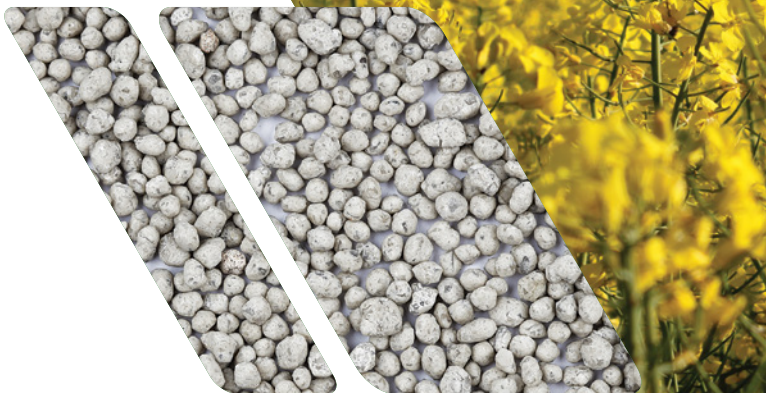
Marketed By:





POLYSULPHATE PREMIUM

4-in-1 fertilizer



Bulk density: 85 lbs

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



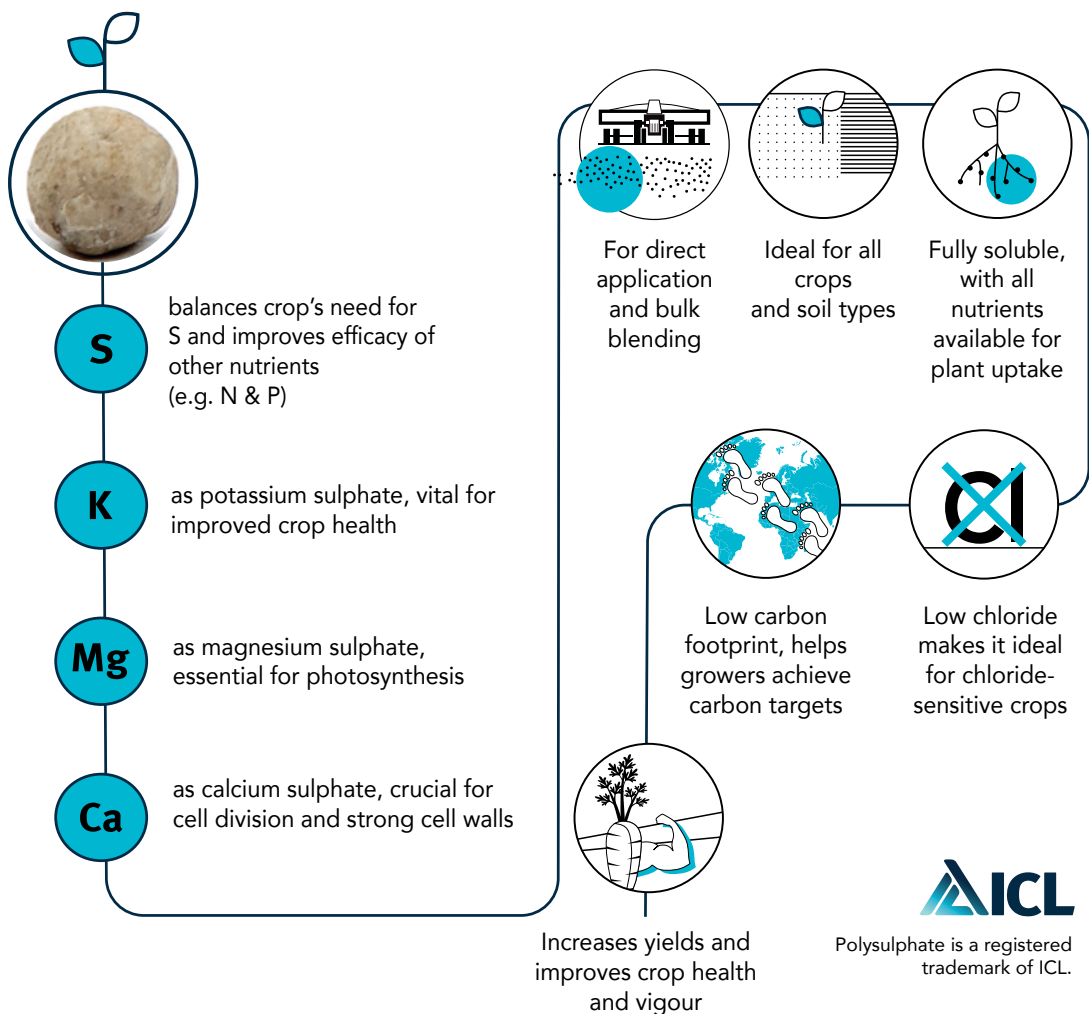
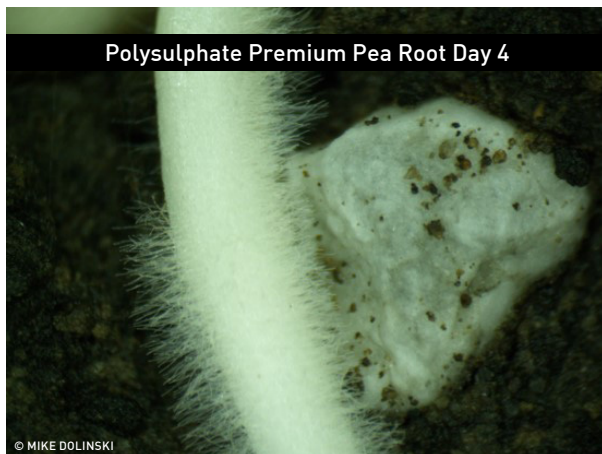
ICL is the first – and only – producer in the world to mine polyhalite, marketed as Polysulphate. www.polysulphate.com/us



Polysulphate is derived from polyhalite, a naturally occurring mineral containing elements essential to high-performance plant growth and function — $K_2Ca_2Mg(SO_4)_4 \cdot 2H_2O$

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





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.



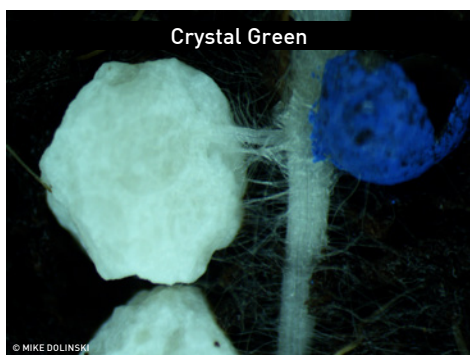
CRYSTAL GREEN GUARANTEED ANALYSIS

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.



SALT INDEX

	DAP	MAP	S15	Crystal Green	Crystal Green Synchro
Salt Index	29	27	21	7.7	8

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.

Additional research available from your Taurus Rep & online

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

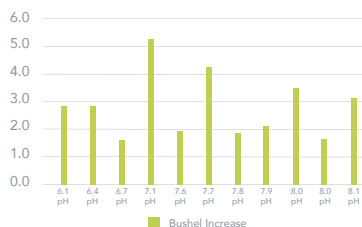
CRYSTAL GREEN vs. MAP

YIELD
INCREASE
↑ **2.7**
Bushel Increase

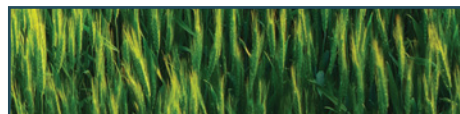
LOCATION

Manitoba
Saskatchewan
North Dakota

3 Year Results
2016-18



SPRING WHEAT YIELD INCREASE



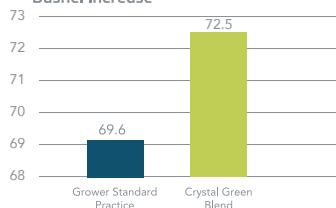
2 Year Results 2017-18

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
Minto, ND

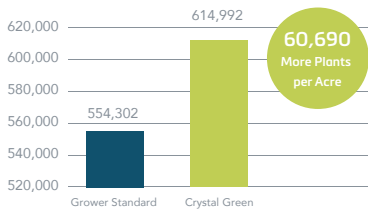


CANOLA STAND COUNT INCREASE



INCREASED STAND COUNT

CRYSTAL GREEN vs. MAP



60,690
More Plants
per Acre

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

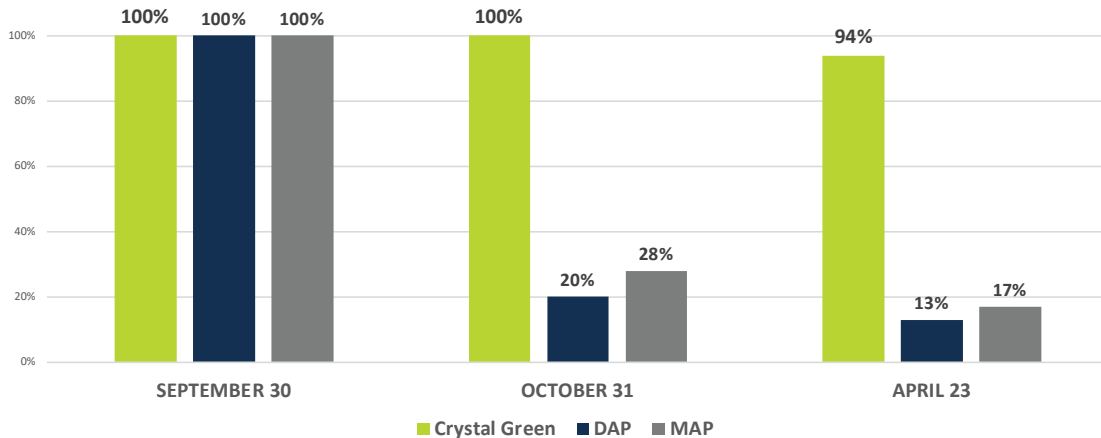
Additional research available from your Taurus Rep & online

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



Additional research available from your Taurus Rep & online



CRYSTAL GREEN IS A FIT FOR YOU IF:

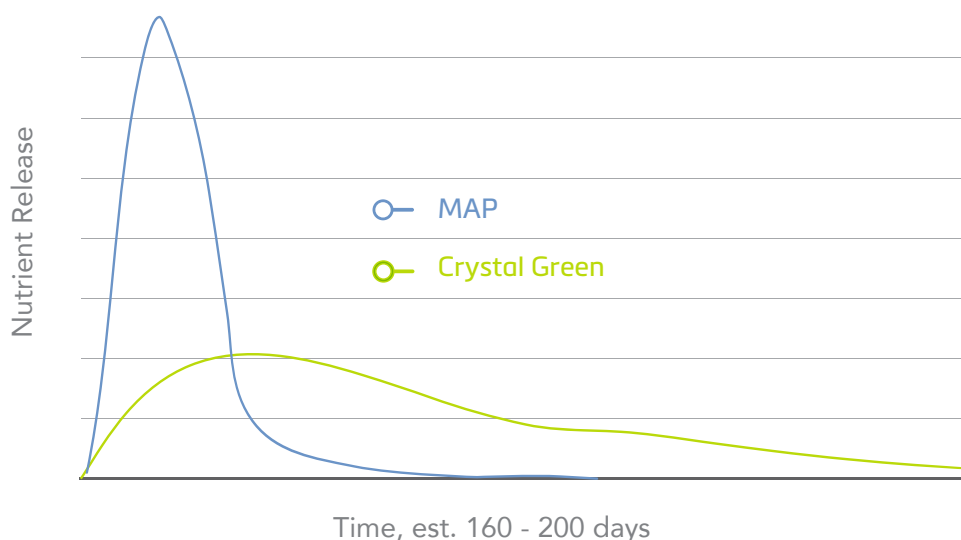
- ✓ Seed safety is a concern for your crop
- ✓ You farm in challenging pH soils, where phosphorus tie-up is common
- ✓ You broadcast, seed place or band phosphorous
- ✓ Your crops need available phosphorus for season-long uptake



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.

Additional research available from your Taurus Rep & online



Crystal Green
Synchro™ 50

THE NEXT GENERATION OF PHOSPHATE FERTILIZER

Crystal Green Synchro™ 50 is a fully homogeneous, sustainable fertilizer with an analysis of 8-40-0-5.0Mg. Synchro 50 combines the up-front nutrient availability of MAP and the on-demand access to nutrients of Crystal Green®. That's not just good economics, it's sustainable and innovative agronomics.

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

Nutrient Availability All Season

Crops need nutrients all season to reach their maximum yield potential. Synchro 50, unlike a physical blend of Crystal Green and MAP, has additional mineralogy created in production. This offers nutrient availability starting from the first day of the season and lasting through the season.

Synchro 50 has three release stages based on crop demand. Synchro 50's mineralogy delivers approximately 35% quick upfront release, 15% mid-range release and 50% season-long feeding, matching crop uptake.

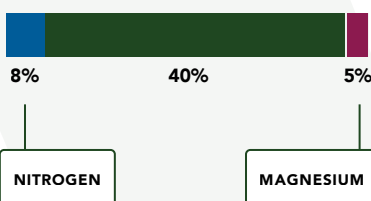
By putting crops in control of their nutrient uptake, growers maximize the efficiency of their applied phosphate.

Lower Salt Index - Improved Seed Safety

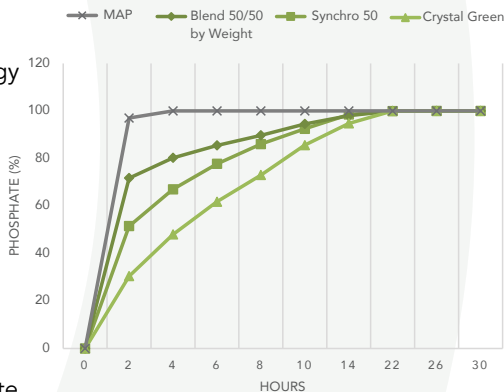
Crops fertilized with only conventional phosphate fertilizers can be injured when the fertilizer is placed near the seed due to the higher salt index. This injury to seedlings reduces stand count and ultimately, yield.

Synchro 50's salt index is one quarter of that which is found in MAP. This reduced salt index improves stand count for maximized yield.

PHOSPHORUS



Accelerated Nutrient Release Test



Full data available upon request



MAXIMIZE
YIELD



PREVENT
SOIL
TIE-UP



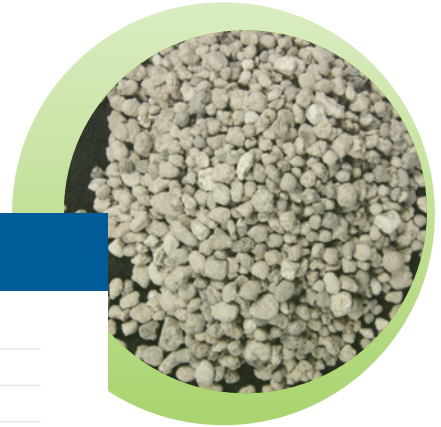
AVOID NUTRIENT
RUNOFF &
LEACHING



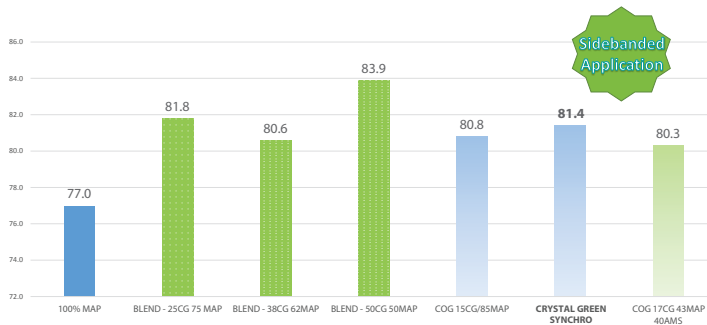
E: info@ostara.com | ostara.com OSTARA



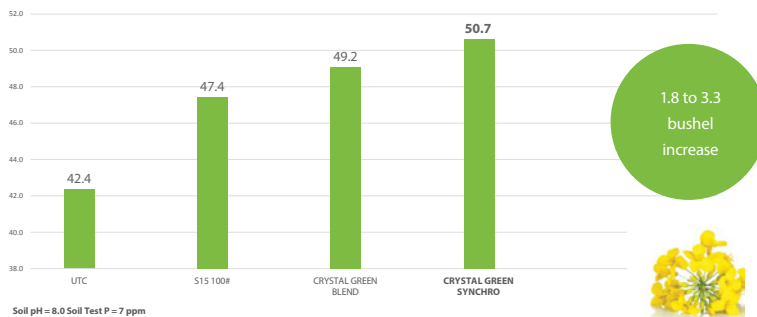
Crystal Green
Synchro™ 50



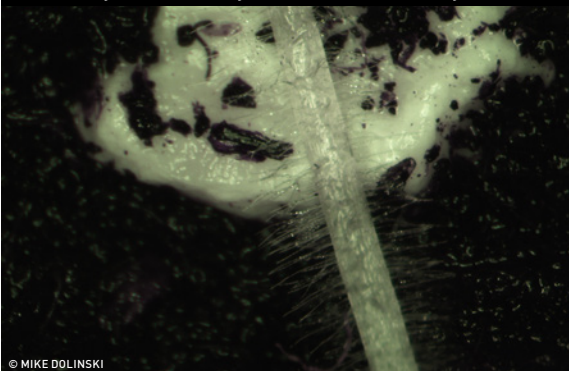
Canola Results – 2018 – MB – New Era



Manitoba Replicated Trial - Minto, MB (AgQuest)

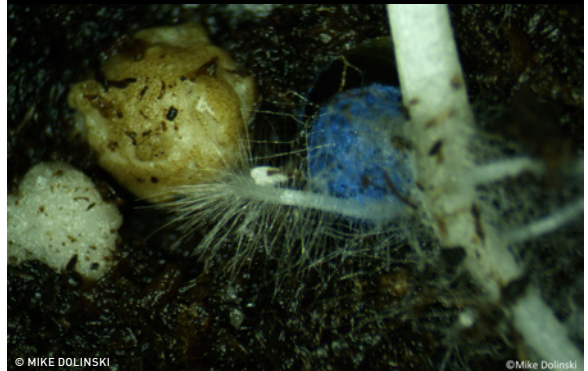


Crystal Green Synchro Wheat root day 4.5



© MIKE DOLINSKI

Crystal Green synhro granules canola 10 days



© MIKE DOLINSKI

© Mike Dolinski

Research used to obtain Canadian CFIA Registration.

Additional research available from your Taurus Rep & online



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.

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 (Fluic 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



• 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

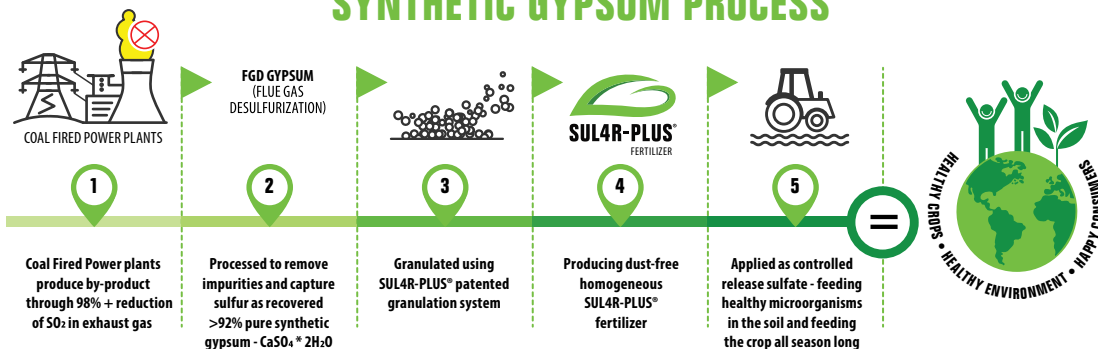
Amending the soil instead of contributing to problems in both saline and compacted soils

• 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

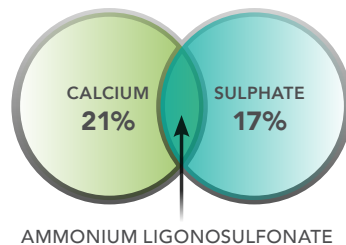
SYNTHETIC GYPSUM PROCESS



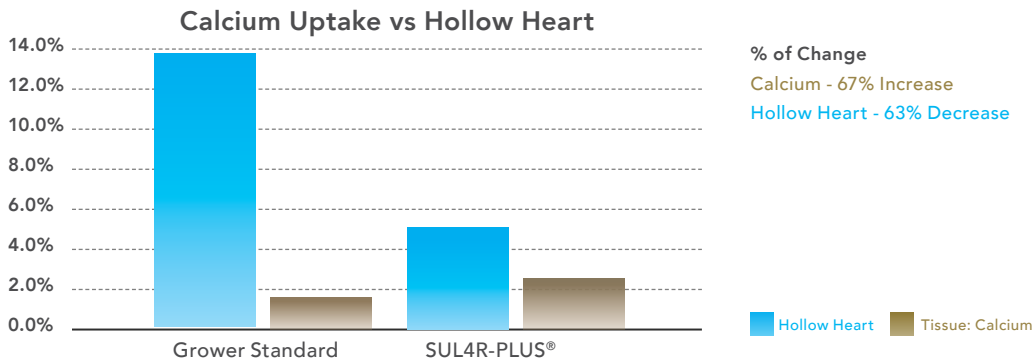
Additional research available from your Taurus Rep & online

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

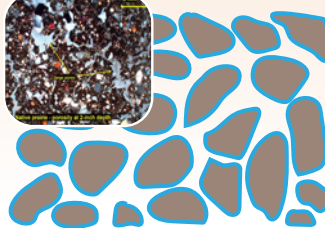
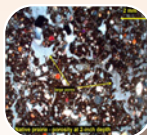


SUL4R-PLUS® 3rd Party Potato Field Trial - 2019

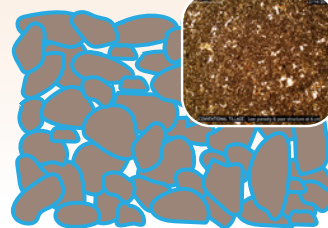


Soil compaction causes a reduction in the available space for soil air and water, and limits pathways for crop roots. If the soil is not acidic and is lacking sulphur, the best tool for removing excess magnesium or sodium is the "clay breaker"- gypsum (calcium sulphate). SUL4R-PLUS® can help mitigate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

Soil Solid
 Water
 Air



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



COMPACTED SOIL

Additional research available from your Taurus Rep & online

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)

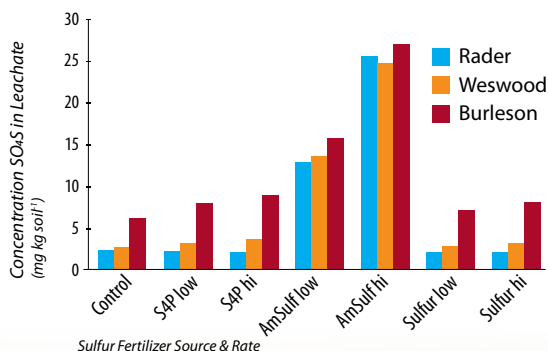
• Leachate Collected at Following Intervals:

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

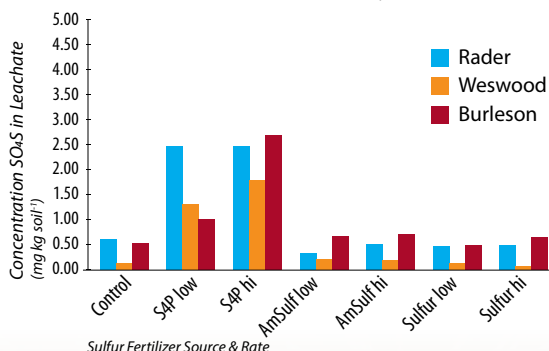
Research study showed SUL4R-PLUS® to release plant available sulphate at a rate of **2 to 5 lbs** (depending on High/low application rate) **every 10 days for a period of 60-80 days**.

Texas A&M Agrilife Extension Research Study

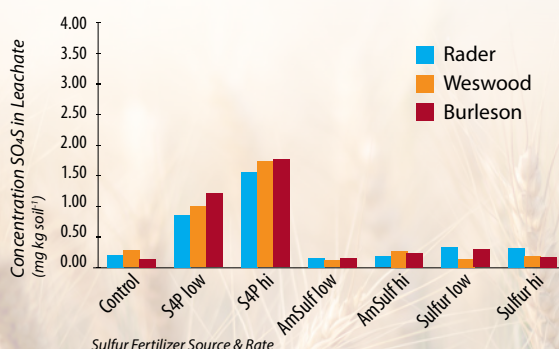
SO₄-S in Soil leachate (day 0)



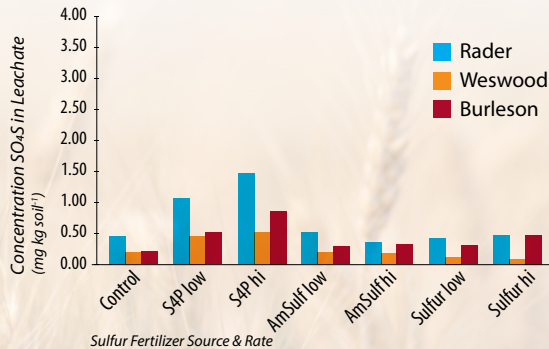
SO₄-S in Soil leachate (day 30)



SO₄-S in Soil leachate (day 15)



SO₄-S in Soil leachate (day 60)



* 2016 Texas A&M Leachate Study

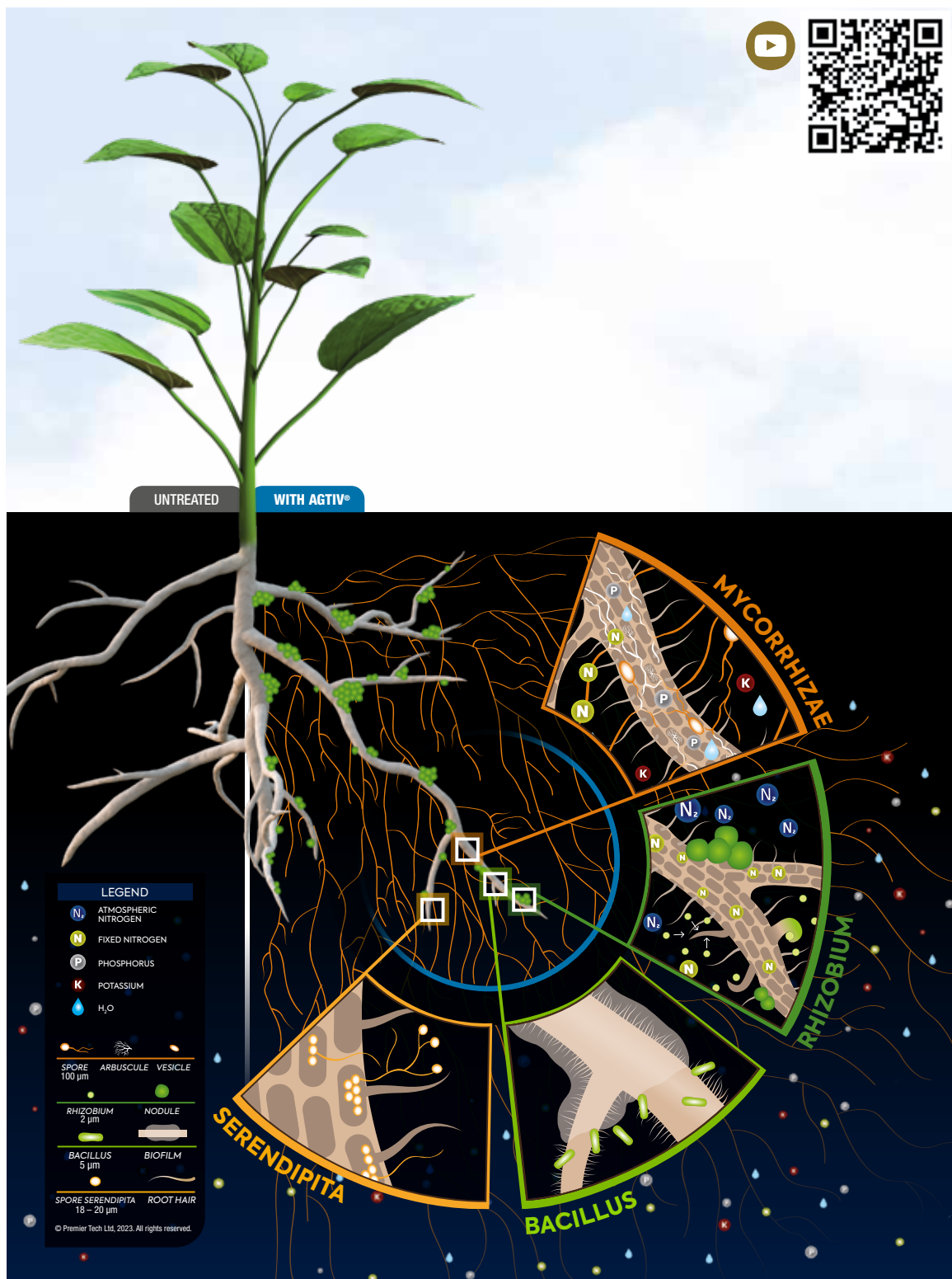
Additional research available from your Taurus Rep & online

BIOLOGICAL INOCULANTS

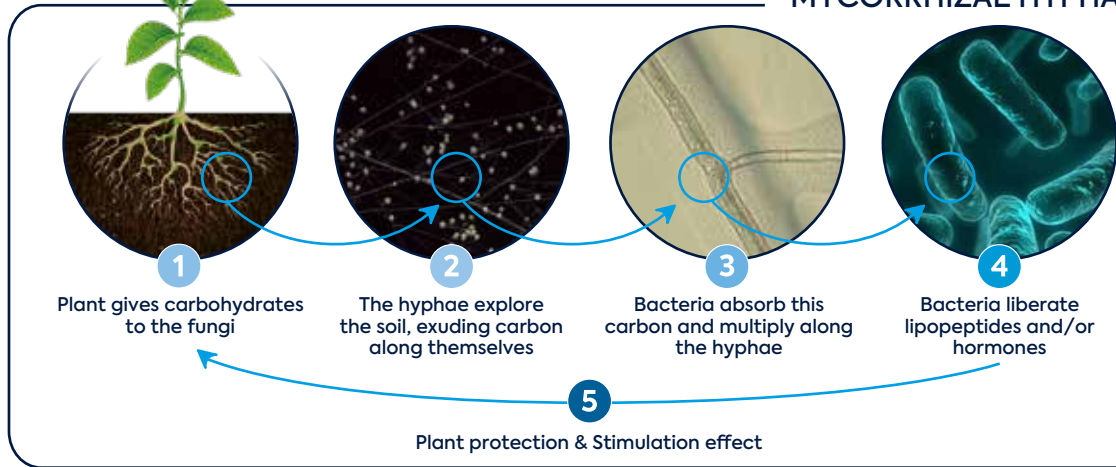


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PROPAGATION OF BACTERIA BY THE MYCORRHIZAL HYPHAE



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.

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



R

RHIZOBIUM

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

PTB162 Technology (soybean), *Bradyrhizobium japonicum*

Mesorhizobium ciceri (chickpea)

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

- ✓ INCREASES NODULATION
- ✓ FIXES NITROGEN
- ✓ PROVIDES NUTRIENTS TO LEGUMES



B

BACILLUS

PTB180 Technology, *Bacillus pumilus*

PTB185 Technology, *Bacillus inaquosorum*

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

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



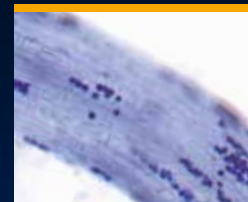
S

SERENDIPITA

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

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

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





AGTIV®

40 YEARS OF EXPERTISE IN BIOLOGICALS

In 1983, we opened our Research Centre in Rivière-du-Loup, the most extensive research facility solely dedicated to advancing biotechnologies associated with growing media. This approach led us to the creation of an innovative technological platform for the aseptic production of mycorrhizal inoculants on an industrial scale. Since then, our biotechnology portfolio expanded with the addition of *Bacillus*, rhizobium and *Serendipita*. And it's not over... we are constantly working to continue to develop sustainable solutions to help feed the growing global population and beautify the world around us.

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 our AGTIV® brand's three pillars: **NATURE, SCIENCE** and **PERFORMANCE**.



100 YEARS, AND BEYOND

This year marks a significant milestone in our history: the 100th anniversary of Premier Tech. With tomorrow in mind, Premier Tech is 100 years young and always making a difference with passion.

Our promise since 1923: being a reliable partner and creating value for our clients. We reaffirm this commitment to collaborate with farmers and distributors for the next 100 years, and beyond. By using our ability to innovate and by paying careful attention to the growers' needs, it has always been essential for us to incorporate something unique in both our products, and the services we offer.

AGTIV® RELIABLE INOCULANTS

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

AGTIV® THRIVE™ P PEA & LENTIL

F: Powder (peat)
S: 4.7 kg (10.3 lb) pail – 2.4 kg (5.3 lb) pail
C: Pea & faba bean: Pail 4.7 kg: **16 ha (40 acres)** – Pail 2.4 kg: **8 ha (20 acres)**
Lentil: Pail 4.7 kg: **24 ha (60 acres)**



AGTIV® THRIVE™ G PEA & LENTIL

F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Pea, lentil & faba bean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**



AGTIV® THRIVE™ PEA & LENTIL

F: Liquid
S: Combo box: 8 L (8 kg) bag-in-box + 4 x 950 ml (4 x 32 fl. oz) bottles
C: Pea, lentil & faba bean: **32 ha (80 acres)**



AGTIV® FUEL™ P PEA & LENTIL

F: Powder (peat)
S: 4.7 kg (10.3 lb) pail
C: Pea & faba bean: **16 ha (40 acres)** – Lentil: **24 ha (60 acres)**



AGTIV® FUEL™ G PEA & LENTIL

F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Pea, lentil & faba bean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**



AGTIV® FUEL™ L PEA & LENTIL

F: Liquid
S: 8 L (8 kg) bag-in-box
C: Pea, lentil & faba bean: **32 ha (80 acres)** or **6530 kg of seeds (240 bu)**



AGTIV® THRIVE™ P SOYBEAN

F: Powder (peat)
S: 4.7 kg (10.3 lb) pail
C: Soybean: **16 ha (40 acres)**



AGTIV® THRIVE™ G SOYBEAN

F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Soybean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**



AGTIV® THRIVE™ SOYBEAN

F: Liquid
S: Combo box: 8 L (8 kg) bag-in-box + 2 x 950 ml (2 x 32 fl. oz) bottles
C: Soybean: **16 ha (40 acres)**



AGTIV® FUEL™ G SOYBEAN

F: Granules (peat)
S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag
C: Soybean: Bag: **4 ha (10 acres)** – Tote bag: **80 ha (200 acres)**



AGTIV® FUEL™ L SOYBEAN

F: Liquid
S: 8 L (8 kg) bag-in-box
C: Soybean: **16 ha (40 acres)** or **5680 kg of seeds (250 units)**



AGTIV® ENRICH™ SOYBEAN

F: Liquid
S: Combo box: 8 L (8 kg) (*Bradyrhizobium*) bag-in-box + 300 ml (*Bacillus*) bottle
C: Soybean: **16 ha (40 acres)** or **5680 kg of seeds (250 units)**



PEA, LENTIL & FAB BEAN

SOYBEAN



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

CHICKPEA	AGTIV® THRIVE™ P CHICKPEA						
	F: Powder (peat) S: 4.7 kg (10.3 lb) pail C: Chickpea: 16 ha (40 acres)	M	R	✓		●	●●●●●
CANOLA & CEREAL	AGTIV® THRIVE™ G CHICKPEA						
	F: Granules (peat) S: 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag C: Chickpea: Bag: 4 ha (10 acres) – Tote bag: 80 ha (200 acres)	M	R	✓	●		●●●●●
FIELD & SPECIALTY CROPS	AGTIV® IGNITE™ L						
	F: Liquid S: 11 L (11 kg) bag-in-box C: Canola: 454 kg (1000 lb) or 81 ha (200 acres) of seeds Cereal: 9165 kg (20 205 lb) or 81 ha (200 acres) of seeds	S	*			●	●●
	AGTIV® REACH™ P						
	F: Powder (peat) S: Case of 4 x 800 g (4 x 1.75 lb) pails C: Cereal, flax & dry bean: 32 ha (80 acres) per case Alfalfa, mix forages & grass: 16 ha (40 acres) per case Vegetables, berries & garlic: see page "Specialty Crops" for details.	M	✓		●		●●●●●
	AGTIV® REACH™ G						
	F: Granules (peat) S: 6 kg (13.2 lb) pail – 18.2 kg (40 lb) bag – 364 kg (800 lb) tote bag C: Cereal, flax & dry bean: Bag: 4 ha (10 acres) – Tote bag: 80 ha (200 acres) Alfalfa, mix forages & grass: Bag: 45 kg of seeds (99 lb) – Tote bag: 720 kg of seeds (1584 lb) Vegetables, herbs, berries & fruit trees: see page "Specialty Crops" for details.	M	*	●			●●●●●
	AGTIV® REACH™ L						
	F: Liquid (spores in suspension) S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles C: Cereal, flax & bean: 16 ha (40 acres) per case	M	✓		●		●●
POTATO	AGTIV® REACH™ L POTATO						
	F: Liquid (spores in suspension) S: Case of 2 x 950 ml (2 x 32 fl. oz) bottles C: Potato: 8 ha (20 acres) per case	M	✓		●	●	●●
	AGTIV® REACH™ P POTATO						
	F: Powder S: Case of 2 x 300 g (2 x 10.5 oz) bag C: Potato: 16 ha (40 acres) per case	M	*		●	●	●●●●●
	AGTIV® STIMULATE™ L POTATO						
	F: Liquid S: 8 L (8 kg) bag-in-box C: Potato: 8 ha (20 acres)	B	✓		●	●	●●

See last page for complete product recommendations.

ACTIVE INGREDIENTS		LEGEND	
M MYCORRHIZAE PTB297 Technology	B BACILLUS PTB180 Technology PTB185 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.
R RHIZOBIUM PTB160 Technology (pea & lentil) PTB162 Technology (soybean) <i>Mesorhizobium ciceri</i> (chickpea)	S SERENDIPITA PTB299 Technology	FORMULATIONS Liquid Granular Powder	
		Learn more at PTAGTIV.COM/en/products	

AGTIV® AVERAGE YIELD INCREASE BY CROP

LENTIL



- ✓ Highly-effective strain
- ✓ Early P uptake
- ✓ Better legume productivity

2.6 bu/ac
8.4%

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



PEA



- ✓ High-quality active ingredients
- ✓ Increased nodulation
- ✓ Better pod fill

3.4 bu/ac
6.1%

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



SOYBEAN



- ✓ More nodules and larger leaves
- ✓ Quicker row closure
- ✓ Fuller pods

3.4 bu/ac
6.8%

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

1.0 bu/ac
2%

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



CHICKPEA



- ✓ Bigger root system
- ✓ More branching
- ✓ More pods

3.4 bu/ac
7.9%

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



CANOLA & CEREAL



- ✓ Mitigated abiotic stresses
- ✓ Increased photosynthesis rate
- ✓ Better establishment, growth and yield

FOR CANOLA
FOR CEREAL

2.5 bu/ac
6.7%

AGTIV® IGNITE™
27 sites over 5 years, Canada

3.8 bu/ac
10%

AGTIV® IGNITE™
8 sites over 2 years, Canada



Learn more at

PTAGTIV.COM/en/results



DURUM WHEAT



- ✓ Expanded root system
- ✓ Enhanced nutrient and water uptake
- ✓ More robust and vigorous plants

3.8 bu/ac **6.0%**

AGTIV[®] REACH[™]

12 sites over 7 years, North America



FORAGE



- ✓ Increased plant establishment and survival
- ✓ Better growth
- ✓ Increased crop yield

576 kg/ha **16.0%**

AGTIV[®] REACH[™] P

47 sites over 2 years, Canada



DRY BEAN



- ✓ Stronger plants
- ✓ Bigger branches and greener leaves
- ✓ More yield per plant

252 lb/ac **8.7%**

AGTIV[®] REACH[™]

12 sites over 7 years, North America



ONION



- ✓ More developed root system
- ✓ Quicker plant establishment
- ✓ Increased marketable yields

3.5 t/ha **7.4%**

AGTIV[®] REACH[™]

17 sites over 9 years, Canada and Europe

2.5 t/ha **8.8%**

AGTIV[®] REACH[™]

4 third-party trials over 2 years, North America



POTATO



- ✓ Faster germination
- ✓ Improved crop yield, quality and uniformity

31.6 cwt/ac **9.1%**

AGTIV[®] REACH[™] + AGTIV[®] STIMULATE[™]

1184 sites over 12 years, North America and Europe

20.8 cwt/ac **9%**

AGTIV[®] REACH[™] POTATO

9 third-party trials over 2 years, North America





PEA LENTIL & FAB BEAN



ON-FARM MIXING WITH SEEDS

AGTIV® THRIVE™ P PEA & LENTIL



**COVERS
40/60
acres**

ACTIVE INGREDIENTS:

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

R RHIZOBIUM – PTB160 Technology
Rhizobium leguminosarum biovar viciae: 1.6×10^9 active 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	Pea & faba bean: 16 ha (40 acres) Lentil: 24 ha (60 acres)	710303
2.4 kg (5.3 lb) – pail	Pea & faba bean: 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.

ON-FARM MIXING WITH SEEDS

AGTIV® FUEL™ P PEA & LENTIL



**COVERS
40/60
acres**

ACTIVE INGREDIENT:

R RHIZOBIUM – PTB160 Technology
Rhizobium leguminosarum biovar viciae:
 1.6×10^9 active 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	Pea & faba bean: 16 ha (40 acres) Lentil: 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 x 10⁸ 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).

**COVERS
10/200
acres**

COMBO LIQUID FOR IN-FURROW

AGTIV® THRIVE™ PEA & LENTIL



ACTIVE INGREDIENTS:

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

R RHIZOBIUM – PTB160 Technology
Rhizobium leguminosarum biovar viciae: 6 x 10⁸ 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.

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.

**COVERS
80
acres**

GRANULAR IN-FURROW

AGTIV® FUEL™ G PEA & LENTIL



ACTIVE INGREDIENT:

R RHIZOBIUM – PTB160 Technology
Rhizobium leguminosarum biovar viciae:
1.3 x 10⁸ 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).

**COVERS
10/200
acres**

LIQUID FOR IN-FURROW OR ON SEED

AGTIV® FUEL™ L PEA & LENTIL



ACTIVE INGREDIENT:

R RHIZOBIUM – PTB160 Technology
Rhizobium leguminosarum biovar viciae:
6 x 10⁸ 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.

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).

**TREATS
240 bu**

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



SOYBEAN



ON-FARM MIXING WITH SEEDS

AGTIV® THRIVE™ P SOYBEAN



**COVERS
40
acres**

ACTIVE INGREDIENTS:

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

R RHIZOBIUM – PTB162 Technology
Bradyrhizobium japonicum: 2.5 x 10⁹ active 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.

GRANULAR IN-FURROW

AGTIV® FUEL™ G SOYBEAN



**COVERS
10/200
acres**

ACTIVE INGREDIENT:

R RHIZOBIUM – PTB162 Technology
Bradyrhizobium japonicum: 1.1 x 10⁹ viable cells/g

INERT INGREDIENT: Peat

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

BULK DENSITY: 650 g/L (41 lb/ft³)

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: 1.1×10^9 viable cells/g

INERT INGREDIENT: Peat

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

BULK DENSITY: 650 g/L (41 lb/ft³)

**COVERS
10/200
acres**

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

R RHIZOBIUM – PTB162 Technology
Bradyrhizobium japonicum: 8×10^9 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

**COVERS
40
acres**

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.

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: 8×10^9 viable cells/g

PARTICLE SIZE: < 0.1 mm (150 mesh)

Contains non-soluble particles

**TREATS
250
units**

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.

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: 3×10^9 viable spores/g

R RHIZOBIUM – PTB162 Technology
Bradyrhizobium japonicum: 8×10^9 viable cells/g

PARTICLE SIZE: < 0.1 mm (150 mesh)

Contains non-soluble particles

**TREATS
250
units**

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. Apply at a rate of 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 — Mix the content of the bladder and the bottle in the mix tank. Dilute the inoculants in the required volume of clean, non-chlorinated water according to the product label. Apply in the furrow, directly on the seed, at a rate of 518.75 ml/ha (207.5 ml/acre).

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

AGTIV[®]

RELIABLE INOCULANTS

for CANOLA & CEREALS

- ✓ Improves photosynthesis
- ✓ Better water management
- ✓ Increases nutrient absorption



2.5 bu/ac
6.7%

Average yield increase for canola
with **AGTIV[®] IGNITE[™] L**
27 sites over 5 years, Canada

3.8 bu/ac
10%

Average yield increase for cereals
with **AGTIV[®] IGNITE[™] L**
8 sites over 2 years, Canada

IGNITE CROP POTENTIAL

LIQUID ON SEED

AGTIV® IGNITE™ L



ACTIVE INGREDIENT:

S SERENDIPITA – PTB299 Technology
Serendipita indica
 (formerly known as *Piriformospora indica*)
 2 x10⁶ viable spores/g

**COVERS
200
acres**

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) Cereal: 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 thoroughly the 11 liters bladder 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.

CANOLA

Year	Number of sites	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
2018	1	63.5	68.0	4.5
2019	6	44.6	47.1	2.5
2020	5	37.2	39.6	2.4
2021	8	32.5	35.0	2.5
2022	7	33.6	36.2	2.6
Total	27 sites	37.2^a	41.8^b	2.5

DURUM WHEAT

Year	Number of sites	Untreated check yield (bu/ac)	AGTIV® IGNITE™ L yield (bu/ac)	Yield increase (bu/ac)
2021	4	35.8	39.3	3.5
2022	4	40.2	44.4	4.2
Total	8 sites	38.0^a	41.8^b	3.8

BENEFITS

NUTRITIONAL ASPECTS

(P) PHOSPHORUS – essential for energy storage and availability to cells

Stimulates the plant's production of phosphate transporters, enabling it to absorb phosphorus from the soil more efficiently^[1,2].

(N) NITROGEN – key element involved in protein and chlorophyll synthesis

Improves the plant's nitrogen utilization efficiency by increasing the expression of nitrate reductase, the primary enzyme used to transform absorbed mineral nitrogen into organic nitrogen, which plants use for amino acid synthesis^[3].

(S) SULPHUR – essential for protein synthesis

Serendipita has high affinity sulfur transporters to absorb sulfur from the soil very efficiently, which is then transferred to the plant^[4].

ABIOTIC STRESS TOLERANCE

- Mitigates detrimental effects of water stress by stimulating the expression of protective enzymes, which play a major role in regulating reactive oxygen derivatives^[5]. These compounds accumulate under water or salt stress and can damage cell membranes and chloroplasts, affecting plant growth.
- Enhances drought tolerance by improving stomatal conductance^[6,7].
- Improves biochemical pathways of plant partner which includes biosynthesis of prolines, organic acids and sugars, that serve as osmolytes in the cell^[6,8,9,10]. This aids plants to maintain water potential gradient for the flow of water from soil into root and further to aerial parts under water deficit conditions^[11].

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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 10⁸ active cells/g

INERT INGREDIENT: Peat

PARTICLE SIZE: < 1 mm (18 mesh)

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

**COVERS
40
acres**

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 10⁸ 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)

**COVERS
10/200
acres**

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).



ON-FARM MIXING WITH SEEDS

AGTIV® REACH™ P



ACTIVE INGREDIENT:

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

COVERS
80
acres

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	Cereal, flax & dry bean: 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).

FIELD CROPS

GRANULAR IN-FURROW

AGTIV® REACH™ G



ACTIVE INGREDIENT:

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

COVERS
10/200
acres

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

COVERS
40
acres

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 to 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. 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 for application details.



POTATO



IN-FURROW APPLICATION OR SEED-PIECE TREATMENT

AGTIV® REACH™ L POTATO



ACTIVE INGREDIENT:

M MYCORRHIZAE – PTB297 Technology
Rhizophagus irregularis: 10 500 viable spores/g

**COVERS
20
acres**

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

DIRECTIONS FOR USE

IN-FURROW APPLICATION — Dilute the product in the required volume of clean, non-chlorinated water. Refer to the application charts available at 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.

SEED-PIECE TREATMENT — 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

IN-FURROW APPLICATION OR SEED-PIECE TREATMENT

AGTIV® REACH™ P POTATO



ACTIVE INGREDIENT:

M MYCORRHIZAE – PTB297 Technology
Rhizophagus irregularis: 67 000 viable spores/g

**COVERS
40
acres**

INERT INGREDIENT: Diatomaceous earth

PARTICLE SIZE: < 0.2 mm (70 mesh)

SIZE	COVERS (1 CASE)	CODE (CASE)
2 x 300 g (2 x 10.5 oz) – bags	Potato: 16 ha (40 acres)	711104

DIRECTIONS FOR USE

Pour the content of a 300 g pouch of the product into 5.7 liters of clean and non-chlorinated water. **Mix well and maintain under agitation during application.** Apply directly on seed pieces into furrow.

SEE RECOMMENDATIONS BELOW.

IN-FURROW APPLICATION

AGTIV® STIMULATE™ L POTATO



ACTIVE INGREDIENT:

B BACILLUS – PTB185 Technology
Bacillus inaquosorum: 2 x 10⁹ viable spores/g

**COVERS
20
acres**

INERT INGREDIENT: Water

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

SIZE	COVERS (1 CASE)	CODE (CASE)
8 L (8 kg) – bag-in-box	Potato: 8 ha (20 acres)	711021

DIRECTIONS FOR USE

Apply inoculant in the furrow, directly on the seed pieces, at a rate of 1000 ml/ha (400 ml/acre).

SEE RECOMMENDATIONS BELOW.

IN-FURROW APPLICATION

RECOMMENDATIONS

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.
- 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.

SEED-PIECE TREATMENT

RECOMMENDATIONS

MILESTONE TREATER:

- Validate that the atomizing head and the mixing paddles correspond to the approved specifications.
 Visit 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.

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PRIMERS & FOLIARS



PRIMERS & FOLIARS	69 - 85
Active AgriScience Patented Biostimulant Technology	69
Foliar Fertility Program	70
Active PRIME™	72
Active PLS™	74
Active BUILD™	76
Active VPR™	78
Active VPR™ PLUS	79
Active Flower™	80
Active Grainfill™	82
Active PODFILL™	83
Active KONNECT™, Proform N™	84
Micronutrients™	85



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 FERTILIZER PROGRAM



ACTIVE[™]
AgriScience
activeagriscience.com

All ACTIVE AgriScience products are developed and manufactured in Saskatoon, SK



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APPLY AS CROP DEFICIENCIES ARE APPARENT

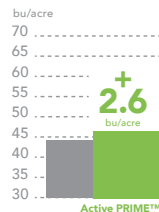


CANOLA & CORN

SEEDING



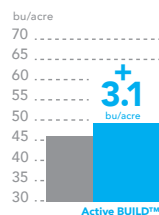
4 ml/1kg Seed
90 ml/bu
110 Bags/10L Jug



HERBICIDE



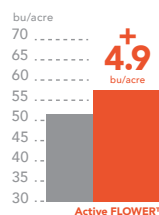
0.5 L - 1L/acre
3-4 weeks between application



FUNGICIDE



1 L/acre
3 weeks between application



HAIL EVENT

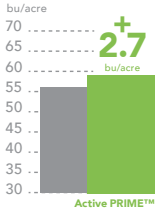


Always use Active BUILD[™] until flowering. If the plant has already begun to flower, use Active FLOWER[™]





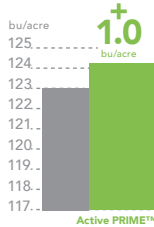
CEREALS



Wheat
108ml/bu
93 Bu/10L Jug

Barley
115ml/bu
87Bu/10L Jug

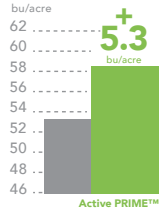
Oats
61ml/bu
162 Bu/10 L Jug



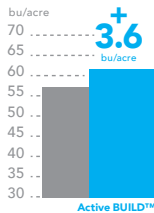
PULSES



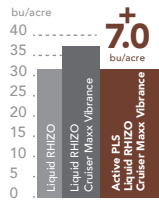
2 ml/1kg Seed
54 ml/bu
184 bu/10L Jug)



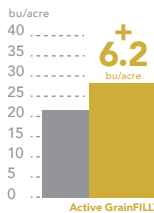
0.5 L - 1L/acre
3-4 weeks between
application



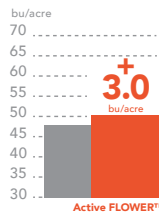
1L/acre
3-4 weeks between
application



1 L/acre



1 L/acre
3 weeks between
application



Always use Active BUILD™
until Cereal Heading.



Always use Active BUILD™ until flowering.
If the plant has already begun to flower,
use Active FLOWER™





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 ₂ O ₅)	15%
Soluble Potash (K ₂ 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.

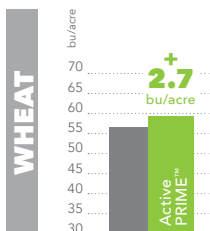
INCREASED NUTRIENT MOBILIZATION and ABSORPTION:

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:

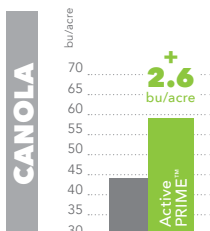
Active PRIME™ benefits are unaffected by unfavourable conditions. It maintains the ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways, allowing plants to maximize their genetic potential under cold, wet or drought conditions.





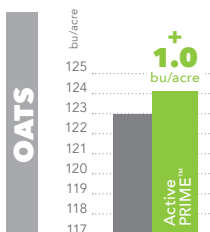
WHEAT • 6 YEAR AVERAGE YIELD DATA *

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 ₂ O ₅)	10.0%
Soluble Potash (K ₂ O)	10.0%
Boron (B)	0.1%
Iron (Fe)	0.005%
Manganese (Mn)	0.1%
Molybdenum (Mo)	0.05%
Zinc (Z)	0.2%



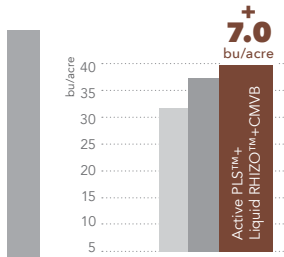
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Liquid RHIZO™ PULSE +
ACTIVE PLS™



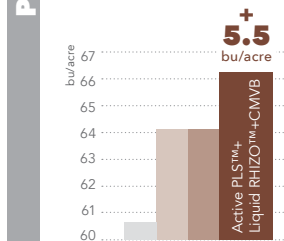
Liquid RHIZO™ SOY +
ACTIVE PLS™



PEAS • YIELD DATA , SK - 2018 ¹

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

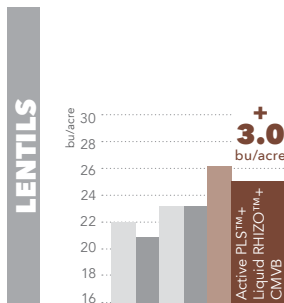
CMVB = Cruiser Maxx® Vibrance® Beans Seed



PEAS • YIELD DATA , MB - 2018 ²

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

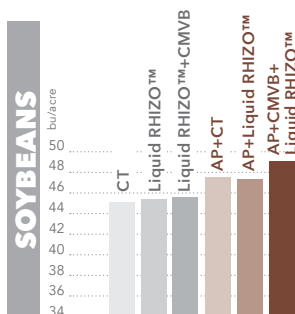
CMVB = Cruiser Maxx® Vibrance® Beans Seed



LENTIL • YIELD DATA , SK • 2018 ³

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 ⁴

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

¹ 3rd party field research with Ag-Quest, Saskatoon, SK - 2018

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

³ 3rd party field research with Ag-Quest, Saskatoon, SK - 2018

⁴ 3rd 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 ₂ O ₅)	30%
Potassium (K ₂ 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.

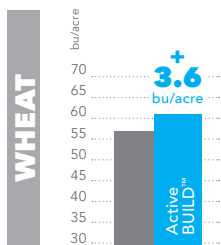
INCREASED NUTRIENT MOBILIZATION and ABSORPTION:

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:

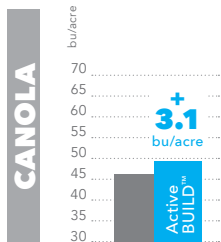
Active BUILD™ benefits are unaffected by unfavourable conditions. It maintains the ability to simultaneously upregulate desirable pathways and downregulate undesirable pathways, allowing plants to maximize their genetic potential under cold, wet or drought conditions.





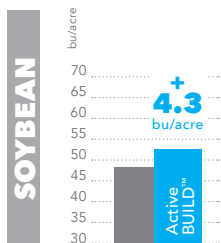
WHEAT • 6 YEAR AVERAGE YIELD DATA *

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



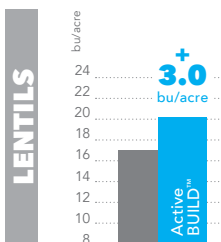
CANOLA • 6 YEAR AVERAGE YIELD DATA *

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 ₂ O ₅)	10%
Potassium (K ₂ O)	10%





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 (P₂O₅) 10.0%
Potassium (K₂O) 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:

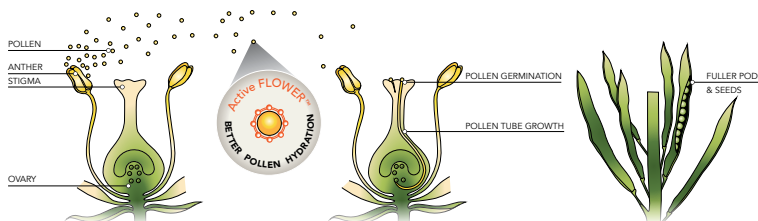
Active FLOWER™ helps regulate anther dehiscence and pollen hydration, and increases pollen volume and viability.

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:

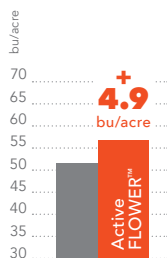
The polyamines present in Active FLOWER™ help attract bees, resulting in greater fertilization and minimal abortive flowers.



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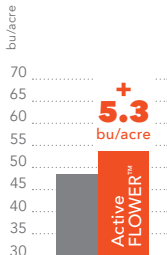
CANOLA



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

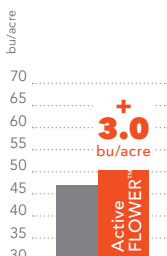
SOYBEAN



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

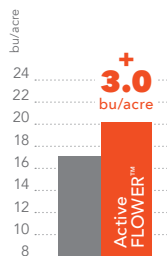
PEAS



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

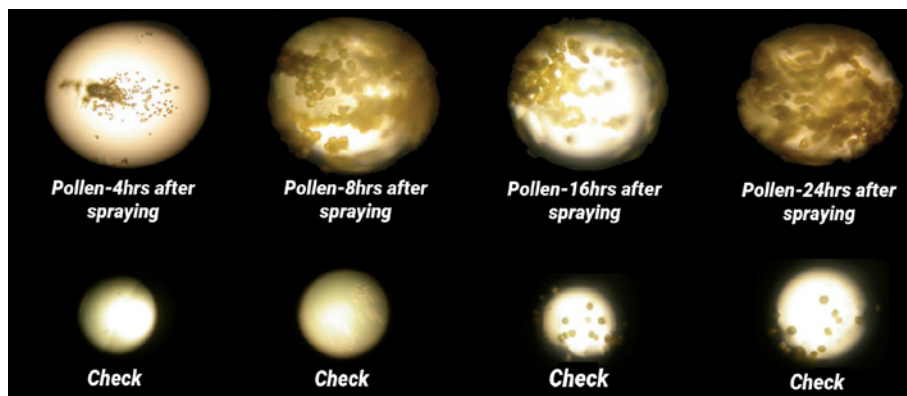
LENTILS



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



* 3rd 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 ₂ 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 ₂ O ₅)	4.0%
Soluble Potash (K ₂ O)	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 (K₂O) 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 10% 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: 18318914

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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A series of horizontal dotted lines for taking notes, preceded by a solid grey bar.

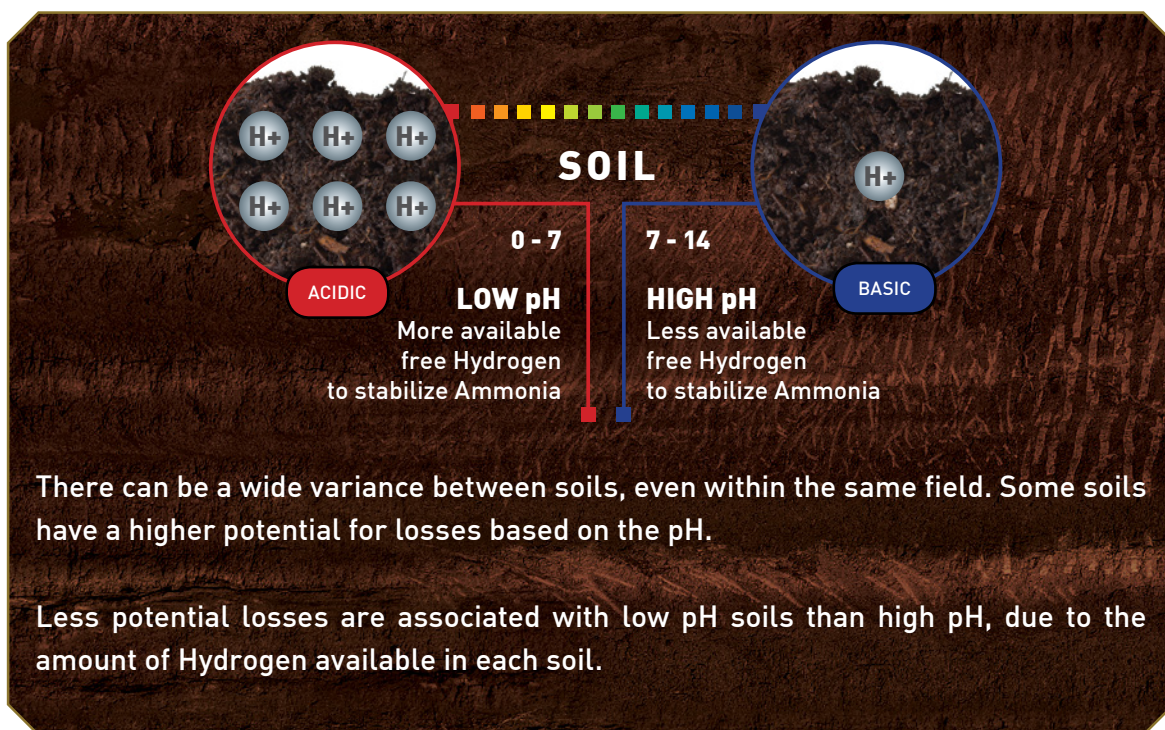
NITROGEN MANAGEMENT



NITROGEN MANAGEMENT.....	89 - 96
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Considerations of Hydrolysis. Considerations of Nitrification Losses	89
Nitrogen Management	90
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Active STABILIZER™ PLUS	93
Active STABILIZER™	94
ArmU™ Advanced	95
ArmU™	96



Why Soil pH is important



Considerations of Hydrolysis

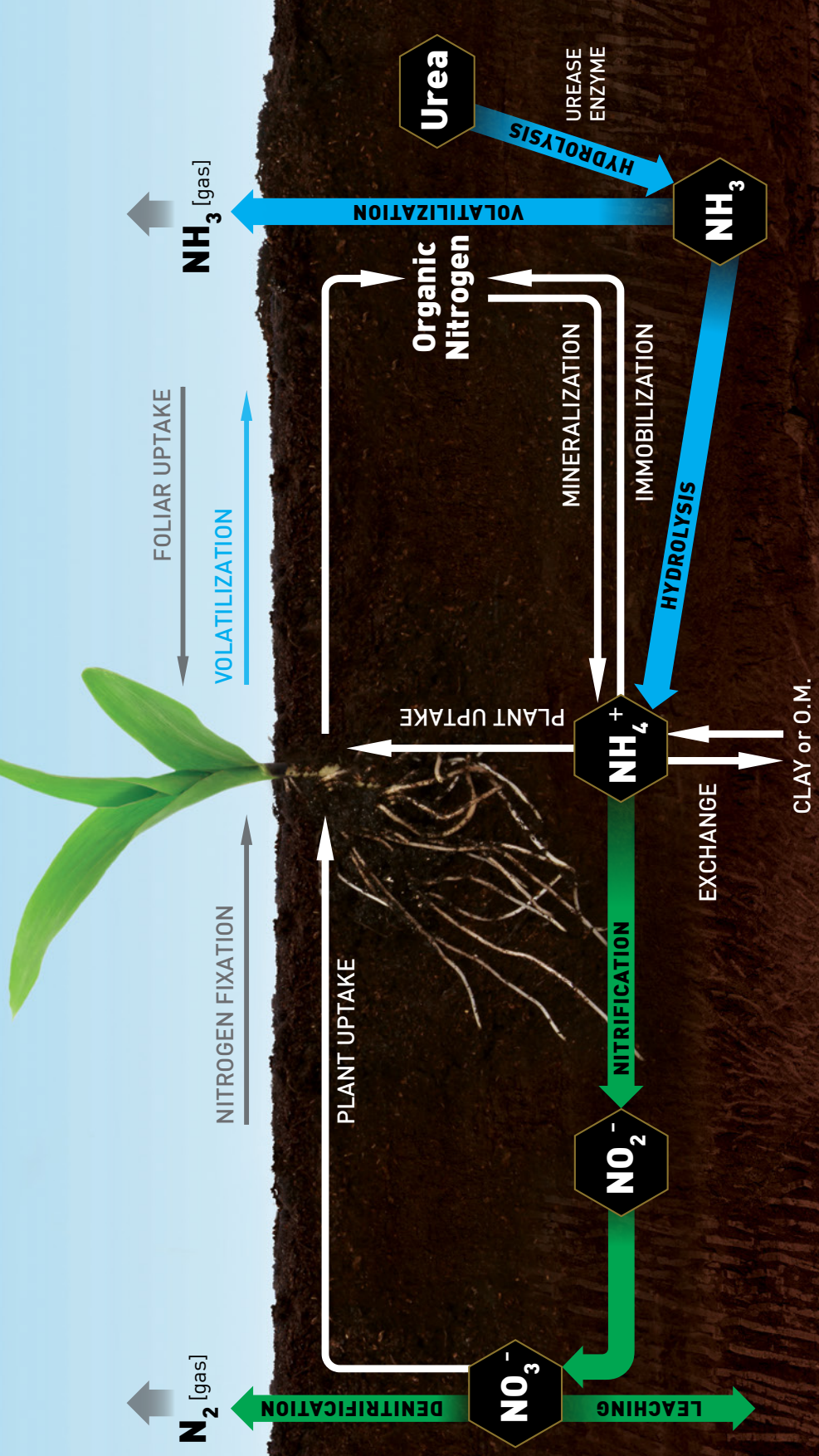
- Soil pH
- Soil Moisture
- Soil Temperature (- 20°C)
- Thatch Cover — 20-30 times higher urease concentration than underlying soil*
- Placement & Concentration

* https://umanitoba.ca/faculties/afs/agronomists_conf/media/Fernandez_NitrogenAdditivesWinnipegDec152016.pdf

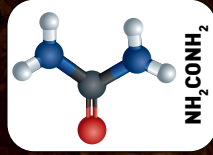
Considerations of Nitrification losses

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

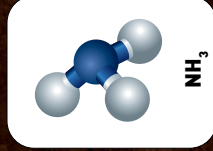
NITROGEN MANAGEMENT



HYDROLYSIS



Urease
Enzyme



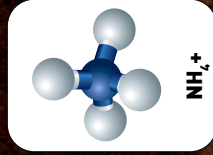
H⁺



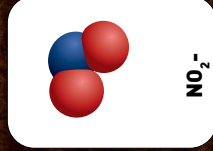
Ammonium

✓ BINDS TO NEGATIVELY CHARGED SOIL

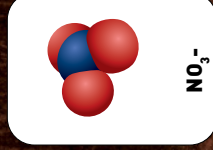
NITRIFICATION



NitroSomonas Bacteria



NitroBacter Bacteria



Nitrate

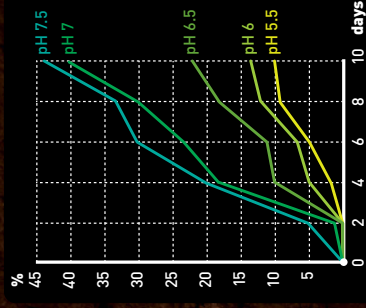
✗ DOESN'T BIND TO NEGATIVELY CHARGED SOIL

Considerations when applying Urea, UAN, or NH₃

- 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° Celcius.¹
- **Nitrification** soil temperature: NitroSomonas and NitroBacter Bacteria will remain active in soils as low as +4° Celcius.²

% Volatilization based upon soil pH ³

Days	Soil pH									
	5.5	6	6.5	7	7.5	% of Added N Volatilized				
0	0	0	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



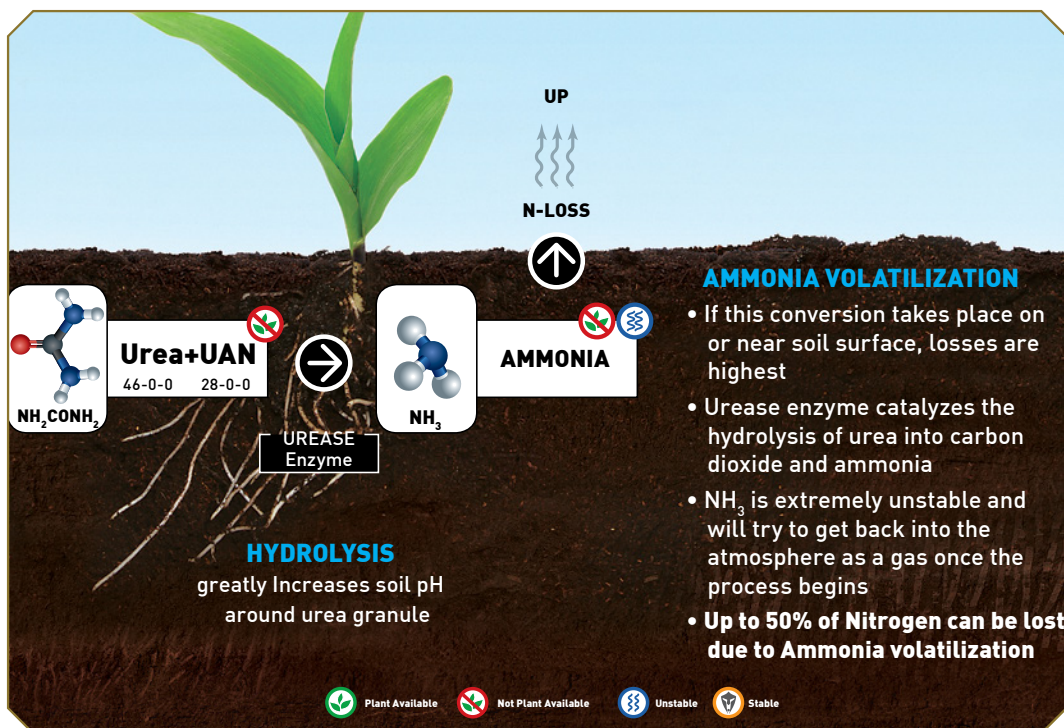
Unstable



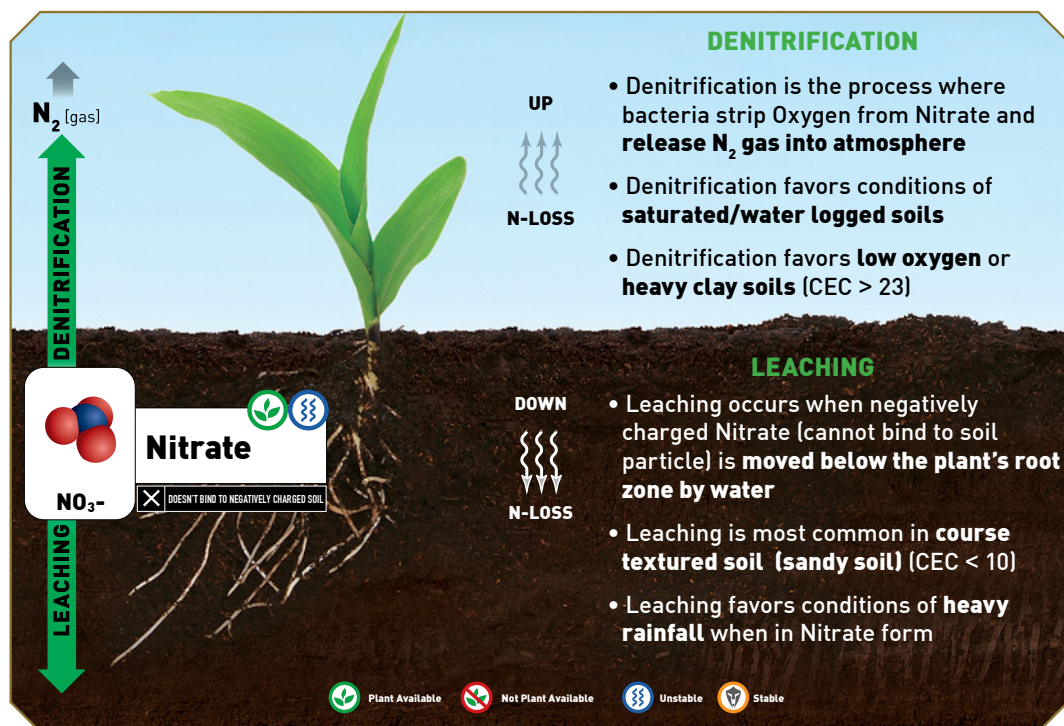
Stable

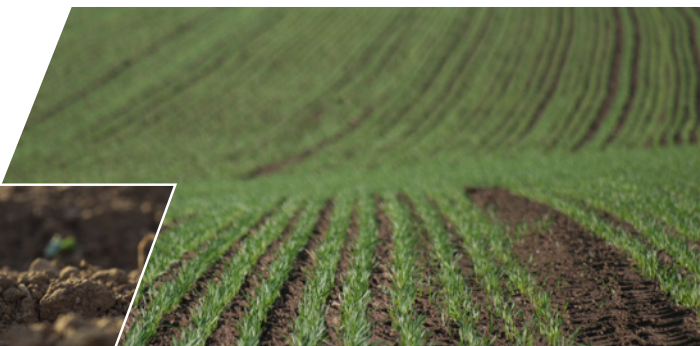
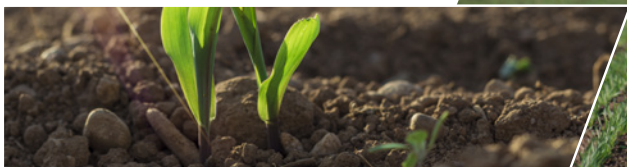
¹ Enzyme Activity in Soils at Subzero Temperatures, J.M. Bremner & M.I. Zantua, Stability of Urease in Soils, M.I. Zantua & J.M. Bremner
² Ammonia Oxidation in Nitrosomonas at NH₄⁺ Concentrations near K_m, Effects of pH and Temperature, Joost Groeneweg et al 1994, www.biosciences.com/bio/bact/bact.html
³ Overdahl et al., 1960, Soil Sci. Soc. Am. Proc. 24:87-90

Volatilization



Potential loss mechanisms of Nitrate





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.

ELIGIBLE FOR THE CANAOLA 4R ADVANTAGE FUND



N LOSS REDUCTION - UREA 3RD PARTY RESEARCH BY UOM*

TREATMENTS	BANDED	
	NH3 loss (kg/ha)	% NH3 reduction
Untreated Urea	16.6	0.0
1.2L/mt Active STABILIZER PLUS (12% NBPT, 2% DMPP)	4.6	72.5
1.8L/mt Active STABILIZER PLUS (12% NBPT, 2% DMPP)	3.4	79.4
2.4L/mt Active STABILIZER PLUS (12% NBPT, 2% DMPP)	2.7	83.8

• 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

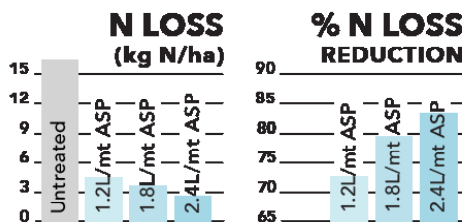
With 1.2 L / mt of urea, Active STABILIZER™ PLUS is able to produce a ROI >1% in Nitrogen savings alone. Everything after that is profit.

• 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.



N loss reduction:
84%



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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

*While Active AgriScience stands behind the quality of our products, we cannot guarantee the same, or similar, yield results due to the effects of variables outside of our control (soil conditions, weather, pests, diseases, tank mix partners, application rates, and errors in mixing and application). We encourage all prospective customers to run trials of our products before broad acreage adoption.



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.

PATENT NUMBERS: USA: 9422203 B2 ; Canada: 2889430

ACTIVE INGREDIENTS:
12% N-(n-butyl)
thiophosphoric
triamide (NBPT),
CAS No. 94317-64-3.

INACTIVE INGREDIENTS:
88 % (preservative, colorant,
spreading agents, surfactant).

• 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.

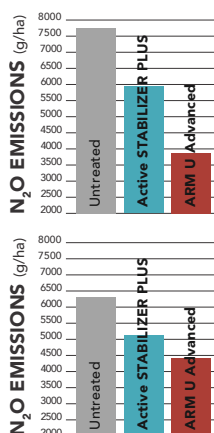
• NITROGEN STABILIZER TECHNOLOGY

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



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N₂O EMISSIONS REDUCTION



N₂O EMISSIONS FROM BROADCASTED UREA*

TREATMENT	N ₂ O FLUX (g/ha)	DIFFERENCE (g/ha)	% REDUCTION
Untreated	7760		
Active STABILIZER PLUS	5965	1794	23.1
ARM U Advanced	3889	3871	49.9

N₂O EMISSIONS FROM SHALLOW BANDED UREA*

TREATMENT	N ₂ O FLUX (g/ha)	DIFFERENCE (g/ha)	% REDUCTION
Untreated	6301		
Active STABILIZER PLUS	5161	1141	18.1
ARM U Advanced	4462	1839	29.2

*Urea applied at 217kg/ha. Researchers: Dr. Francis Zvomuya and Drs. Theresa Adesanya

*While Active AgriScience stands behind the quality of our products, we cannot guarantee the same, or similar, yield results due to the effects of variables outside of our control (soil conditions, weather, pests, diseases, tank mix partners, application rates, and errors in mixing and application). We encourage all prospective customers to run trials of our products before broad acreage adoption.



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.

ELIGIBLE FOR THE CANAOLA 4R ADVANTAGE FUND

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 & 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.

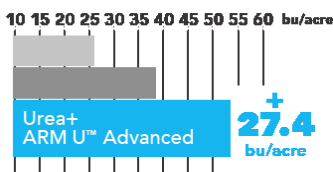
HAS LOW APPLICATION RATES

WORKS EQUALLY ON DRY UREA & UREA SOLUTIONS (UAN)

FALL APPLIED YIELD DATA

WHEAT • UREA - 3RD PARTY RESEARCH BY UOM AND UOW*

TREATMENTS	TOTAL NH ₃ LOSS (kg N/ha)	% REDUCTION	GRAIN YIELD (kg/ha)	GRAIN YIELD (bu/acre)	% CHANGE
Bare soil	0.0		1710	25.6	
Urea	21.0		2573	38.5	
Urea with ARM U™ Advanced	2.4	88.0	3544	53.0	37.7



Yield Increase:
38%

*While Active AgriScience stands behind the quality of our products, we cannot guarantee the same, or similar, yield results due to the effects of variables outside of our control (soil conditions, weather, pests, diseases, tank mix partners, application rates, and errors in mixing and application). We encourage all prospective customers to run trials of our products before broad acreage adoption.



ACTIVE
AgriScience
activeagriscience.com

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.



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.

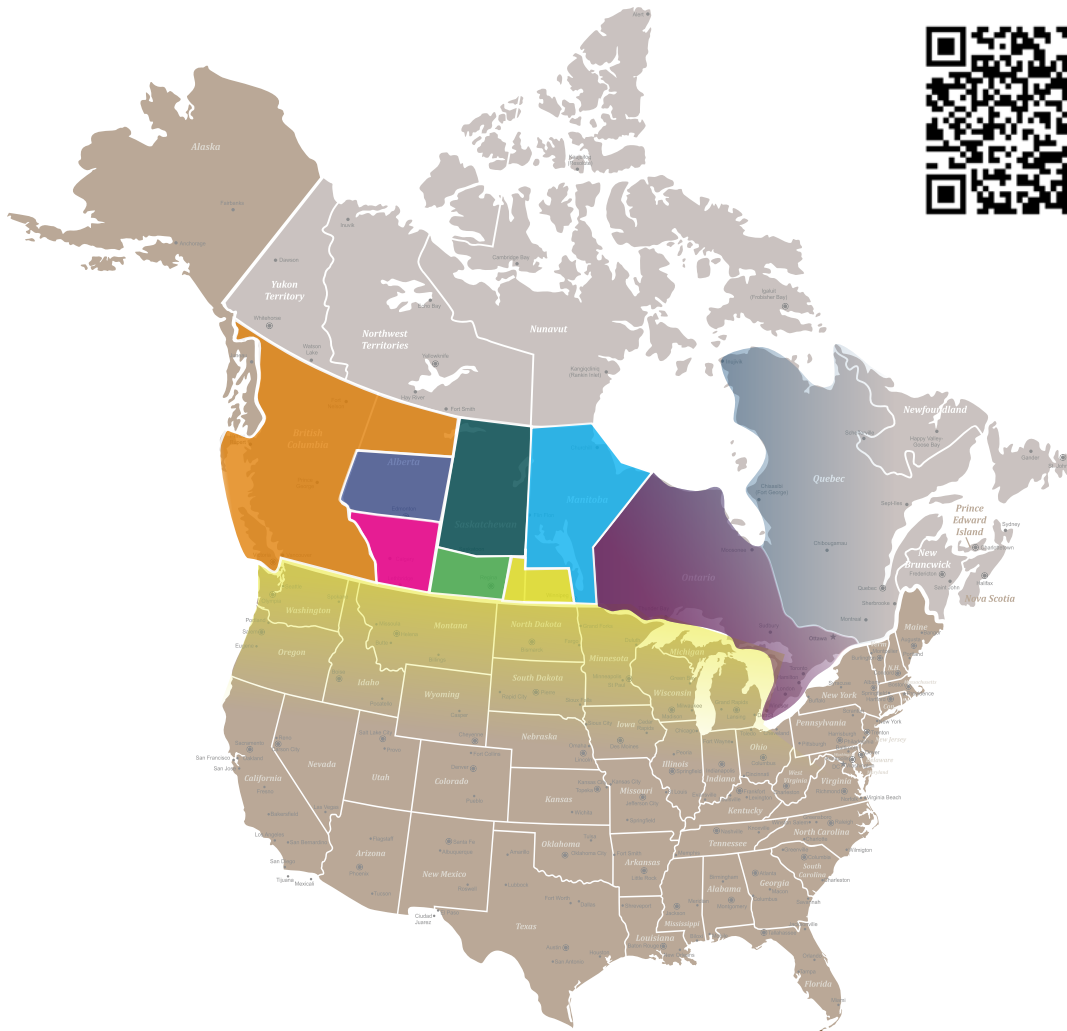
ARM U LIQUID MANURE RATE

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

A series of horizontal dotted lines for taking notes, preceded by a solid grey bar.








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