



Getting Logical with Biologicals

Cade Schawang and Cameron Alderfer

WHY BIOLOGICALS?

Why should we use any? Are they worth it? What are they?

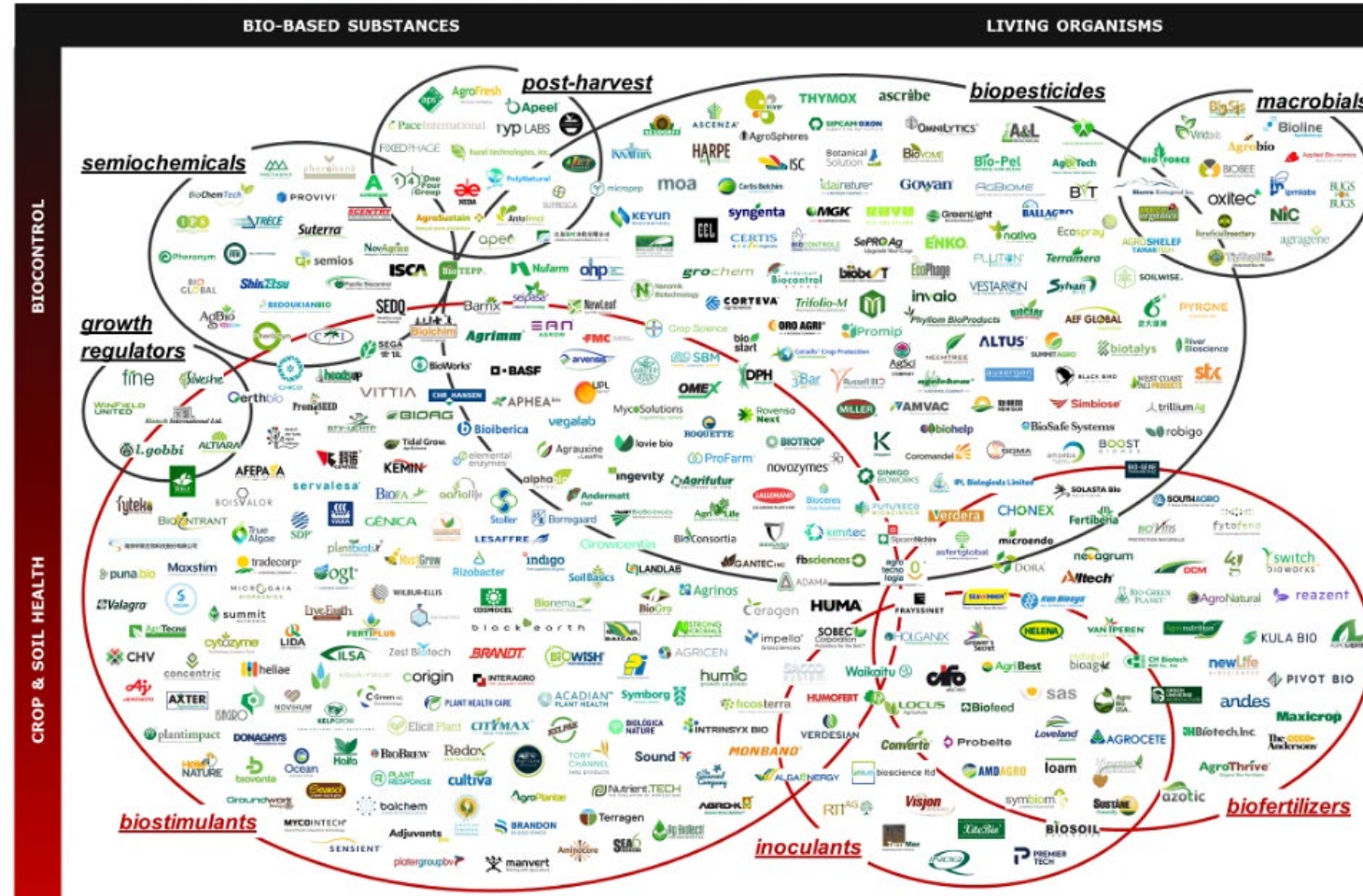
Addressing BIOLOGICALS: Reputations/Misconceptions

Tried it didn't see any results, SNAKE OIL, HIGH-Cost, Low or Negative ROI, Waste of Money and Time

Market Noise 2023

2023 AG BIOLOGICALS LANDSCAPE

The Mixing Bowl
CONNECTING INNOVATORS IN FOOD, AG & IT



Market Noise 2025

2025 CROP BIOSTIMULANT LANDSCAPE



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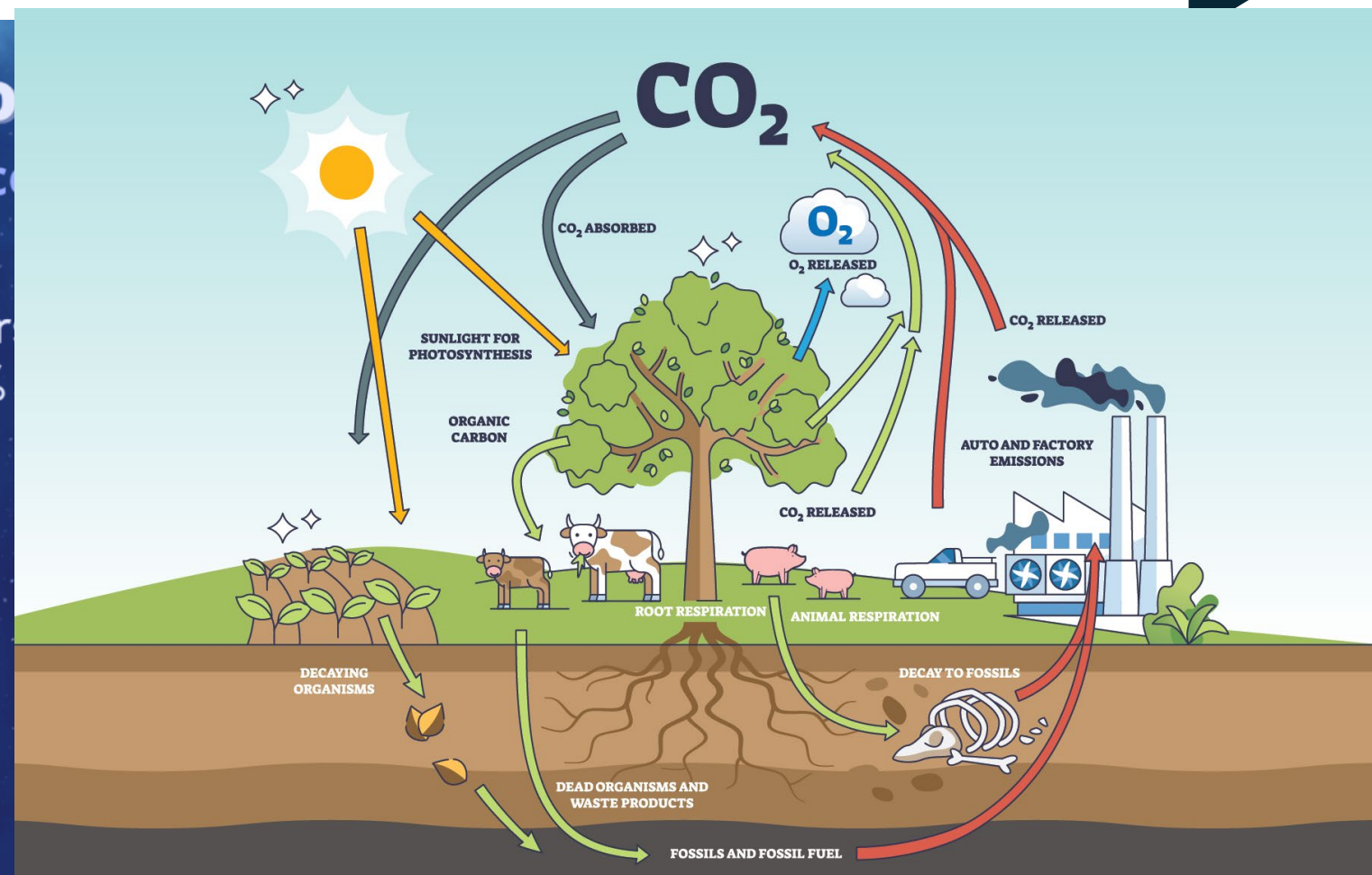
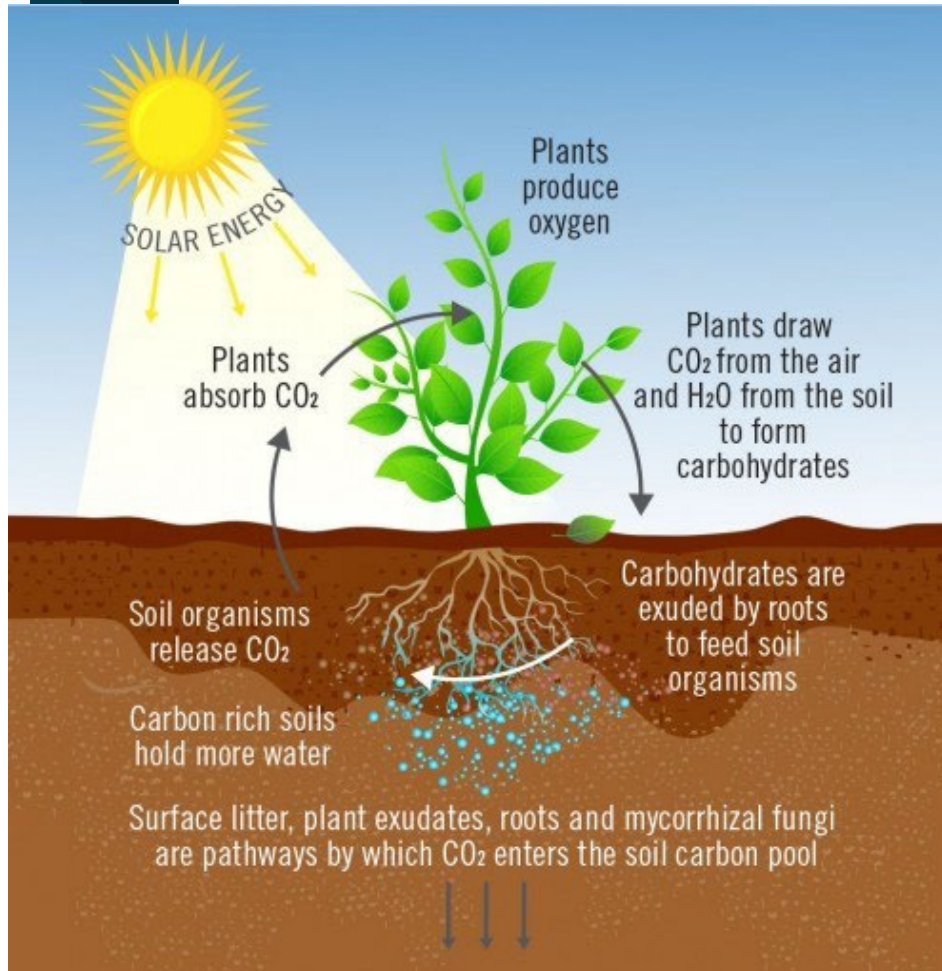
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CARBON CYCLE



Setting the DINNER TABLE



- PLANT RESIDUE=CARBON
- CARBON = MICROBE FOOD
 - MICROBE WASTE=CO₂
- CO₂=PLANT Consumable

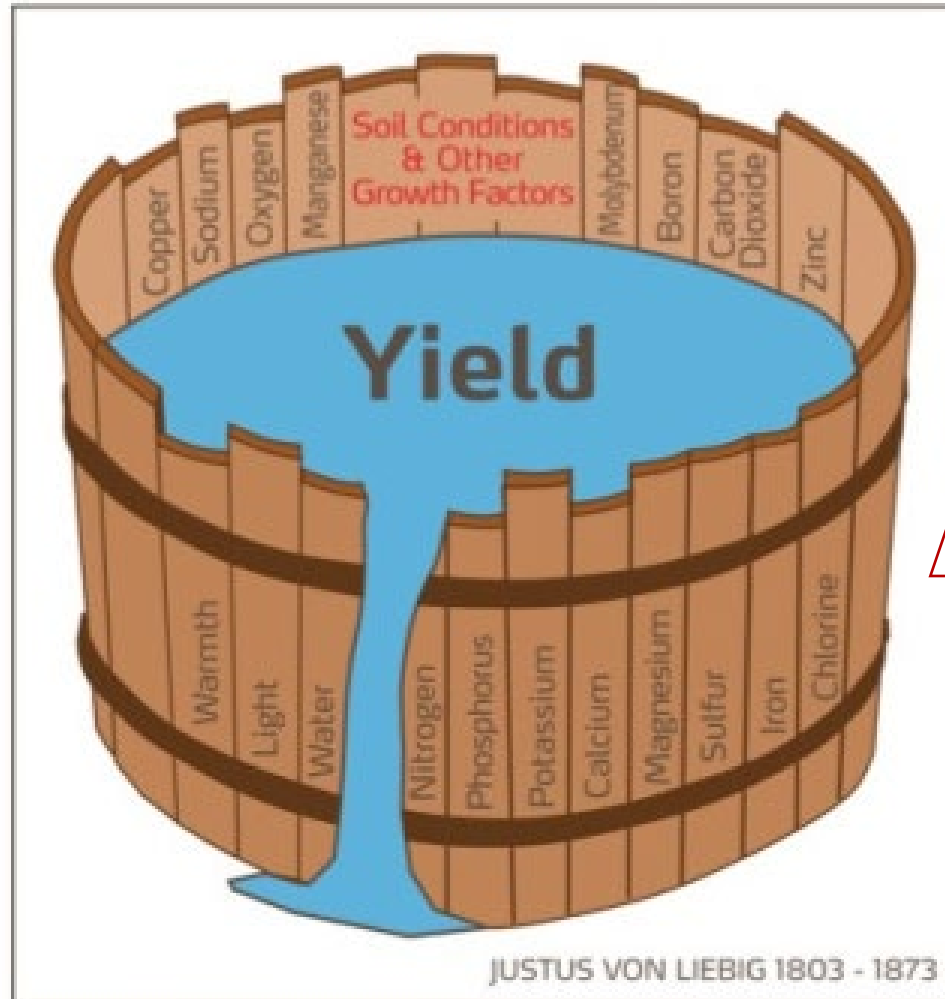
Essential Nutrients

Justus von Liebig's

"Law of the Minimum"

Published in 1873

"If one growth factor/nutrient is deficient, plant growth is limited, even if all other vital factors/nutrients are adequate...plant growth is improved by increasing the supply of the deficient factor/nutrient"



Essential Nutrients

TABLE 36.1

Mineral Elements Required by Plants

ELEMENT	ABSORBED FORM	MAJOR FUNCTIONS
MACRONUTRIENTS		
Nitrogen (N)	NO_3^- and NH_4^+	In proteins, nucleic acids, etc.
Phosphorus (P)	H_2PO_4^- and HPO_4^{2-}	In nucleic acids, ATP, phospholipids, etc.
Potassium (K)	K^+	Enzyme activation; water balance; ion balance; stomatal opening
Sulfur (S)	SO_4^{2-}	In proteins and coenzymes
Calcium (Ca)	Ca^{2+}	Affects the cytoskeleton, membranes, and many enzymes; second messenger
Magnesium (Mg)	Mg^{2+}	In chlorophyll; required by many enzymes; stabilizes ribosomes
MICRONUTRIENTS		
Iron (Fe)	Fe^{2+} and Fe^{3+}	In active site of many redox enzymes and electron carriers; chlorophyll synthesis
Chlorine (Cl)	Cl^-	Photosynthesis; ion balance
Manganese (Mn)	Mn^{2+}	Activation of many enzymes
Boron (B)	B(OH)_3	Possibly carbohydrate transport (poorly understood)
Zinc (Zn)	Zn^{2+}	Enzyme activation; auxin synthesis
Copper (Cu)	Cu^{2+}	In active site of many redox enzymes and electron carriers
Nickel (Ni)	Ni^{2+}	Activation of one enzyme
Molybdenum (Mo)	MoO_4^{2-}	Nitrate reduction



Biological Product Considerations:

Won't replace CPPs or synthetic fertilizers

Complements existing inputs and adds value

Supports integrated pest management programs with additional modes of action

Best fit for well-managed acres with minimal limiting factors

Helps unlock top-end yields once core practices are in place

Strong agronomic fundamentals are required for consistent results

**ENHANCE AND COMPLIMENT
Current Management Practices**



BIOLOGICAL PRODUCTS

PLANT AND SOIL HEALTH

MICROBIALS & BIOFERTILIZERS ¹		BIOSTIMULANTS ²	
NUTRIENT UPTAKE ENHANCERS		NATURAL PROCESS STIMULATORS	
N-FIXERS	K-MOBILIZERS	PLANT & SEAWEED EXTRACTS	AMINO ACIDS
P ₂ O ₅ SOLUBILIZERS	OTHERS	ORGANIC ACIDS	

¹ Microbials used to enhance plant nutrient uptake from soil.

- Nitrogen-fixing bacteria make up largest group
- Others include mobilizers/solubilizers or chelators of specific nutrients (phosphorous, potassium, zinc, sulfur, iron). In some markets, mycorrhizae are included in this category
- Biofertilizers regulated under country/state fertilizer regulations

² Natural Substances Biostimulants are non-microbial products which mitigate abiotic stress, enhance crop quality and increase nutrient assimilation.

- Seaweed Extracts make up the largest segment in this group
- Organic acids are mainly humic and fulvic acids used as soil amendments
- The definition and regulation of biostimulants remains under development in many parts of the world., In most cases they are regulated under country/state fertilizer regulations.

BIOCONTROLS

BIOPESTICIDES ³				MACROORGANISMS ⁶		
BIOCHEMICALS ⁴		MICROBIALS ⁵		INSECTS	MITES	NEMATODES
PLANT EXTRACTS	ORGANIC ACIDS	BACTERIA	FUNGI	⁵ Microbials refer to products based on Bacteria; Fungi; Viruses, and Protozoans and are the largest market of biopesticides <ul style="list-style-type: none"> • Bacteria, followed by Fungi make up the largest groups commercially (>90%) • Biggest challenges are formulation related to: 1) Shelf-life; 2) Stability; 3) Performance enhancement 		
SEMIOCHEMICALS		PROTOZOA	VIRUS			
		YEASTS	OTHERS			

³ Biopesticides are derived from natural materials, such as plants, bacteria and certain minerals. Biopesticides target specific pests and are inherently less toxic than synthetic pesticides.

⁴ Plant Extracts make up the largest segment by sales volume in this group. Challenges include manufacturing and quality control. Semiochemicals are pheromones.

⁶ Macroorganisms include Insects, Mites, and Nematodes. Insects and mites are largest groups

- Unique in that the live organism in the form of eggs, larvae, pupae or adult is used
- Most important challenge is logistics —shipping live organisms that require special care to survive
- Normally not classified as a Biopesticides but rather Biocontrols

How should I choose a biological product?

What is the category?

Does it have a mode of action?

What is the geography and placement?

What are the limitations?

Does it have data to support it?



Winfield United: BIOVERIFIED



		Criteria			
		Uniqueness <i>Does the product bring something new to the market?</i>	Agronomic <i>How does the product work? What data exists? Does it live up to its claims?</i>	Operational <i>How compatible is it with application methods, other products and my inventory approach?</i>	Economic <i>Is there return for the retailer and grower?</i>
Rating	High	Little to no similar options available	Strong understanding of mode of action, performance and placement	Fits into standard protocol	High profit potential for all parties in the value chain
	Medium	A few similar options available	Some understanding of mode of action, performance and placement, but needs more investigation	Requires extra attention	Profit potential for all parties in the value chain
	Low	Many similar options available	Unclear mode of action, performance and placement and/or doesn't work as claimed	Requires unique equipment and/or handling accommodations	Not profitable for one or more parties in the value chain

Planet Earth: Soil DNA TESTING



- **TEST YOUR SOILS!!!!**
- **VERY Comprehensive**
- **Sporulation. Heat and moisture
pH 4 and below.**

What am I trying to accomplish with a biological product?

Manage Residue

Nutrient Efficiency

Manage Grain Fill



Humik[®] ONE 0-0-10

EXTRACTED • GRANULE • TECHNOLOGY

GENERAL INFORMATION

Humik[®] ONE features Extracted Granule Technology and can be applied to most crops. This product features a low-dust formula which may aid in the uptake of micronutrients and can be blended with most dry fertilizers, including urea.

DIRECTIONS FOR USE

SOIL: Broadcast, band or prepare transplant beds with **4 - 10 lbs.** per acre, per application with dry fertilizer program. If applying with seed or in-season, incorporate with water or tillage. Multiple applications may be more beneficial.

SEEDING: Band or broadcast **1 - 5 lbs.** with seed at planting.

PROPER MIXING PROCEDURE

1. Add all dry NPK and micros to blender.
2. Add desired rate of Humik[®] ONE.
3. Blend until homogeneous.

Note: Avoid storing liquid blends for periods greater than 4 hours without recirculation.

COMPATIBILITY

Humik[®] ONE has been formulated to be mixed with dry fertilizer blends, including urea. If humidity is above 70% and urea softens or sweats, we recommend employing a drying agent and performing the application rapidly. If Humik[®] ONE is mixed into water or a liquid fertilizer it may require agitation after 4 hours. Always jar test combinations to reduce risk of incompatibility. Do not mix with calcium containing liquid fertilizers or solutions with pH 6.5 or below.

STORAGE AND DISPOSAL

DO NOT CONTAMINATE WATER, FOOD OR FEED BY STORAGE, DISPOSAL OR CLEANING OF EQUIPMENT. STORE IN A DRY LOCATION AND IN A SAFE MANNER. STORE IN ORIGINAL CONTAINER ONLY AND KEEP TIGHTLY SEALED WHEN NOT IN USE. STORE PRODUCT AND DISPOSE OF UNUSED PRODUCT AND EMPTY CONTAINERS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. THE PRODUCT MAY NOT BE APPLIED NEAR WATER, STORM DRAINS OR DRAINAGE DITCH OR TO ANY IMPERVIOUS SURFACE. THE PRODUCT MAY NOT BE APPLIED IF HEAVY RAIN IS EXPECTED. THE PRODUCT MAY ONLY BE APPLIED TO THE INTENDED APPLICATION SITE.

GUARANTEED ANALYSIS

Soluble Potash (K₂O).....10.0%

DERIVED FROM: Potassium Hydroxide

ALSO CONTAINS NON-PLANT FOOD INGREDIENTS:
60.0%.....Humic Acids derived from Leonardite

F3470

Information regarding the contents and levels of metals in this product is available on the internet at <http://aapfco.org/metals.html>

PURPOSE:

Humic acids may aid in the uptake of micronutrients.



Scan QR code for patents or visit hgsbioscience.com/patents

NET WEIGHT

22 LBS / 10 KG
55 LBS / 25 KG
2200 LBS / 1000 KG



PRECAUTION - KEEP OUT OF REACH OF CHILDREN

Do not ingest. Avoid breathing dust, vapor or mist. Avoid breathing dust, vapor or mist. Avoid contact with eyes, skin or clothing. Wash hands and affected areas thoroughly with soap and water after handling. Wear eye protection. Wear rubber or chemical-resistant gloves.

FIRST AID

IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical attention. Take off contaminated clothing and wash before reuse.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

IF SWALLOWED: Rinse mouth. Call a doctor or poison control center if symptoms occur or you feel unwell.

IF INHALED: Move person to fresh air and keep comfortable for breathing. Call a doctor or poison control center if symptoms occur or you feel unwell.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY:

This product may not be available for purchase or authorized for use in every state. In addition, some states, counties and cities may require special licensing and training to sell, purchase or apply the product. It is the responsibility of the distributor, retailer or professional applicator to verify before product sale/ purchase, that the product is approved for the use intended in their city, state and county.

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using the product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of the product should be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of many different factors including, without limitation, manner of use or application, weather, combination with other products, or crop conditions. All such risks shall be assumed by Buyer and User, and Buyer and User agree to hold Manufacturer and Seller harmless from any claims relating to such factors.

Seller warrants that this product conforms to the chemical description on the label. EXCEPT FOR THIS WARRANTY, THE PRODUCT IS FURNISHED "AS-IS," AND NEITHER SELLER NOR MANUFACTURER MAKES ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE SELECTION, PURCHASE OR USE OF THIS PRODUCT; SELLER AND MANUFACTURER SPECIFICALLY DISCLAIM ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Buyer and User accept all risks arising from any use of this product, including without limitation uses contrary to label instructions, under abnormal conditions, or under conditions not reasonably foreseeable to (or beyond the control of) Seller or Manufacturer.

To the extent permitted by law, neither Manufacturer nor Seller shall be liable for any incidental, consequential or special damages resulting from the use or handling of this product. THE EXCLUSIVE REMEDY OF THE BUYER OR USER, AND THE EXCLUSIVE LIABILITY OF MANUFACTURER AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THIS PRODUCT, OR, AT THE ELECTION OF MANUFACTURER OR SELLER, THE REPLACEMENT OF THE PRODUCT.

These Conditions of Sale and Limitation of Warranty and Liability shall be interpreted in accordance with the laws of the State of Florida, excluding its conflicts of laws rules, and may not be amended by any oral or written agreement. Humic Growth Solutions and the corresponding product logo on this label are registered trademarks of Humic Growth Solutions.

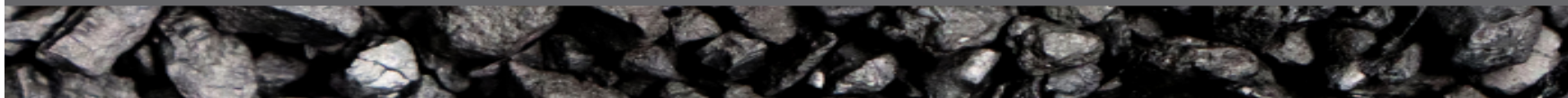
BATCH #:

HGS Bioscience
709 Eastport Rd. | Jacksonville, FL 32218
(P) 904.329.1012 | www.HGSBioScience.com

MFG DATE:

Humik[®]ONE

EXTRACTED • GRANULE • TECHNOLOGY



Introducing Humik ONE™

Humik ONE is the most effective and convenient way to deliver humates to the soil. As a soil-first product, Humik ONE protects yield potential across all soils and conditions.



**Soil
Mobility**



**Quick
Availability**



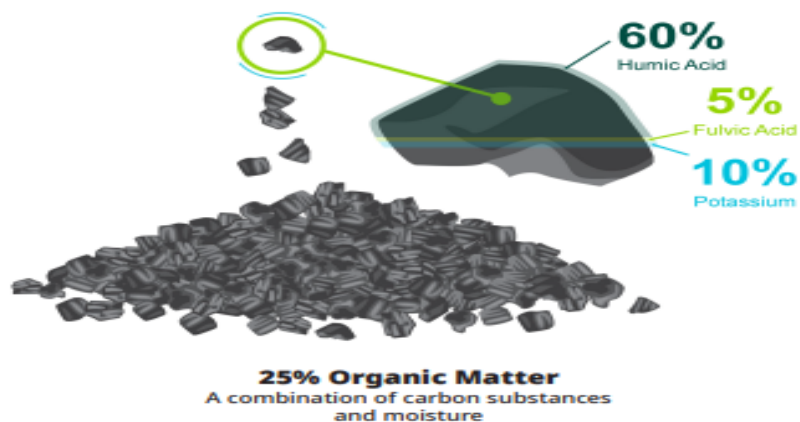
**Granule Built
Like a Fertilizer**



**Easily Blends
With Dry
Fertilizer**



**New Low-Dust
Manufacturing
Process**



HUMIC ACID
Improves soil health and structure

FULVIC ACID
Helps with transportation and absorption
of nutrients

POTASSIUM
Helps with the movement of water,
nutrients, and carbohydrates within
plant tissue

Humik ONE is the **one** granule for dry delivery – the foundational product that will be co-formulated with biologicals and nutritional to form new solutions that best meet your growers' needs.

USE RATE

AGRONOMIC CROPS

4-10 lbs per acre (1.8-4.5 kg per hectare)

TURF

4-10 lbs per acre (1.8-4.5 kg per hectare)



What happens in the soil

- Improved **soil structure** and greater **soil microbiome diversity**
- Higher **water infiltration & retention**
- Increased **cation exchange capacity**



What happens in the plant

- Greater **nutrient uptake**
- Higher **root growth**
- Increased **stress tolerance**



Impact for growers

- **Increased yield** (>75% of the time)
- **Higher ROI** from fertilizer use driven by increased P and N efficiency



Why HumiK ONE

EXTRACTED • GRANULE • TECHNOLOGY

- HumiK ONE **patented granule** is the most **effective and convenient** way to deliver humates to the soil
- Extracted humate is **more readily available** and enables **lower use rates**
- HumiK ONE is a **"soil-first product,"** enabling improvement **across crop types**

Built Like a Fertilizer: Easily blends with your dry fertilizer mix and is immediately available in the soil



Soil Solubility like Urea



Hardness and Durability like MAP



Bulk Density Like Urea/MAP



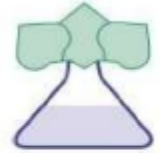
Consistent Granule Size

	Rain Simulation	Crush strength	Bulk density	Sieve Analysis
	Minutes to solubilize	Average LBF	LBS/CU FT	Particle size, SGN
HumiK ONE	5	22.3	50-55	90%
Potash	8	26.4	65-80	90%
MAP	10+	12.5	60-70	95%
Urea	4	10.2	45-50	90%

Water-extractable organic carbon (WEOC) is the most active and mobile part of soil organic matter, consisting of compounds that dissolve in water and serve as a readily available food source for soil microbes. It is a key indicator of soil health and fertility, playing a crucial role in nutrient cycling and regulating the soil's overall carbon balance. Factors like vegetation type, precipitation, and land use can influence its concentration and composition.

American Agricultural Laboratory, Inc.

700 West D Street / PO Box 370 / McCook, Nebraska 69001
Office: 308-345-3670 / FAX: 308-345-7880
www.AmAgLab.com



PLANET EARTH AGRONOMY
E 2741 PHYLANE RD
LONE ROCK, WI 53556

ACCOUNT #: 40620
DATE RECEIVED: 11/13/2025
DATE REPORTED: 11/18/2025

Soil Water Extractable Nutrients

Lab #	Grower	Field ID	Sample ID	Organic Carbon, ppm	Nitrogen, ppm
4105427	TEST PLOT	STRIP 1	TREATED	183.80	25.70
4105428	TEST PLOT	STRIP 1	UNTREATED	213.30	28.30
4105429	TEST PLOT	STRIP 6	TREATED	189.60	23.90
4105430	TEST PLOT	STRIP 6	UNTREATED	238.60	25.10

Why is there less Water Extractable Organic Carbon in the Carbon Cycle Samples??



- Typical Ranges of 50-800 ppm most soils fall between 100-300 ppm
- WEOC values fluctuate thorough out the year, typically we see values in the winter and spring we see values climb as thawing events and mechanical breakdown of residue release carbon from soil aggregates.
- Cold Temps and lack of moisture slow the release down, typically what you experience after harvest.
- As microbes begin to digest residue typically in the spring, there is a dip in WEOC values. As microbes are utilizing the food source faster than the soil can re-supply.
- Equilibrium is reached sometime in the growing season when the supply of carbon from microbial release is matched with plant consumption.

Carbon Cycle



Carbon Cycle™

CONCENTRATED MICROBIAL Powder in a Liquid Solution

NON-PLANT FOOD	
ACTIVE INGREDIENTS:	1%
Bacillus licheniformis	8.3 x 10 ⁹ cfu/gm
Bacillus coagulans	8.3 x 10 ⁹ cfu/gm
Bacillus subtilis	8.3 x 10 ⁹ cfu/gm
Bacillus pumilis	8.3 x 10 ⁹ cfu/gm
Bacillus megaterium	8.3 x 10 ⁹ cfu/gm
Bacillus amyloliquefaciens	8.3 x 10 ⁹ cfu/gm
Bacillus laterosporus	8.3 x 10 ⁹ cfu/gm
Bacillus macerans	8.3 x 10 ⁹ cfu/gm
OTHER (INERT) INGREDIENTS:	99%

**8 Microbe strains that are:
8.3 Billion Each**



Soil health and mineralization formula

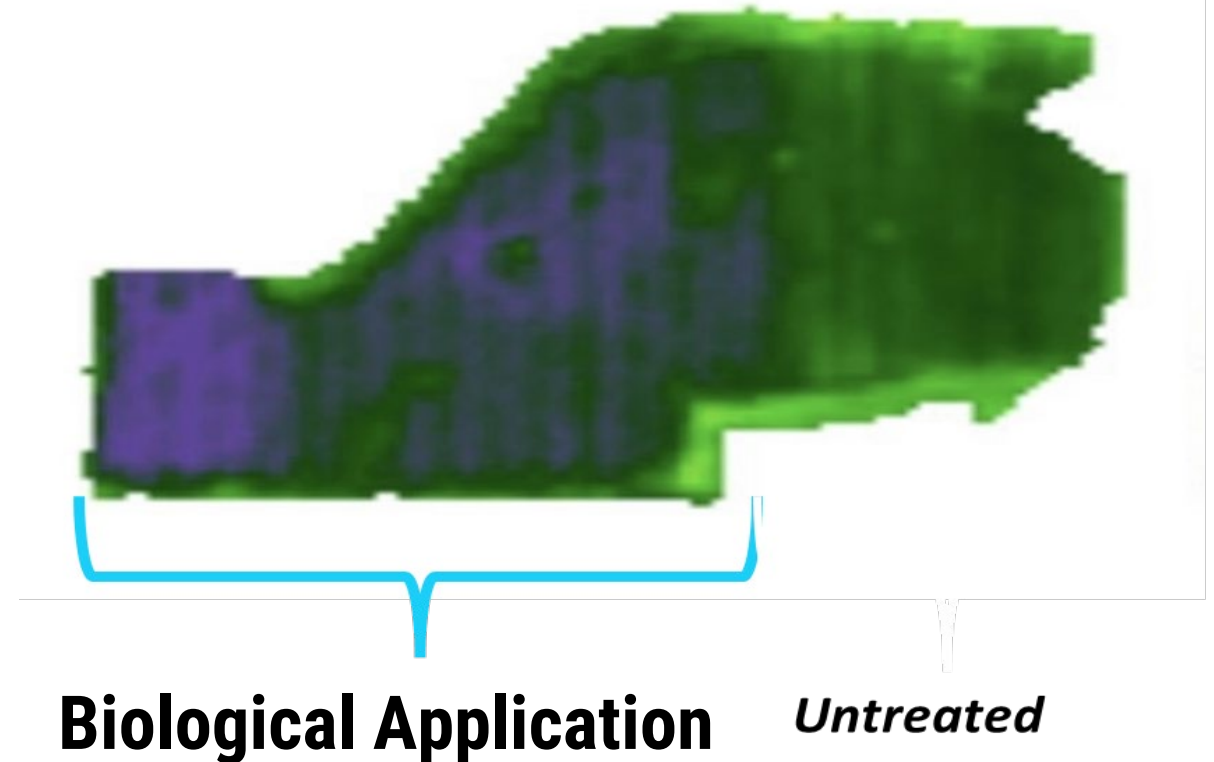


Designed to work in synergy to degrade and compost residue and promote nutrient recycling

Carbon Cycle Climate Results



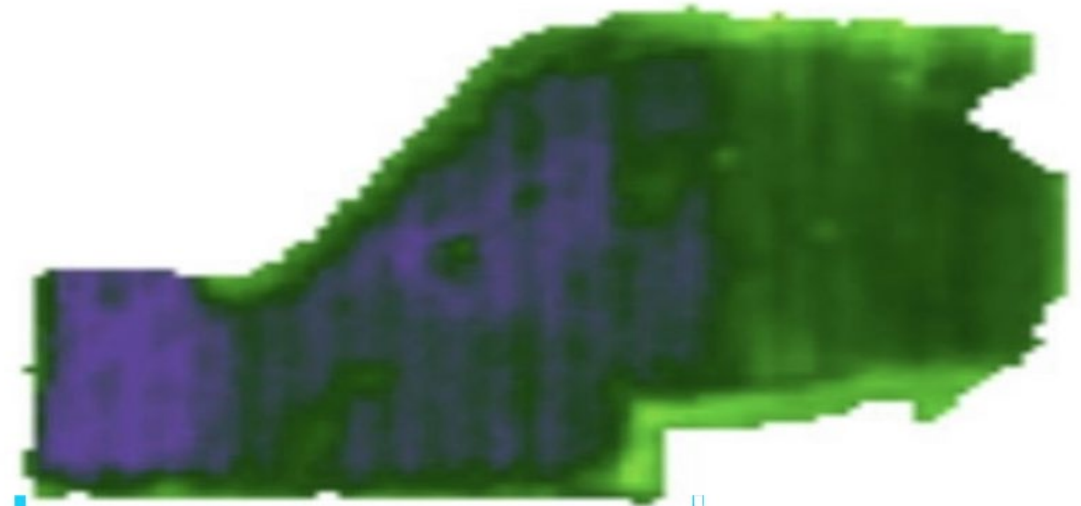
- Grower split field with fall-applied Carbon Cycle, then observed difference in the biomass using satellite imagery.



Carbon Cycle Climate Results



- Grower 6 years of use.
- Save your money if you only want to do one year applications.



Biological Application

Untreated

What am I trying to accomplish with a biological product?



Manage Residue

Nutrient Efficiency

Manage Grain Fill

		Corn Program	
		Analysis: 165.6-52-60-13-1.3	
		Standard Go-To	Fall Application
			rate(lbs/ac) cost
		NH3	183 \$ 79.15
		MESZ	130 \$ 53.63
		Potash	100 \$ 22.75
\$/bu	\$ 4.00	Application	\$ 31.00
Bu	46.63	total	\$ 186.52
		Add-ons	
		Power Coat	
		NH3 Stabilizer	14.64 \$ 9.47

Dash™ PBC contains 8 microbes specially formulated for corn production

Bacillus lincheniformis	Establisher and accelerator of germination and new root expansion
Bacillus composti	Produces large amounts of mineralizing and composting enzymes and proteins
Bacillus azotofixans	Producer of nitrification enzymes to accelerate and cycle nitrogen to support healthy plant growth
Bacillus ligniniphilus	Producer of lignin, keratin, and complex environmental polymer degradation enzymes
Thiobacillus sulfooxidans	Rapid cyler of sulfur, magnesium, manganese and other essential micronutrients in the environment
Thiobacillus ferrooxidans	Accelerates iron solubility and helps improve the chelation of calcium, magnesium, manganese and zinc from soil into a soluble form.
Azotobacter chroococcum	Nitrogen assimilation in the soil to help enhance nitrification in the rootzone
Bradyrhizobia denitrificans	Nitrogen fixer and assimilator at the plant rootzone

Rate & application

- Apply 0.5 oz (14 grams) per 1 unit of corn at 80K seeds/unit
- Apply by dispersing the powder evenly onto seeds using appropriate equipment
- No additional specific markers or distinguishing features of seed coating are needed
- Read entire label before using this product



Dash PBC Trials

Croplan	CP5336VT2P		3	247.33	14.6	60.3
Croplan	CP5336VT2P	w/DASH		248.68	14.8	60.9

Croplan	CP5336VT2P	No Treat	15	213.12	13	58.8
Croplan	CP5336VT2P	w/DASH		222.81	12.6	59

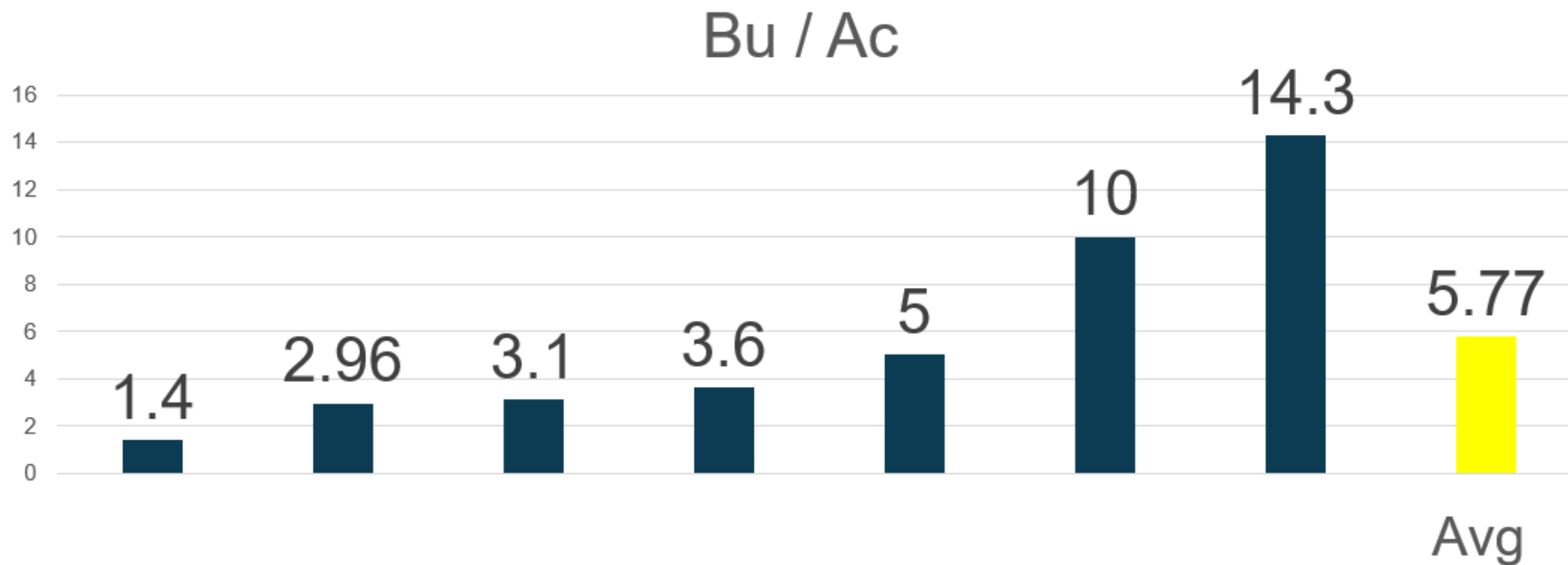
Seed Lubrication with microbial benefits

8 synergetic strains with N fixation and P solubilizing microbes

Supports germination, early plant vigor and microbial nutrient release

\$27/unit, so \$10.80/ac with a 5.5 bu increase

Dash PBC Corn Trials Eastern KS Treated vs Untreated



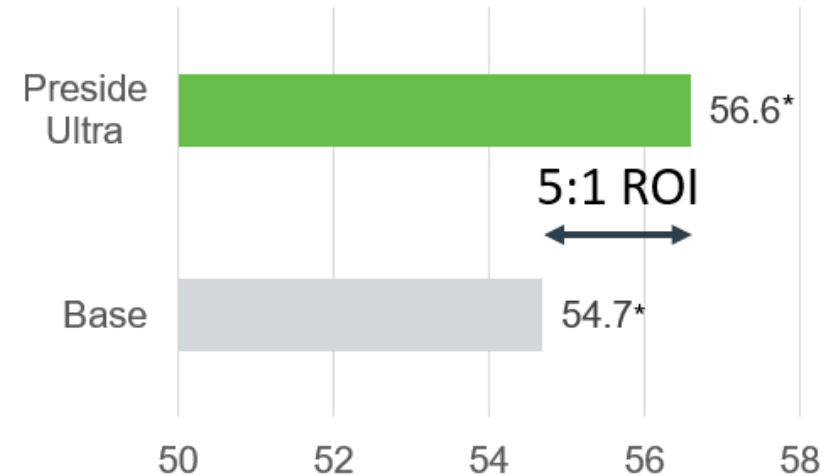
Preside Ultra



\$4/unit with a 2 bu advantage
for a 5:1 ROI



Preside Ultra Responsive Sites



- * Means are significantly different (**LSD 0.05**)
- 1.9 bu Advantage, 38 Trial Locations, 58% wins

BioPath



3:1 ROI



What is it

- Water-based liquid formulation
- Active ingredient is beneficial *Bacillus* bacteria (PGPR- Plant Growth Promoting Rhizobacteria)

In-Furrow Application in Corn



Biopath promotes root growth by adding the growth of more fine root hairs, deeper growth with increased vigor.

BioPath Data

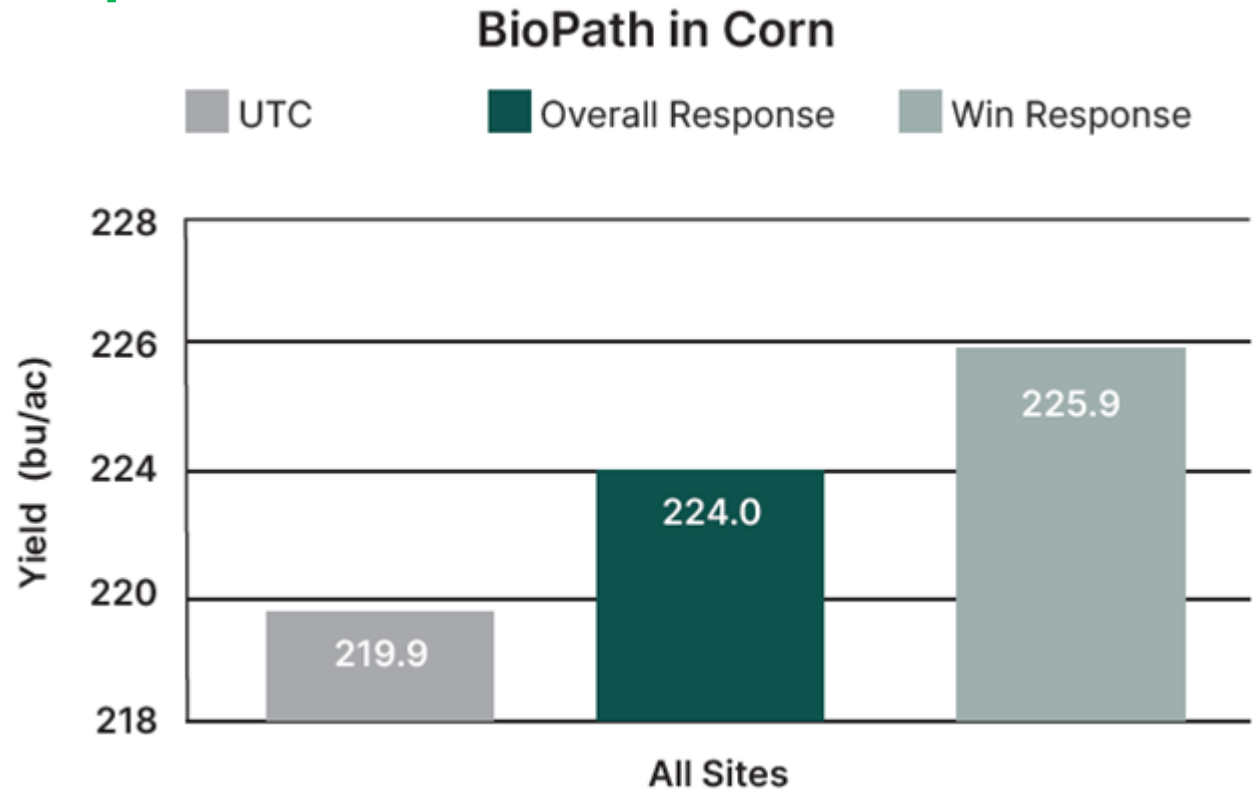


- **+4.1 bu @ 16oz/ac at \$6.50/ac**

Scope: 262 site-years
small plot replicated trials

Years: 2017-2024

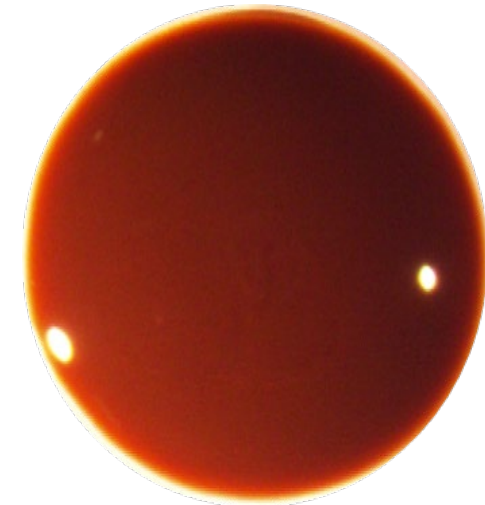
Rates: multiple rates of
UAN or APP liquid carriers
including 16 oz/ac of
BioPath



PowerCoat



- What it is:
 - Oil based liquid formulation
 - Active ingredient is beneficial Bacillus bacteria
 - (PGPR-Plant Growth Promoting Rhizobacteria)



Advanced Crop Nutrition = Greater Yield

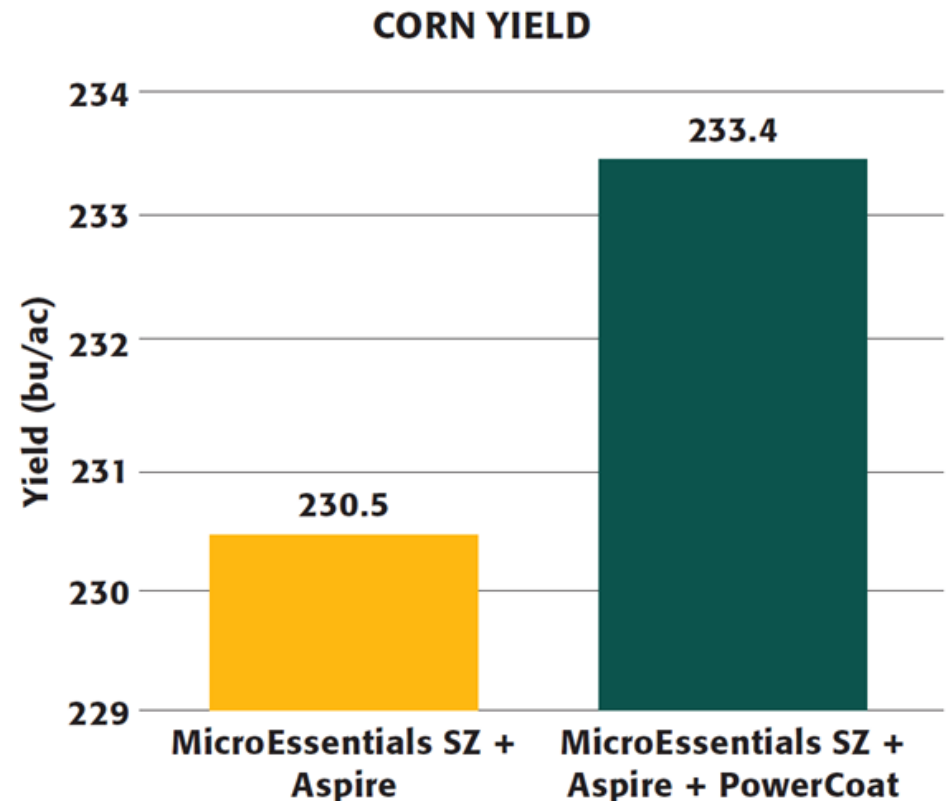


+2.9 bu @\$4.30/ac

Scope: 12 site-years small plot replicated trials

Years: 2023-2024

Rates: 80 lbs P_2O_5 as MicroEssentials SZ and 60 lbs K_2O as Aspire, 5 oz/ac PowerCoat preplant



In NE, there were 6 trials with 5 winning with a 4.2 bu average

Trurow™ Amaze can help plants in hot, dry conditions overcome growth-limiting stress

CHALLENGE/STRESSOR

! One of the **first responses to heat stress** in plants is a **reduction in cytokinin** levels (particularly in leaves)

When cytokinin levels drop, the plant can have –

- **Reduced growth** as the plant prioritizes survival over growth
- **Rapid water loss** due to dysregulated stomatal opening
- **Flower abortion and pod loss**

SOLUTION

Trurow Amaze is a foliar application of cytokinin designed to **restore the hormone balance** within the crop to **safeguard yield** during **hot, dry conditions**

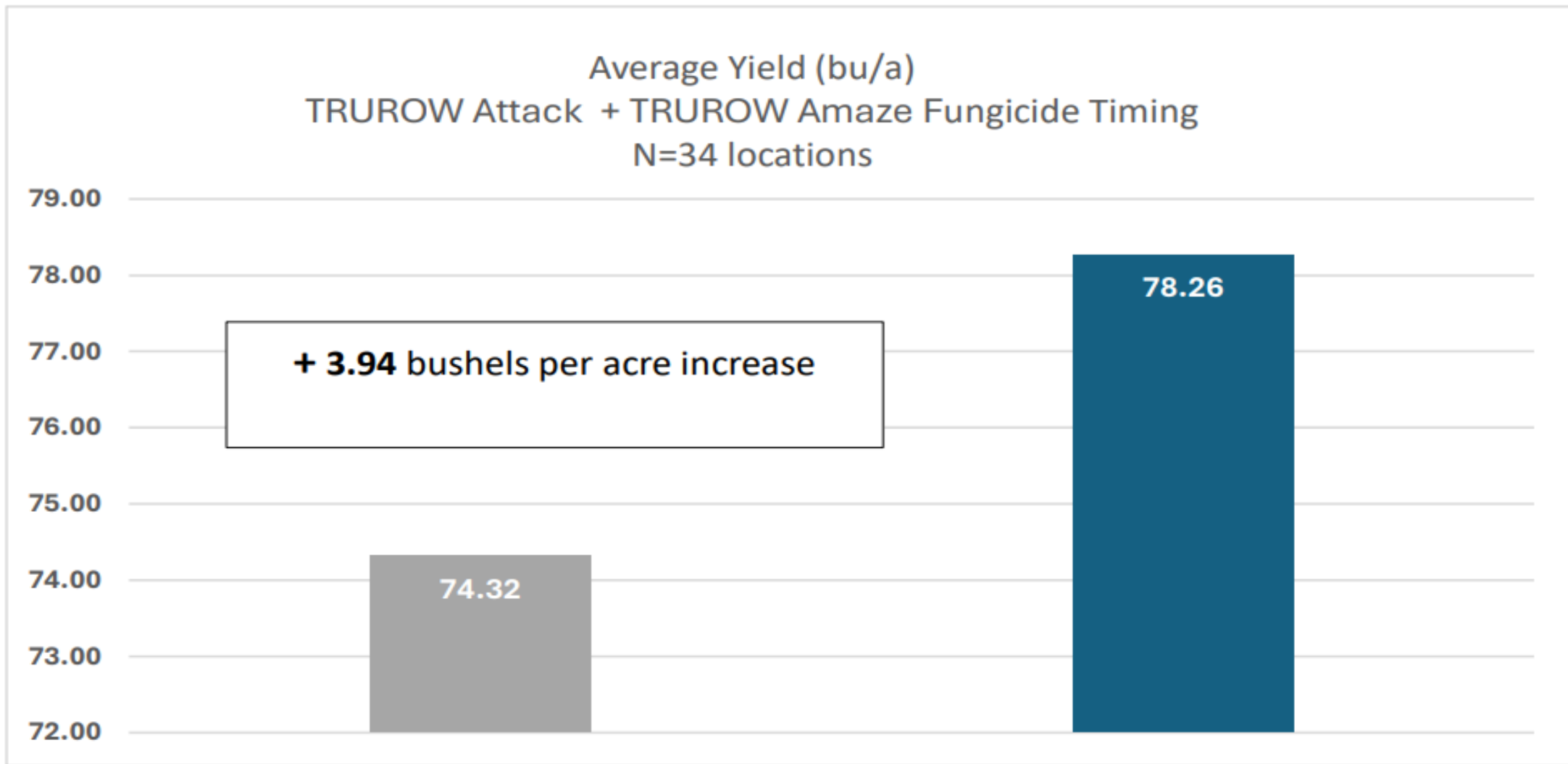
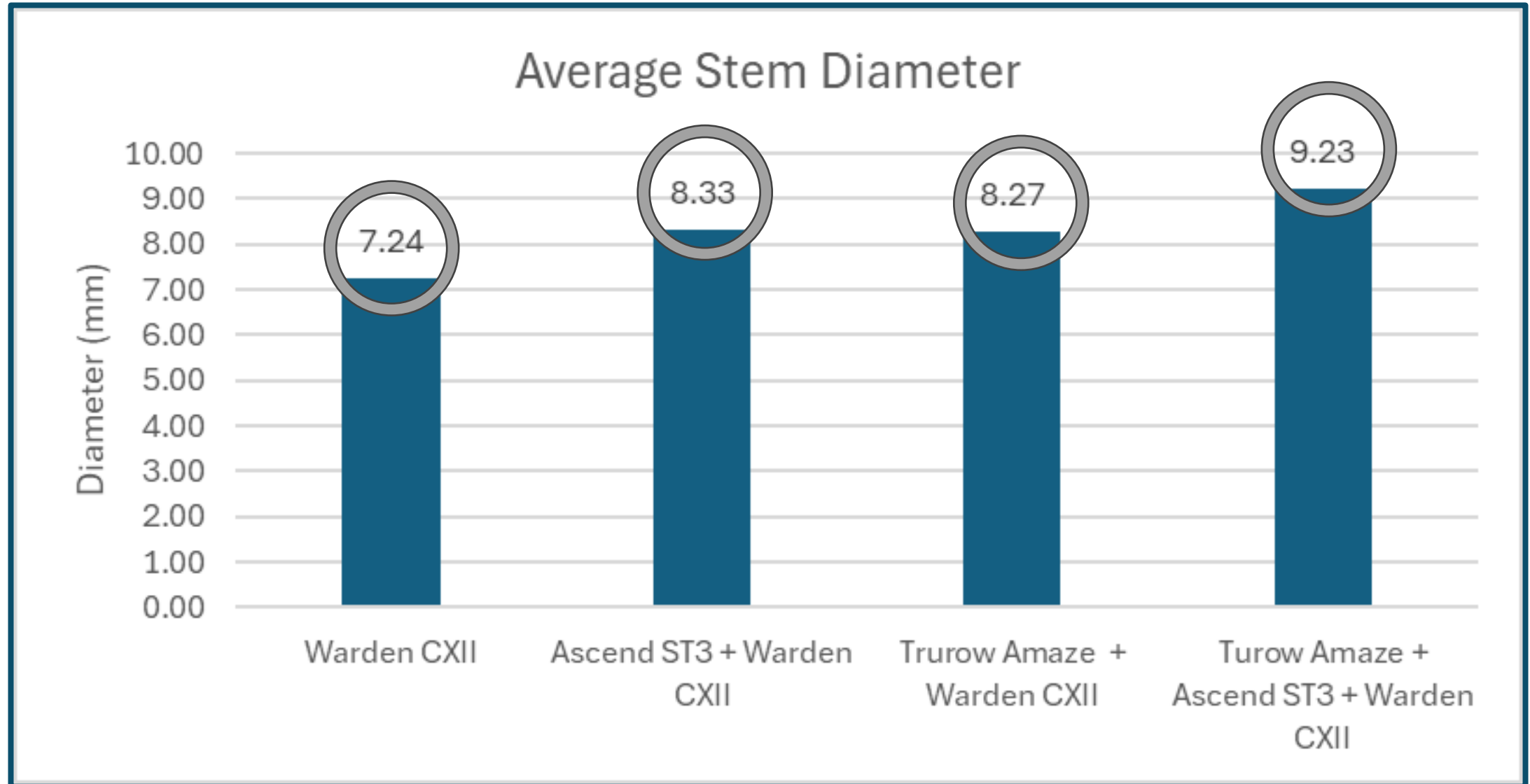


Figure 51.- Average Soybean Yield (bu/a) with TRUROW Attack + TRUROW Amaze (blue bar) Applied at Fungicide Timing. n = 34

Results indicate that applying TRUROW Attack (32 oz/a) plus TRUROW Amaze (8 oz/a) at the fungicide timing increased average yields by 3.94 bu/a across 34 locations.

2025 Observations: Soybean Management Impact on Stem Diameter



What am I trying to accomplish with a biological product?

Manage Residue

Nutrient Efficiency

Manage Grain Fill



YIELDON[®]

VALAGRO

F002574

2.5 GAL (9.46 L) NET VOLUME – 25 lbs (11.35 kg) NET WEIGHT

3-0-3 PLANT NUTRIENT FOR ROW CROPS

GENERAL INFORMATION

YIELDON is a liquid foliar fertilizer specially formulated to improve row crop productivity. More than 50% of the composition is characterized by a selection of extracts from three distinct families of plants and seaweeds enriched with trace elements such as Mn, Zn and Mo.

CLEANING OF SPRAYER

Flush with clean water all parts of the sprayer, including the pump, hoses and nozzles, several times prior to and after the use of this product.

CONDITIONS OF SALE:

Seller warrants this product consists of the ingredients specified and is reasonably fit for the purpose stated on this label when used in accordance with directions under normal conditions and use. No one other than an officer of the seller is authorized to make any warranty, guarantee or direction concerning this product. Because time, place, rate of application and other conditions of use are beyond the seller's control, the seller's liability from handling, storage, and use of this product is limited to replacement of the product or a refund of the purchase price. It is impossible to eliminate all risks associated with use of this product.

Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions, abnormal conditions, presence of other materials, the manner of application, or other factors, all of which are beyond the control of Valagro USA or the seller. All such risks shall be assumed by buyer.



Where science serves nature

SHAKE WELL BEFORE USING

GUARANTEED ANALYSIS

Total Nitrogen (N)	3.0%
2.0 % Urea Nitrogen	
1.0 % Other Water Soluble Nitrogen	
Soluble Potash (K ₂ O)	3.0%
Manganese (Mn)	0.5%
0.5 % Chelated Manganese (Mn)	
Molybdenum (Mo)	0.2%
Zinc (Zn)	0.5%
0.5 % Chelated Zinc (Zn)	
DERIVED FROM: Urea; corn extract; vinasse; Sodium molybdate; Manganese EDTA; Zinc EDTA; Kelp extract.	

DIRECTIONS FOR MIXING

YIELDON will disperse in water with little agitation. Any residue in container is water-soluble. Triple rinse and add contents to the spray tank. Do not reuse container. TANK MIXES: Yield-ON can be tank mixed with pesticides, fertilizers or any other chemicals. It is advised to conduct a compatibility test.

NOTICE: This product contains Molybdenum (Mo). Crops high in molybdenum can be toxic to ruminant animals. Use only according to manufacturer's directions.

KEEP OUT OF REACH OF CHILDREN

YIELDON MUST NOT be applied directly to the soil on field crops in Iowa. In Mississippi this is a Low Analysis Fertilizer. Do not sell unpacked.

DENSITY: 10 pounds per gallon at 68 °F
NET VOLUME: 2.5 gallons (9.46 l)
NET WEIGHT: 25 lbs (11.35 Kg).

YIELDON is a registered trademark of VALAGRO S.p.A.



FOLIAR APPLICATION

4255012F07P1EF 06

Directions for use

APPLICATION METHOD: FOLIAR
RATE: 1.5 PTS/ACRE
APPLICATION TIMING:

WHEAT

1-2 applications, first application at heading

SOYBEAN

1-2 applications, first application at R1-R3 stage

CORN

1-2 applications, during V10-R2

COTTON

1-2 applications, first application at match-head square stage

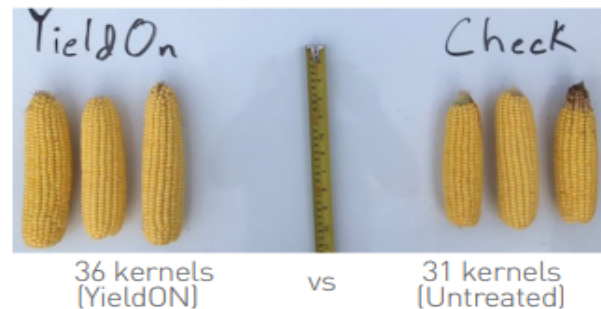
CANOLA

1-2 applications, first application at beginning of flowering stage

SUNFLOWER

1-2 applications, first application at 4-6 leaf growth stage

Image below from trials conducted in Indiana.



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YIELDON®

**Highest maximized
crop yield, highest
potential return for
farmers**



Yield On @25.4oz/ac= \$9.29/ac



Untreated
201.3 Bushels



Treated with YieldON
216.0 Bushels



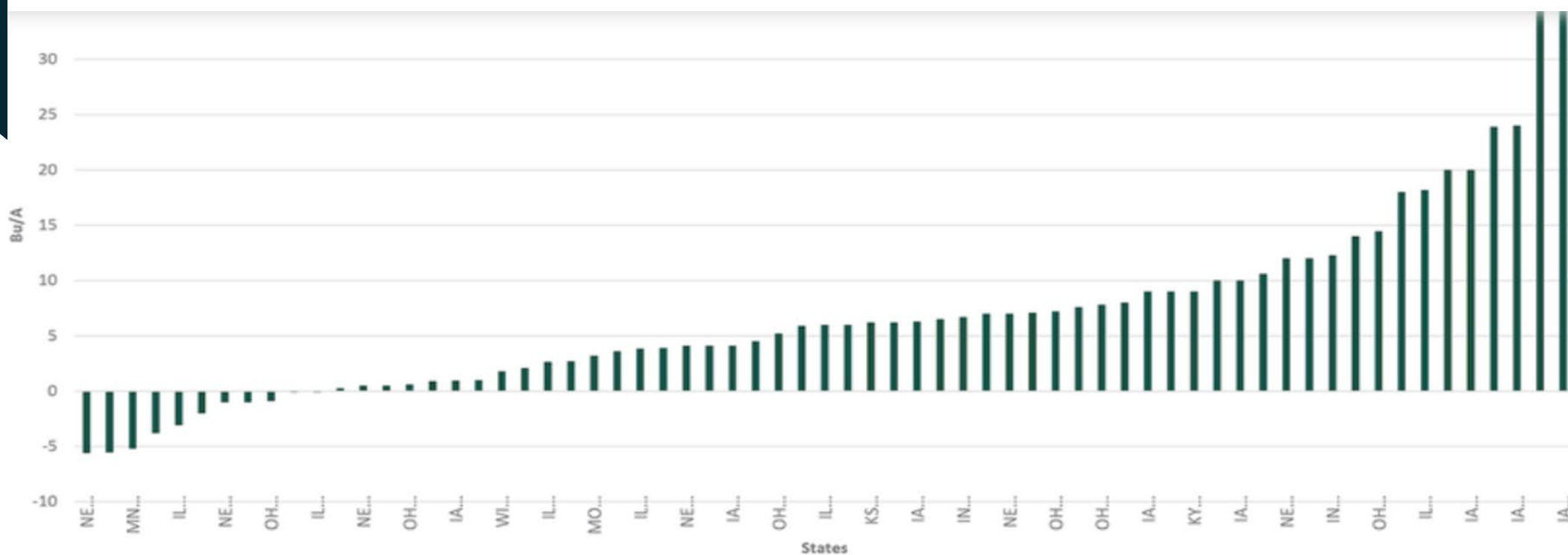
Untreated
73 Pods



Treated with YieldON
123 Pods

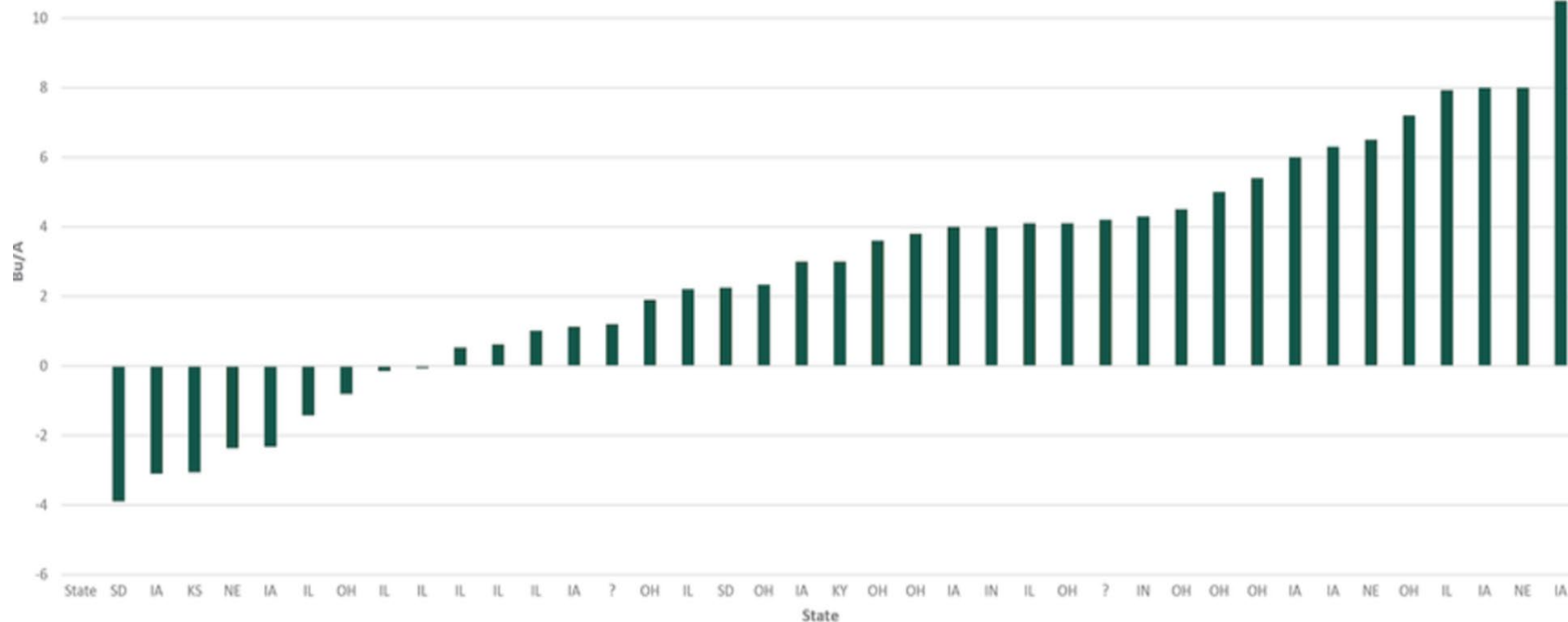
**Corn Yield Response to
YieldON® Application Delta BU/A**

Yield On



64 corn trials in 2021
YieldON® application resulted in positive yield response in 83% of trials
With an average Bu/A increase of 6.8 Bu/A

Yield On - Soybeans



39 soybean trials in 2021

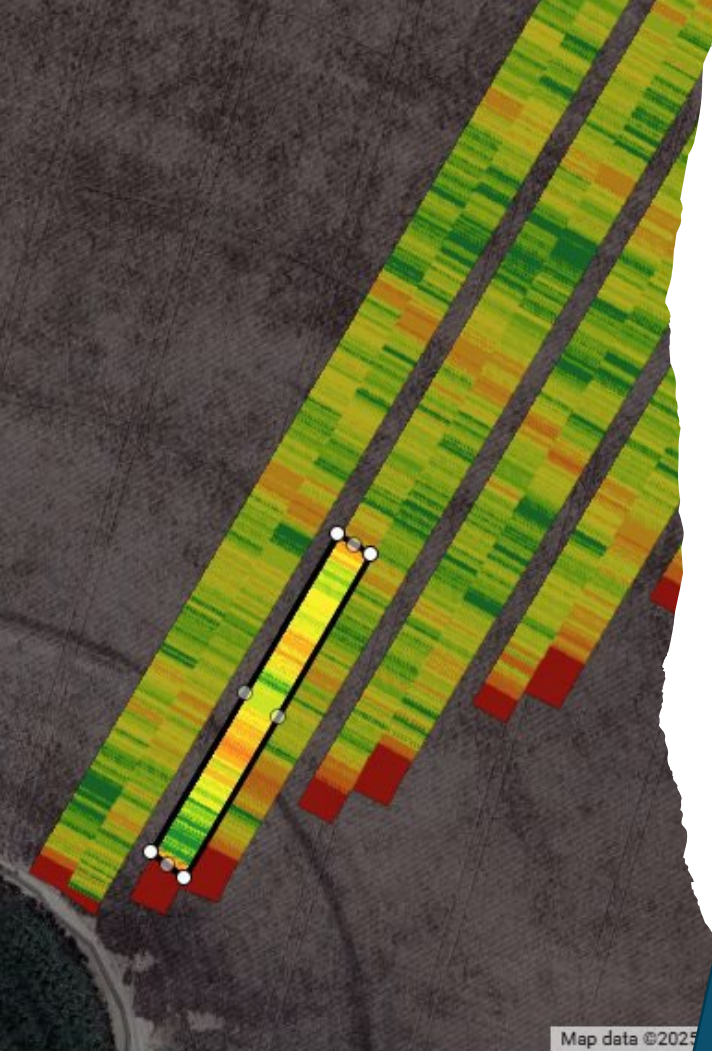
YieldON® application resulted in positive yield response in 76.9% of trials

With an average BU/A increase of 2.8 Bu/A

Yield Edge Bio-Boron

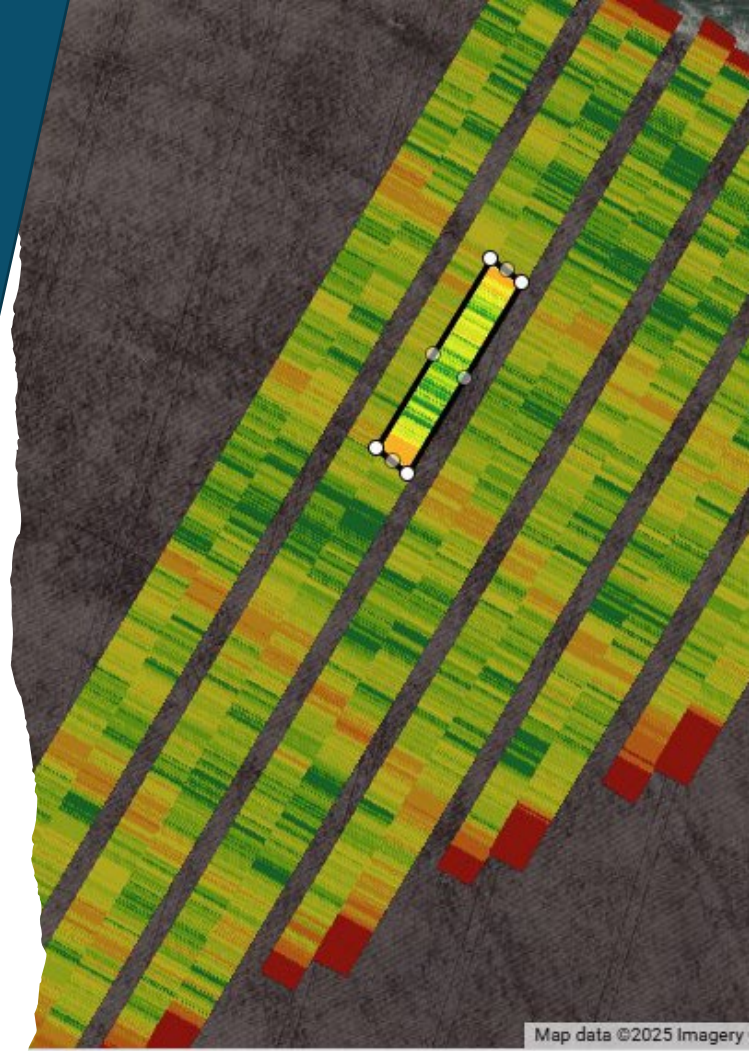
- 1-2 Pts/a
- Applied with herbicide at V4-V8
- Then again at tassel
- Consistently 7bu/ac

@1.5pt/ac = \$9.36/ac



Map data ©2025 Imagery

Work Totals	Subfield	Whole Field
Area Harvested	0.2 ac	7.6 ac
Yield	257 bu/ac	253 bu/ac
Total Yield	52 bu	1,926 bu
Moisture	14.7 %	15.3 %
Wet Weight	14,416.8 lb/ac	14,239 lb/ac



Map data ©2025 Imagery

Jork Totals	Subfield	Whole Field
Area Harvested	0.1 ac	7.6 ac
Yield	265 bu/ac	253 bu/ac
Total Yield	37 bu	1,926 bu
Moisture	15.4 %	15.3 %
Wet Weight	14,934.9 lb/ac	14,239 lb/ac



Big Bean

- 6-8 oz/a with herbicide at the first sight of a bloom.
- This works better if it's applied
- Earlier in the reproductive cycle

3 oz/ac = \$12.44/ac



Comparing What's In The Jug



Biological Comparison Chart:
created by Cameron Alderfer and Jake Heim



What does it do?	Company/products below -->		Prime Dirt		Waste away	Bio SI		Indigo		Mosaic		DPH	FMC	FMC	Corteva	Azotic	Pivot Bio
	Active Microbe	N-TEXX Edge	N-TEXX SI	Ag Formula		SD 25	W-12	X-19	Bio Path	Powercoat	SP-1	Zironar	Avodigen	Utrisha N	Envita	ProveN 40	
Remedy contaminated soils, adapt to stress, protect from pathogens, colonize roots	<i>Pseudomonas putida</i>	X	X														
Increase germination, stem, root, leaf growth, act as bio insecticide, drount tolerant	<i>Pseudomonas alcaligenes</i>	X															
Promotes availability of Cu, P, salt solubility, surpress soil pathogens	<i>Pseudomonas flourescens</i>	X															
Increase root/shoot mass, prevent movement of toxic ions in plant tissue	<i>Bacillus simplex</i>					X											
Biotic and abiotic stress tolerance, reduces N losses, helps purify metals in soil	<i>Bacillus subtilis</i>		X		X	X		X	x	X	x	x					
Promote root colonization and elongation, increase potassium levels in soil	<i>Bacillus methylotrophicus</i>							X	x								
Tolerant to heat stress, increases nutrient uptake	<i>Bacillus licheniformis</i>				X	X		X	x	X	x	x					
Resistance to pathogens & biotic/abiotic stresses, help cell growth/root development	<i>Bacillus amyloliquefaciens</i>					X			x	X							
High resistance to UV/abiotic stresses, produce a wide range of phytohormones	<i>Bacillus pumilus</i>				X	X				X							
Improves availability of P & K	<i>Bacillus megaterium</i>								x	X							
Nitrogen-fixing	<i>Kosakonia sacchari</i>																X
Nitrogen-fixing, targets seedling disease pathogens, non-sporulating	<i>Kosakonia cowanii</i>																
Produce antimicrobial compounds to help plant development and disease prevention	<i>Streptomyces griseus</i>				X	X											
Help with nutrient cycling, OM breakdown, and decomposition	<i>Coniochaeta nivea</i>						X										
High atmospheric nitrogen-fixing capacity	<i>Methylobacterium symbioticum</i>														X		
Can oxidize ammonium into nitrite, break down contaminates in soil	<i>Arthrobacter globiformis</i>				X												
Increase nutrient uptake/ N fixation, degrade phenolic compounds like FA & PHBA	<i>Acinetobacter calcoaceticus</i>				X												
Nitrogen fixation and minerilization of nutrients, helps root and shoot development	<i>Azotobacter vinelandii</i>				X												
Nitrogen-fixing, synthesizes Indole-3-acid acetic	<i>Gluconacetobacter diazotrophicus</i>														X		
Nitrogen-fixing, produces indole acetic acid, acetoin, and ammonia, breaks down P	<i>Klebsiella variicola</i>																X

Nutrient solubilization and cycling improving nutrient availability - macronutrie

Take Aways

- Know your goals/problems
- Know how products fit into your operation
- Shelf life/ ease of use



Biologicals are...Not A Silver Bullet

- Biologicals are not one-size-fits-all
- If your goal is to lose weight, no supplement will counteract an unhealthy diet
- Same with biologicals:
 - We have to make sure the rest of our nutrients and pH are in good shape before finding the right supplements



Pair up Product	Rate/ac	Pair up Volumes- Corn	Pair up Volumes- Beans	Price/ac Estimate	List Price	UOM
Trurow Arrive	8 oz/ac	7.5 gal	17.5 gal	\$ 6.38	\$ 102.00	gal
Trurow Ahead	2 oz/ac	2.5 gal	5 gal	\$ 3.52	\$ 225.00	gal
Trurow Attack	32 oz/ac	30 gal	62.5 gal	\$ 8.75	\$ 35.00	gal
Trurow Amaze	8 oz/ac	7.5 gal	17.5 gal	\$ 4.50	\$ 72.00	gal
Dash PBC	0.5 oz/unit	1-1.56 lb bag	N/A	\$ 9.75	\$ 865.00	lb
Dash PBS	0.5 oz/unit	N/A	6-1.25 lb bags	\$ 8.60	\$ 275.00	lb
Yield On	24 oz/ac	22.5 gal	N/A	\$ 9.38	\$ 50.00	gal
Ascend ST3	1 oz/unit	N/A	2 gal	\$ 2.75	\$ 2.75	unit
Max-IN ZMB Plus	32 oz/ac	30 gal	62.5 gal	\$ 9.30	\$ 37.20	gal
Voyagro	16 oz/ac	17.5 gal	30 gal	\$ 9.00	\$ 72.00	gal