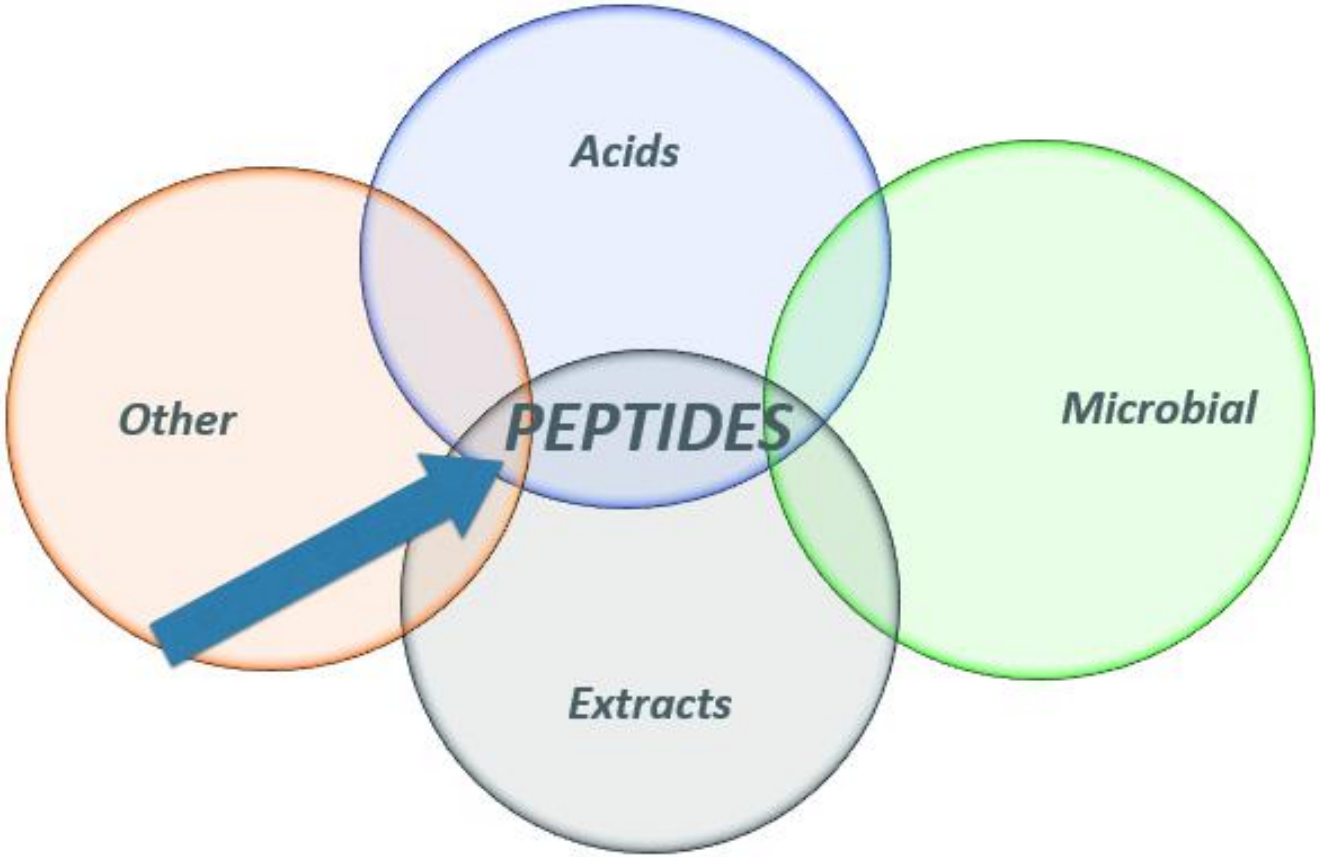

CO-OP AGRO IT'S HERE.
CO-OP
Biostimulants
2025
Ken Wall PAg
FCL
GROW
FUEL
EQUIP
BUILD
FEED

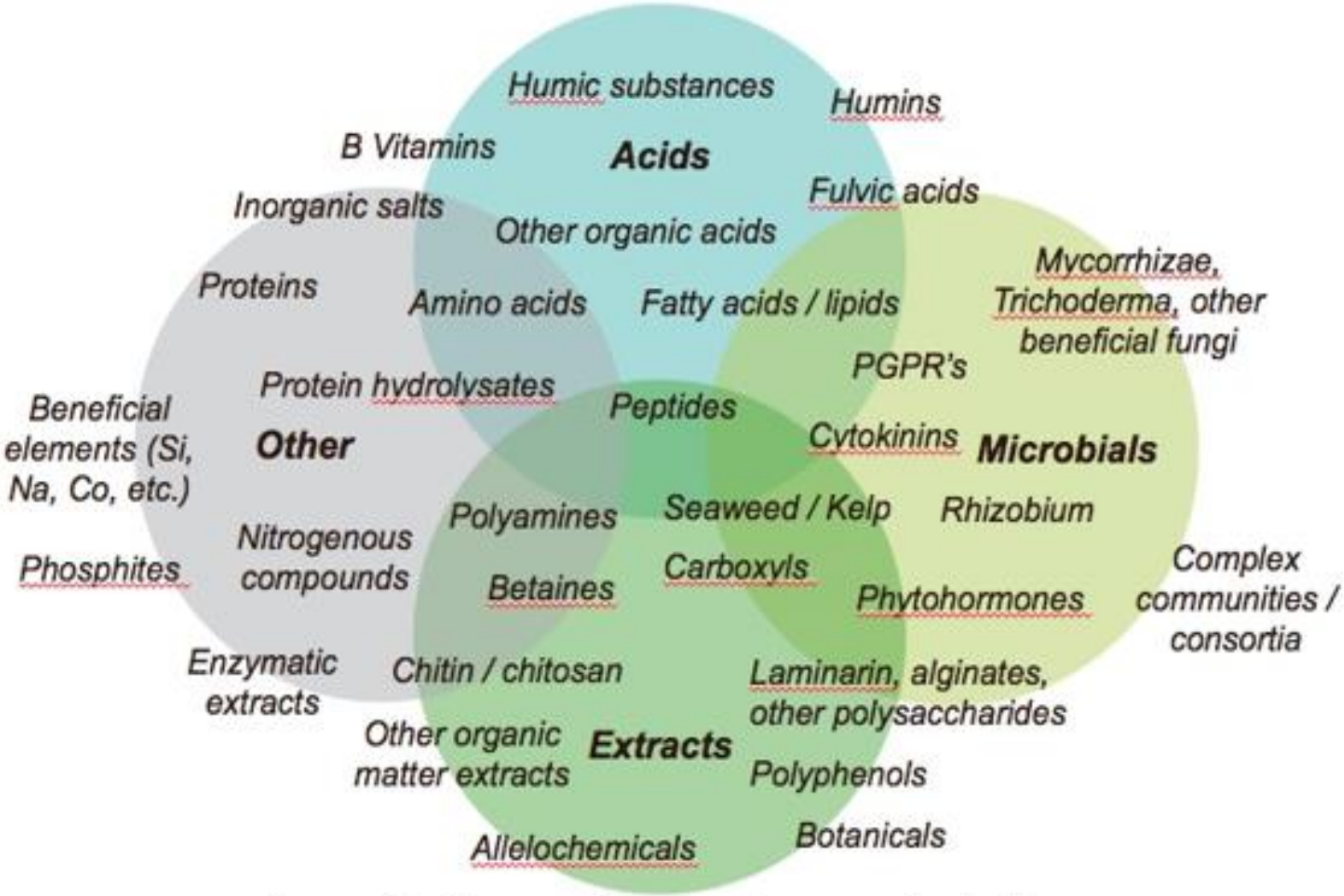
Biostimulants

- Definitions
- Role in Agriculture?
- Seaweed Extracts
- Plant hormones
- Macro/micro/vitamins/AA/proteins/betaines
- Seaweed extracts
- Peptides
- Algae Extracts
- Other products
- Summary

Major Categories of Biostimulants



Market Analysis - Landscape of Biostimulants



A confusing and complex marketplace

Source: Agricen Sciences' analysis of market analysts, survey papers on Biostimulants

Biostimulants
Becoming a very crowded space

Acids:
Humins
Organic acids
Humic and fulvic acids
Amino acids
Fatty acids/lipids
Peptides

Microbials:
Mycorrhizae/tricoderma
Beneficial fungi
Beneficial bacteria
Rhizobium
Polyphenols
Enzymes

Extracts:
Seaweed/algae extracts
Carboxyls
Polyamines
Other OM extracts
Alleliochemicals
Botanicals/biopesticides

Other:
Proteins
Nitrogen compounds
Beneficial elements
Phosphites
Inorganic salts
Polysaccharides

Biostimulant:

A substance or microorganism that when applied to seeds, plants, or in the rhizosphere, stimulates natural processes to enhance or benefit nutrient uptake, nutrient use efficiency, tolerance to abiotic stress or crop quality and yield.

Biostimulants/Biologicals

Projections show that by 2035, Biologicals could make up **25%** of the **total global crop protection market** ,with an anticipated market size of **$30 billion annually** (in context, the 2023 herbicide market size is approximately $33 billion)

While Biologicals currently occupy a smaller share of the market, three major drivers are expected to fuel rapid adoption over the next decade:

Sustainability and regulatory changes

Across the globe, farmers are focused on feeding a growing population while managing the change in society and consumer preferences, policies, and regulations, prompting the agriculture industry to explore alternative solutions to improve plant productivity.
Biological products are being developed to meet these new standards by minimizing environmental impact while supporting plant health.

R&D investment and innovation

Complementary agronomic benefits

While Biologicals currently occupy a smaller share of the market, three major drivers are expected to fuel rapid adoption over the next decade:

Sustainability and regulatory changes

R&D investment and innovation

The agriculture industry has seen a steady increase in R&D investment, especially in Biologicals. This commitment to innovation is enhancing the range of effectiveness, and applicability of Biologicals, making them more reliable and accessible for Canadian farmers.

Complementary agronomic benefits

While Biologicals currently occupy a smaller share of the market, three major drivers are expected to fuel rapid adoption over the next decade:

Sustainability and regulatory changes

R&D investment and innovation

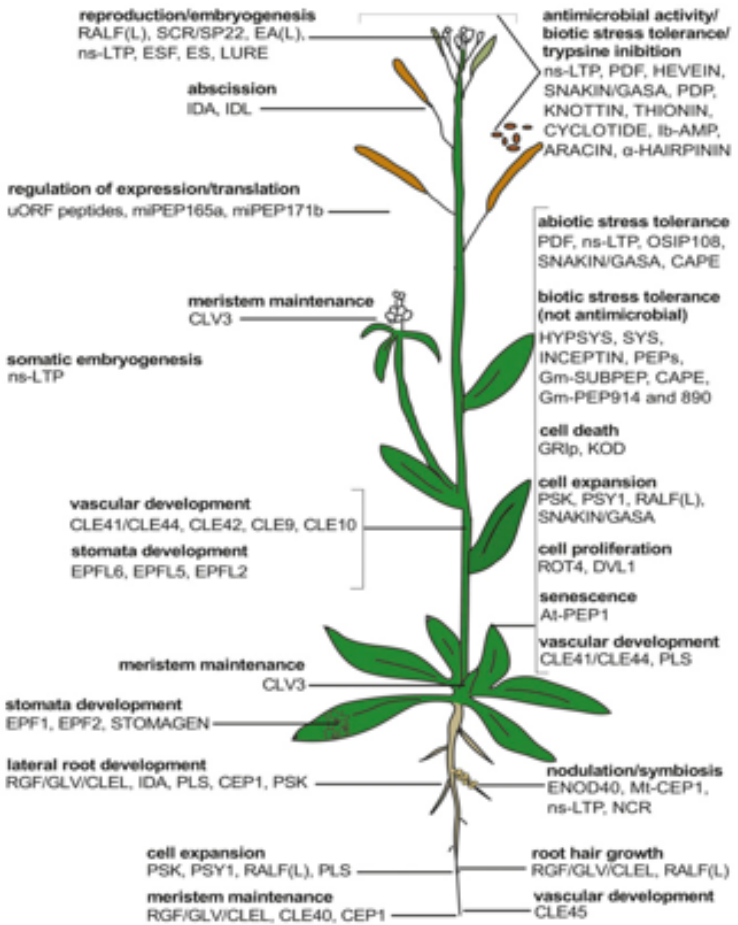
Complementary agronomic benefits

On-farm adoption of Biologicals will ultimately be driven by product efficacy. As profitability continues to be a top driver, the pressure is on for growers to maximize their return on investment. Biologicals provide a unique opportunity to enhance the efficacy of current practices, by providing complementary solutions that allow farmers to reap benefits from both biological and conventional products.


FCL Innovation Trials

The functional diversity of plant peptides

- Reproduction
- Cell proliferation and expansion
- Stress response
- Development of vascular tissues
- Stomata development



Tavormina et al.,2015. The plant peptidome: an expanding repertoire of structural features and biological functions. The Plant Cell, 27, 2095-2118.

Peptides are signaling molecules

Plant Stimulating Peptides

What are the Key Benefits?

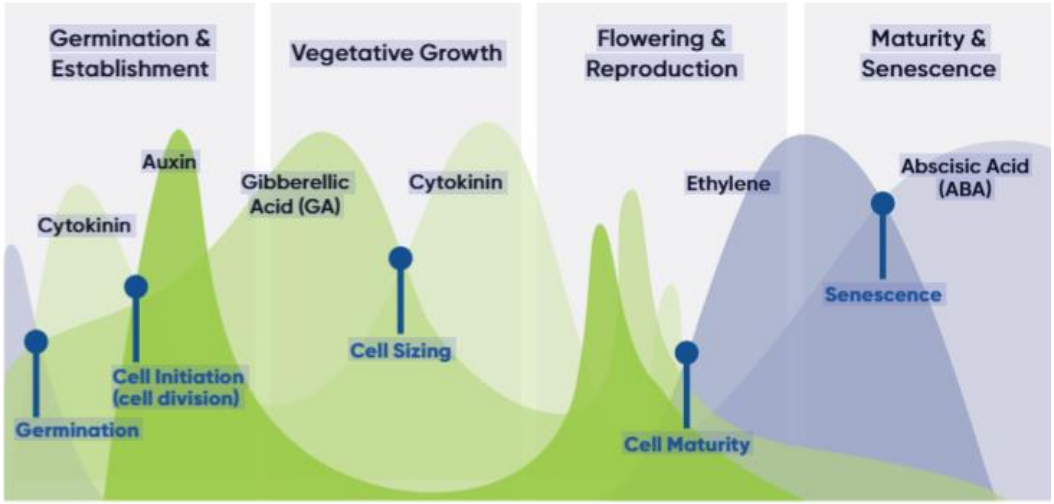
1. Mitigates risk of plant stress & improves stress recovery
2. Enhanced Nutrient Use Efficiency
3. Increased Plant Growth & Vigour
   -Lateral Root Promoting Peptides
   -Precursor to hormone production

Plant Hormones

Plant hormones, nutrients, and hormone co-factors regulate plant growth and reproduction much like hormones, nutrition, and vitamins regulate growth in humans and animals.

Auxin and Cytokinin give birth to new cells. Auxin then directs food movement to the new cells and with Cytokinin, stimulates cell growth. Gibberellic Acid, which is made inside the new cell, controls the rate of movement of food into the new cell and its size.

Start	Grow	Finish	



N, Ca, P, Zn, Mg, K, Mn	Ca, Cu, Mg, B, Mn N, Zn, NO_3	Ca, B, Mg, Amine N	B, Cu, P, K, Mo, Mg, Amine N
Abscisic Acid (ABA): Keeps the seed dormant before going into the soil. **Gibberellic Acid (GA):** Awakens the seed from its dormant state. **Cytokinin:** Promotes shoot development. **Auxin:** Promotes root development.	**Gibberellic Acid (GA):** Promotes cell elongation and stem growth. **Cytokinin:** Produced in the roots and, along with Auxin, promotes cell division and lateral stem development. **Auxin:** Produced in the shoot and, along with Cytokinin, promotes cell division and influences root development.	**Gibberellic Acid (GA), Cytokinin, & Auxin:** Combination of all growth hormones regulate seed set and overall seed development. **Ethylene:** Triggers ripening and initiates senescence.	**Gibberellic Acid (GA), Cytokinin, & Auxin:** Growth hormone levels are completely depleted. **Abscisic Acid (ABA):** Promotes crop senescence and initiates seed dormancy.

Corteva Agriscience Solutions

FOLIAR

X-Cyte™

X-Cyte™ is designed to increase plant resilience and safeguard yield by proactively protecting crops from heat blast – reducing flower abortion and pod loss caused by heat stress.

KEY PRODUCT INFORMATION:

- **Crops*:** canola
- **Ingredients:**
  - Cytokinin (0.04%)
- **Timing:** fungicide timing, should be applied during 10% - 30% flowering, before the onset of a heat event
- **Product size:** 1,000 L tote, 2 x 10 L case

*see label for additional crop registrations

PRODUCT FEATURES & BENEFITS:

- Protects yield potential by **reducing flower abortion and pod loss** during times of excess heat.
- Improves overall crop resilience by **delaying premature senescence** caused by heat loss.
- Built with the **highest quality ingredients,** resulting in guaranteed analysis of actives for consistent performance, extensive tank-mix compatibility.

CORTEVA agriscience biologicals

growing together

SEED TREATMENT AND / OR FOLIAR

Fortified Stimulate™ Yield Enhancer

Fortified Stimulate™ Yield Enhancer contains a combination of critical plant growth hormones, strategically formulated to enhance root development, boost plant growth, and maximize yields.

KEY PRODUCT INFORMATION:

- **Crops*:** canola, wheat, pulses
- **Ingredients:**
  - Cytokinin (0.009%)
  - Gibberellic Acid (0.005%)
  - Indole-3-butyric acid (0.005%)
  - Indole-3-acetic acid (0.005%)
- **Timing:** seed treatment and/or herbicide timing
- **Product size:** 1,000 L tote, 2 x 10 L case

*see label for additional crop registrations

PRODUCT FEATURES & BENEFITS:

- Fortified Stimulate™ Yield Enhancer is the only plant growth promoter that contains four plant growth hormones – **delivering balanced and improved plant growth.**
- **Accelerates and increases root and shoot development,** improving plant competitiveness to maximize crop potential
- Built with the **highest quality ingredients,** resulting in guaranteed analysis of actives for consistent performance, extensive tank-mix compatibility.

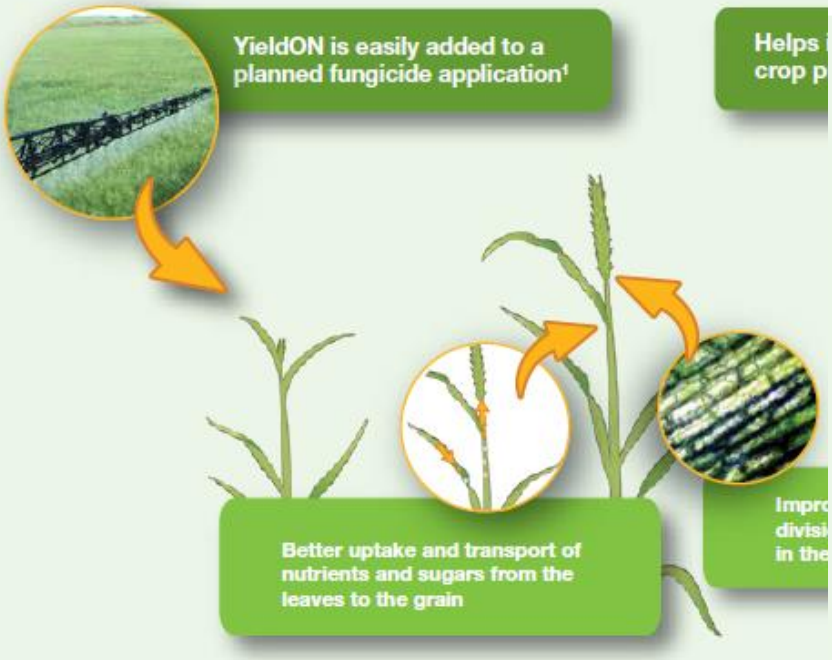
CORTEVA agriscience biologicals

growing together

Supercharge crop productivity with YieldO

YieldON™ is a liquid foliar biostimulant containing a unique combinatio of naturally derived ingredients to 'switch on' crop productivity.

YieldON has the potential to increase yie the flow of nutrients and sugars through



Technical features:

Contains:
- A unique combination of extracts from plants and seaweeds
- Enriched with trace elements manganese (Mn), zinc (Zn) and molybdenum (Mo)

Application timing:[1]
- Applied at late-season fungicide timing.
- Wheat and canola: One application with a planned fungicide at heading/flowering timing, such as Miravis® Ace or Miravis® Era in wheat, and Miravis® Star or Miravis® Bold in canola. ALWAYS read and follow fungicide label directions.
- For all other crops, refer to the product label.

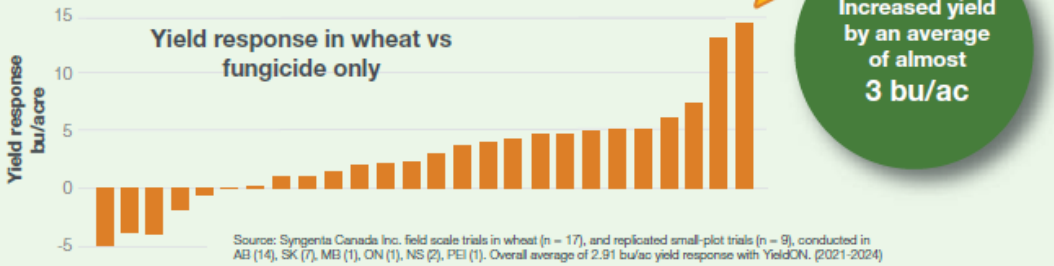
For use on:[1]
- Wheat, canola and other row crops

Application rate:
- 0.75 L/ac (1.85 L/ ha)

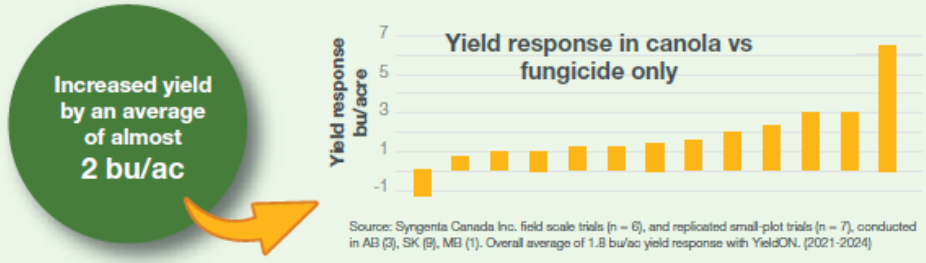
Tank mix compatibility:[1]
- YieldON can be tank mixed with pesticides, fertilizers, or any other chemicals. It is advised to conduct a compatibility test. For more information, refer to the product label.
- Add YieldON to the tank last.

Packaging:
- 2 x 10 L case (treats 26.7 acres)
- 450 L tote (treats 600 acres)

The Canadian trial results are in! Yield boost in wheat and canola



Source: Syngenta Canada Inc. field scale trials in wheat (n = 17), and replicated small-plot trials (n = 9), conducted in AB (14), SK (7), MB (1), ON (1), NS (2), PEI (1). Overall average of 2.91 bu/ac yield response with YieldON. (2021-2024)



Source: Syngenta Canada Inc. field scale trials (n = 6), and replicated small-plot trials (n = 7), conducted in AB (3), SK (9), MB (1). Overall average of 1.8 bu/ac yield response with YieldON. (2021-2024)

Performance evaluations are based on internal trials, field observations and/or public information. Data from multiple locations and years should be consulted whenever possible. Individual results may vary depending on local growing, soil, and weather conditions.

[1] Refer to label for a complete listing of crops, tank mix information, application rates, and application timing.

YIELD

YIELDON

syngenta.

GROW IT

CO-OP

Anti-stress and gr
activation with Me

Megafol® 3-0-8 is a liquid foliar
reduce abiotic stresses includir
damage. Megafol is intended t
is a readily available source of

Product benefits:

- Stimulates growth of plants and im
- Helps promote balanced vegetative
- When applied in times of environm
  actions of the betaines and amino

Contains:

- 3-0-8, including vitamins, amino acids, proteins and betaines

What does Megafol do?

Plant function	Up-regulation of genes
Wound response	62 X
Heat stress	5 X
Cold stress	8 X
Protein synthesis	4 X
Photosynthesis	10 X
Nutrient transport	4 X

ADVASSA™

Advassa™ is a new highly concentrated biostimulant for broad acre and row crops, that fortifies plants against the numerous stressors that can chip away at yield throughout the growing season. Advassa™ supports improved yield and defends against yield robbing impacts by supporting root growth and plant establishment, boosting nutrient use efficiency, and helping plants increase tolerance to environmental stressors like drought, heat, chill, and salinity.

ACTIVE INGREDIENT	*Ascophyllum nodosum*

PRODUCT BENEFITS

- Advassa™ improves plant establishment, root structure and mass
- Optimizes plant nutrient availability throughout the growth cycle and creates conditions for root growth, plant vigor, and increased yield.
  - Advassa™ contains natural chelators that bind to micronutrients leading to improved uptake & translocation within the plant
- Promotes antioxidant production which aids in stress tolerance improves photosynthesis by increasing chlorophyll production better vegetative growth
- Improves plants tolerance to abiotic stress conditions such as heat, chill, salinity, and drought:
  - Helps regulate water loss through stomata in times of drought which improves moisture retention & reduces wilt
  - Increases plant salt tolerance in both saline soils and irrigation

THE FOLLOWING ARE JUST A FEW OF THE BENEFICIAL COMPLEX SUGARS, NUTRIENTS AND OTHER COMPONENTS THAT ARE PRESENT IN OUR PRODUCTS:

Mannitol
An osmoprotectant, Mannitol raises the tolerance to high salinity. It is also a micronutrient chelator and aids with cell water retention and nutrient mobility.

Alginic Acid
A structural carbohydrate that gives the seaweed resistance and strength, Alginic Acid gives seaweed the ability to withstand wave action and maintain ionic equilibrium in the cell. In the field, it also aids mineral chelation that boosts nutrient availability and promotes soil microbial health and vitality.

Fucoidans (FCPs)
Complex structures, Fucoidans give seaweed protection from dessication in low tide and high irradiance conditions. FCPs aid in increased antioxidant and stress protection.

Acadia Plant Health

Advassa supports improved yield and defends against yield robbing impacts by supporting root growth, boosting nutrient use efficiency, and helping plants increase tolerance to environmental stressors like drought, heat, chill, and salinity.

NUTRIMYR / 5-15-5 1B

Enhanced Fertilizer for Improved Crop Development and Quality
After extensive research, the Italpollina team developed the NUTRIMYR line of products – which combine high quality fertilizer with micronutrients and vegetal peptides for complete and balanced nutrition. Our NUTRIMYR products guarantee nutritional efficiency. NUTRIMYR peptides are quickly absorbed and translocated in plants, carrying out their functions within a few hours of application.

GUARANTEED ANALYSIS

Total Nitrogen (N)	5%
Available Phosphate (P_2O_5)	15.0%
Soluble Potash (K_2O)	5.0%
Boron (B)	1.0%

Derived from: Vegetal protein hydrolysate, urea, potassium nitrate, potassium phosphate, boron ethanolamine

PLANT STIMULATING PEPTIDES (PSP):
NUTRIMYR products have a high concentration of PSPs which have been shown to stimulate the natural bioactivity of plants and enhance the effectiveness of fertilizer products. This product is formulated for quick absorption and within a few hours of application can impact the vigor of plants.

PSP PLANT STIMULATING PEPTIDES
PEPTIDES ARE THE KEYS

- **STRESS PROTECTION** – increases tolerance to and recovery from stresses such as herbicides, temperature, drought, salinity, low light and more.
- **BIOSTIMULANT** – stimulates the plants natural processes and boosts metabolism efficiency to induce yield increases and improved crop quality.
- **NUTRITIONAL** – facilitates nutrient uptake, translocation and use; increases water use efficiency; enhances soil fertility by fostering the development of beneficial micro-organisms.

PhycoTerra® FX

PhycoTerra®

PhycoTerra® and PhycoTerra® FX improve the unique microbiome of plant leaves (phyllosphere) with an inert microalgae superfood.

This key food source feeds the microbes that provide nutrient acquisition, reduced leaf desiccation and abiotic stress relief. Well-fed microbes create a unique mode of action with proven on-farm results.

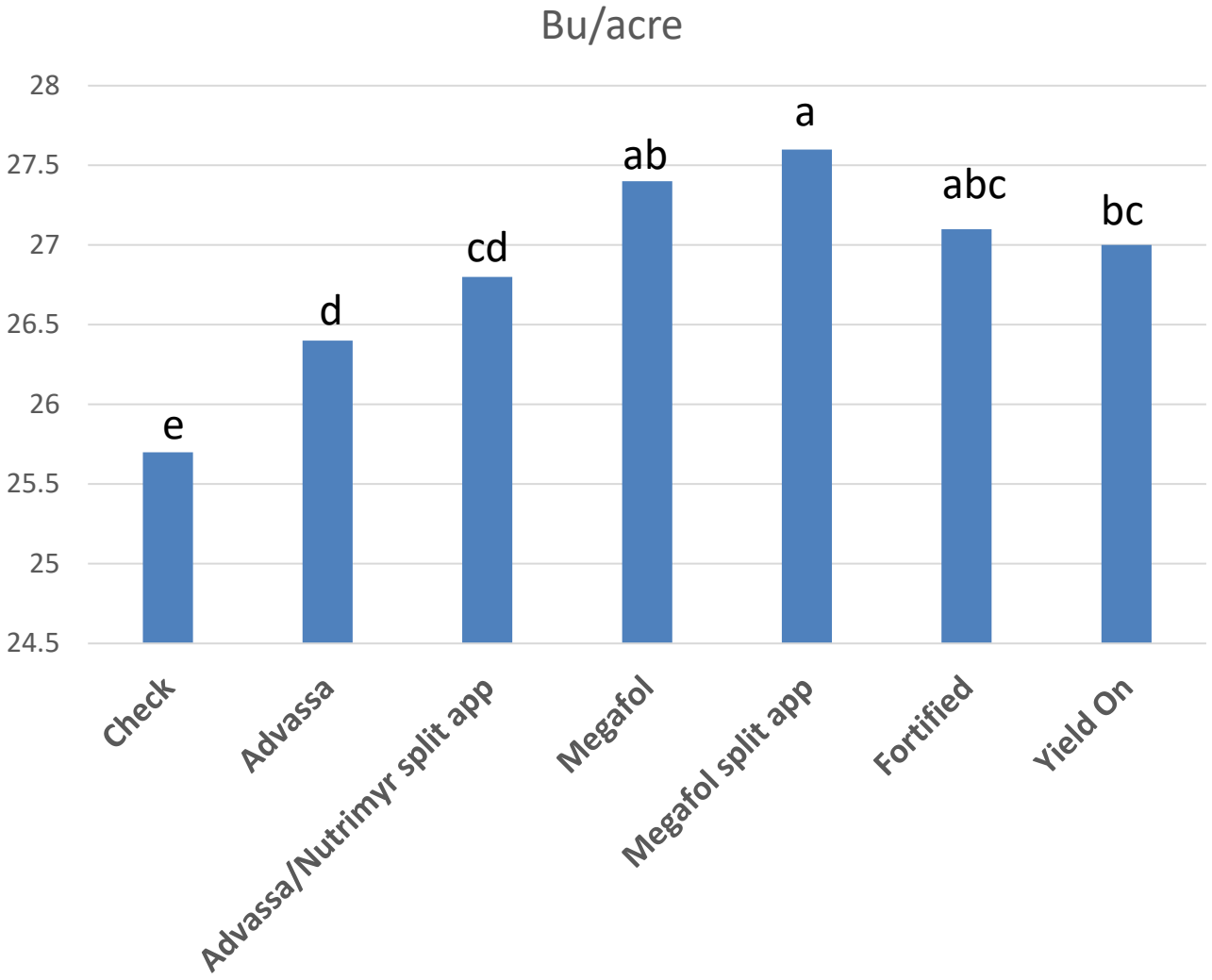
heliae® AGRICULTURE

PhycoTerra®

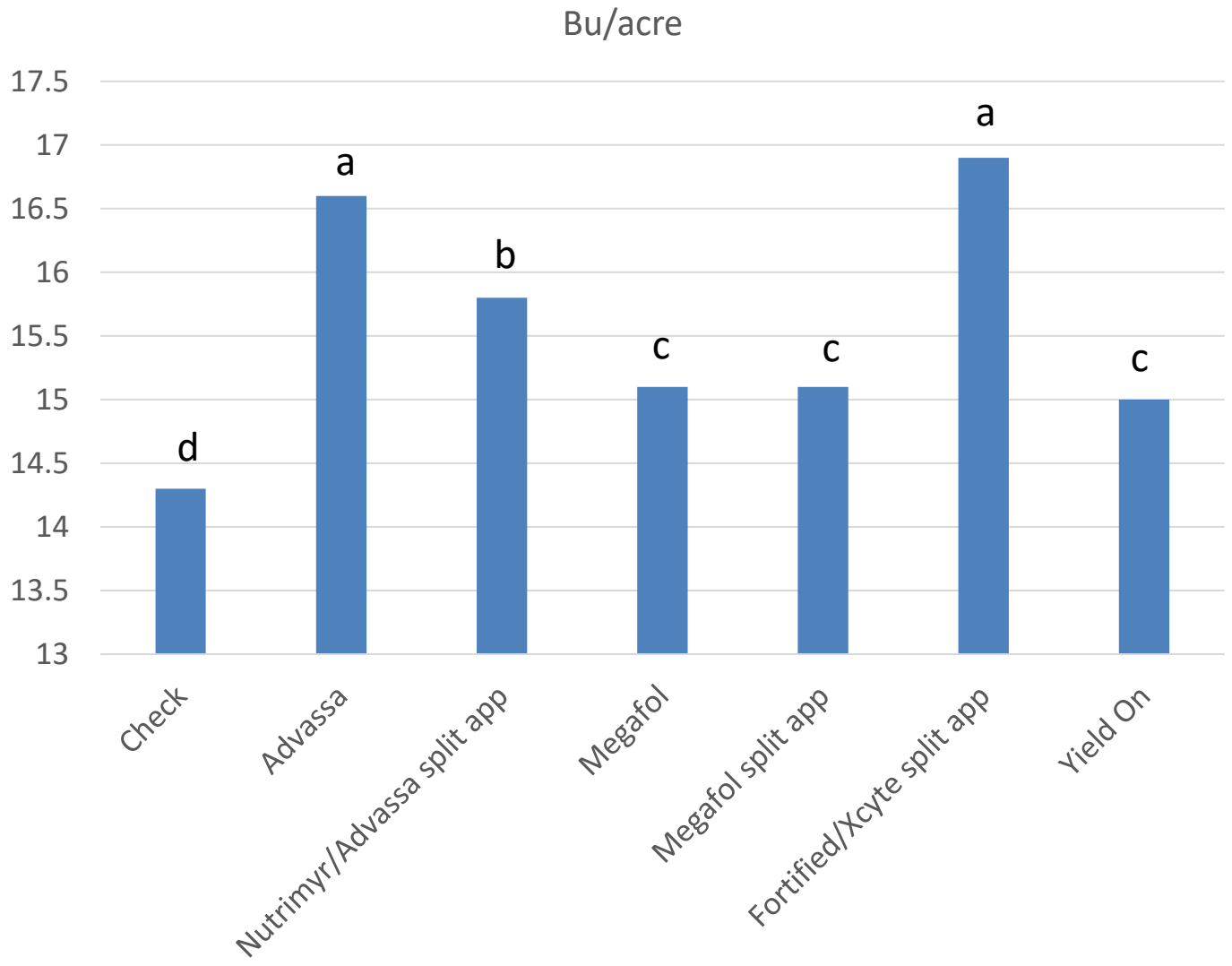
PhycoTerra:

- Feed your Soil Microbes
- Increase Soil Aggregation
- Increase Water Holding Capacity
- Optimize Nutrient Availability
- Contributes to Increased Yields

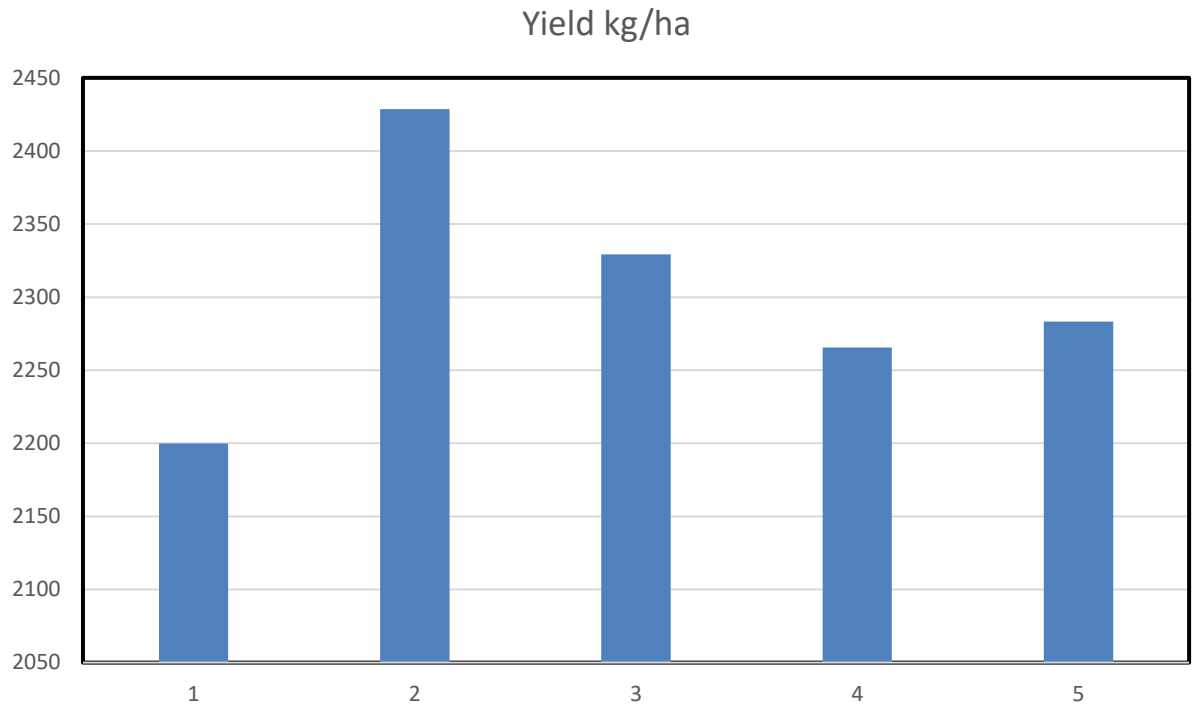
Defy Durum – Swift Current, SK (2024)



DK400TF Canola – Swift Current (2024)



2022 FCL – WCA Biostimulant Comparison in Durum



Treatment	Product	Rate
1	Check	n/a
2	Nutrimyr (5-15-5) @ herbicide	1L/ac (404ml/ac)
3	PhycoTerra + UAN @ seeding	1L/ha (25N)
4	Acadia (Advassa) @ 2-6 leaf stage	300ml/ac + surfactant
5	Liquid Fert (UAN) @ Herbicide	~30-35N

Other Products

Methylobacterium symbioticum

Increased Yield Potential

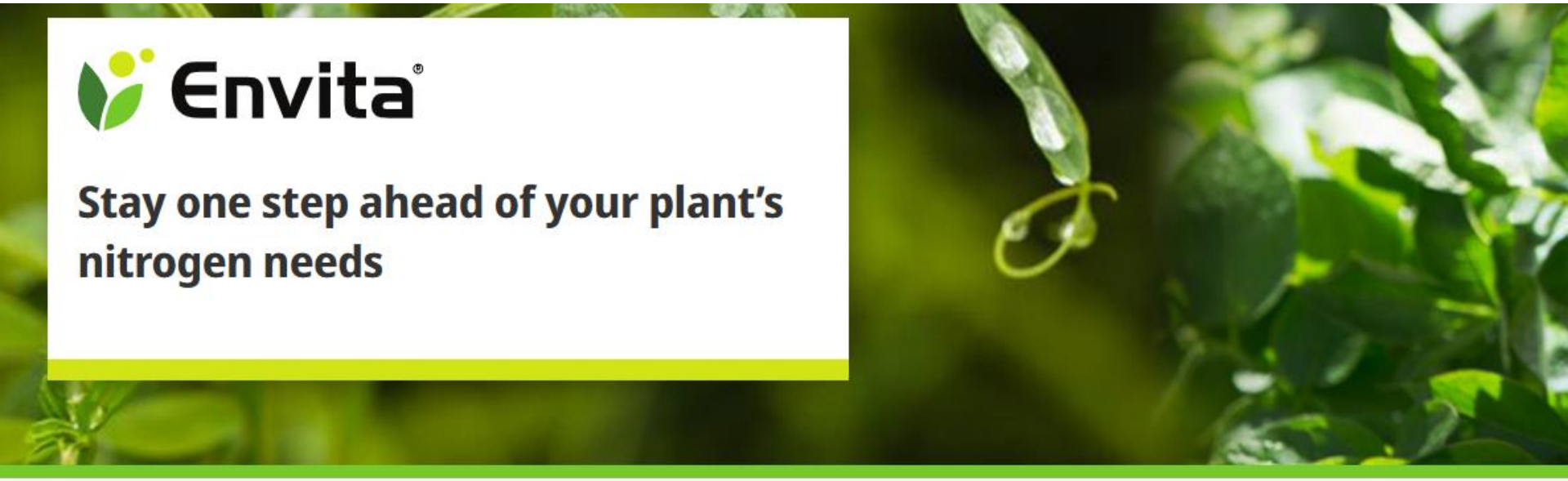
The active ingredient in Utrisha® N is a nitrogen-fixing bacterium that supplies needed nitrogen to crops throughout the growing season. This helps increase yield potential and, in fact, field trials show farmers who use Utrisha N grow more bushels per acre. For example, soybean farmers see an average increase of 2.5 bushels per acre and corn farmers see an average increase of 5 bushels per acre.

How Utrisha N Works:

1. Utrisha N enters the plant through the stomata and colonizes in the leaf cells.
2. It then converts N_2 from the air into ammonium, resulting in a constant supply of nitrogen to the plant.

No plant energy is required for this process.

Application flexibility – Foliar applied



Envita® biological

Envita® is a liquid nitrogen-fixing biological product that features the bacteria *Gluconacetobacter diazotrophicus* (Gd) – a naturally occurring food-grade bacteria that enables a unique mode of nitrogen fixation in a wide variety of crops.

Humic Acid:

- **Largest and most stable fraction of humic substances**
- **Obtained from decomposed OM**
- **Improve soil structure and enhance water-holding capacity, aeration and drainage**
- **Increase CEC, increasing nutrient retention and availability**
- **Used as soil amendments to enrich soil with OM and improve nutrient availability**

Fulvic Acid:

- **Smaller and more soluble fraction of humic substances resulting from further breakdown of humic acids**
- **Promote nutrient uptake within plants by chelating minerals and making them more mobile.**
- **Enhance photosynthesis and enzymatic activities in plants**
- **Improve soil structure and water retention.**

Ulmic Acids:…..

Humic Products:

Key benefits to agriculture

- **Improve soil structure and enhance water-holding capacity, aeration and drainage**
- **Increase cation exchange capacity**
- **Fertilizer Efficiency**
- **Seed germination and root development**
- **Stress management**
- **Bio-stimulant properties**
- **Foliar application**

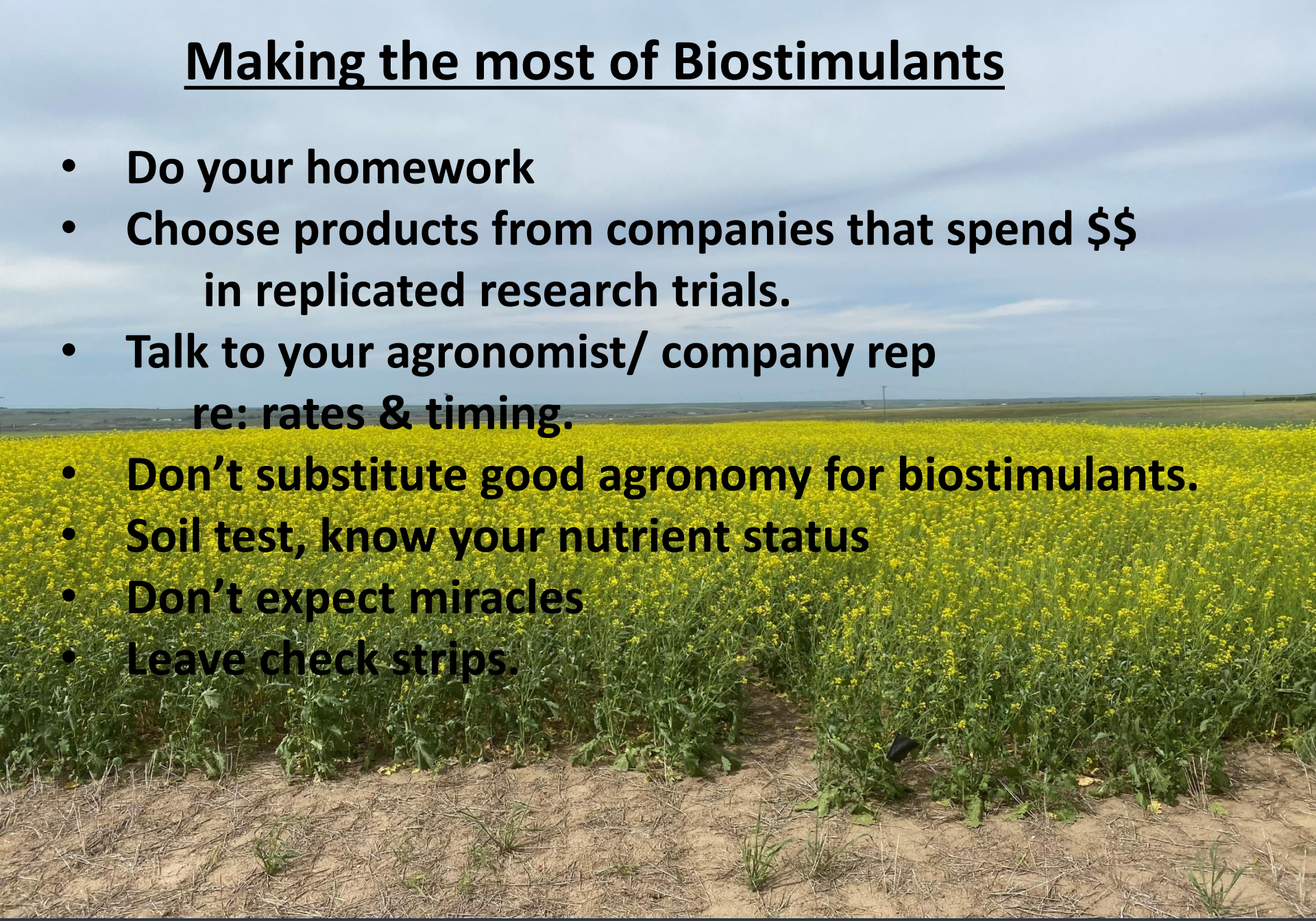
Making the most of Biostimulants

Good agronomy!!

- **Weed control – pre-seed**
- **Proper seeding rate and placement/good clean seed**
- **Soil test!**
- **Optimize nutrients – 4 R's**
- **Weed control – in-crop**
- **Insects/disease control**
- **Inoculants for pulses**

Making the most of Biostimulants

- Do your homework
- Choose products from companies that spend $$ in replicated research trials.
- Talk to your agronomist/ company rep re: rates & timing.
- Don’t substitute good agronomy for biostimulants.
- Soil test, know your nutrient status
- Don’t expect miracles
- Leave check strips.

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Questions?

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