IMPROVE MICROBIAL DIVERSITY

REFINE SOIL HEALTH

INCREASE YOUR BOTTOM LINE

Foster® FC

Fertilizer Catalyst

NUTRITIONAL PRODUCTS

DRIVING YIELDS

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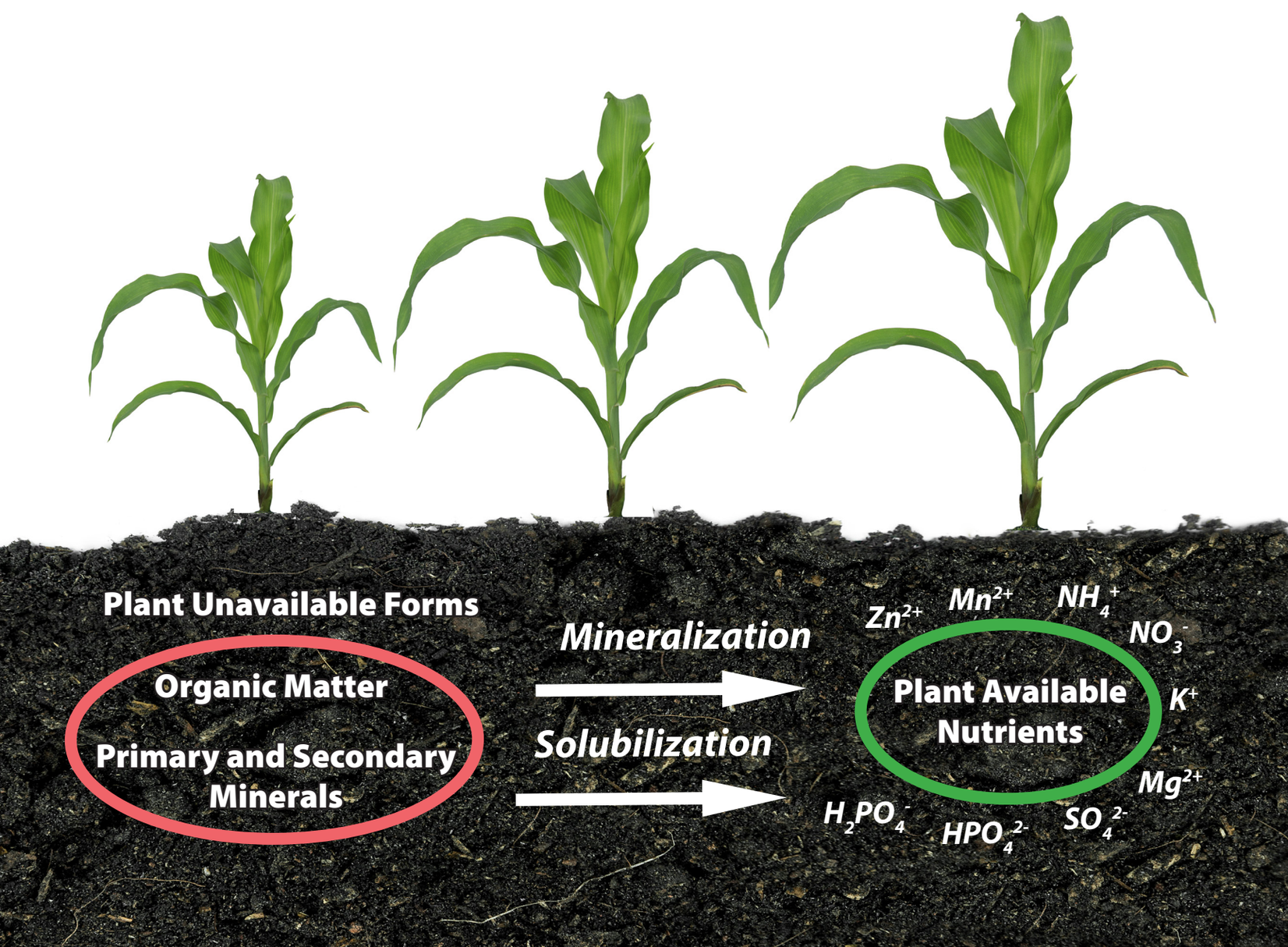
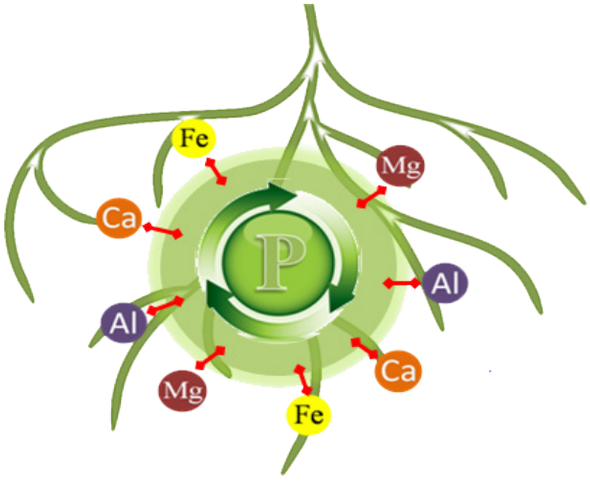
Soil Fertility Limitations on Crop Growth

Agriculture soils in the U.S. often contain significant amounts of essential plant nutrients. However, these nutrients are not always available for plant uptake. As average crop yield potentials continue to increase with improved genetics and management strategies, nutrient resources available can become yield limiting despite the efforts of fertilization. Limited nutrient availability is a result of natural occurring reactions in the soil that promote formation of insoluble nutrients (plant unavailable forms).



Soil Fertility Limitations on Crop Growth

Phosphorus is a primary macronutrient, a component of nucleic acids and critical for energy transfer within the plant. In the soil, phosphorus is often abundant, however the bulk supply is bound in organic matter or tied up in soil mineral compounds. For plant uptake phosphate minerals must be solubilized into the soil solution, a process that must repeat itself approximately 500 times during the growing season. This slow release is often unable to meet crop demands throughout the growing season. Thus the availability of phosphorus to the crop is dependent on the ability of the soil to replenish the soil solution with solubilized phosphorus.



Phosphorus tie up with multivalent cations forms insoluble minerals. Nutrients in this form are unavailable for plant uptake.

Zinc, magnesium, iron, and calcium are all multivalent cations in the soil. The strong positive charge of these elements promotes attraction to negative charged clay particles, as well as a strong affinity for mineral fixation (primarily with phosphorus). Availability of each nutrient will vary under specific conditions, such as pH influence on phosphate tie-up with calcium, iron and aluminum. The breakdown of these minerals into available forms is primarily driven by microbial processes.

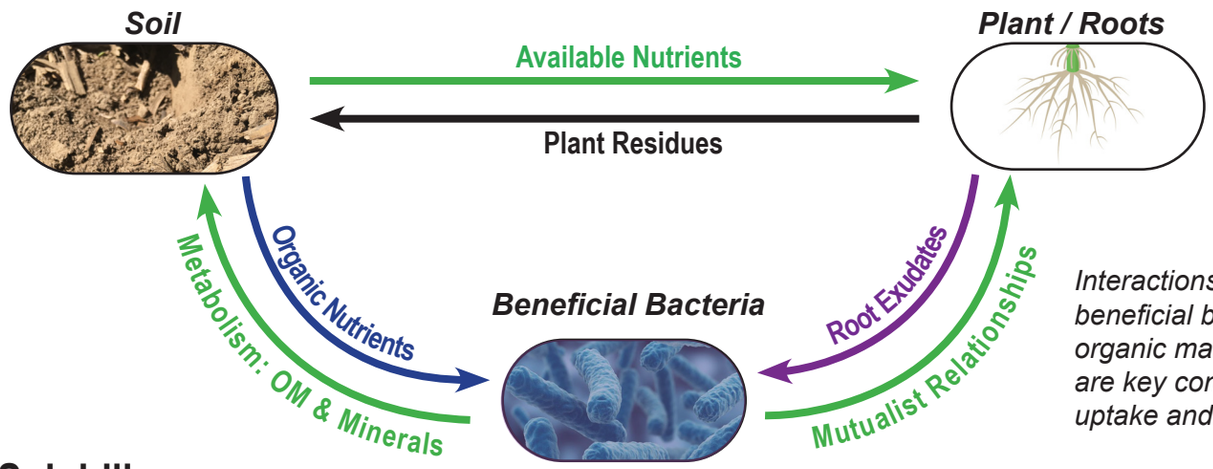
Microbial, Plant & Soil Interactions

Microorganism interactions and life cycles are critical to maintain available nutrients to keep crops functioning at full speed. Soils that retain a balanced complexity of microorganisms (bacteria, fungi, protozoa, etc.) promotes an environment where nutrients cycle from mineral forms into plant available forms. Agricultural practices over time, such as tillage and crop rotations, have impeded the growth of beneficial-bacterial populations. A thriving beneficial-bacteria population improves crop efficiencies through one or more of the following characteristics: breakdown of organic materials, nutrient cycling and improving soil health and structure.

Decomposers

This primary category of microbes promotes the breakdown of soil organic matter. Bacteria are primarily involved in breaking down simple organic compounds such as root exudates (sugars) and fresh plant residues. These microbes are thus attracted to the rhizosphere, where root exudates and decomposing roots are commonly found. As bacteria break down organic material, they mobilize nutrients that will become readily available when the bacteria is consumed through the food chain by protozoa or nematodes. An example may be species of Streptomyces. These bacteria are filamentous, meaning they grow webbing structures that span throughout the soil (similar to fungi). Streptomyces are efficient in colonizing within the rhizosphere and promoting breakdown of complex organic polymers and chitin.

Microbial, Plant & Soil Interactions



Interactions that occur between beneficial bacteria, plants, and organic material within the soil are key contributors to nutrient uptake and soil health

Solubilizers

These bacteria are those that are responsible for converting insoluble inorganic minerals into soluble nutrients. Different bacterial strains have different methods for solubilizing minerals. Popular methods may include release of specific enzymes, acids, protons, or utilizing oxidoreductive systems. Species within the genera of Pseudomonas and Bacillus tend to have phosphorus, zinc, potassium and other mineral solubilizing characteristics.

Mutualists

Beneficial bacteria often have mutual relationships with crop hosts. Crops understand the benefits of soil microbes and release sugars to feed these populations in the root zone. In certain cases, such as Rhizobium in soybeans, these bacteria live within the plant tissue in nodules. In other cases, such as the beneficial-bacteria in Foster FC, bacteria live in the host rhizosphere where they promote nutrient availability, improved soil structure, as well as out compete pathogenic microbes.

Improve Biological Diversity

Foster® FC
Fertilizer Catalyst

A premier Microbial-Based Fertilizer Catalyst, formulated with eight uniquely selected bacteria strains designed to enhance microbial diversity, nutrient use-efficiency, and increase the growers bottom line.

Each bacterial strain in Foster FC has undergone over 1,000 tests and studies to ensure microbial stability, integrity, and efficiency.

Foster FC bacteria are derived from original parent cells, meaning that every production cycle of Foster FC is identical in composition and consistent in performance.

Each bacterial strain is specifically selected for how it interacts with the plant, soil, microbial partners, as well as integration within common management strategies.

Momentum is behind Foster FC as a result of these specific attributes, which has resulted in increased crop performance across the U.S.

Improve Biological Diversity

Bacillus coagulans *8.3 x 10^9 CFU's per gram*

Solubilization of phosphorus, zinc, manganese and potassium for improved uptake

Bacillus licheniformis *8.3 x 10^9 CFU's per gram*

Strong composter of organic polymers promotes plant available nutrients

Streptomyces rimosus *8.3 x 10^9 CFU's per gram*

Strong fungal remediation activity, produces enzymes to protect the root zone

Streptomyces vioalascens *8.3 x 10^9 CFU's per gram*

Breakdown of complex polymers and chitin, excellent colonizer & decomposer

Thermobacillus composti *8.3 x 10^9 CFU's per gram*

Boosts plant biomass, strong secretor of enzymes for organic matter breakdown

Thiobacillus feroxidans *8.3 x 10^9 CFU's per gram*

Strong solubilizer of iron, strong chelator of calcium, magnesium, manganese & zinc

Pseudomonas putida *8.3 x 10^9 CFU's per gram*

Increases solubilization of phosphorus and potassium, improves nutrient availability

Rhodopseudomonas capsulatus *8.3 x 10^9 CFU's per gram*

Boosts nitrogen assimilation at the root zone for improved nitrogen efficiency

Foster FC Life Cycle

Foster FC Life Cycle

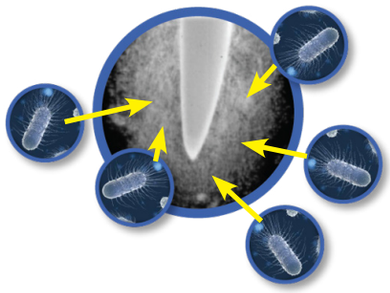
1. Foster FC is applied to the soil

2. Bacteria are activated by carbon source from soil and residues

3. Within a few days, bacteria sporulate and begin cell division

4. The rate of division is dependent primarily on soil temperature and moisture

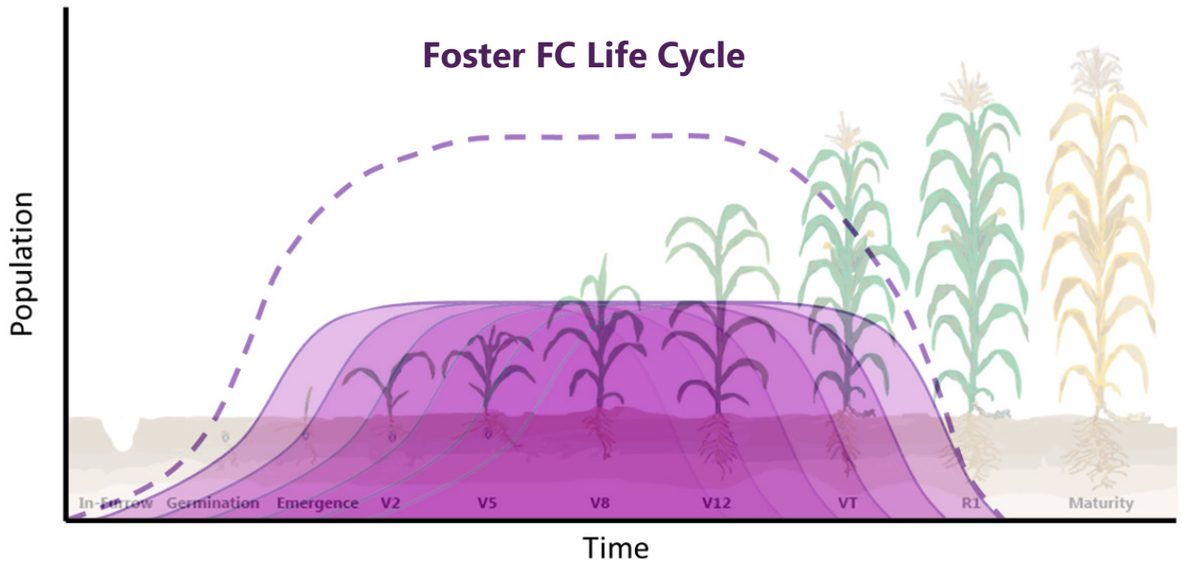
5. As the bacteria populate, they move toward carbon sources (ex. root exudates)



Foster FC bacteria colonize in the rhizosphere where roots release sugars.

6. Exponential growth and colonization occurs for 1-2 months until the population becomes stationary in growth (bacteria die off and reproduce equally)

7. Established bacteria begin to decline and die off as crops reach maturation



Handling & Use Characteristics

Physical Attributes of Foster FC

- Dry formulation with 5 year shelf life
- High CFU count, for improved root colonization and establishment
- Endospore formulation keeps bacteria protected prior to application
- Compatible to tank-mix with fertilizers, pesticides & adjuvants

Use Rates:

4 grams/Acre
(in-furrow, 2x2 & seed treatment)

4-6 grams/Acre
(dry impregnation & broadcast)

Technical Information

1 bottle = 160 grams or 40 Acres

1 case = 4 bottles or 160 Acres

Mag-Pack = 20 lbs or 2,270 Acres

Application Flexibility

- Foster FC has proven to enhance crop development and yield potential in a number of different application types
- Apply in-furrow, 2x2, seed treatment, strip-till, dry fertilizer impregnation, soil broadcast, side-dress or early post
- For best results, apply Foster FC earlier in the growing season to maximize bacterial growth and root colonization

Image above is to provide a visual of Foster FC packaging.

In-Season Field Results

In-Furrow: Minnesota

Untreated

Foster FC Fertilizer Catalyst

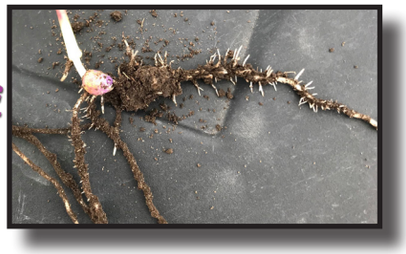
In-Furrow: South Dakota

Untreated

Foster FC Fertilizer Catalyst

Untreated

Foster FC Fertilizer Catalyst



PRE Herbicide: Iowa

Untreated

Foster FC Fertilizer Catalyst

Improved phosphorus uptake and reduced Fallow Syndrome symptoms

Starter Only

Foster FC + Starter

Fertilizer Catalyst

Top-Dress Wheat: Ohio

Untreated

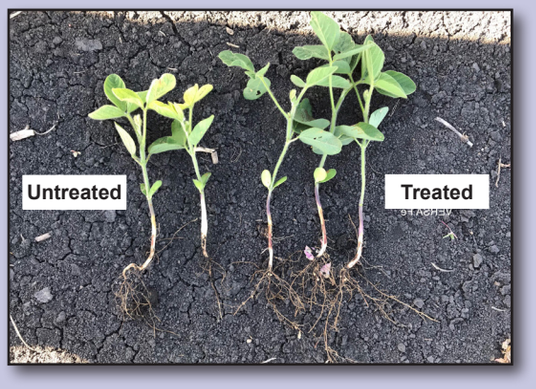
Foster FC Fertilizer Catalyst

In-Season Field Results

Designed to enhance current management strategies!

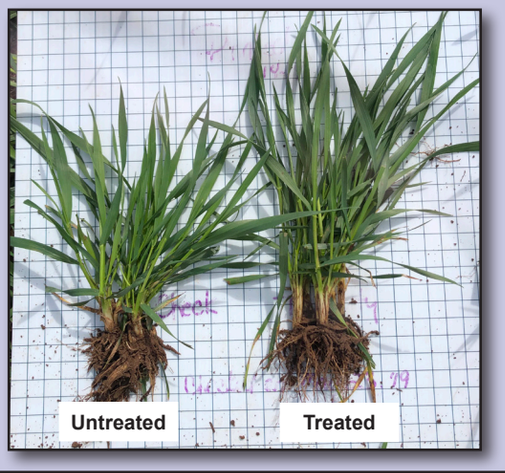
Foster FC Fertilizer Catalyst + VERSA Fe Iron Liquid for IDC EDDHSA Fe 1.8%

In-Furrow: Minnesota

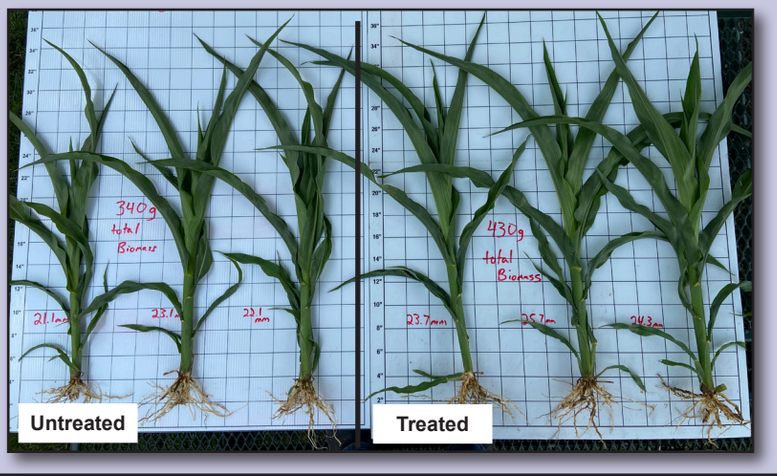


In-Furrow - Wheat Oklahoma

Foster FC Fertilizer Catalyst + PMAX LFS Phosphate Fertilizer Additive



In-Furrow - Corn: Ohio

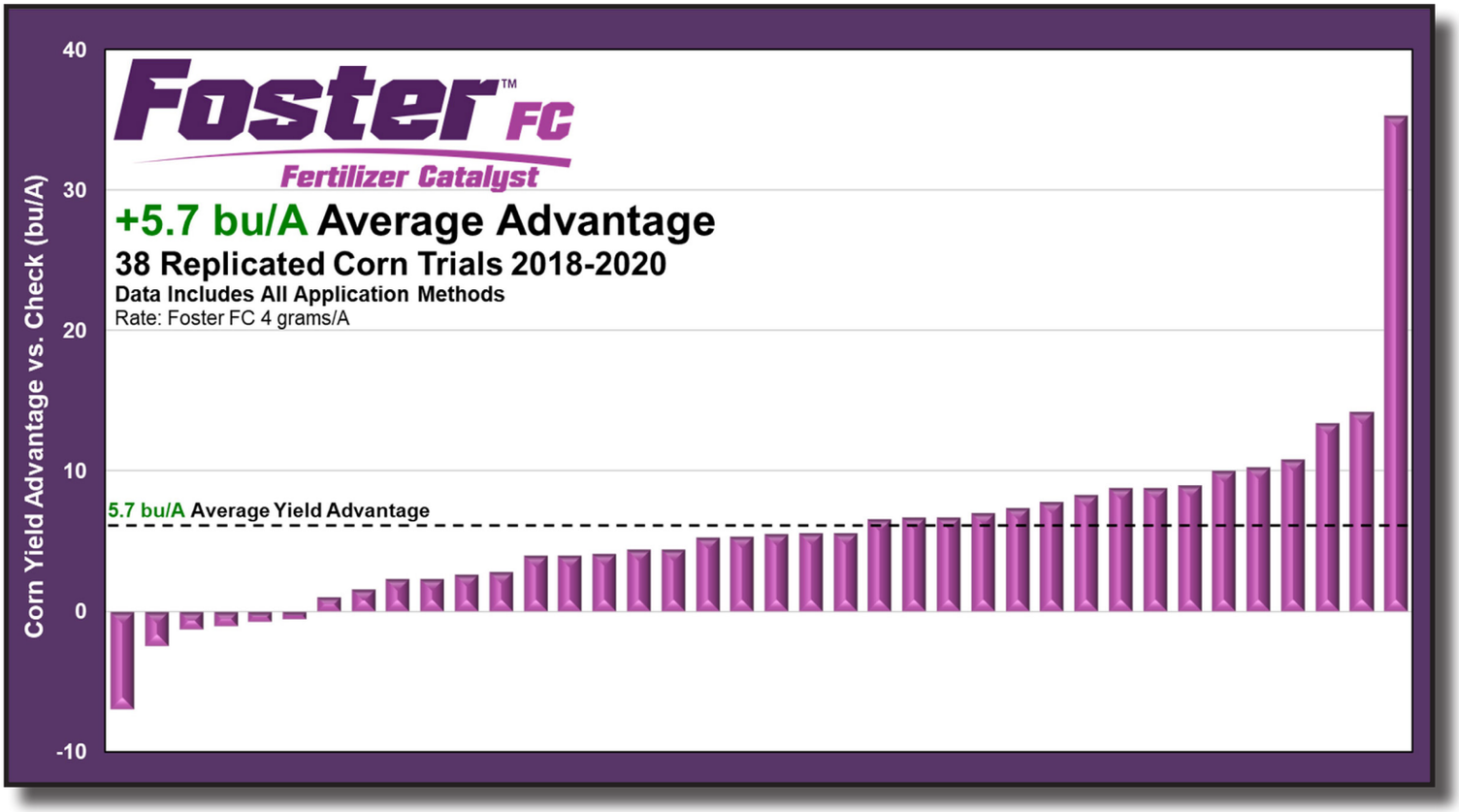


Foster FC Fertilizer Catalyst + USA 500 Universal Starter Additive

- 21% Plant Mass Increase
- 10% Stalk Diameter Increase

Replicated Performance: Corn

All Application Types

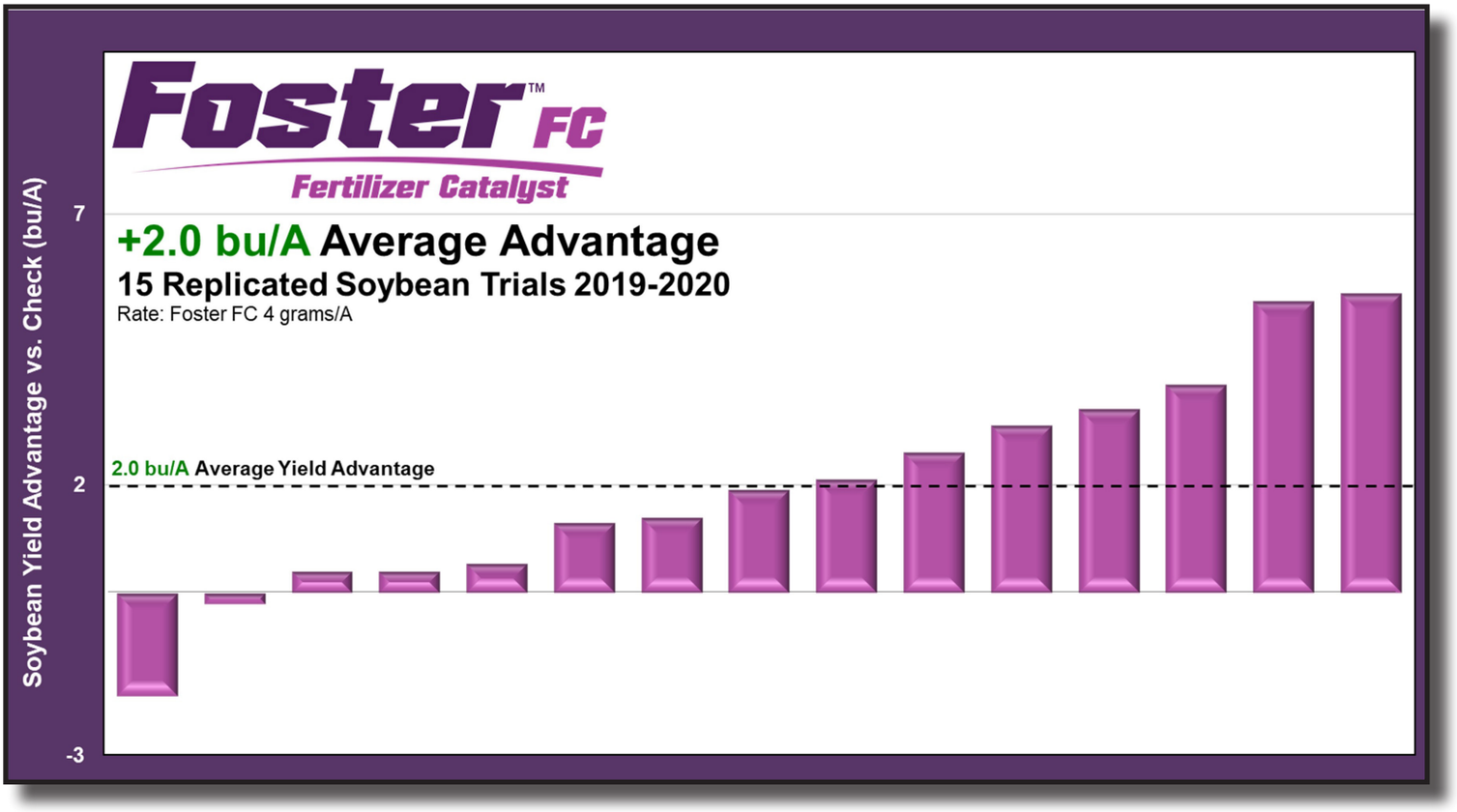


Yield Response by Application Type

- **In-Furrow Applications:** 7.0 Bushel/A Advantage
- **In-Furrow combined with P-Max:** 10.5 Bushel/A Advantage
- **Side-Dress UAN Applications:** 5.9 Bushel/A Advantage
- **Early Post Applications:** 4.9 Bushel/A Advantage

Replicated Performance: Soybean

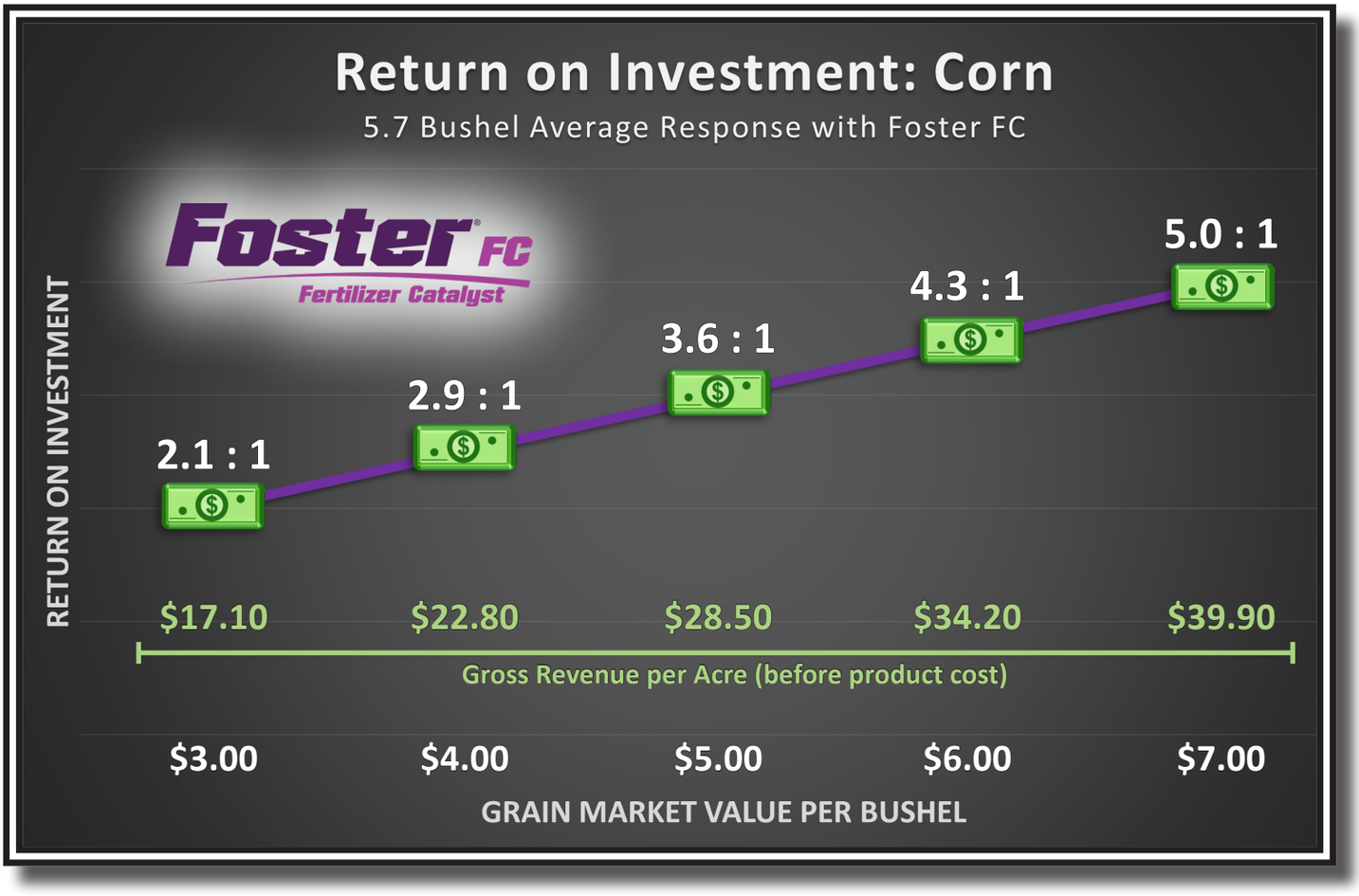
All Application Types



Yield Response by Application Type

- **In-Furrow Applications:** 2.5 Bushel/A Advantage
- **In-Furrow with Tripidity ST:** 3.8 Bushel/A Advantage
- **In-Furrow with Versa Fe 1.8%:** 2.7 Bushel/A Advantage

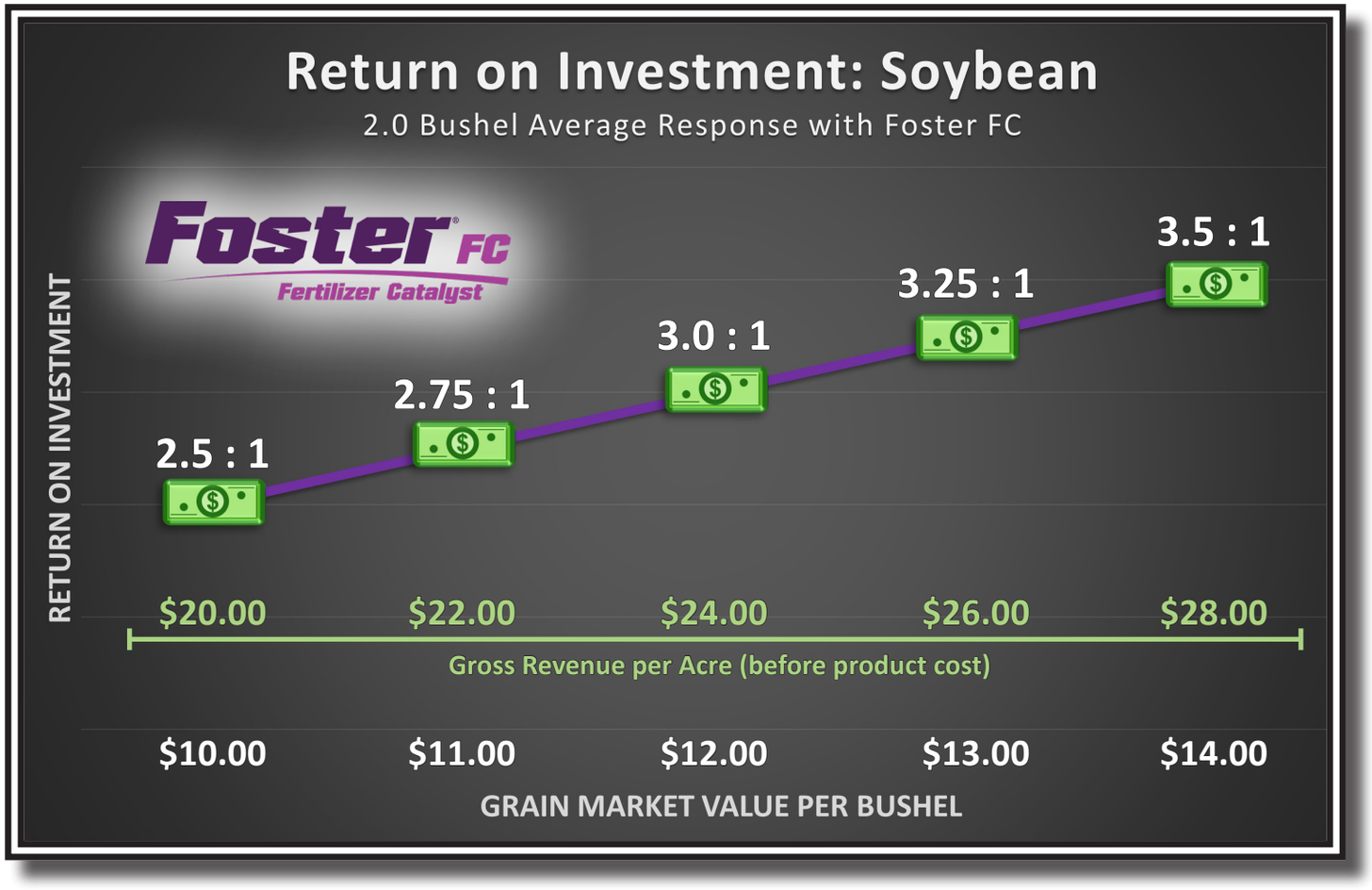
Increase Your Bottom Line



- **Yield data compiled from 38 replicated trials**
- **5.7 bushel per acre average yield response**
- **Proven performance to Increase Your Bottom Line**

Return on investment calculated on estimated retail pricing which may vary.

Increase Your Bottom Line



- Yield data compiled from 15 replicated trials
- 2.0 bushel per acre average yield response
- Proven performance to Increase Your Bottom Line

Return on investment calculated on estimated retail pricing which may vary.

What is the Bottom Line?

Foster® FC
Fertilizer Catalyst

A **premier** microbial-based fertilizer catalyst

Enhances **nutrient availability** and crop uptake

Promotes **accelerated plant growth** and development

Flexible, with multiple cropping systems and applications

Increases yield with a high **return on investment**

Proven to **increase your bottom line**

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