



The BioAg Alliance

Opportunities, Accomplishments and Priorities

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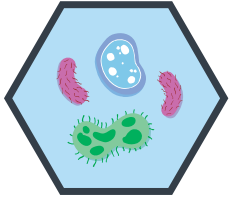
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Session Outline

- The microbial opportunity
- The BioAg Alliance: aim and year 1 accomplishments
- BioAg through the lens of Monsanto. Value for the grower
- Unique approach to BioAg technology development
- R&D starting point and priorities



Microbial solutions for agriculture



Microbials, notably **bacteria and fungi**, are types of agricultural biologicals that **protect** crops from pests and diseases and **enhance** plant productivity and fertility.

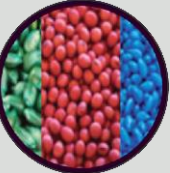


BioControl

- Complements or potentially replaces chemical pesticides
- Provides additional modes of action

BioYield

- Utilizes nutrients in the soil
- Creates stronger, healthier plants
- Provides new options for sustainable agriculture

How are microbials applied?

	Seed treatment		Foliar		In-furrow
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There are approximately
50 billion microbes
in 1 tablespoon of soil¹

1. North Carolina State University Cooperative Extension



The BioAg Alliance opportunity: Unlocking potential of microbial solutions as a new tool in agriculture

1 Ag Biologicals Market¹

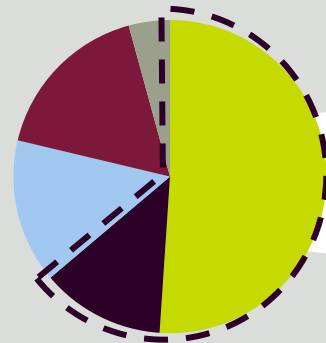
Market segmented by product class

Industry growth driven by increasing demand for sustainable options

2014 Estimated Sales **\$2.9 billion**

Annual Growth **Mid-teens CAGR**

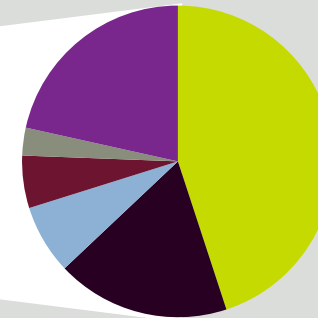
- Microbial Pesticides
- Microbial Inoculants
- Beneficial Insects
- Biochemical
- Other



2 Ag Microbials Market¹

Market segmented by crop

- Fruits and Vegetables
- Soybeans
- Cotton
- Rice
- Corn
- Other Crops



Opportunity: Core Crops

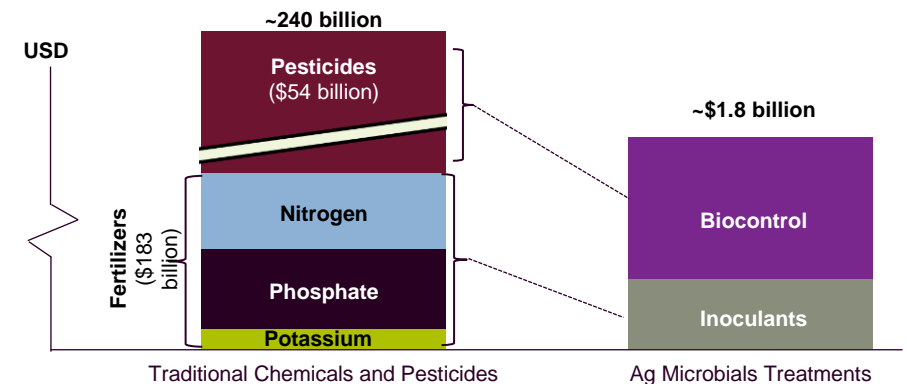
- Today, the majority of Ag microbials are used in the fruits and vegetables market
- We see significant opportunities in broad-acre field crops such as corn, soy, cotton and canola

3 Ag Microbials Opportunity

Example: Traditional chemicals & pesticides² vs. Ag microbials market¹

There's significant opportunity for Ag Microbial market expansion

- Microbials can be a range of products that can be complementary to, or replace, traditional pesticides and fertilizer options
- Today, the Ag microbial market is worth approx. \$1.8 billion in sales, while traditional chemicals and pesticides are worth approximately \$240 billion



1. Monsanto estimates of Ag biologicals industry based on a combination of research data from DunhamTrimmer, Agrow, MarketsandMarkets, Frost & Sullivan, Boston Consulting Group, BCC Research, Phillips McDougall, Global Industry Analysts 2. MarketLine and Phillips McDougall market data; All figures in USD.

Inoculants hold significant opportunity for market expansion across crops and geographies



Factors driving inoculant growth:

- 1 Market expansion**
 - Significant opportunity across crops and geographies
- 2 Immediate commercial portfolio**
 - Working from strong starting position with existing commercial products
- 3 Advantageous commercial footprint**
 - Monsanto's broad global footprint enabling upstream distribution and leveraging relationships with distributor and retail channels

	Soybean	Pulses	Alfalfa	Canola	Corn	Wheat	Cotton	Rice
Global Planted Acres¹ (5 year avg. 2009–2013)	~260m	~190m	~15m	~85m	~425m	~540m	~80m	~400m
Inoculants Treated Acres²	~55-60%	~15%	~50%	~5%	~5%	<1%	<1%	<1%
BioAg Existing Product Portfolio	●	●	●	●	●	●	●	●
NA	●	●	●	●	●	●	●	●
LATAM	●	●	●	●	●	●	●	●
RoW	●	●	●	●	●	●	●	●
Current Inoculants Treatment Regime								
Upstream (Seed Company)	○	○	◐	◐	◐	○	◐	◐
Midstream (Distributor/Retailer)	◐	◐	○	◐	◐	◐	◐	○
Downstream (Grower)	◐	◐	◐	○	○	◐	○	◐

● Strong product position
 ● Moderate product position
 ● Minor product position
 ● No current product position

1. Source: FAO stats and Internal estimates 2. Internal Estimates



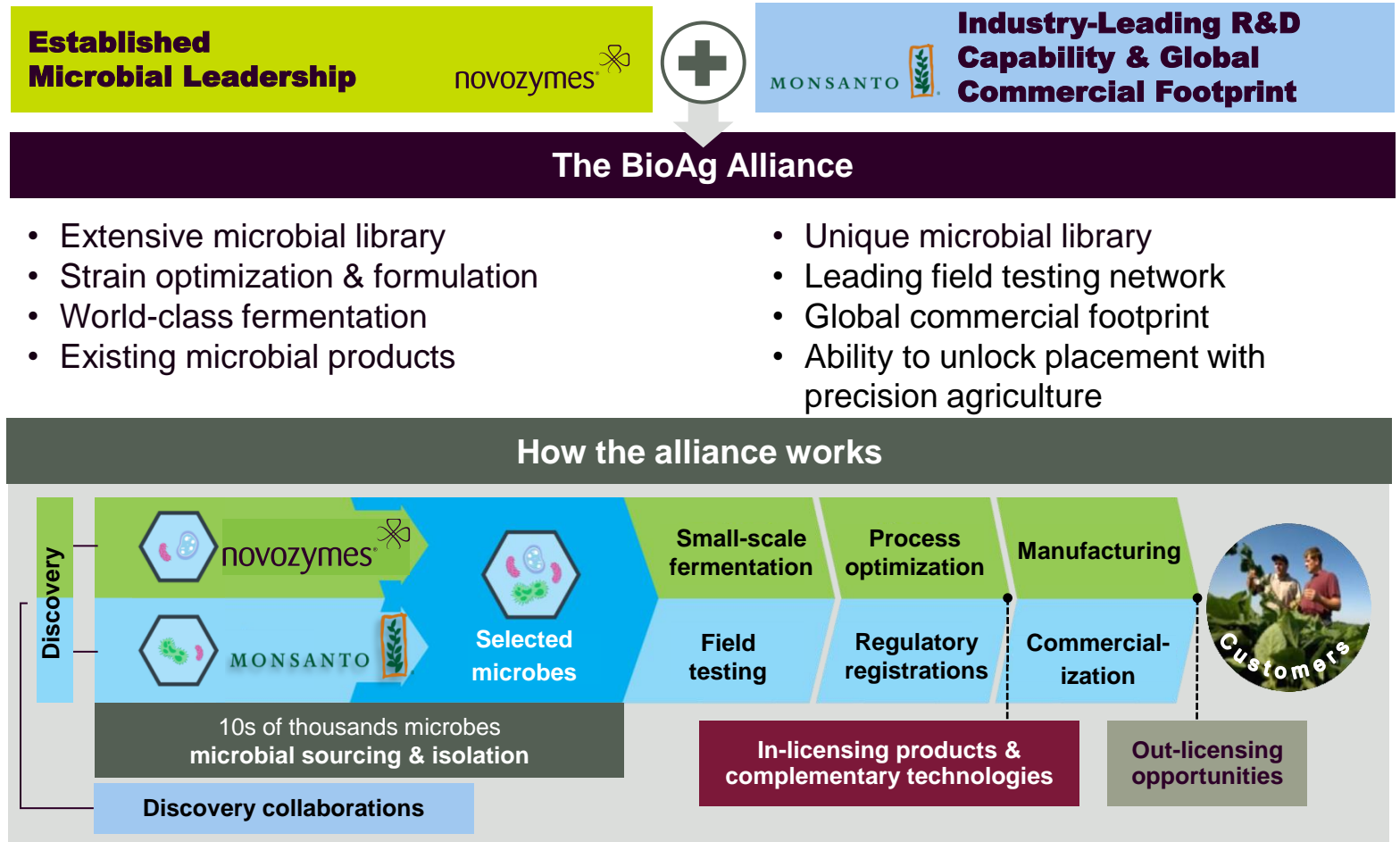
The power of The BioAg Alliance

A unique opportunity...

...to combine Novozymes' and Monsanto's capabilities and establish industry's most advanced microbial platform

A premier vehicle for bringing microbes to market and a sustainable Agriculture platform for farmers to produce more with less

A joint focus to transition this small niche into mainstream Ag practice

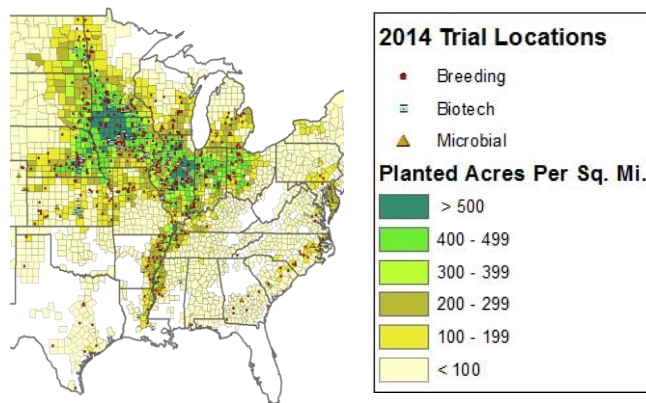


A Strong Start...

– evidenced by the year 1 accomplishments

New Commercial Platform & Defining Collaboration Partnership Model

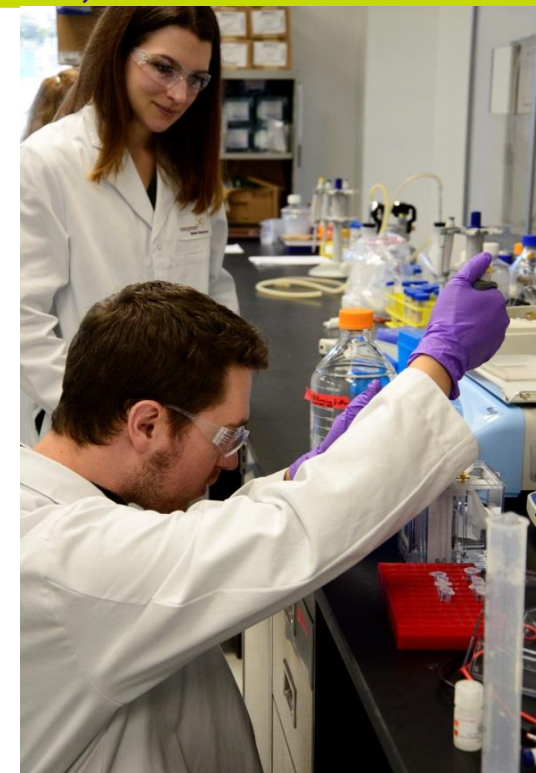
- **Commercial** activities transitioned from Novozymes to new dedicated unit: **Monsanto BioAg**
- **Distribution** transitioning to Monsanto's broad global footprint, enabling distribution through multiple brands, channels and geographies to give farmers more choice
- Leveraging Monsanto's industry-leading field testing network, creating a unique testing platform for microbes of an unprecedented scale
- >50 U.S. corn & soy locations in 2014¹
- 170K plots
- Hundreds of microbes



¹ Planted corn and soybean acre concentration (USDA 2009 – 2013)

New Novozymes BioAg R&D Center in North Carolina, USA

- Establishment of new Novozymes research center in Research Triangle Park, Raleigh, NC
- New team of 100+ scientists working on discovery, small-scale fermentation and stability testing of new microbe candidates across bacterial diversity.



Ag Microbials provide pivotal tools in Monsanto's systems approach to deliver increasing yield

FOCAL POINT: FARMER CUSTOMER



**40+
KEY DECISIONS**

a farmer makes that influence on-farm yields and productivity center on critical needs

SEED

CROP PROTECTION

SOIL FERTILITY

DATA ANALYSIS

GRAIN MARKETING

FINANCIAL MANAGEMENT

LABOR/OPERATION

IN THE SEED

BREEDING

Industry-leading breeding engine drives key commercial advantage for Monsanto globally

BIOTECHNOLOGY

Monsanto's pipeline delivering 3rd- & 4th- gen. upgrades to insect-and-weed-control platforms

SEED



NATIONAL AG RETAIL IN THE BAG OR IN BULK
SHIP
REGIONAL BRANDS



IN THE BAG

MICROBIALS

The BioAg Alliance with Novozymes positions microbial solutions as a next major new technology advance in industry

CROP PROTECTION

New technologies that improve in-field protection

Working collaboratively with our distributor partners to deliver innovative microbial and chemical seed treatments and crop protection products

TREATMENT



IN THE FIELD

BIODIRECT™ TECHNOLOGY

New RNAi-based tools to provide potential new options for disease, insect and weed control

CLIMATE CORP.

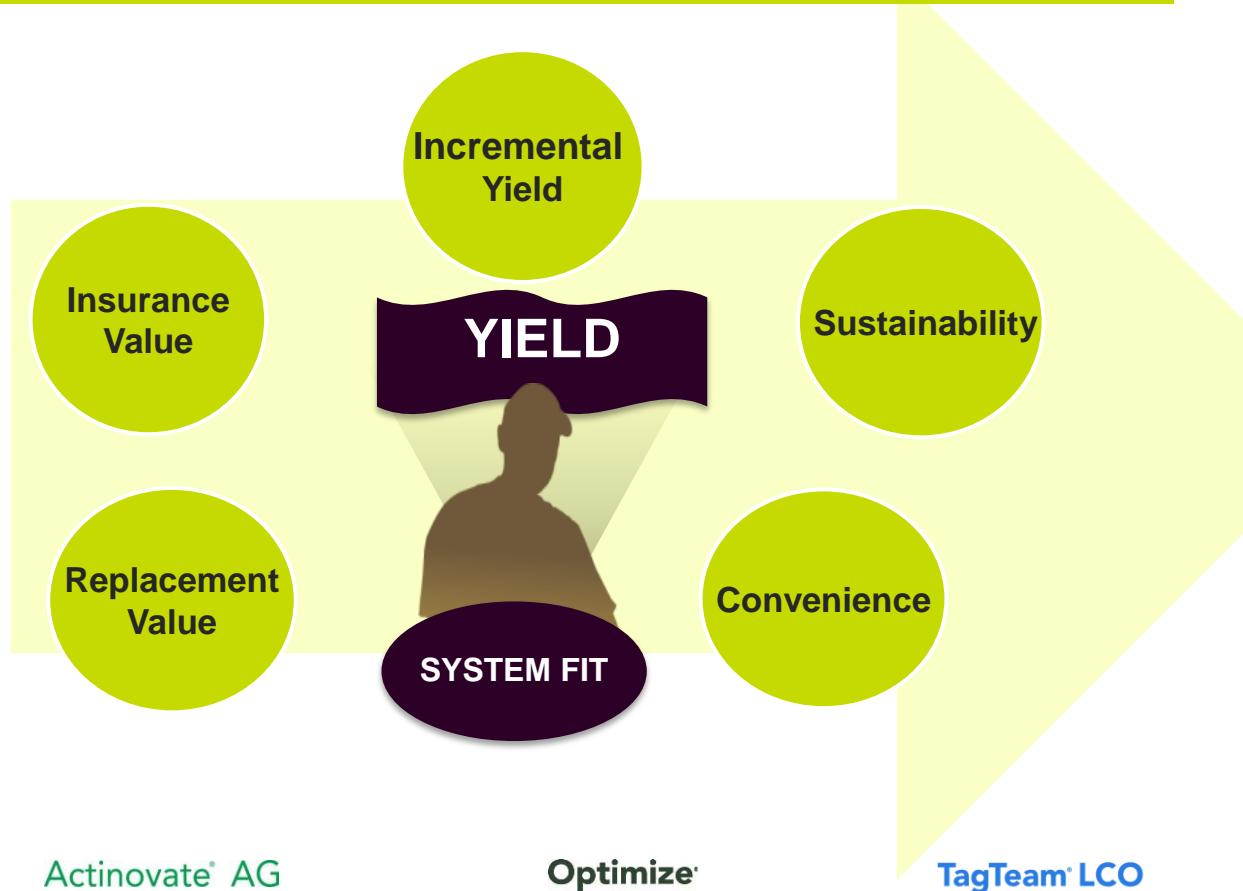
The Climate Corporation has potential as integrating platform for Ag on 1B acre opportunity

Integrating technologies & improving farmer productivity through industry-leading production systems



Microbials can help farmers mitigate risk and maximize yield through soil health and pest control activities

VALUE PROPOSITION TO GROWERS



Microbial value proposition examples

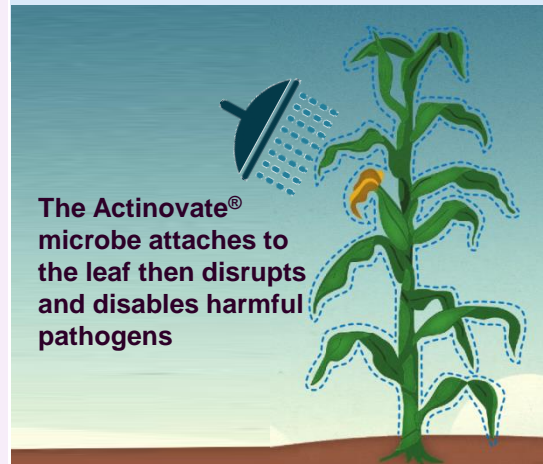
Inoculant example: JumpStart

- Microorganism applied to the seed before planting
- The active ingredient, a soil fungus, grows on the roots and solubilizes the residual soil phosphate, unavailable for plant use
- Yield increases due to superior nutrient uptake in plant's early life stage



BioControl example: Actinovate

- Formulation is water-soluble and may be used as a drench, liquid feed, in irrigation, as a spray or similar applications
- The active ingredient, a beneficial bacteria, effectively protects against many common foliar and soil-borne diseases



Actinovate® AG

Optimize®

TagTeam® LCO

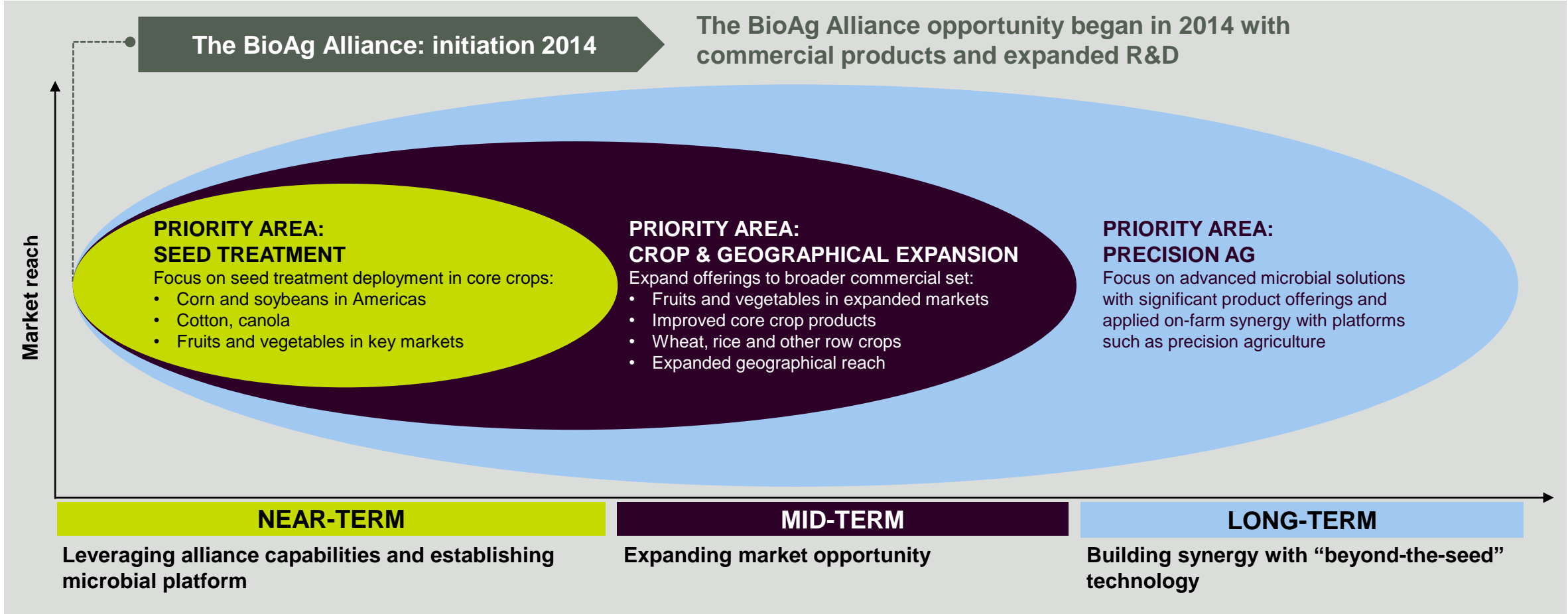
QuickRoots®

Torque®

MONSANTO 

JumpStart® 
 novozymes®

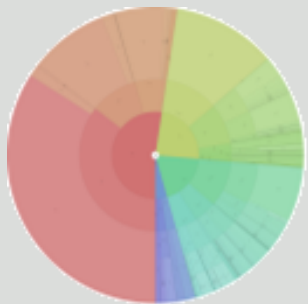
Establishment of alliance to drive microbials as industry platform for next wave of “beyond-the-seed” yield and sustainability solutions



The Bioag Alliance R&D pipeline: Industry's most advanced microbials platform and R&D capability

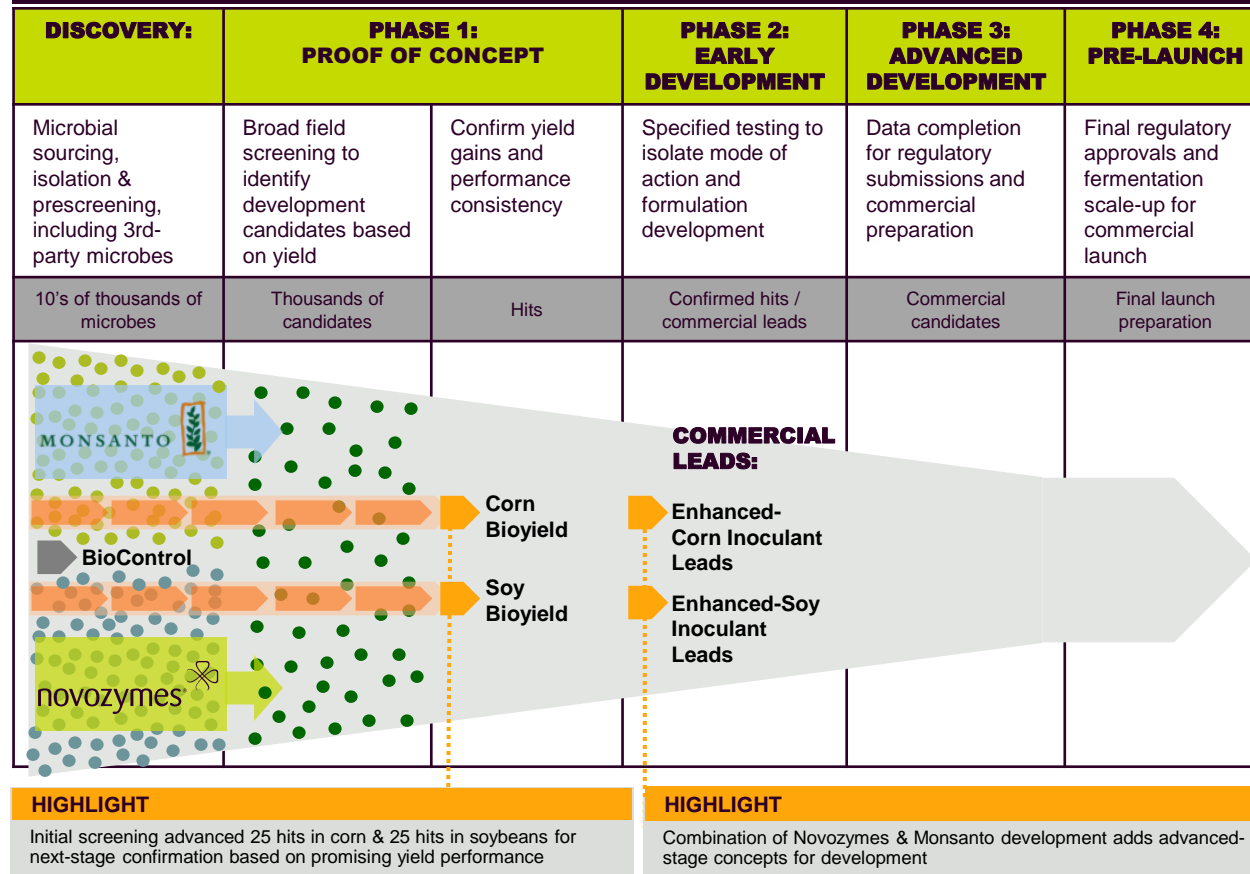
Industry's Most Diverse Microbial Discovery Effort

- Complementary strategies bring broad diversity across genera, and deep diversity within key genera
- The Alliance evaluates and includes key 3rd-party sources as well



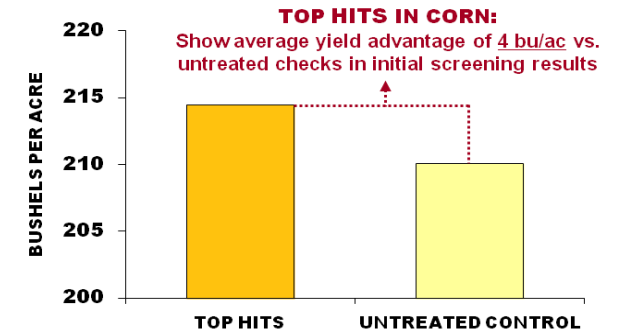
THE BIOAG ALLIANCE MICROBIAL GENERA SOURCES

The BioAg Alliance: R&D Development Pipeline

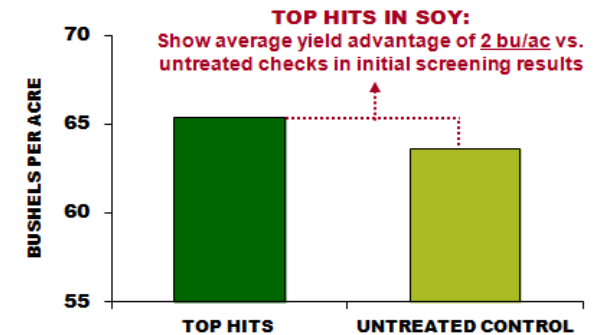


2014 Microbial U.S. Field Trials (Phase 1 Screening)¹

CORN TRIALS: NEW MICROBIAL STRAINS VS. UNTREATED CONTROL



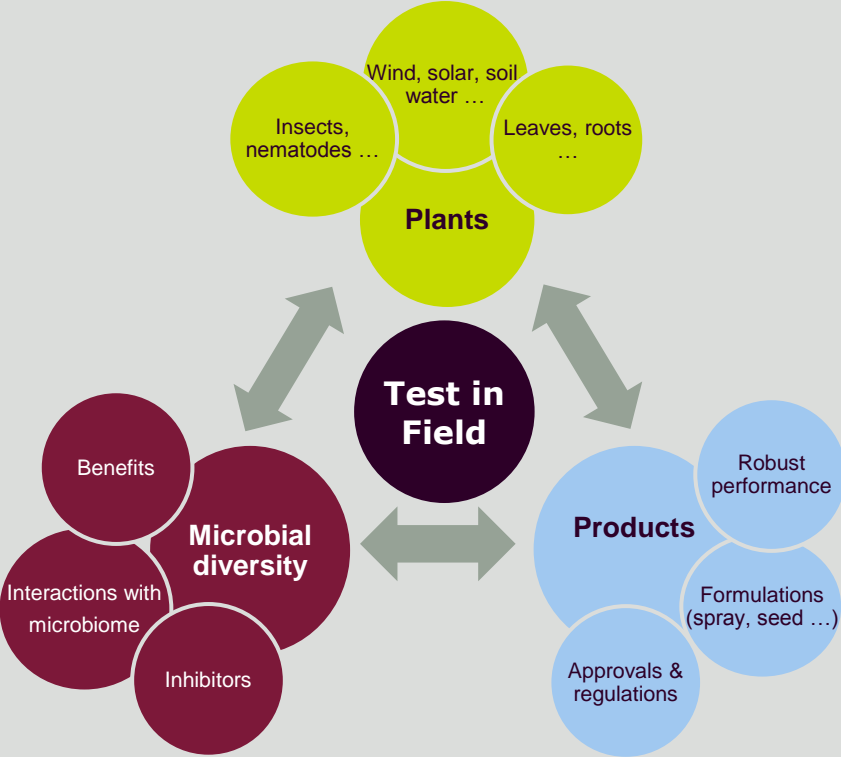
SOYBEAN TRIALS: NEW MICROBIAL STRAINS VS. UNTREATED CONTROL



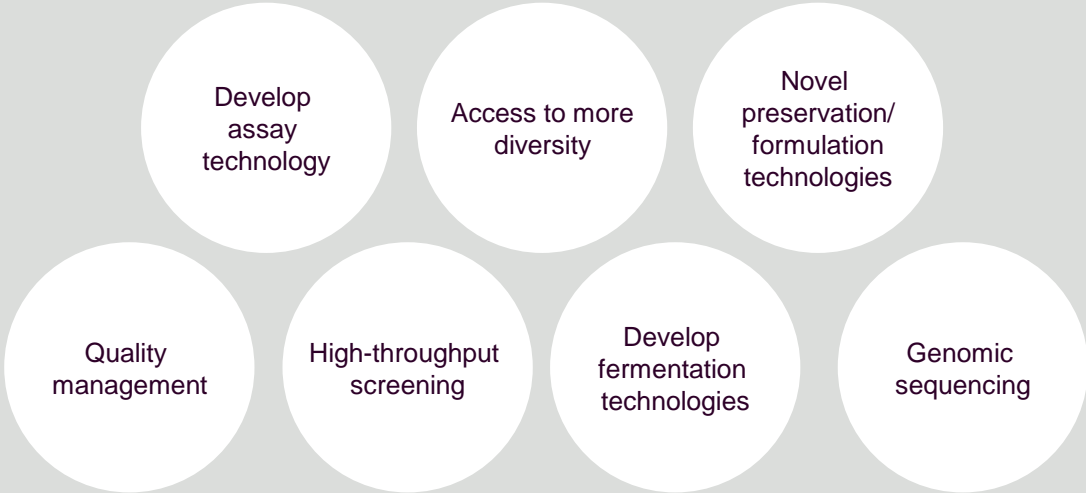
1. 2014 field trial data from early microbial screening in corn and soybeans across more than 50 locations.

Complex microbiome: Deploying novel technology and unique combined expertise to bring new solutions to market

BioAg is a complex world...



...Technology deployment will make the difference



World leading fermentation and upscaling of microbes

Leveraging Novozymes' core competencies:

60+ years of microbial fermentation, upscaling, formulation and quality experience position The BioAg Alliance as leader for the manufacturing of microbes for agriculture

Fermentation scale-up from microtiter to tons



Growth in microtiter plates

Isolation

Test in Shake flasks

Test in lab & pilot scale

Production
Sub-merged or solid state fermentation

Formulation
Liquid, granular or wettable powder

Conclusion

- Tremendous opportunities in agriculture for Ag Biologicals: Sustainable solution to maximize yield potential
- Strong start for The BioAg Alliance with significant year 1 accomplishments
- R&D capabilities positioned to unleash long-term potential
- Near-term we expect to increase penetration of existing technologies
- Approach and capabilities of both parties are differentiating factors from the competition and increase the likelihood of success



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