

# **Evogene's Ag-Biologicals Division**

Microbiome driving crop productivity

Introduction



Ido Dor, EVP & GM, Ag-Biologicals Jan 2018

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## **AGENDA**

## **'Evogene Inside' – introduction to Evogene**

Evogene's Ag-Biologicals Division

Summary

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### What We Do



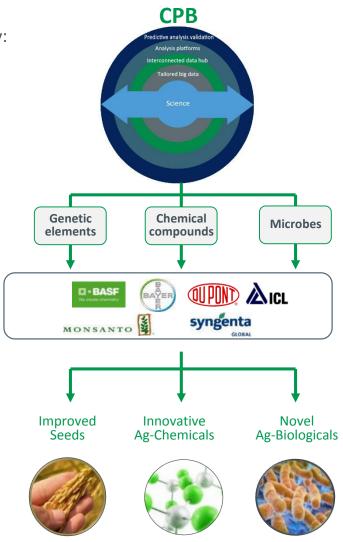
We develop novel products for lifescience markets... ...through the use of a unique computational predictive biology platform



## **Evogene at a Glance**



- Computational Predictive Biology (CPB) Platform applied to identify:
  - Genetic elements for improved seeds
  - Chemical compounds for innovative Ag-Chemicals
  - Microbes for novel Ag-Biologicals
- Strategic collaborations with world-leading agriculture companies including BASF, DuPont, Monsanto, Syngenta, ICL
- Revenue model based on licensing agreements, which typically include three main revenue streams:
  - R&D payments short term
  - Milestone payments mid term
  - Royalties from product sales longer term
- Subsidiaries -
  - Evofuel (100%) Castor Seeds
  - Biomica (90%) Human Microbiome
- Financial fundamentals -
  - Cash position \$76 million (September 30<sup>th</sup>, 2017), no debt
  - Listed on TASE (2007) and NASDAQ (2013)



# **Computational Predictive Biology (CPB) Platform**









PointHit™
Chemical discovery



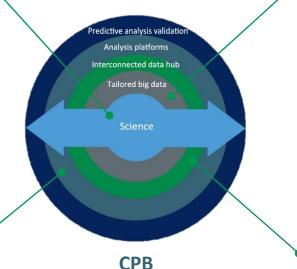
Gene optimization Gene optimization



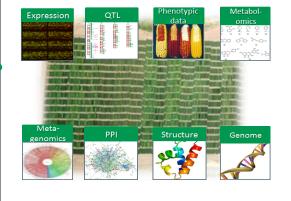
BiomeMiner™
Toxin discovery



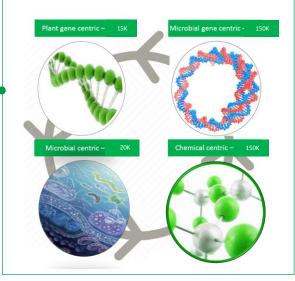
Driving Innovation 'Connecting the Dots'



#### Tailored big data







# **Predictive Analysis and Development System**













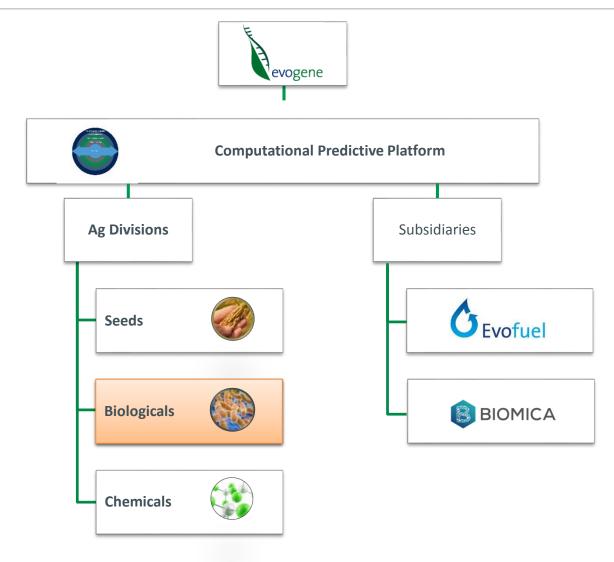






# **Corporate Structure**





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### **Evogene's Ag-Biologicals Division**

- Ag-Biologicals Market
- Vision & Strategy
- Technology
- Pipeline & Collaborations

Summary

## **Industry Challenges & Opportunity**



#### **Need for innovation**

- Increasing resistance
- Regulation pressure
- Decline in product introductions

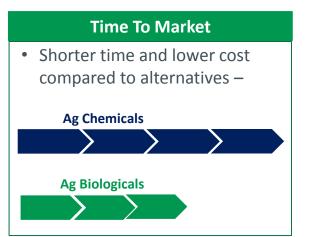




#### **Green and Safe**

Awareness, regulations and practices





#### Ag-Biologicals - a new pillar in agriculture productivity

#### **Seeds & Traits**



~\$40B

#### **Ag-Chemicals**

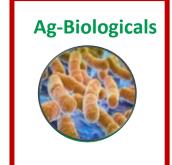


~\$50B

#### **Fertilizers**



~\$100B



## **Ag-Biologicals**



#### Products derived of natural sources

## **Ag-Biologicals Sources:**

#### **Plant Extracts**



Plant derived chemistry

#### Microbial



e.g. bacteria or fungi

#### **Macrobials**



Pest natural enemies

#### **Bio-Stimulants**

Mediating plants' response to optimize yield potential



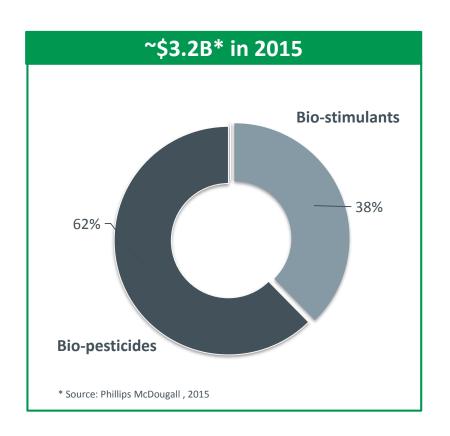
#### **Bio-Pesticides**

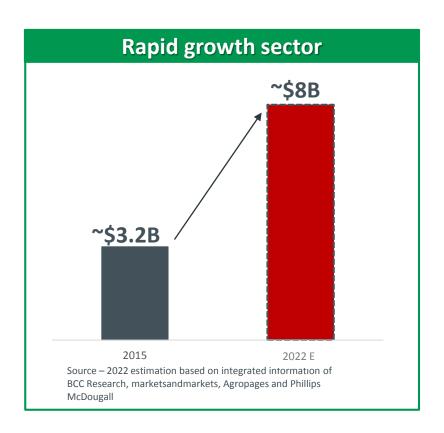
Support the plant by reducing pest damage to the plant



# **Ag Biologicals Market**







Fast growing sector with potential to complement Ag-Inputs market

## **Industry Recognition of the Microbiome Opportunity**



## Major Ag companies – actively invest in order to build position









## **Emerging startups** – significant investments in recent 2-3 years







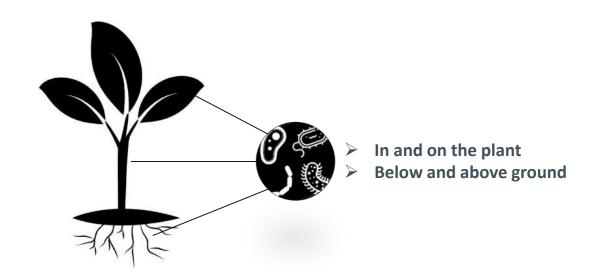


## **The Microbiome Opportunity**

**Billions of Microbes Matter!** 



## Microbiome is driving crop's productivity

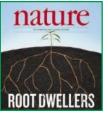


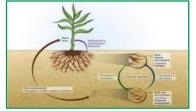
#### Human microbiome understanding





# Leveraged to plant microbiome research nature





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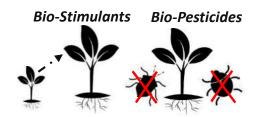
### Summary

## **Ag-Biologicals Division's Goal**





# To introduce environmentally safe and effective microbiome based Ag-Biological products driving crop's productivity



#### **Addressing Key Challenges**

Addressing key challenges of:

efficacy, stability and commercial viability

#### Efficacy

Significant improvement / protection of yield

#### Stability

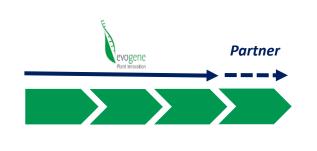
Consistency across germplasms / geographies

# Commercial viability

Shelf-life COGS

#### **Position on Value Chain**

- > Short time to market
- End to end capabilities for product development



## **Product Offering**

Evogene's Ag-Biologicals Product Strategy



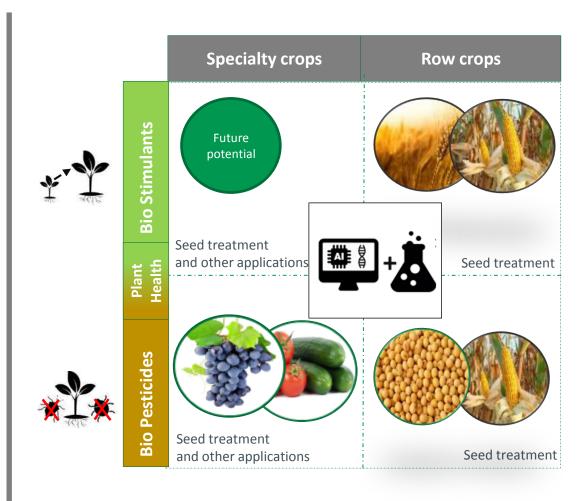
Balance between Row and Specialty crops & direct vs. indirect market access

Balanced product programs: Bio-stimulants and Biopesticides

Enabling Fermentation & Formulation technology - driving product stability and efficay

Leverage of core program for extension into new product types

Cost effective application paths



#### **Position on Value Chain**



**Discovery** 

Early Development Development stage 1

Development stage 2

Precommercialization

evogene

Model A

Partner

evogene

Model B

Distributor

#### Model A – Indirect Market Access

- Focus mainly on <u>row crops</u>
- Go-to-market based on partners channel

### Model B – Direct Market Access

- Focus mainly on high value specialty crops
- Commercialization through distributors
   / strategic licensing agreements

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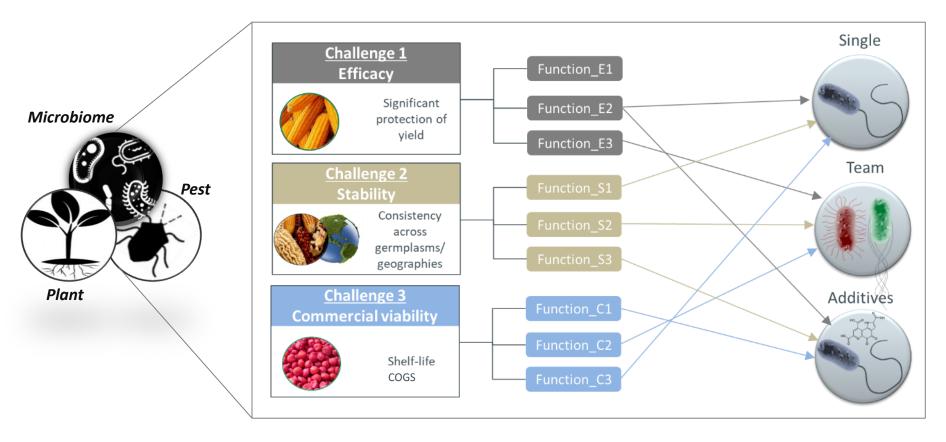
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## **Approach**



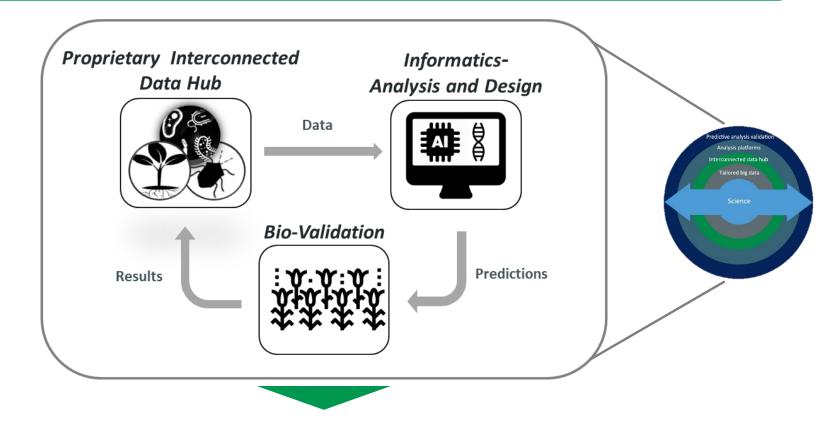
Decoding complex plant - pest - microbiome interaction for the identification of genetic elements with desired features for the development of microbial based products



## **Technology – Computational Predictive Biology Platform**



Utilizing a proprietary *Computational Predictive Biology (CPB) Pl*atform harnessing the power of genotypic & phenotypic *BIG DATA* through advanced informatics

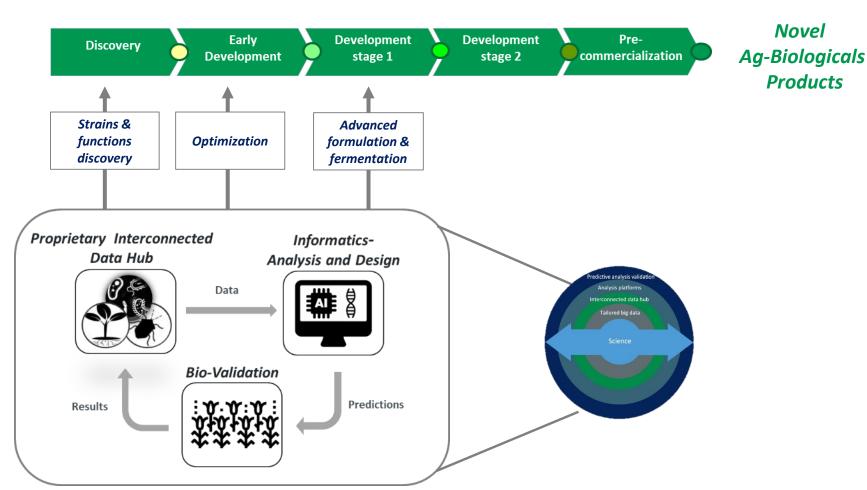


Novel Ag-Biologicals
Products

## **CPB Platform to Support Product Development**



Utilizing a proprietary *Computational Predictive Biology (CPB) pl*atform harnessing the power of genotypic & phenotypic *BIG DATA* through advanced informatics



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# Ag – Biological Product Portfolio





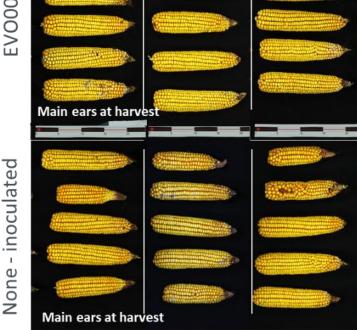
			Discovery	Early Development	Development stage 1	Development stage 2	Pre- commercialization
Bio-Stimulants	1	Corn	QUPON				
	2	Wheat					
Bio-Insecticides	3	Corn Root Worm					
	4	Stink-Bug - soy					
	5	Lepidoptera - specialty					
Bio-Fungicides	6	Fusarium bio- fungicide - Corn					
	7	Mildews Bio- Fungicide - grapes					

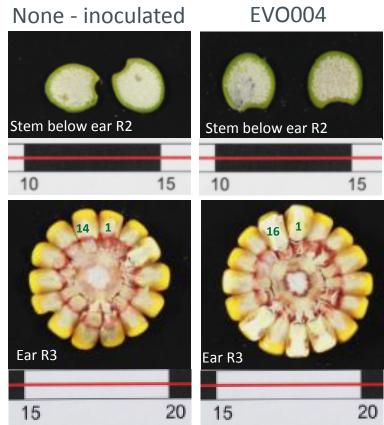


# 10% Yield improvement in field trials (2016, 2017)

Under moderate drought

None 
Stem below



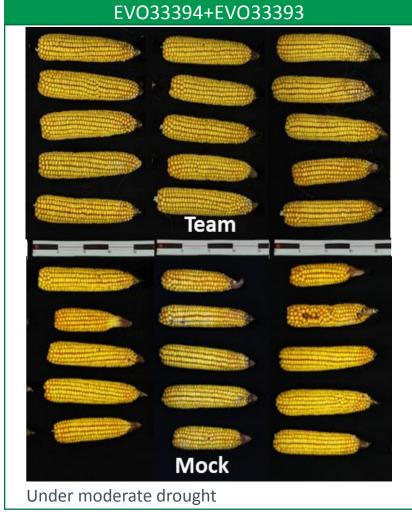


## Results

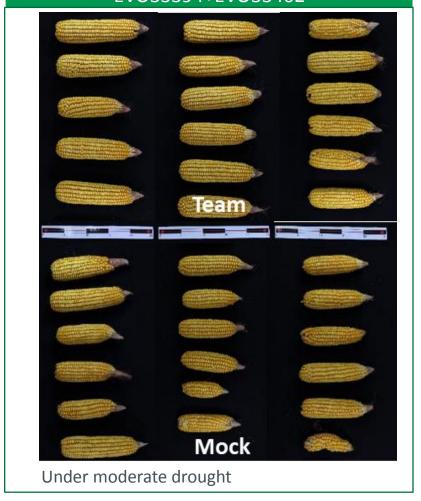
#### Bio-Stimulants examples



# **18%** yield increase in field (2017)



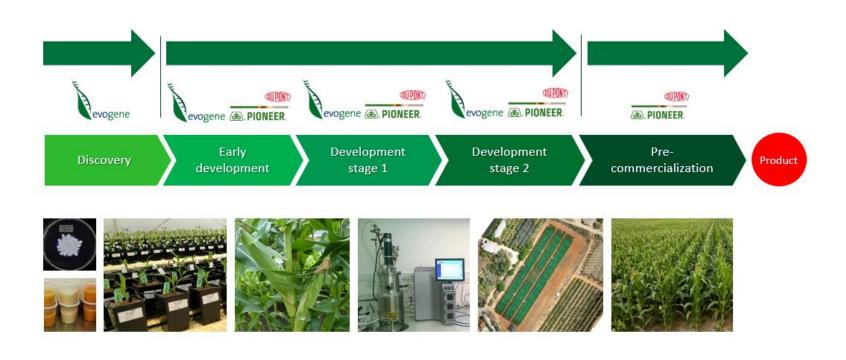
# **13%** yield increase in field (2017) EV033394+EV033402



## **DuPont-Pioneer - Evogene Collaboration**



DuPont Pioneer & Evogene Announce Multiyear Research Collaboration for Development of Corn Bio-Stimulant Products



## **Results**

Bio-Insecticides examples (initial Lab, Greenhouse)

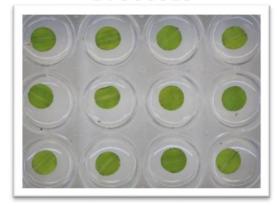


## Western corn root worm 83% increase in leaf area 50% reduction in insect survival

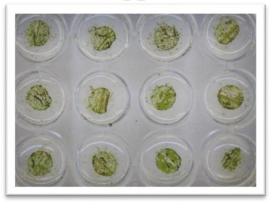


# Fall Army Warm Leaf disk assay results

#### EVO30013

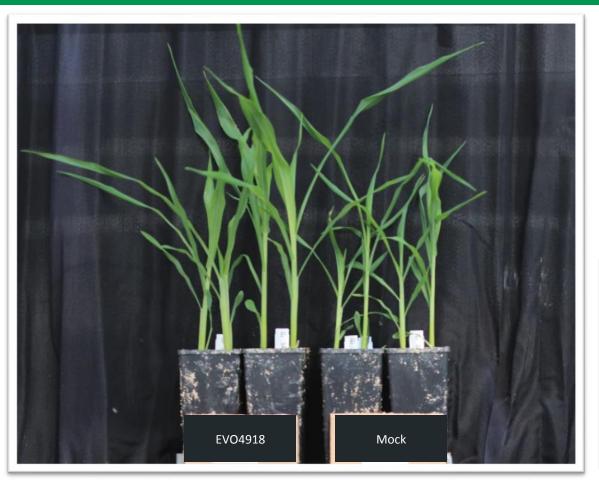


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# Fusarium in corn - ~70% reduction in disease severity







## **AGENDA**

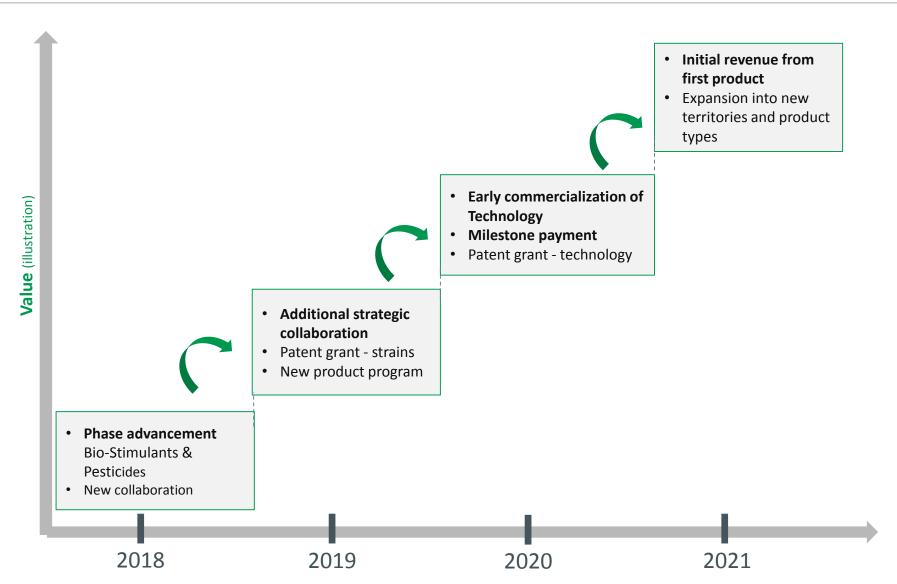
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Evogene's Ag-Biologicals Division

## **Summary**

# **Value Creation Roadmap**





## **Summary**



- Ag–Biologicals fastest growing sector in Agriculture inputs, expected to reach \$8B in 2022
- 2 Ag-Biologicals time to market is relatively short due to favorable regulatory landscape
- 3 Microbiome is a promising opportunity to drive Ag-Biologicals market's expansion
- Evogene's Computational Predictive Biology platform (CPB), combining biological understanding and cutting-edge computational technology is key for next generation product development
- Initiated in 2015, Evogene already generated valuable product pipelines for bio-stimulants & bio-pesticides is in place potential 1<sup>st</sup> product launch in 2021



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