

Biological fungicide: Pathway to commercialization



Ceradis[®] Crop Protection
Green innovations

Exceed the Seed

9 December 2019

Introduction Ceradis

Biological fungicide: Pathway to commercialization

Q&A

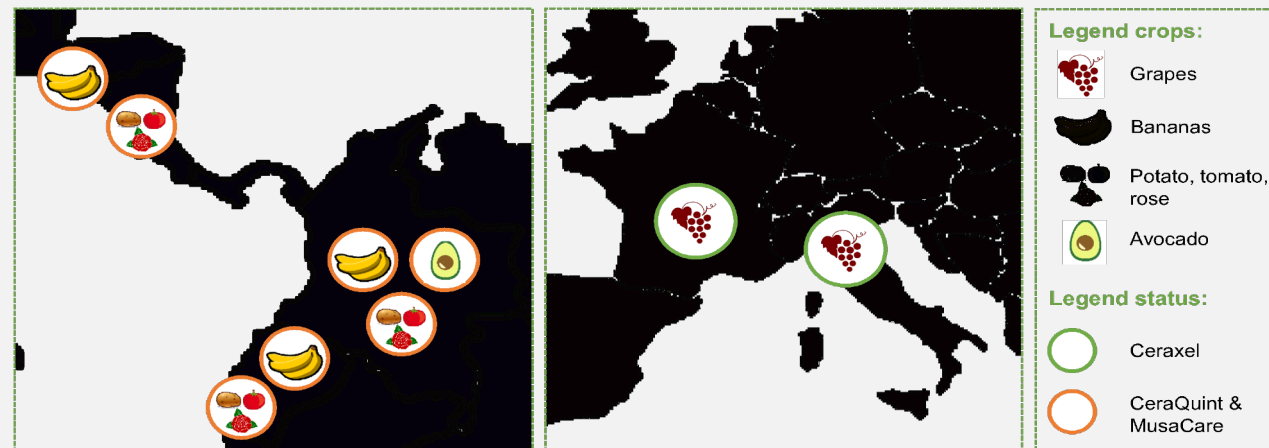
Introduction Ceradis and Ceradis products

- Ceradis goal: reducing chemical loading with 50%
 - Biologicals *without compromises*
 - Dose reduction formulation technologies
- Wageningen university Spin off
 - 4 technology platforms, 11 patents, 12 commercial products, in more than 20 countries
- Bring Ceradis technology to the United states

Key customers



Overview of main products in market



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Pathway to main stream commercialization: Next Generation Biologicals

	Efficacy	Mode of action	Compatibility	Shelf life	Biological
Main stream products	✓	✓	✓	✓	✗
First Biologicals	✓/✗	✗	✗	✗	✓
Next Generation Biologicals	✓	✓	✓	✓	✓

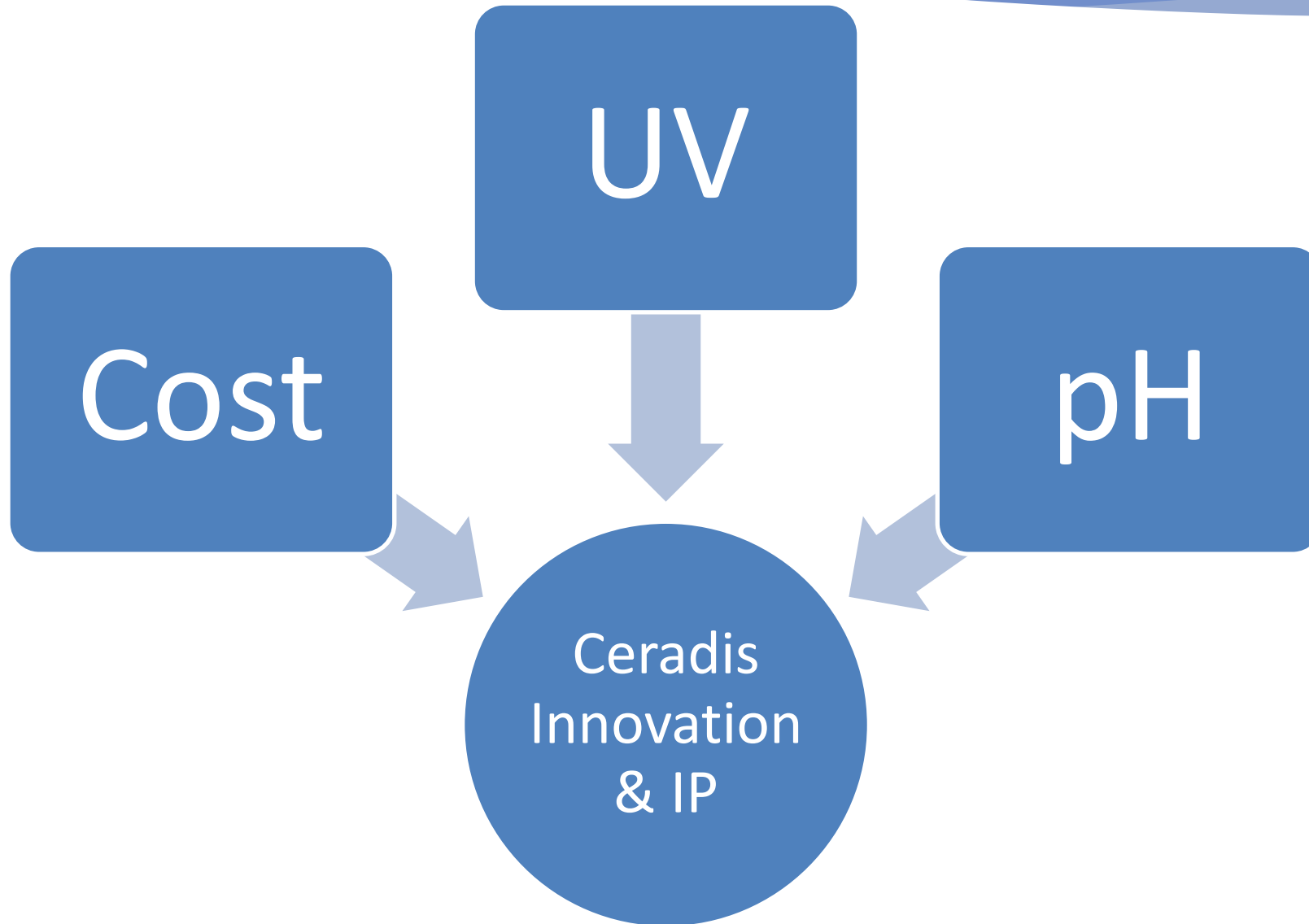
Example of Next generation Biological: Natamycin



Active substance
Natamycin

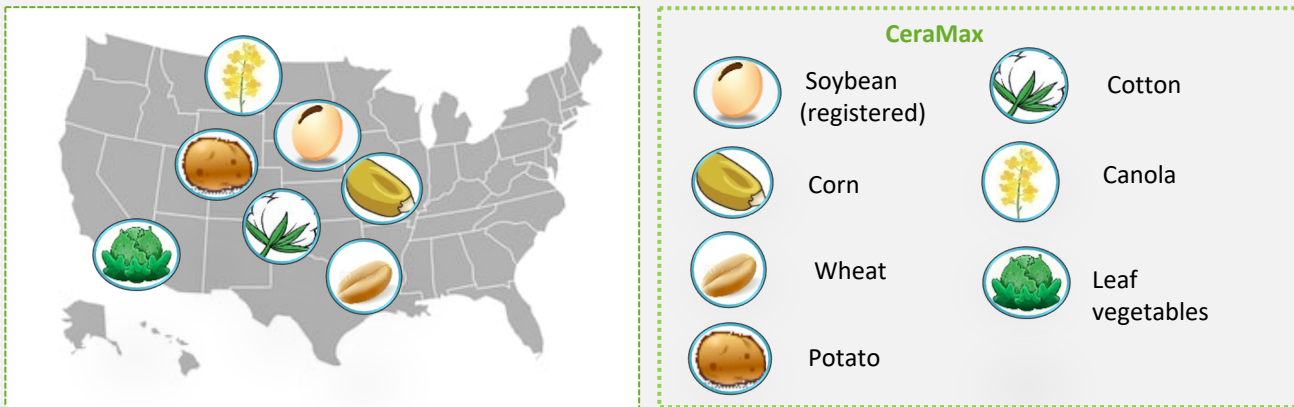
Efficacy	Mode of action	Compatibility	Shelf life	Biological
✓	✓	✓	✓	✓
Same as chemicals	Known	No problem	No problem	Yes
Broad fungi spectrum	F8: Ergosterol Binding	With chemicals and biologicals	2 year stability	Produced by Bacteria

Ceradis' solutions for Natamycin



CeraMax for the USA seed treatment market

Current and potential CeraMax seed treatment crops



CeraMax

- Soybean (registered)
- Corn
- Wheat
- Potato
- Cotton
- Canola
- Leaf vegetables



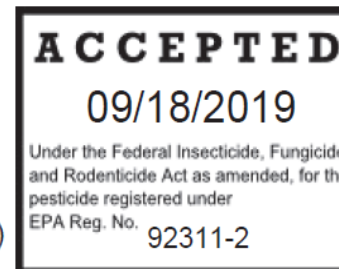
Sudden Death Syndrome



Seed treatment for the protection against Fusarium on soybean seeds

ACTIVE INGREDIENT:	
Natamycin	13.459%
OTHER INGREDIENTS:	<u>86.514%</u>
TOTAL	100.000%

Contains 1.25 lbs Natamycin per gallon (150 grams Natamycin per Liter)



In three years of field trials, CeraMax showed consistent SDS control similar to ILeVo

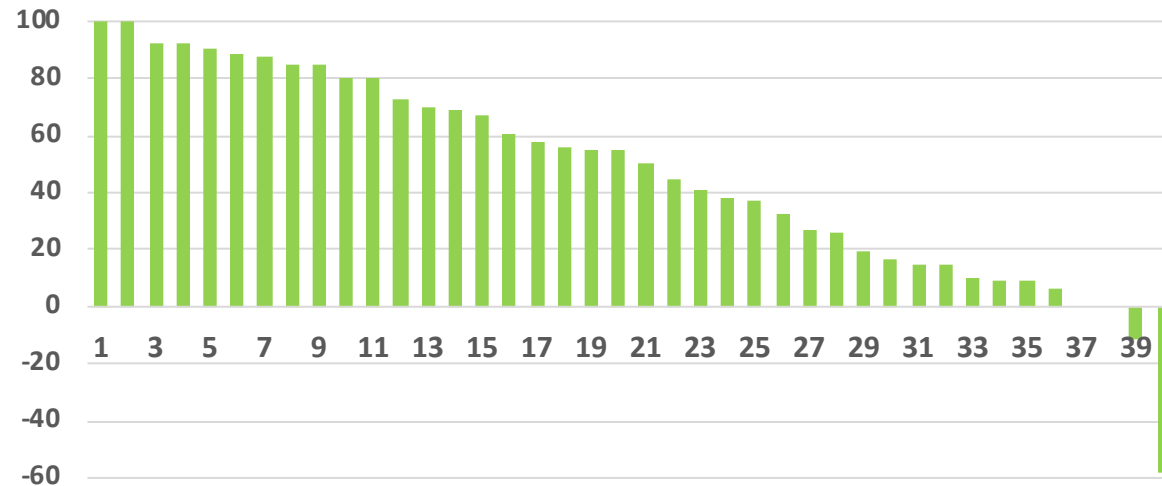
Consistent similar control to ILeVo

- Over 50 field trials
- In 10 different states
- In 3 years (2017-2019)

Consistent similar yield increase to ILeVo

4.3 bu/a increase compared to base treatment (ASSAS)

SDS control CeraMax vs base treatment
2019



Treatment	SDS control (%)	Win % vs. ASSAS
ASSAS + ILeVo	39.5	77.5
ASSAS + CeraMax	46.8	95.0

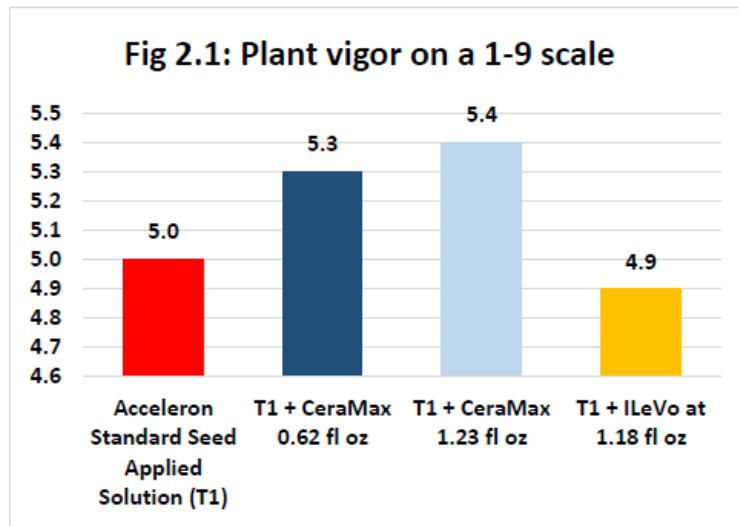
SDS control from 10 large strip trials with a total of 40 plots in 2019. Effect of adding CeraMax to basetreatment

CeraMax benefits over ILeVo

CeraMax showed better plant vigor and seedling disease control compared to ILeVo

Better plant Vigor

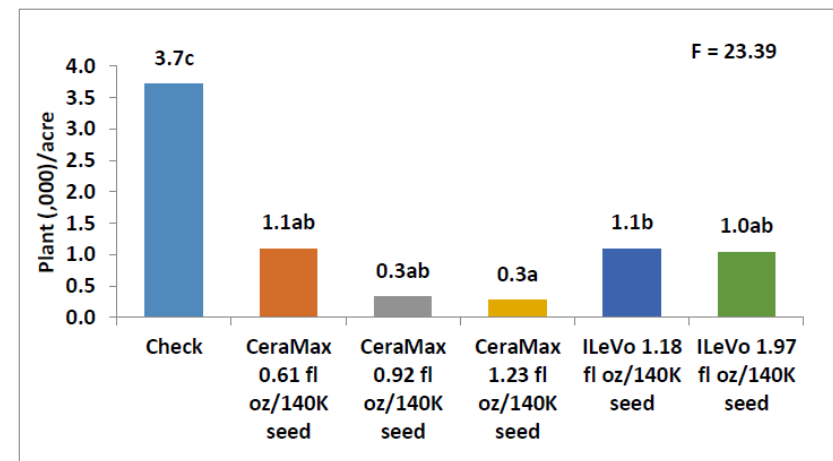
- * CeraMax significantly increases the Plant Vigor across 14 large strip trials at 28 days after planting.
- * CeraMax shows no phytotox on the cotyledons, a known side effect of ILeVO.



* Average over 14 large plot trials, 28 days after planting

Better control on seedling diseases

- * CeraMax showed better control of other seedling diseases compared to ILeVO.



* *Rhizoctonia spp*

* One location in IA, 28 days after planting



Ceradis® Crop Protection

Green innovations

CeraMax®

SC



CeraMax is a next-generation biofungicide for seed treatment, starting with soy SDS control

Thank you for your attention

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**Biological seed treatment to control
Sudden Death Syndrome on soybean
seeds**



*Ceradis develop innovative environmental
friendly solutions for Plant Nutrition
and Crop Protection in order to create
safer food and a
cleaner environment*