



Biological solutions for agriculture

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Always thinking ahead **BECKER
UNDERWOOD**

BioStacked®

Inoculants | Stacking your Yields.

HiStick® N/T: We hope you're hungry. For yield!

HiStick® N/T soybean inoculants are BioStacked® for increased crop performance.

Our unique, patented micro-organism, *Bacillus subtilis*, acts as a Nodulating Trigger® and in combination with *Bradyrhizobium japonicum* results in more vigorous plants with greater root biomass, more nitrogen-fixing nodules, and what you really want – increased yield.

HiStick® N/T — value and performance that really stacks up™.



HiStick N/T
www.hysticknt.com the BioStacked Inoculant

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Seed enhancement

Sepiret[®], FloRite[®]



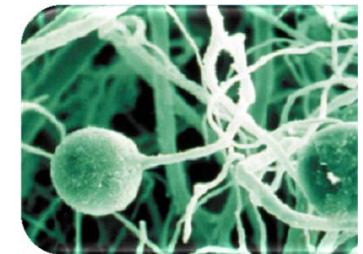
Specialties

Green lawnger[®] Turf mark[®]



Biological solutions

HiCoat[®], Vault[®] HP



Biological Solutions

Bacillus subtilis

Trichoderma harzanium

Beauvaria Bassana

Metharhizium Anisopliae

Beneficial Nematodes

Agrobacterium radiobacter

Paecilomyces illacinus

Biostacked Solutions

Integral[®] Clarity[®] subtilex[®]

Tricho plus[®]

Broad band[®]

Green muscle[®] Green guard[®]

Némasys[®] Nemaslug[®]

Nogall[®]

PL gold[®]

BioStacked[®]
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Challenge

Population increase

9 billion in 2050
*Food production will have to increase by 70 %
(FAO, 2008)*



Emerging challenges :

Water, Fertilizer, pesticides, cultivated areas,
climatic conditions



Research and development

- Breeding program
 - Development of new agricultural techniques
 - Crop rotation
 - Pesticides
 - **Development of new biological solutions**
- New cultivars
Biotechnology

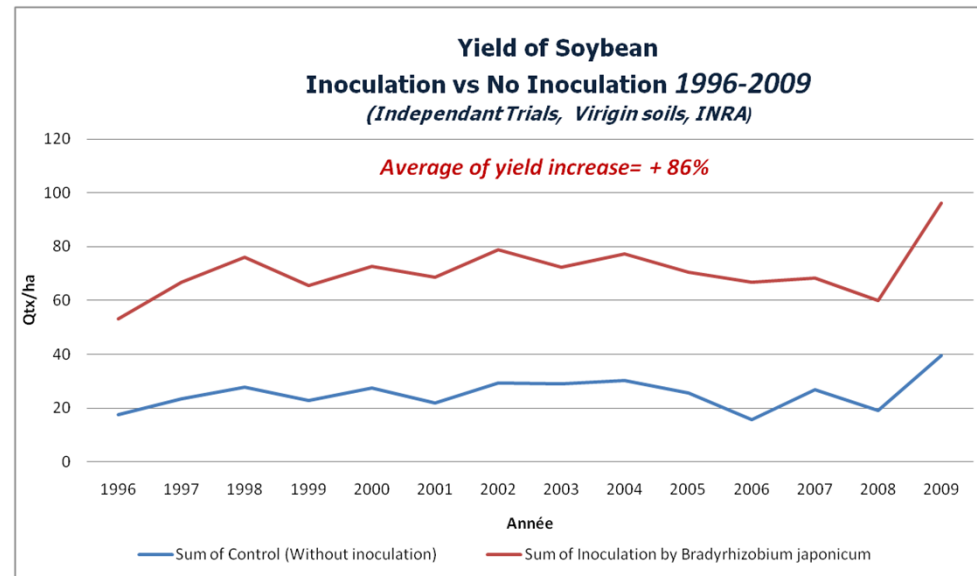


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Origin of the project

Long history of manufacturing products containing naturally occurring biologicals

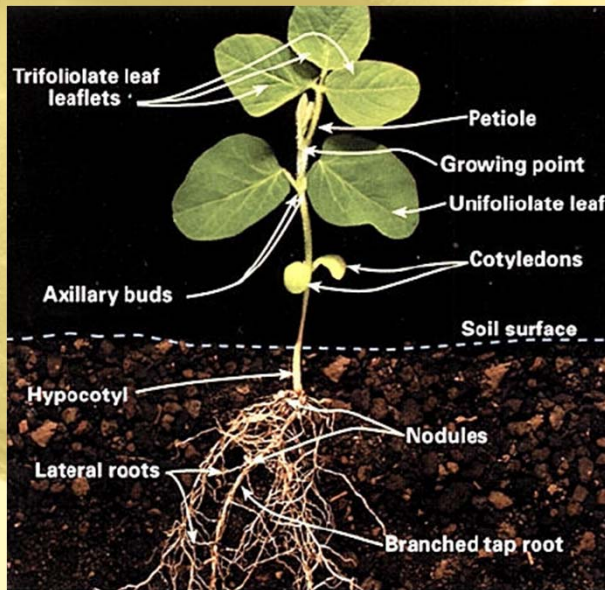


Generally, speaking, difficult to achieve consistent efficacy benefit with variable pest/environmental pressures experienced from year to year, from location to location

A potential to explore ...

Biostacked® concept

Plant Growth Promoting Rhizobacteria



Bacteria inhabiting rhizosphere and beneficial to plants are termed P.G.P.R. (2-5 % of rhizosphere bacteria)

Direct mechanisms

- Plant growth regulator production
- Ethylene synthesis inhibition
- Induction of systemic resistance
- Root permeability increase
- Organic matter mineralization
- Mycorrhizal fungus association
- Insect pest control

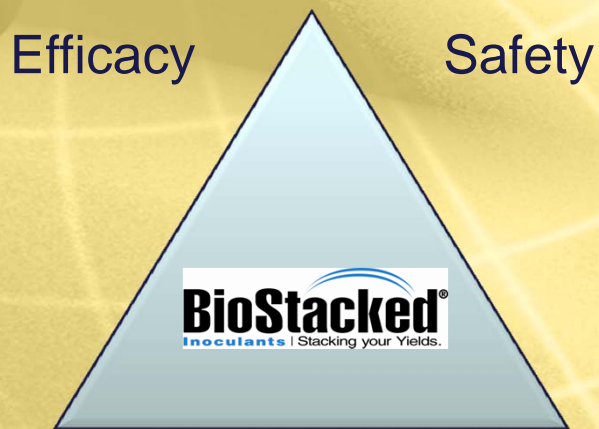
Indirect mechanisms

- Free nitrogen fixation
- Production of siderophores
- Phosphate solubilization
- Hydrolysis of molecules released by pathogens
- Synthesis of enzymes

Biostacked® : Combination of complementary biologicals and bioactives

- Greater consistency of measurable effects
- Opportunity to reduce the chemical load on the environment
- Pest resistance management tool (via different modes of action)
- Can overcome the perceived inconsistency of biological-based products

Development of Biostacked[®] solutions



User friendly

Safety

Preliminary/ Advanced toxicology
Environment and worker safety

Efficacy

Yield and Quality
Field testing/ multi-local trials
Advanced formulation and process of production

User friendly

Shelf life
On-seed survival
Compatibility with chemical treatment

Biostacked[®] first generation (USA)

VAULT^{HP}
HIGH PERFORMANCE



VAULT LVL

VAULT HP

- Same variety
- Same seed treatment
- Same field

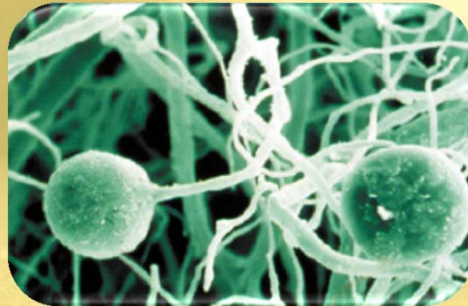
- On seed patented technology
- EPA-Registered biofungicide
- Selected strain of natural rhizobia
- Patent pending inoculant formulation
(10 billion CFU per millimetre of product)
- New patent pending packaging technology

Biostacked[®] Second generation



- Currently in second- or third-year field trials (more than 300 field trials in 2009)
- Both Northern and Southern Hemispheres
 - North America
 - South America
 - Australia & New Zealand
 - South africa
- Europe is a specific case (regulation)

Conclusion



- Biologicals have a great potential :
 - Seed treatments,
 - Foliar application,
 - Soil application
- ... as stand-alone and in combination with traditional nutritional and crop protection products.

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the BioStacked inoculant

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Prody distributed by:

A promising solution...



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**Thank you
for your attention**

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