

# Legume Inoculation



David Allen

**INTX**  
MICROBIALS, LLC

# Our Facilities



## } Two facilities in Kentland, Indiana

- 24,000 sq. ft. building houses production
- 105,000 sq. ft. building houses finished products and corporate offices
- All non-sterile products are produced in Kentland, IN

## } One facility in Wichita, KS

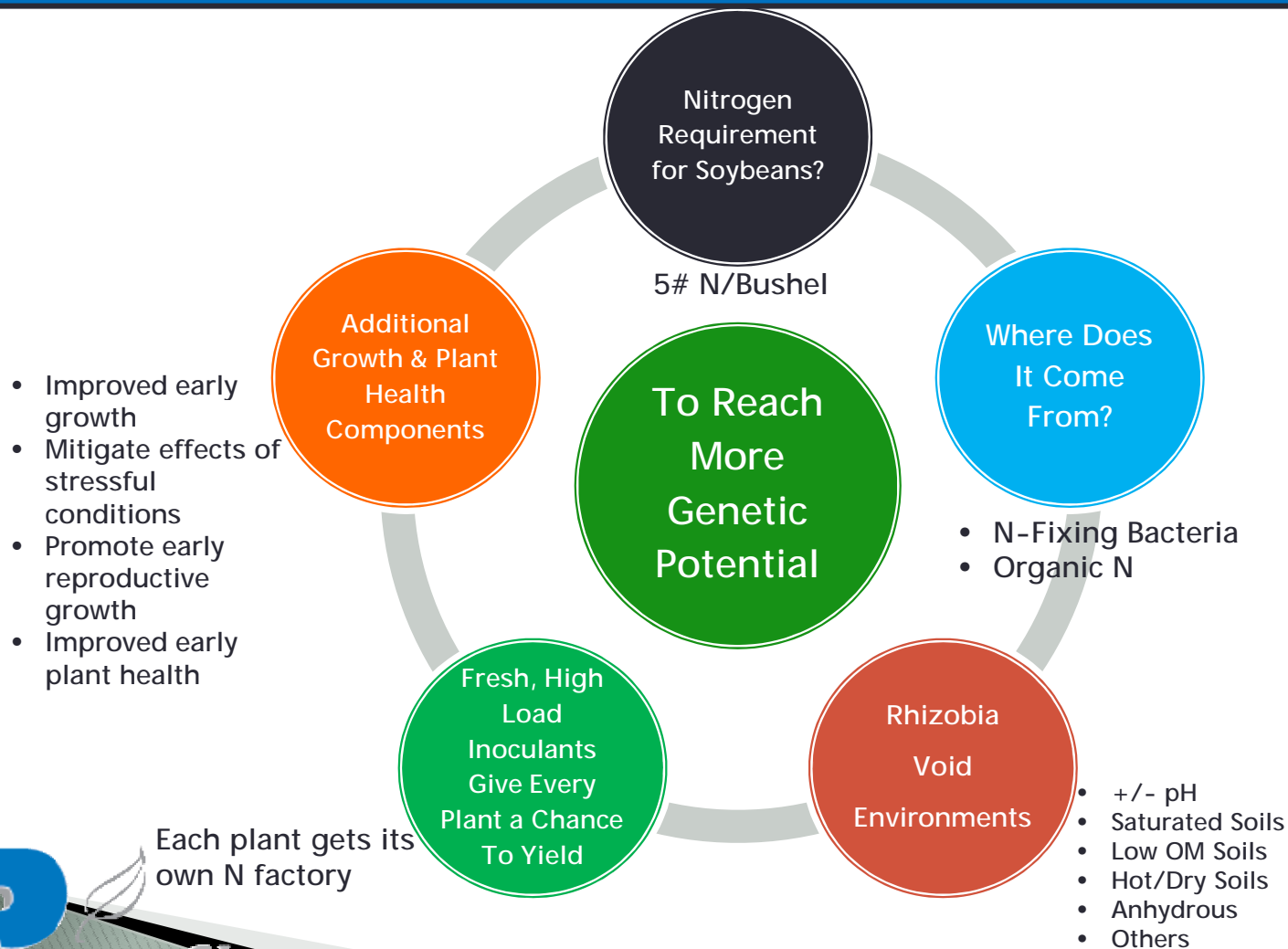
- 10,000 sq. ft. building houses production
- All Aseptic rhizobium production is performed in Wichita, KS.

**Most  
technologically  
advanced  
fermentation  
facility in North  
America**





# Inoculants: Why?



Each plant gets its own N factory



# 2012 Was NOT Friendly For Rhizobia Survival!

 CROP OBSERVATION AND RECOMMENDATION NETWORK  
**C.O.R.N. Newsletter**  
BY THE AGRONOMIC CROPS TEAM



**Survival of Soybean Rhizobia Cells in Soil**  
Jim Beuerlein, Harold Watters, CPAU/CCA

The dry weather of 2012 has given cause for worry about many areas of crop production. On a recent trip to Ukraine, it became obvious that high soil temperatures and dry surface conditions there have greatly reduced rhizobia populations. This is a country where soybeans are only recently being established, first year soybeans even with inoculants applied are suffering from lack of nitrogen due to the lack of rhizobia development. While we in Ohio have a long relationship with soybean and rhizobia, conditions this year may lead to concerns for next year.

Soybean rhizobia bacterial cells survive best when they are in a moist soil environment and an ambient soil temperature of 40-80 degrees F. The drought throughout the Ohio in 2012 has resulted in the top six inches of soil becoming extremely dry and very hot in many fields. Either a very dry soil environment or a very hot soil environment causes the rapid death of rhizobia cells and the combination is lethal. Therefore, we would expect a reduction in the population of residual soil rhizobia cells in many Midwestern soybean fields in 2012 due to those soil conditions. Although many cells will survive the extreme environmental conditions, those cells will have evolved into survival mode and will have lost much of their potential to provide nitrogen to soybean plants in 2013. That means the surviving rhizobia population will likely be less productive next year than in previous years. That reduced productivity should translate into increased yield responses to inoculating soybeans and other legume seeds in the spring of 2013.

- Rhizobia that survived have gone into “survival mode”
- “Lost much of their potential to provide N in 2013”
- We should expect “increased yield responses to inoculating soybeans and other legume seeds in the spring of 2013.”

OSU Corn Newsletter. Jim Beuerlein & Harold Watters

**INTX**  
MICROBIALS, LLC

# PRIMO<sup>CL</sup> High Performance Inoculant & Yield Enhancer



*“Converting Potential To Bushels”*

# Converting Potential to Bushels

**Unmatched Handling Quality**



**Superior Performance and Concentration**

**Incomparable Service**



# Handling: Assured Highest Quality

- **Most Technologically Advanced Production Facilities**
- **Level 4 Biological Manufacturing Standards**
  - Level 1 required for Inoculants
  - Level 5 Human Pharmaceuticals
- **One Year Product**

**Freshest Product**  
**+ Latest Formulation**  
**= Best Possible Performance**





# Handling: PRIMO<sup>CL</sup> has a Superior Formulation

- **Low Use Rate**
  - 2.5 ounces / cwt. for faster drying
- **Low Volume, Low Viscosity Extender Package**
  - Specific Gravity = 1.0 (same as water)  
1.3 (thicker, heavier) for other products
  - Reduced adhesion in treatment equipment
  - Reduced bridging in delivery equipment
- **Highest Concentration of N-Fixing Rhizobia**



# Handling: PRIMO<sup>CL</sup> has Extended Compatibility --2012

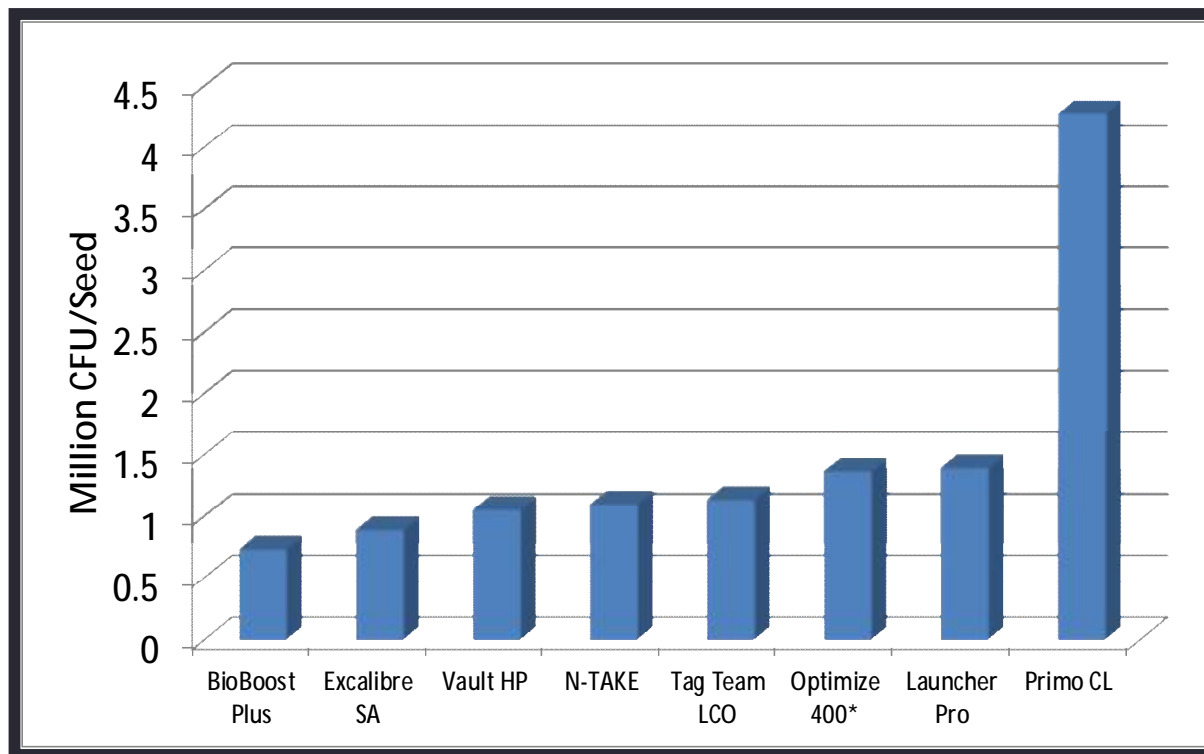
		PRIMO <sup>CL</sup>
<b>UNTREATED SEED</b>		95 days
<b>ACCELERON<sup>®</sup></b>	Simultaneous	80 days
<b>Apron<sup>®</sup>Maxx XL LS+ Maxium 4FS</b>	Simultaneous	70 days
<b>CruiserMaxx<sup>®</sup> Plus + Avicta</b>	Simultaneous	75 days
<b>CruiserMaxx<sup>®</sup> Plus</b>	Simultaneous	85 days
<b>Rancona + 1.5 Meta Star</b>	Simultaneous	65 days
<b>Trilex<sup>®</sup> 6000</b>	Simultaneous	60 days
<b>Treatments containing Molybdenum</b>		5 days

Acceleron<sup>®</sup> is a trademark of Monsanto Company. ApronMaxx<sup>®</sup>, Cruiser<sup>®</sup> and CruiserMaxx<sup>®</sup> are trademarks of Syngenta Group Company. Rancona<sup>®</sup> is a trademark of Chemtura Agrosolutions. Trilex<sup>®</sup> is a trademark of Bayer Crop Science.

Days listed provide optimum performance that will still be achieved by insuring a minimum of 100,000 rhizobia per seed.



# Performance: PRIMO<sup>CL</sup> is the High Load, Multi-Strain Inoculant!



**More for  
Your Money!**

**Soybeans require 4-6# of  
Nitrogen / Bushel**

**More High-Performing  
Rhizobia = More Nitrogen**



Optimize, Tag Team, and LCO Technology are registered trademarks of Novozymes A/S. ©2011 Novozymes. VAULT is a registered trademark of Becker Underwood, Inc., Ames, IA. ©2011 Becker Underwood, Inc. BioBoost Plus is a registered trademark of ©2012 BrettYoung. Excalibre is a registered trademark of © Advanced Biological Marketing, Copyright 2010. Launcher Pro is a registered trademark of © 1988-2012 Precision Laboratories, Inc.



# Performance: What Makes PRIMO<sup>CL</sup> Perform So Well?

- **Bradyrhizobium japonicum**
  - Multiple strains for consistent performance
  - 3-5x the number of active rhizobia applied per seed
- **Plant Yield Enhancer AGH**
  - Unique plant growth hormone with proprietary blend of beneficial plant proteins
  - Mitigates the effects of stressful environmental conditions
  - Enables seedlings to grow without delay through tough conditions
  - Provides for fuller expression of genetic potential



# Performance: Cutting Edge Multi-Action Yield Enhancer

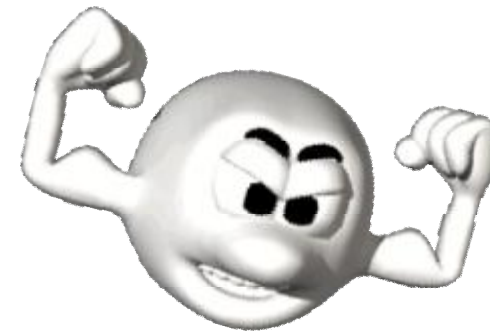
## AGH

AGH Technology masks the stress hormone *Ethylene*

- Ethylene is 5000 times more toxic to plants than Carbon Monoxide is to humans

AGH Results In:

- Quicker Emergence
- Increased root growth & nodules
- Increased stalk girth & nutrient transport
- Increased nodes
- Increased pods
- Increased Yield



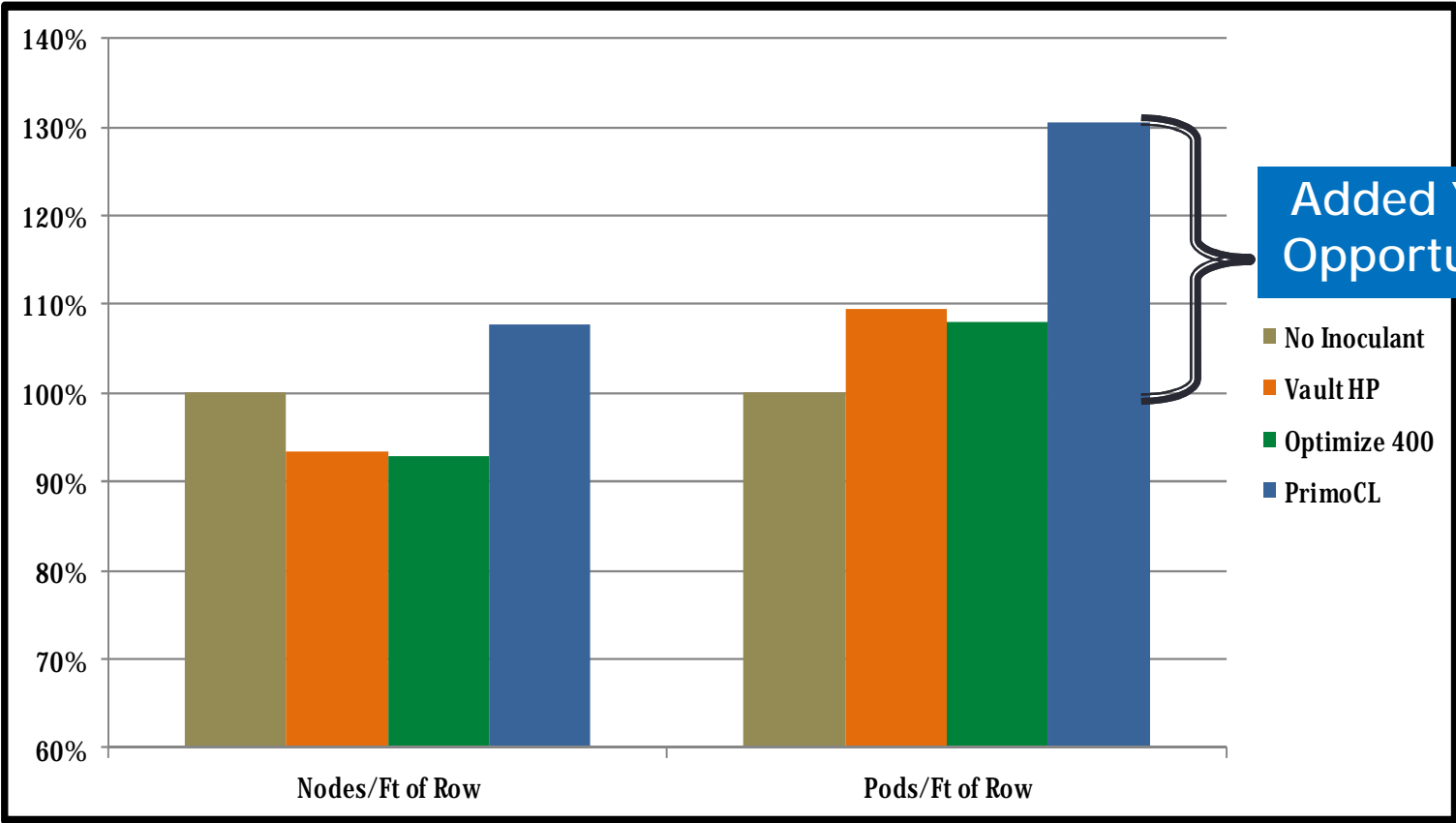
# Performance: Extensive Competitive Testing --2012

## Evaluating the Performance of PRIMO<sup>CL</sup> Compared to Industry Standards

- >50 locations in 12 states w/Randomized Block Design
- All 3<sup>rd</sup> party testing services
- Genetics the same across maturity zones
- All seed treated with same fungicide/insecticide
- Inoculants evaluated PRIMO<sup>CL</sup>, Optimize 400, Vault HP
- Evaluations conducted in July & August



# Performance: Comparative Evaluation Mid-Season (All Locations)



Added Yield Opportunity!

- No Inoculant
- Vault HP
- Optimize 400
- PrimoCL



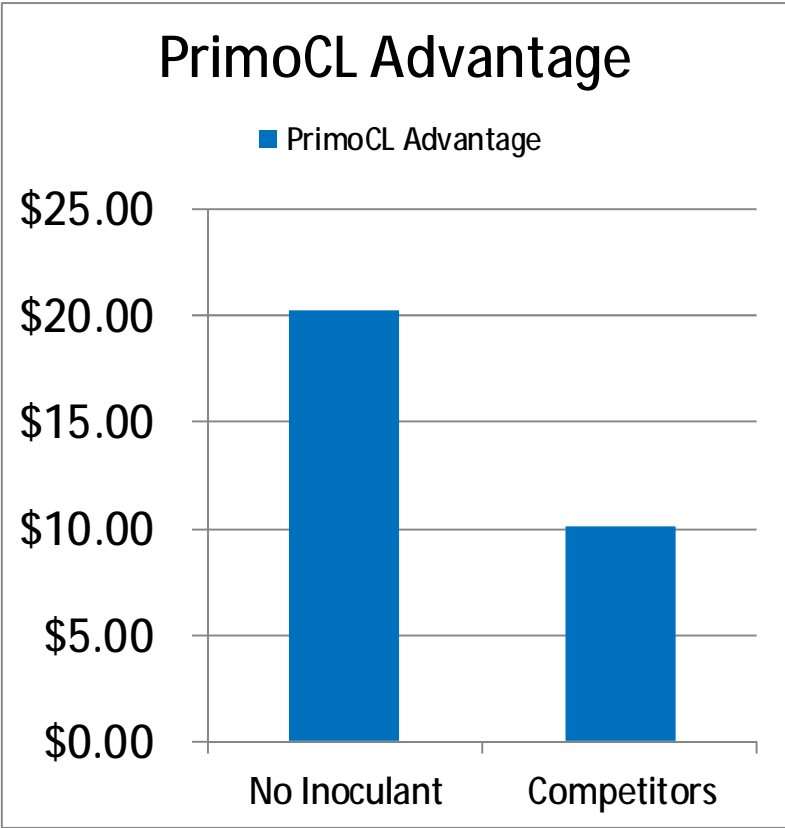
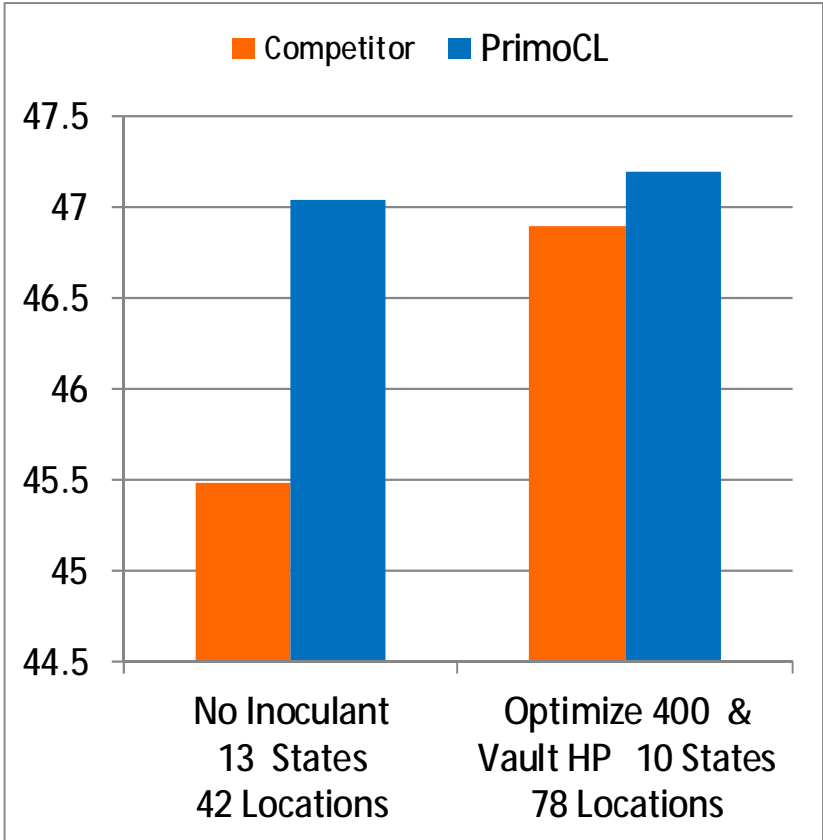
Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota,  
Nebraska, Kansas

Optimize, and LCO Technology are registered trademarks of Novozymes A/S.  
©2011 Novozymes. VAULT is a registered trademark of Becker Underwood, Inc., Ames, IA. ©2011 Becker Underwood, Inc.



# Third Party Replicated Testing 2012

## Primo CL vs Competitors



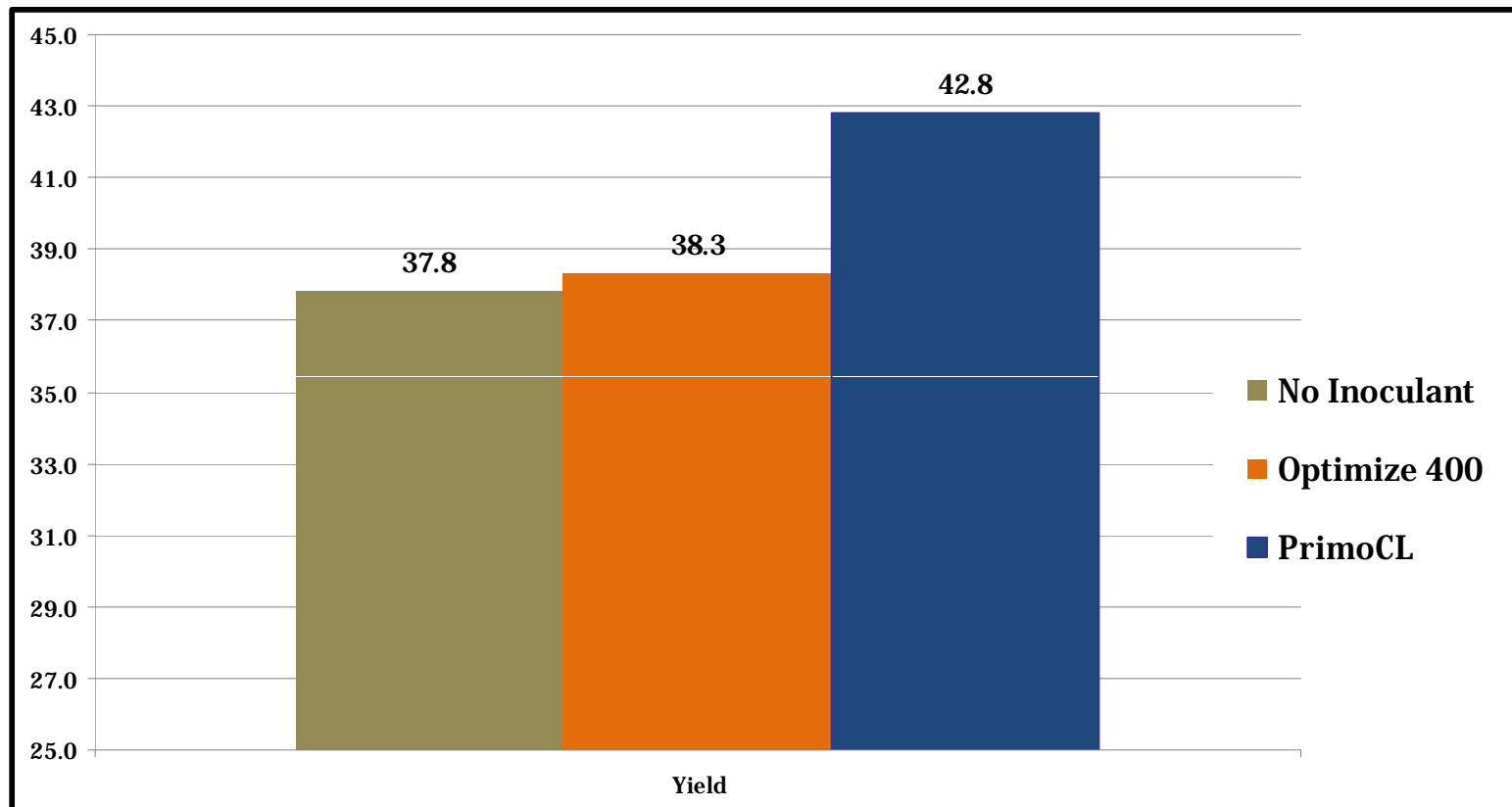
Third party, replicated testing from 8 independent services & 4 Universities from 13 states

Optimize is a registered Trademark of Novozymes  
Vault is a registered Trademark of Becker-Underwood, Inc.





# University of Kentucky Inoculant Study 2012

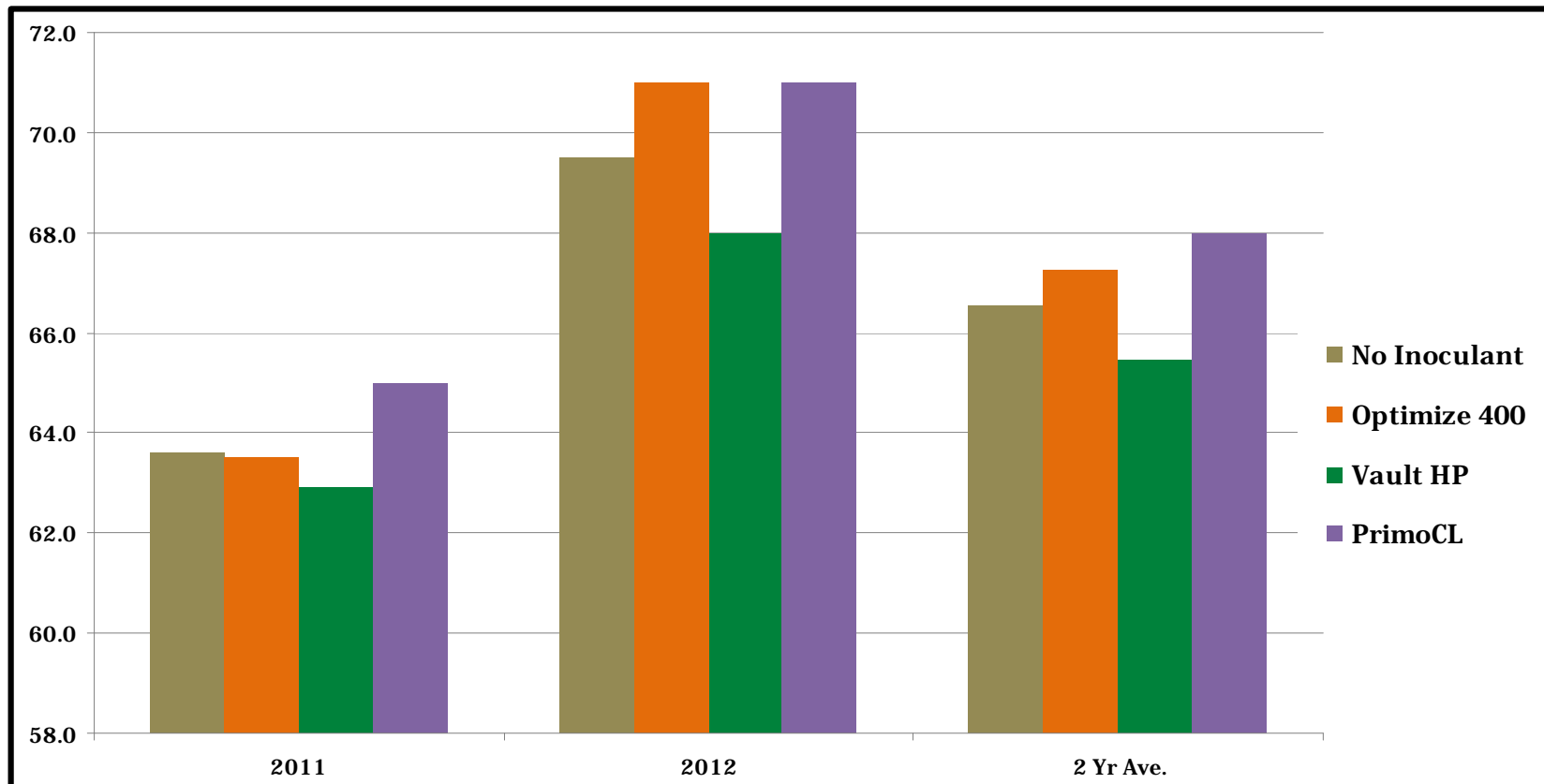


Corn/Soybean Rotation

Optimize is a registered Trademark of Novozymes



# Mississippi State University Inoculant Study, 2011-2012



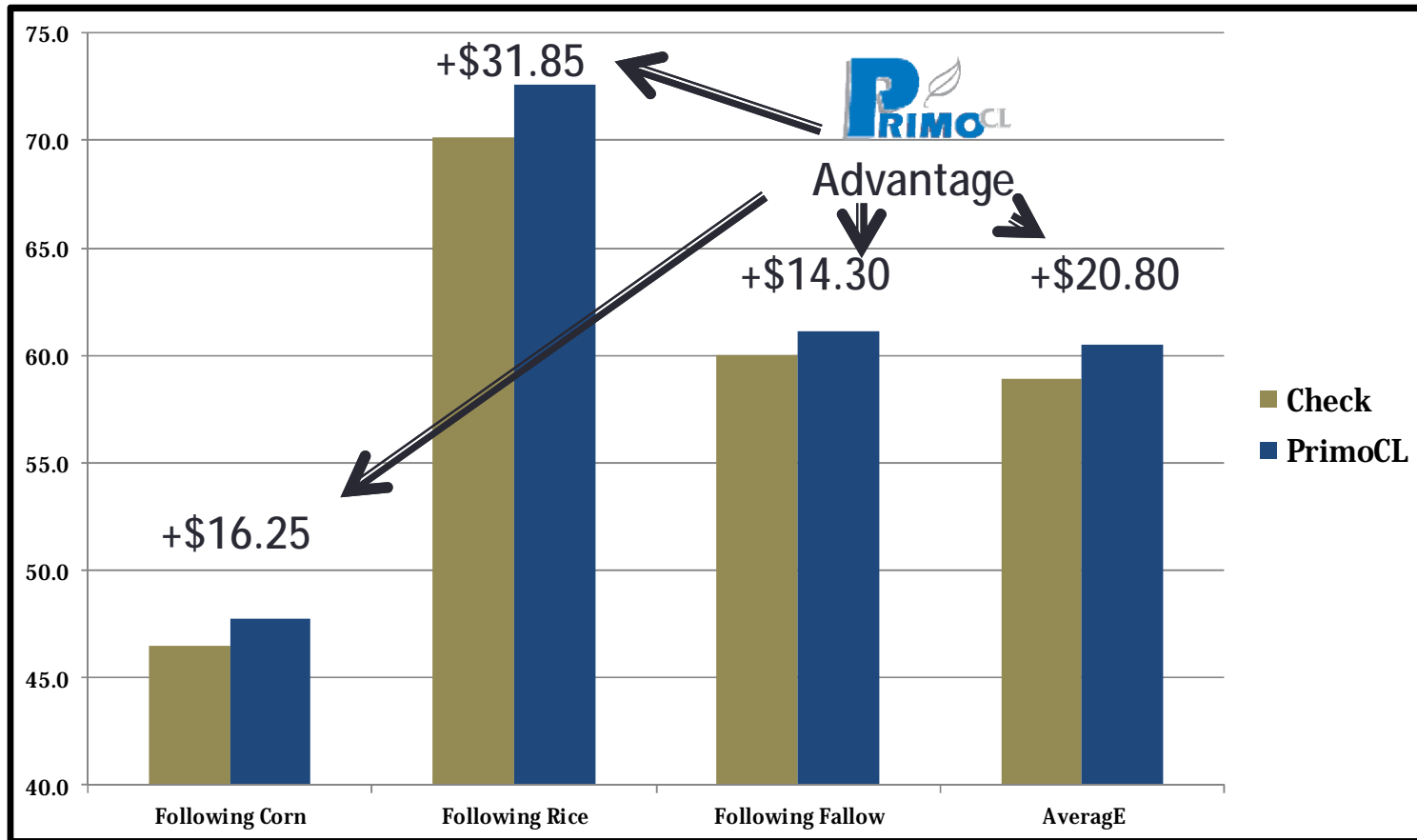
Following corn in 2011, cotton in 2012



Optimize, and LCO Technology are registered trademarks of Novozymes A/S.  
©2011 Novozymes. VAULT is a registered trademark of Becker Underwood,  
Inc., Ames, IA. ©2011 Becker Underwood, Inc.



# University of Arkansas Inoculant Trial 2012



# Service: Innovative Customer Support

- *Fresh Product in Every Case*
- *Seed Tags Are Included - Less Labor*
- *Labeled by 140,000 seed count*  
(Matches selling units)
- *Deeper Support for Equipment Upgrades*
- *Shared Risk Replant Program!*
  - *100% credit for PRIMO<sup>CL</sup> used for replanting*  
(seed originally inoculated with PRIMO<sup>CL</sup>)
  - *Ensures replants will reach their YIELD potential*
  - *No surprises for grower*

**ADDED  
INCENTIVE!**



# PRIMO<sup>CL</sup>: Delivering More to You, Your Customer & Your Bottom Line!

**Remember!**

**Easy to Handle and Superior Formulation with Extended Application Window**

**Top Performance in High Yield or Stressful Conditions**

**Unmatched Customer Service**

***“Converting Potential To Bushels”***



# Convert Your Potential Into Bushels

Place The  
Best  
Genetics  
Where They  
Belong

Develop  
More  
Nodes &  
Pods

Reach More  
Genetic  
Potential  
with Primo<sup>CL</sup>

Apply A Great  
Disease &  
Pest  
Controlling  
Treatment

Improve Stress  
Tolerance &  
Overall Plant  
Health with  
AGH

Load 4x More  
Aggressive N-  
fixing Rhizobia  
Per Seed





**GRANDPA,**  
I thought I told you to use...

**P** **PRIMO**<sup>CL</sup>

**Soybean Inoculant**

*Next time, Use Primo<sup>CL</sup>*

*— More PODS, more YIELD, more **PROFIT***

**INTX**  
MICROBIALS, LLC

200 W. Seymour | P.O. Box 62 | Kentland, IN 47951  
219-474-5510 | 219-474-3700 Fax | 800-350-4789

[www.inbdlc.com](http://www.inbdlc.com)

# ACCOLADE: Growth Promoter



***“Converting Potential To Bushels”***



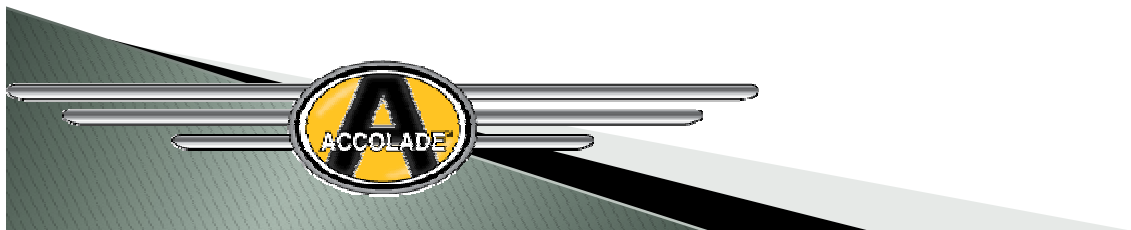
# Non Legume Inoculants

- ∅ Azospirillum brasilense is the Active Ingredient in *Accolade* Brand Products by INTX
- ∅ *Accolade* is a plant Growth Promoting Rhizobacteria (PGPR)
- ∅ Azospirillum brasilense is the Growth Enhancement Product Used in *Primo* Brand Inoculants
- ∅ INTX Developed a Process to Propagate the Asospirillum Bacteria, Which Enables More Stable and Concentrated Formulations



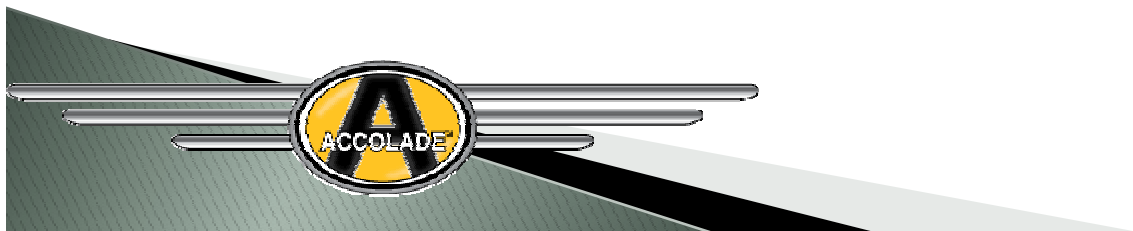
# Accolade-How it Works

- ∅ Azospirillum Colonizes on Developing Root in the Root Elongation Zone
- ∅ Inoculation Increases the Density and Length of Root Hairs, Increasing Root Surface Area
- ∅ Secretion of Indole Acetic Acids (IAA) Contribute to Beneficial Effects of Root System
- ∅ Alters Root Membranes to Increase Nutrient , Mineral and Water In-Take
- ∅ Rhizobium Bacteria Fixes Nitrogen in Soil



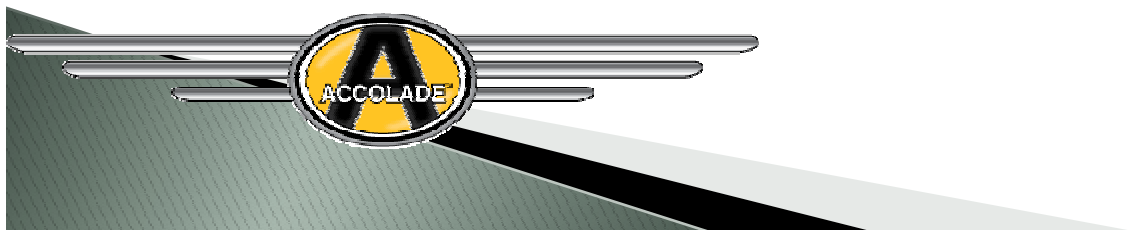
# Accolade–Benefits

- ∅ Improved Root Systems, 43% Increase in Root Mass
- ∅ 30% Increase in Stand Counts
- ∅ 20% Increase in Seedling Vigor
- ∅ Improved Moisture and Nutrient Uptake
- ∅ Improved Grain Yields
- ∅ *Accolade* is not Crop Specific



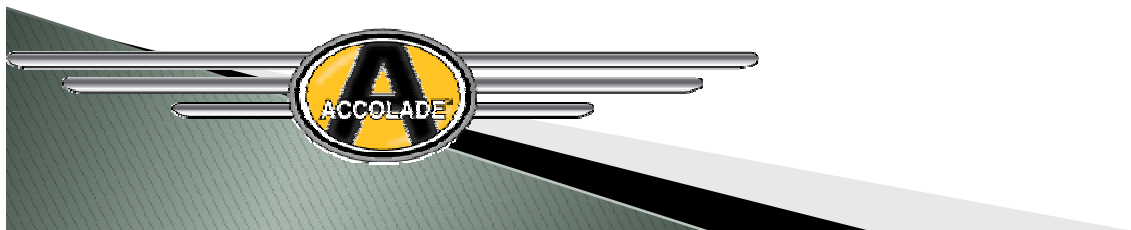
# Accolade Products

- ∅ *Accolade L*-Sterile Liquid Formulation
- ∅ Guaranteed 1 Billion Cells per Gram
- ∅ Compatible With Fungicides and Insecticides
- ∅ Designed for use Through Seed Treaters or in-Furrow
- ∅ Use Rate-2.5 oz per 50# Seed or 7 oz per Acre in-Furrow
- ∅ Packaged in 350 ounce size (140 units or 50 acres)



# Accolade Products

- ∅ *Accolade P* -Sterile Peat Based Formulation
- ∅ Guaranteed 1 Billion Cells per Gram
- ∅ Designed for use as a Planter Box Seed Treatment
- ∅ Use Rate-2.5 oz per 50# of seed
- ∅ Available in 75 oz and 58 oz sizes; Treats 30 and 11 units of seed



# Accolade – Improves Bio-Mass

## Winter Wheat

On average a 9%  
boost in grain yields  
on winter wheat



Untreated

Treated

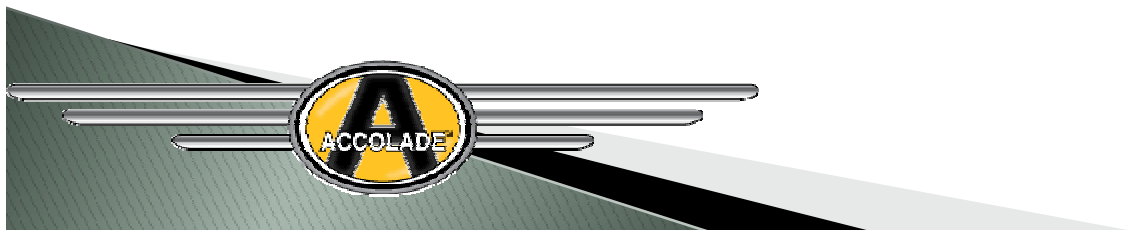
## Winter Rye

ACCOLADE has shown to  
increase bio mass of small  
grains by as much as 30%

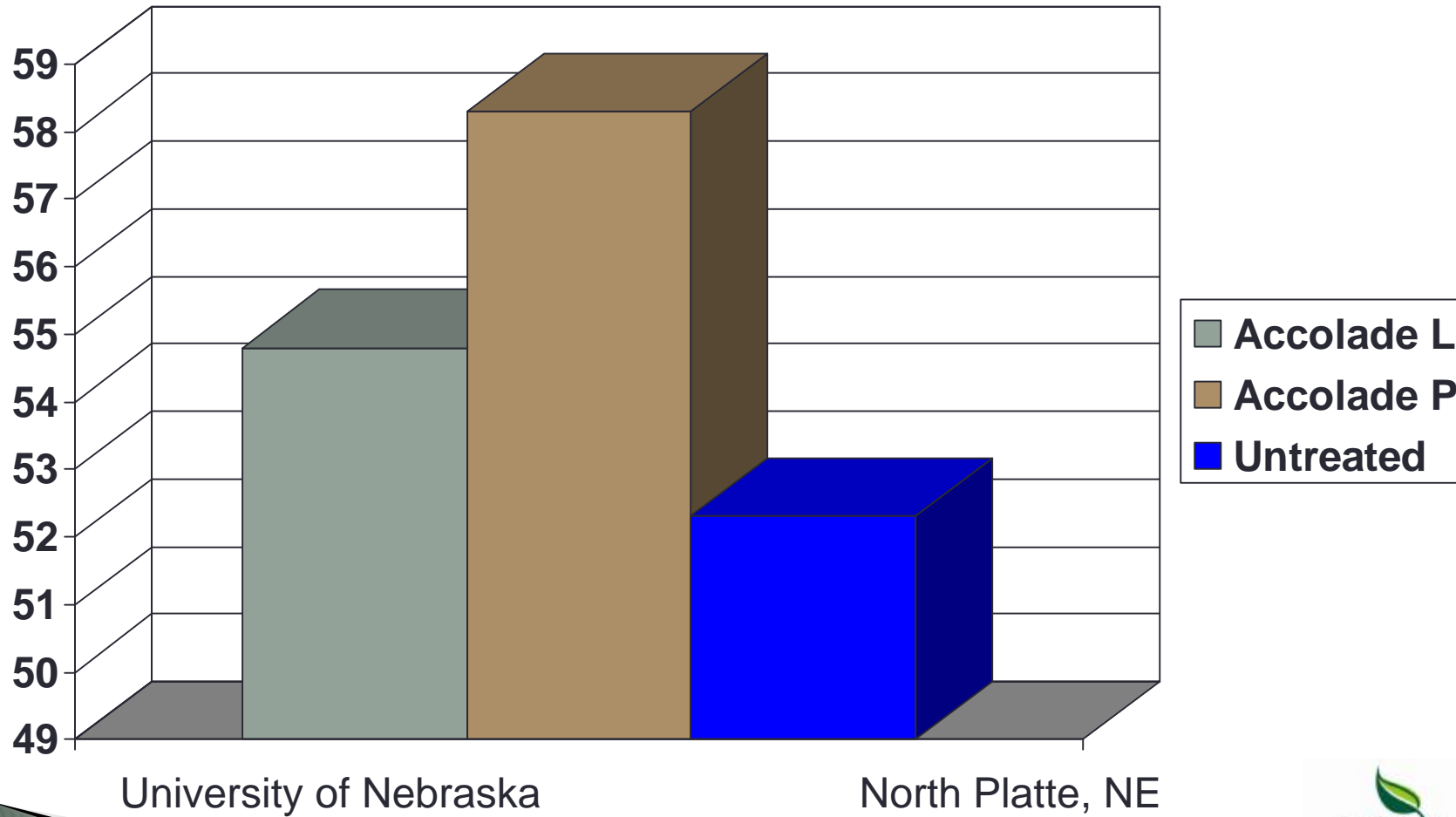


Untreated

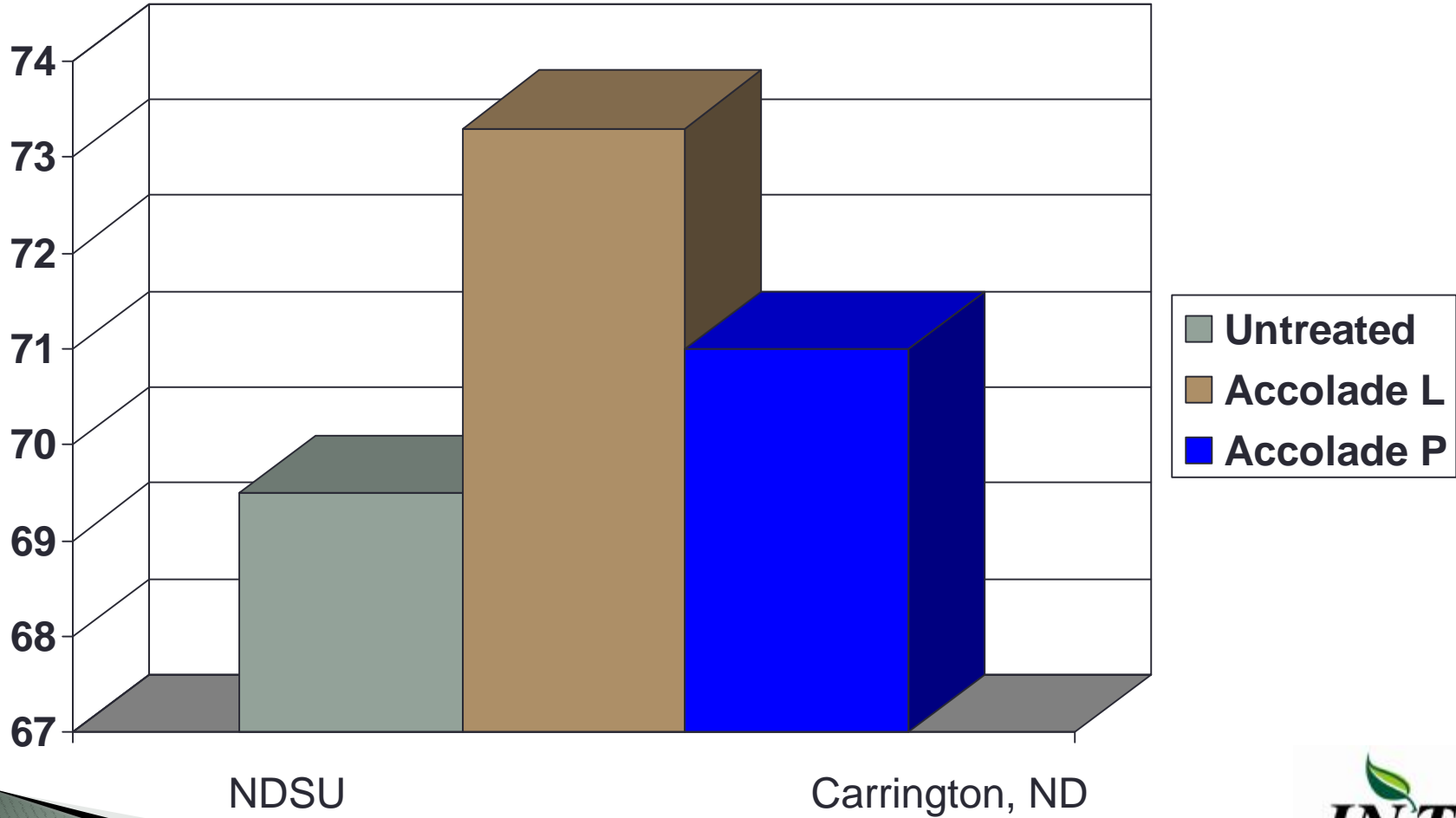
Treated



# 2010 Accolade Wheat Trials

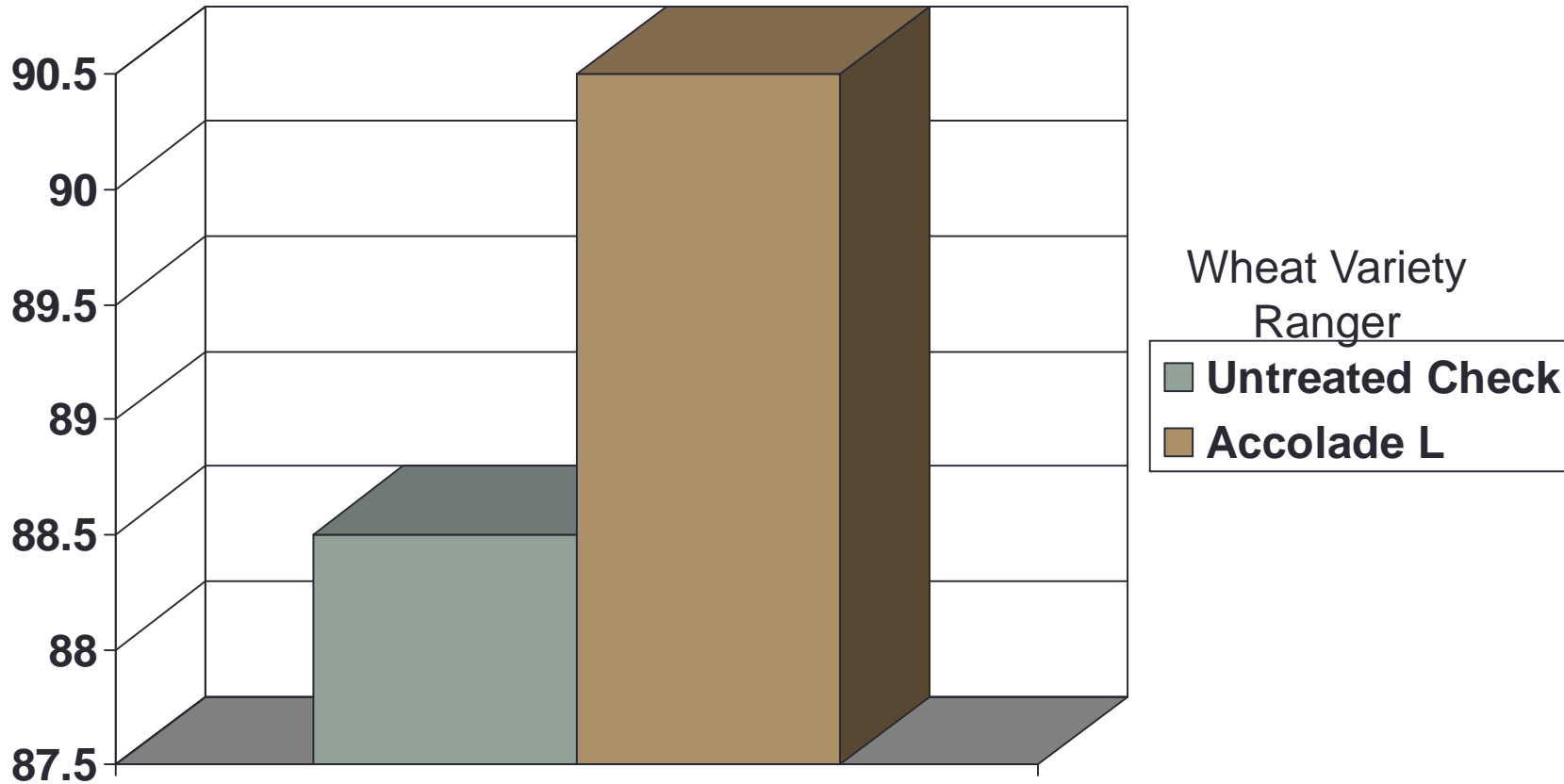


# 2010 Accolade Wheat Trials





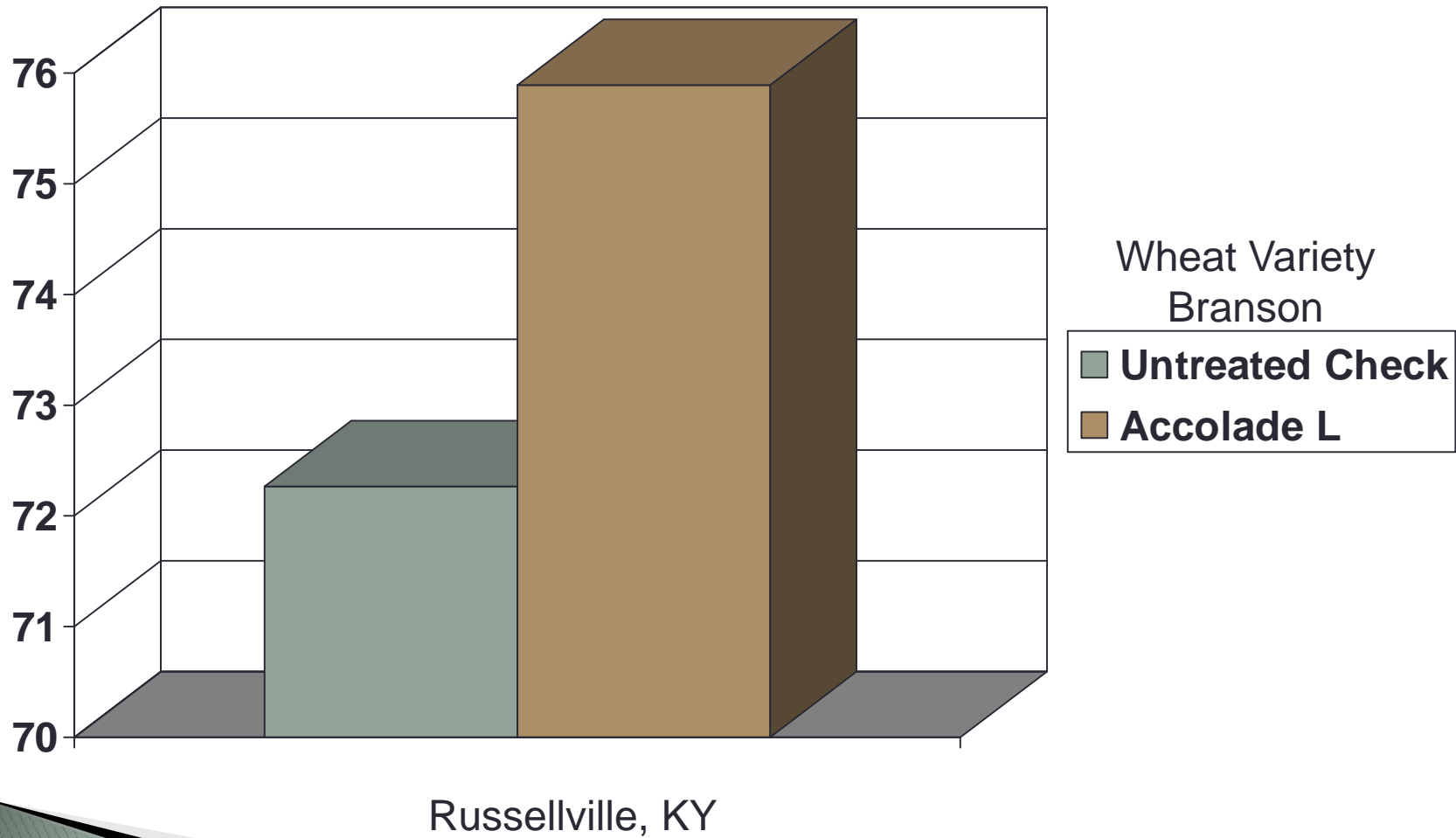
# 2011 Accolade Wheat Trials



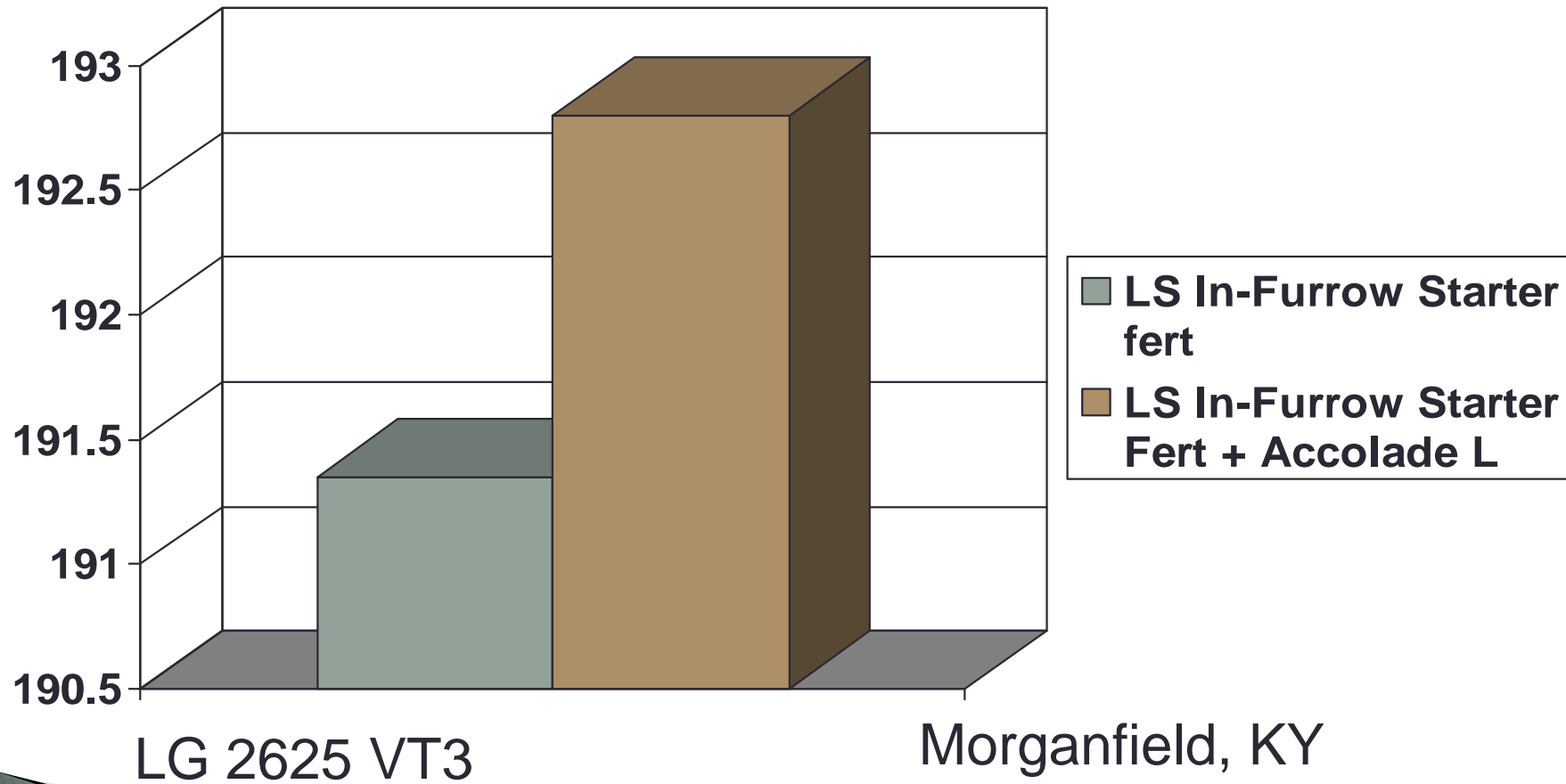
Marshall County, AL



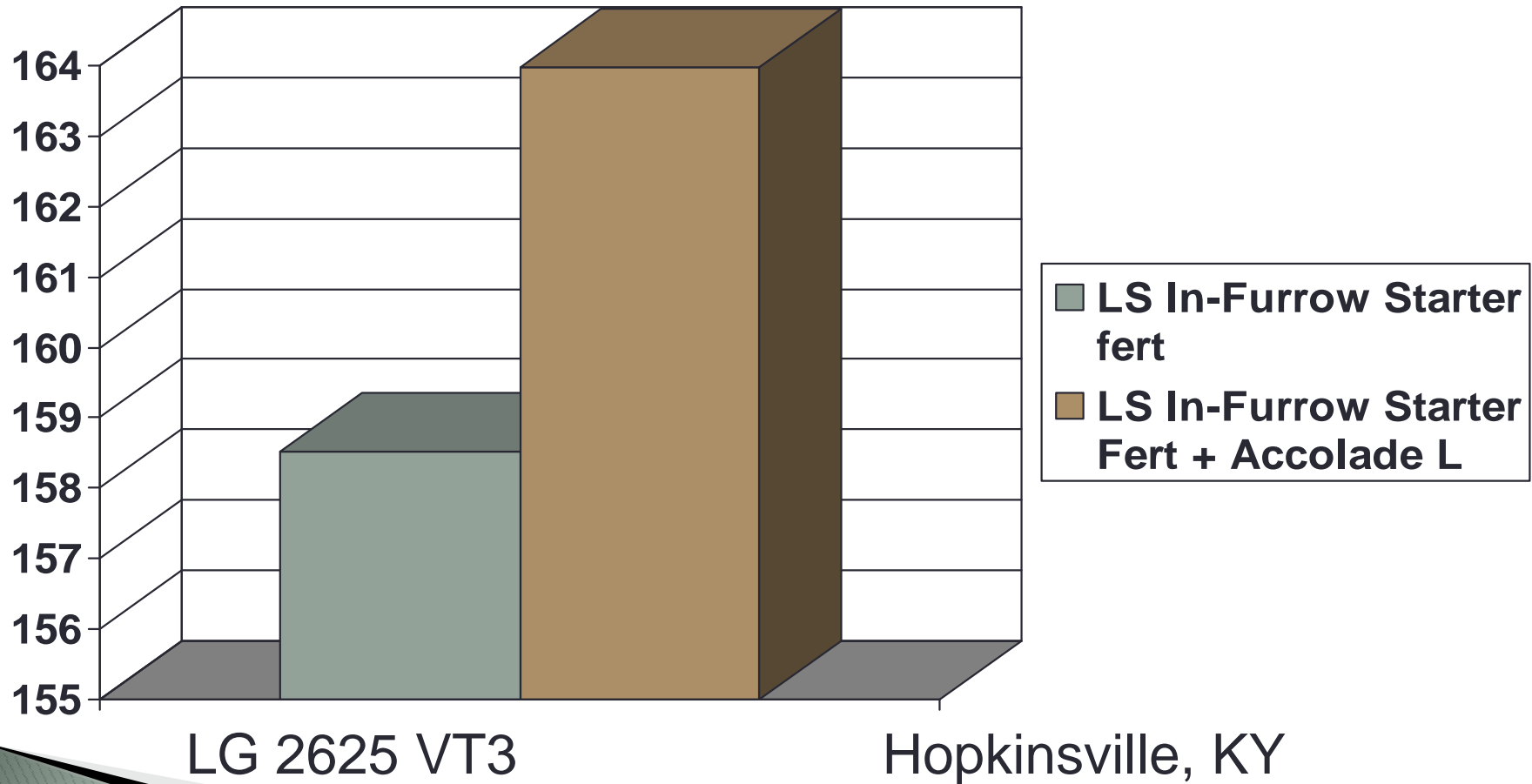
# 2011 Accolade Wheat Trials



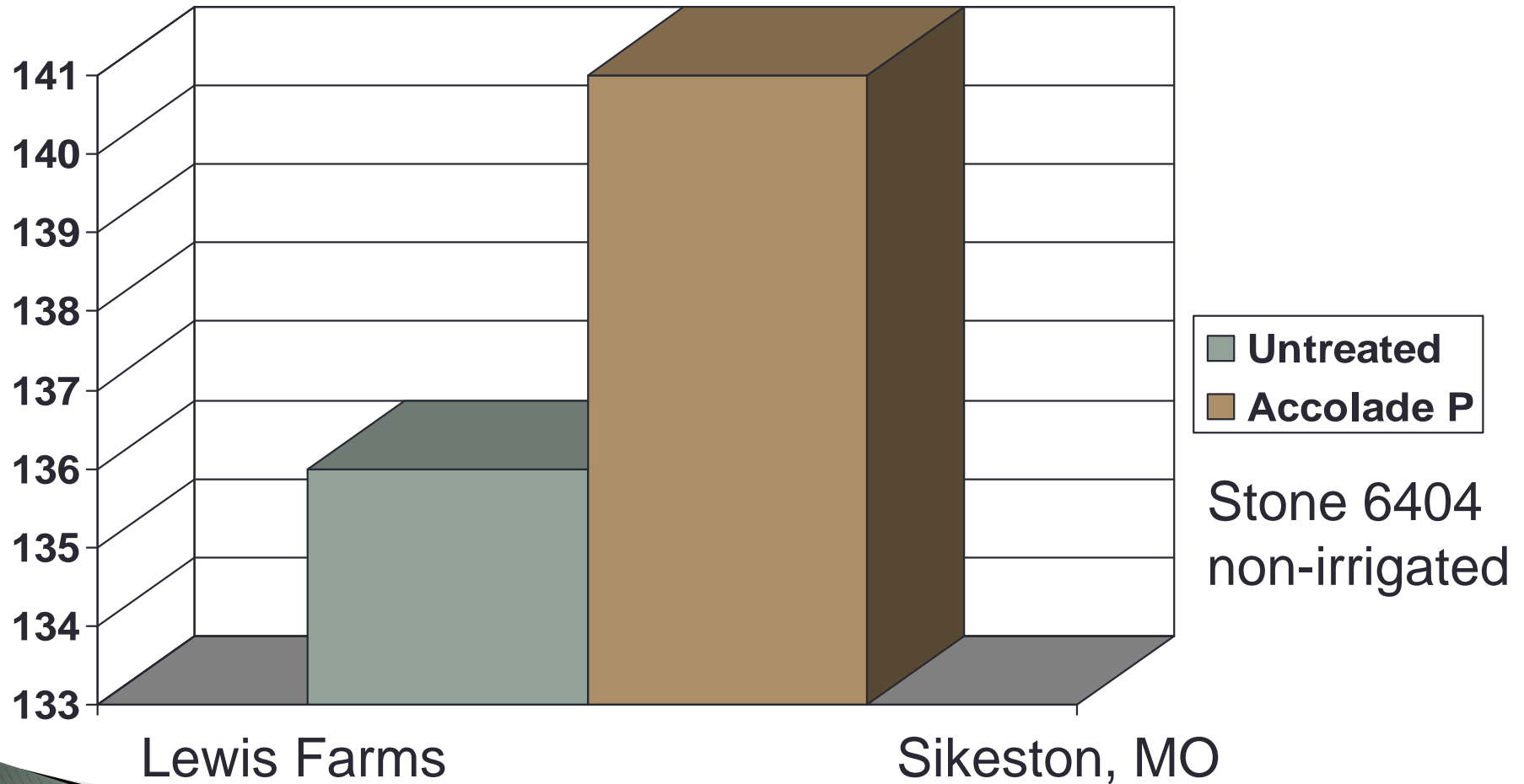
# 2011 Accolade Corn Trials



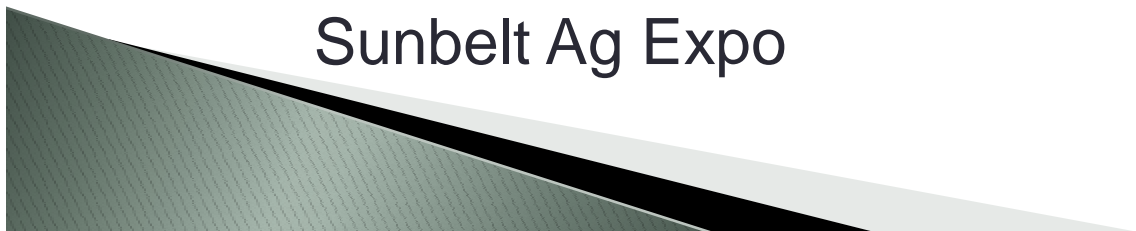
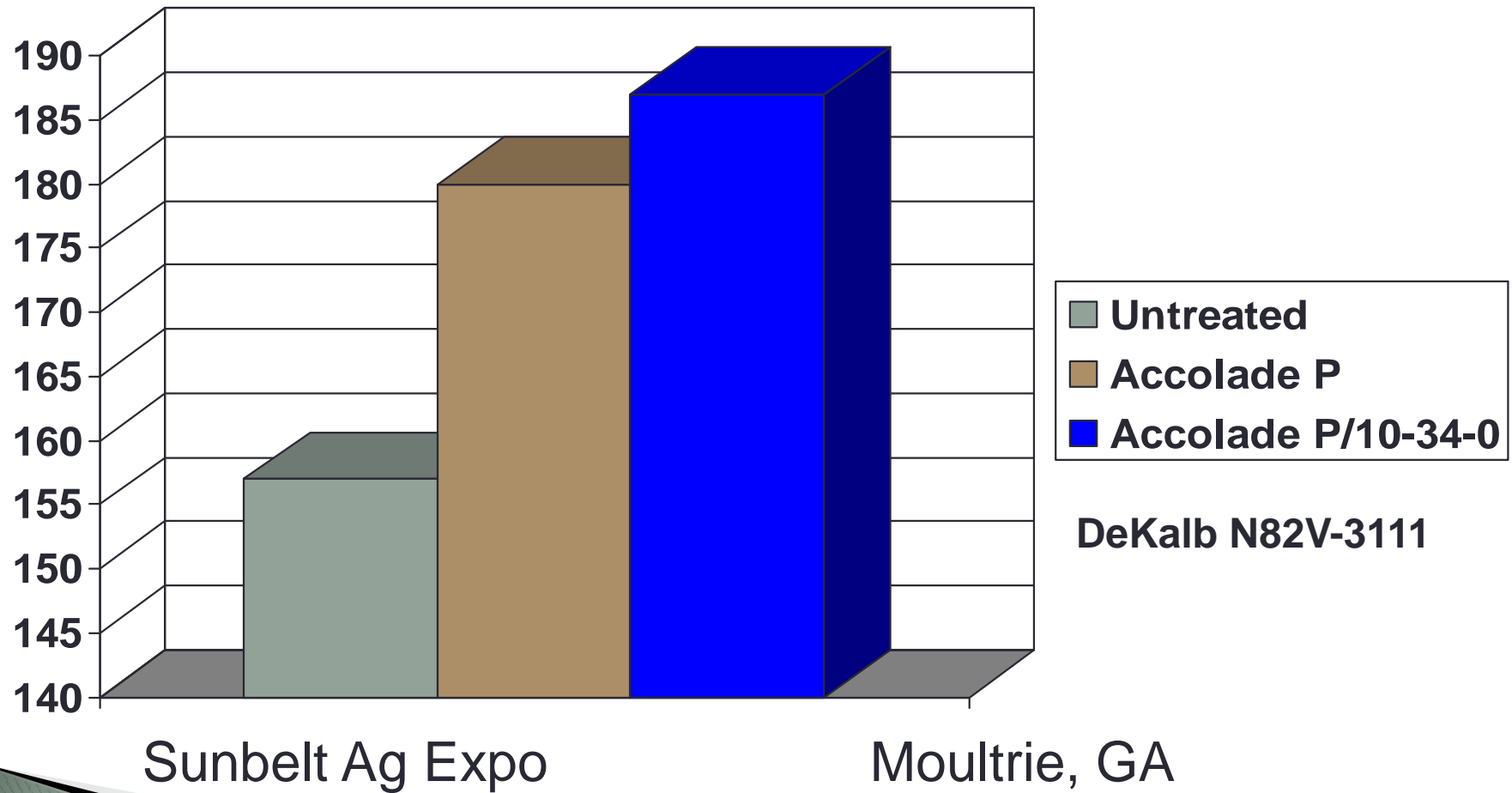
# 2011 Accolade Corn Trials



# 2012 Accolade Corn Trials



# 2012 Accolade Corn Trials



*Rising above the rest*



Plastic drink cups were filled with equal amounts of a professional soil mix. Six replications of each treatment were prepared. Seed was selected at random from a bag of commercial seed corn. All seed was planted at the same depth. Six untreated cups were watered with a measured amount of distilled water. The treated cups were watered with the same measure of distilled water / Accolade mixture. All twelve cups were incubated in the same environment. All six replications showed similar results.

# INTX Microbials

Thank You

David Allen

615-715-9556

