

# Breeding Soybeans with a Robust Trait Pipeline

Rick Leitz

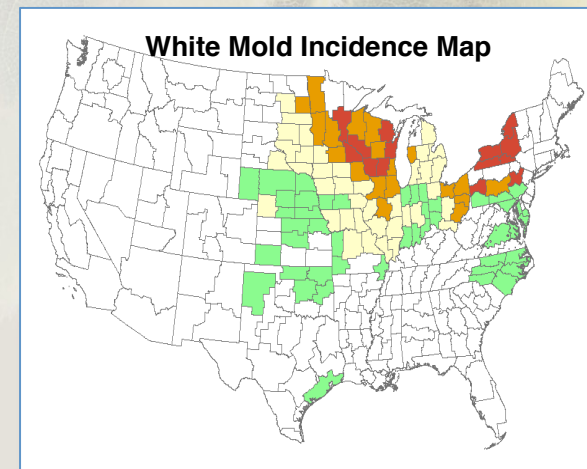
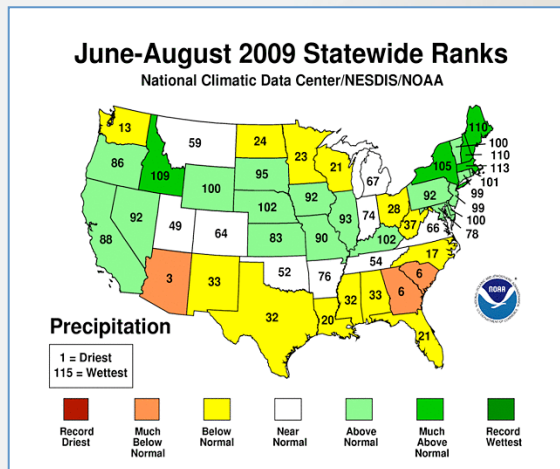
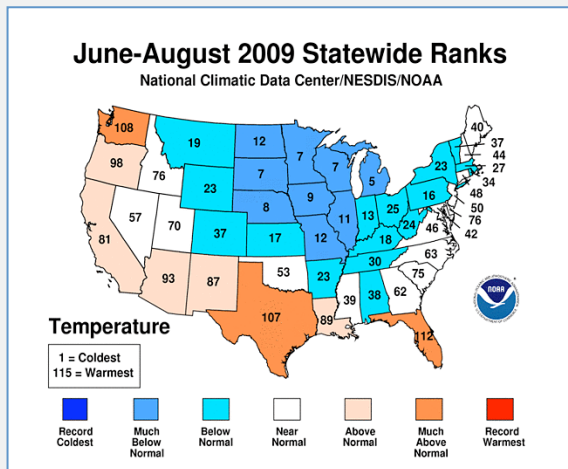
February 22, 2010

Monsanto Company



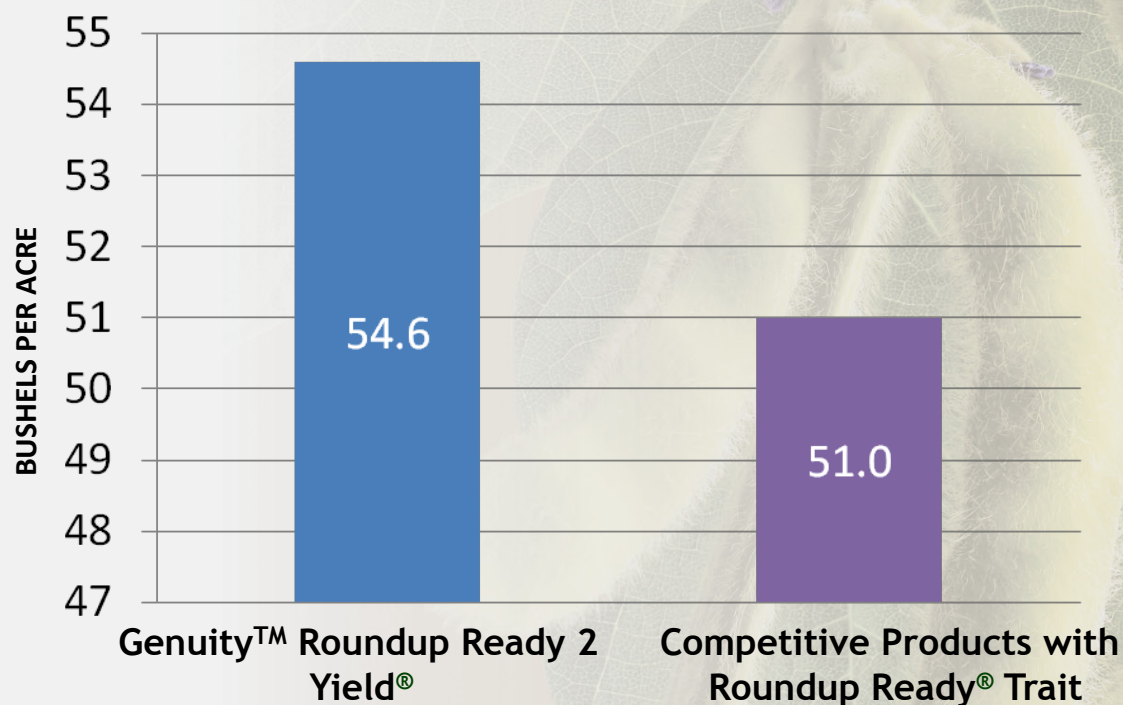
# 2009 Growing Season Review

- The central US experienced one of the coolest and wettest summers on record
- White mold in Illinois, Iowa, Indiana and Ohio



# Final Yield Data Confirms Genuity™ Roundup Ready 2 Yield® Soybean Delivers

RELATIVE MATURITIES▶	1 – 4
COMPARISONS:	>40,000
APPROXIMATE BU/AC ADVANTAGE FOR ROUNDUP READY 2 YIELD:	3.6
PERCENT YIELD ADVANTAGE FOR ROUNDUP READY 2 YIELD <sup>1</sup> :	7.1%



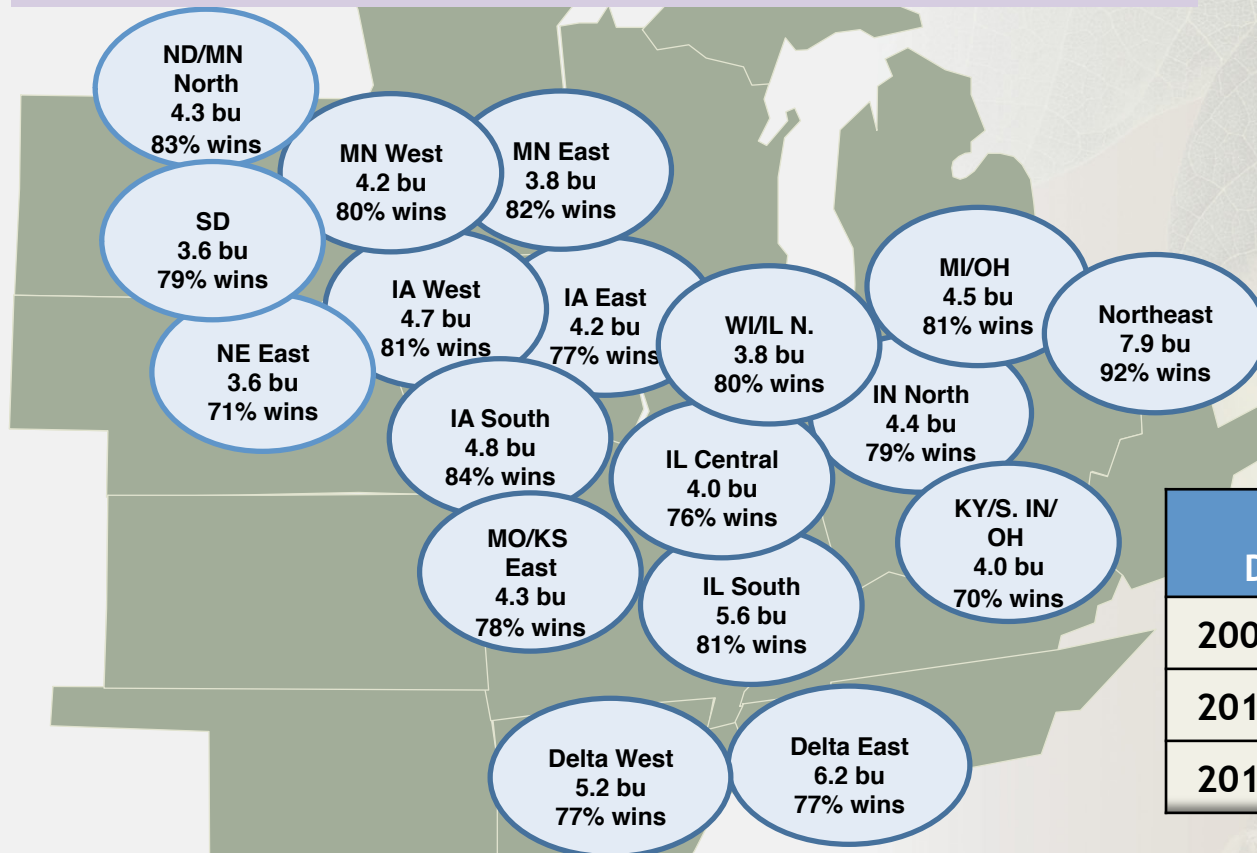
## *Genuity Roundup Ready 2 Yield® 2009 Trials Combine For 7+ Percent Over Competitive Roundup Ready® in Three-Year Summary*

Three year summary (2007-2009) of head-to-head comparisons between all *Roundup Ready 2 Yield®* products available for sale in 2010, includes Class of 2009 and advancement Class of 2010 products versus national competitive *Roundup Ready* products as of November 21, 2009

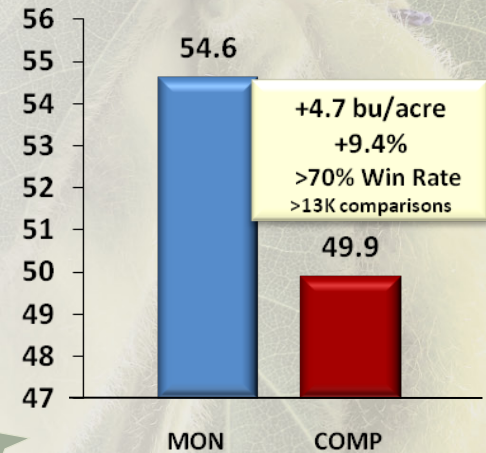
<sup>1</sup>Source: Includes all breeding and commercial strip trial data. 2009 data includes maturity groups 1, 2, 3 and 4. All head-to-head comparisons are within +/- 0.4 day maturity. Data is weighted equally by year.

# Class of 2010 Genuity™ Roundup Ready 2 Yield® Advancements Deliver Outstanding Results

## GEOGRAPHIC BREAK-DOWN: GENUITY™ ROUNDUP READY 2 YIELD®



## Advancement Class of 2010<sup>1</sup>



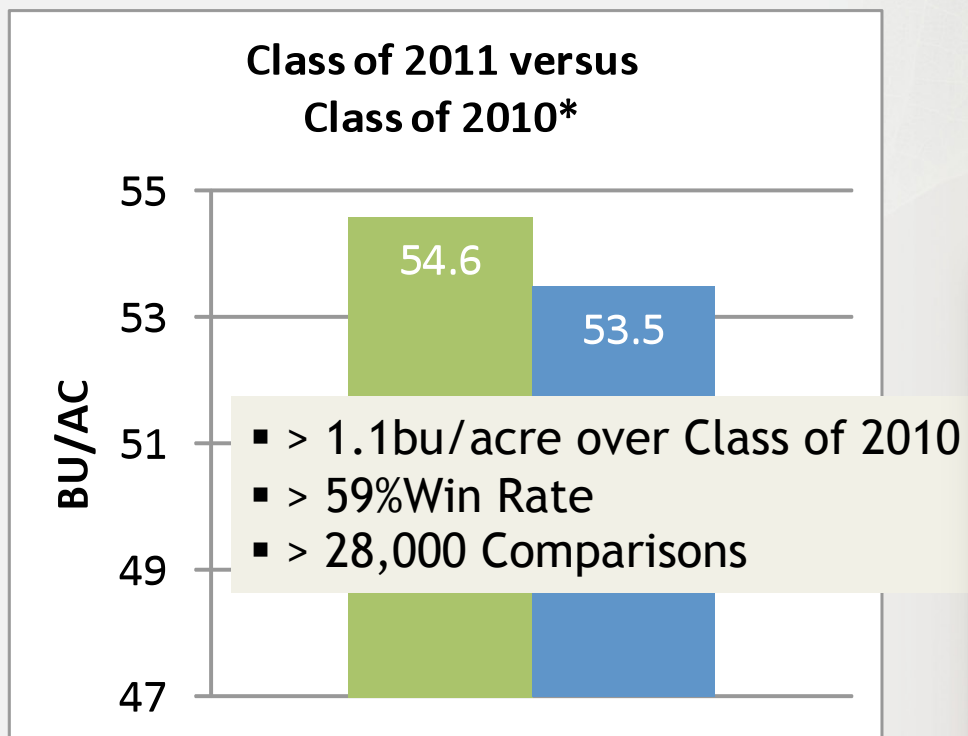
## GENETIC BANDWIDTH AND DIVERSITY EXPANDS RAPIDLY

2009	<15 varieties
2010	>125 candidate varieties
2011	>1200 candidate varieties

Advancement Class of 2010 represents *Roundup Ready 2 Yield* varieties to be deployed in their projected sales geographies. Comparisons are between Class of 2010 versus national competitive *Roundup Ready* products as of Nov. 21, 2009. Data includes breeding and commercial strip plot data. Seed treatments are equivalent in every individual head to head comparison.

1. Class of 2010 advancements represents *Roundup Ready 2 Yield* varieties to be deployed in their projected sales geographies. Comparisons are between Class of 2010 versus national competitive *Roundup Ready* products as of Nov. 21, 2009.

# Class of 2011 Genuity™ Roundup Ready 2 Yield® Soybeans Show Promise to Deliver Additional Advantage Versus Class of 2010

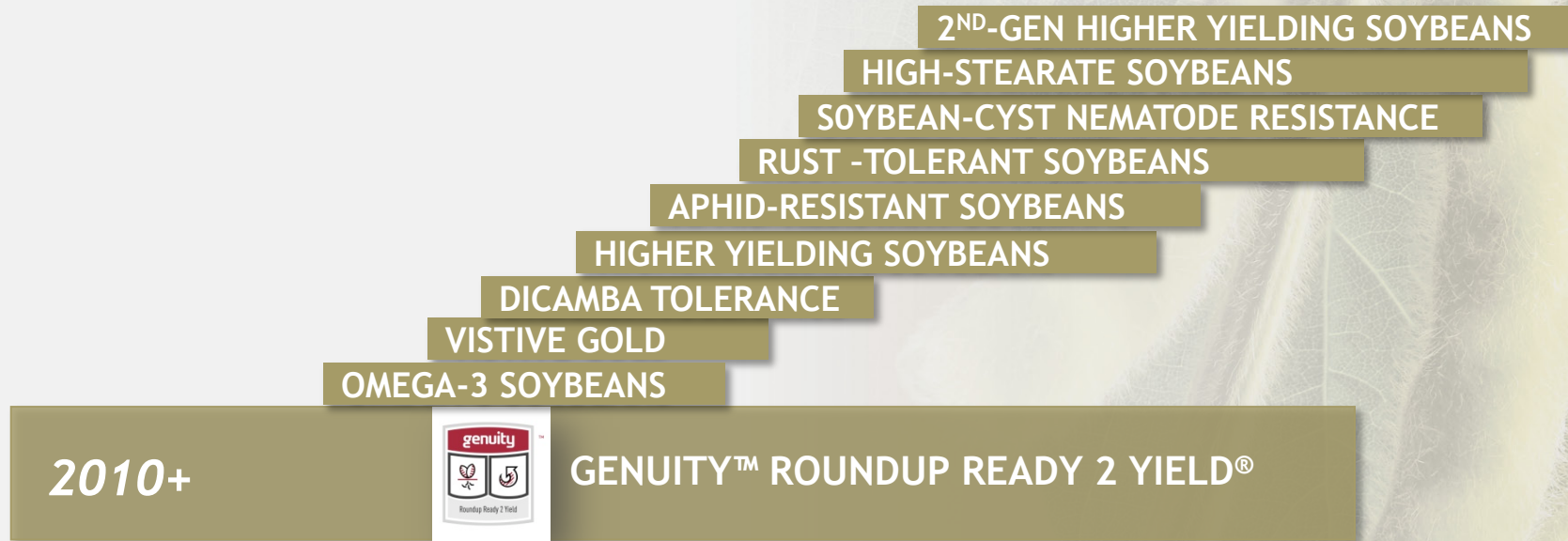


Genuity™ Roundup Ready 2 Yield® Breeding Pipeline	
2011	>1200 candidate varieties



\*Head to head comparisons from breeding trials between Class of 2011 candidates and Class of 2010 advancements as of Nov. 21, 2009.

# Soybean Pipeline Products Designed to Provide Additional Grower Benefits



Commercialization Depends on Many Factors, Including Successful Conclusion of Regulatory Process

# Insect-Protected Genuity™ Roundup Ready 2 Yield® Advances to Phase 4, Ushering In International Soybean Trait Platform

St. Helena de Goias, Brazil – January 2009



Roundup Ready Soybeans



Insect-Protected Roundup Ready 2 Yield Soybeans

Initial Yield Results 2008/2009 Crop Year  
Medium Insect Pressure - 5 Sites

- Insecticide reduction
- Weed-control system performance
- 11% Yield improvement from Roundup Ready 2 Yield® and insect control trait

Discovery

Phase 1

Proof of Concept

Phase 2

Early Development

Phase 3

Adv. Development

Phase 4

Pre-Launch

Launch

# Dicamba-Tolerant Soybeans Expected to Provide the Most Effective Weed Management System

- Improved weed control options with two modes-of-action.
- Roundup plus dicamba provides excellent control of hard to control weeds and glyphosate-tolerant weeds.
- Low residues of dicamba and dicamba metabolites may simplify registration of dicamba for over-the-top use.



Discovery

Phase 1  
Proof of Concept

Phase 2  
Early Development

Phase 3  
Adv. Development

Phase 4  
Pre-Launch

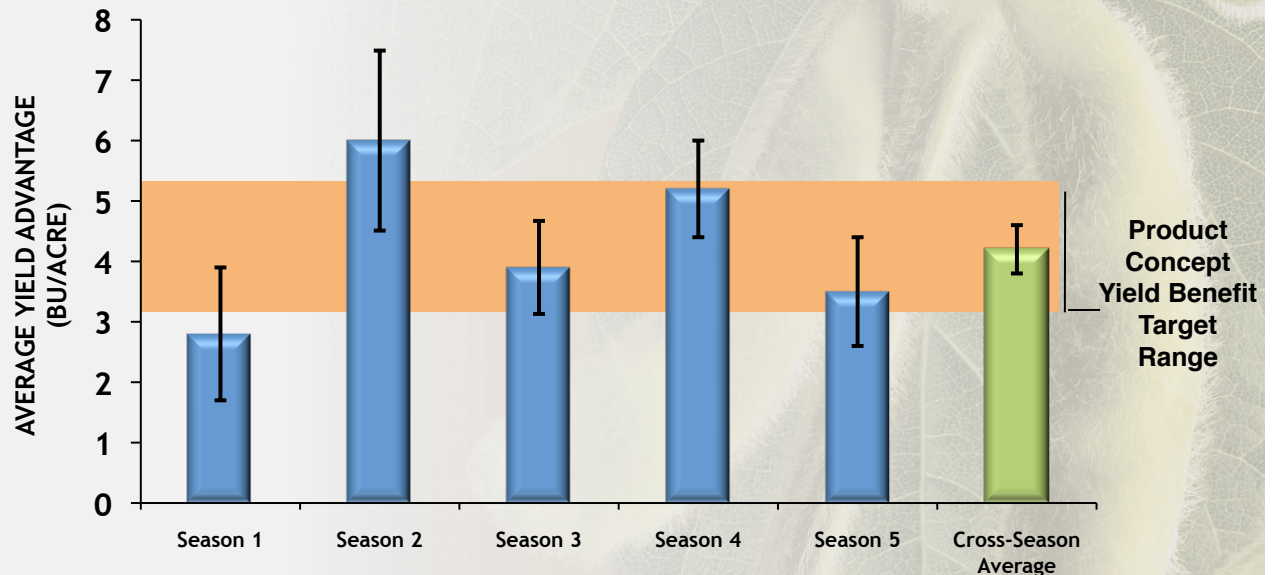
Launch



# Higher-Yielding Soybeans Showed Improved Yield Across Five Seasons of Broad-Acre Yield Trials

## Higher-Yielding Soybeans Outperform Controls In North And South American Trials

- Intrinsic yield improvement through insertion of key genes
- Lead event shows an average yield advantage of 7 percent over controls in meta-analysis across 5 seasons of testing in 95 environments
- Developing regulatory data for phase advancement



	US '07	LAS '07-'08	US 08	LAS '08-'09	US '09	Summary
Locations	18	13	24	23	17	95
% Win	67%	100%	87%	85%	82%	84%

COLLABORATION  
WITH



Discovery

Phase 1  
Proof of Concept

Phase 2  
Early Development

Phase 3  
Adv. Development

Phase 4  
Pre-Launch

Launch

# SDA Omega 3 Soybean Oil Provides a Sustainable Source of Omega 3's in Human Diet

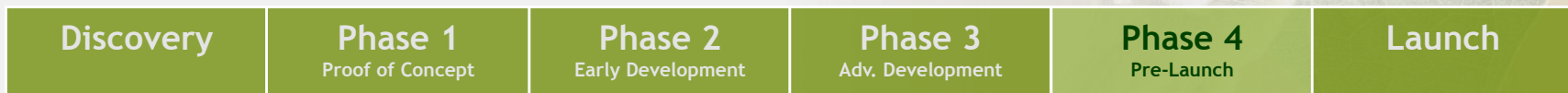
## PRODUCT CONCEPT:

- Provide consumer health benefit (cardiovascular)
- Improve food product performance (taste and shelf life)
- Preferred sustainable source of omega 3 in food (flexible supply)

Fatty Acid Composition (%)						
	16:0 Palmitic	18:0 Stearic	18:1 Oleic	18:2 Linoleic	18:3 Linolenic	18:4 $\omega$ 3 SDA
Commodity Soy	11	4	24	52	8	0
SDA Omega 3 Soy	11	4	20	24	10	20

Key Food Applications	
<ul style="list-style-type: none"> <li>• Oil Based Foods</li> <li>• Dairy Products</li> <li>• Snack Foods</li> </ul>	<ul style="list-style-type: none"> <li>• Beverages</li> <li>• Baked Goods</li> <li>• Prepared Foods</li> </ul>

Increase Omega-3

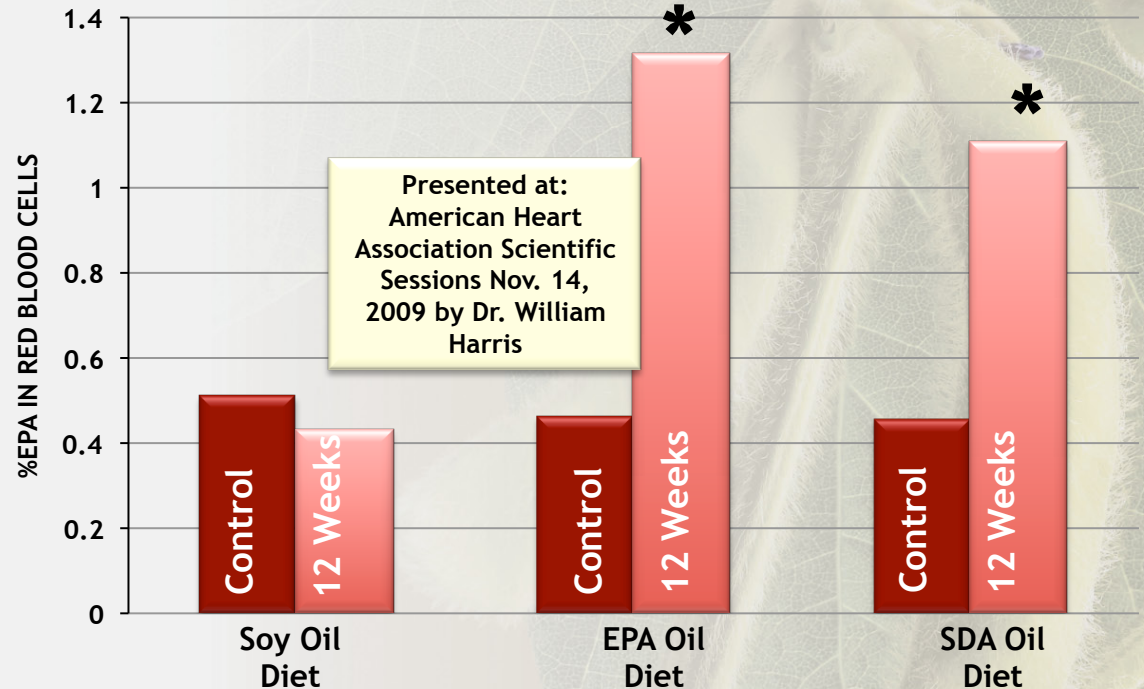


# SDA Omega-3 Soybean Oil Confirms Heart Health Benefits



**SDA Omega-3 Soybean oil for food applications (bread, cereal bars, dairy drinks, spreads, dressings)**

## CLINICAL STUDY RESULTS SHOW CONVERSION TO HEART HEALTHY EPA



\*Per protocol population of 157 subjects;  $p < 0.001$  compared to soy oil control; SDA and EPA not different  $p = 0.101$

- **Aquaculture and feed applications**
- **SDA diet more than doubles heart healthy EPA levels compared to commodity soy**
- **SDA diet exhibited a significant reduction in triglycerides (26-30% versus control for subjects with high baseline triglycerides within subjects with high baseline triglycerides)**

Discovery

Phase 1

Proof of Concept

Phase 2

Early Development

Phase 3

Adv. Development

Phase 4

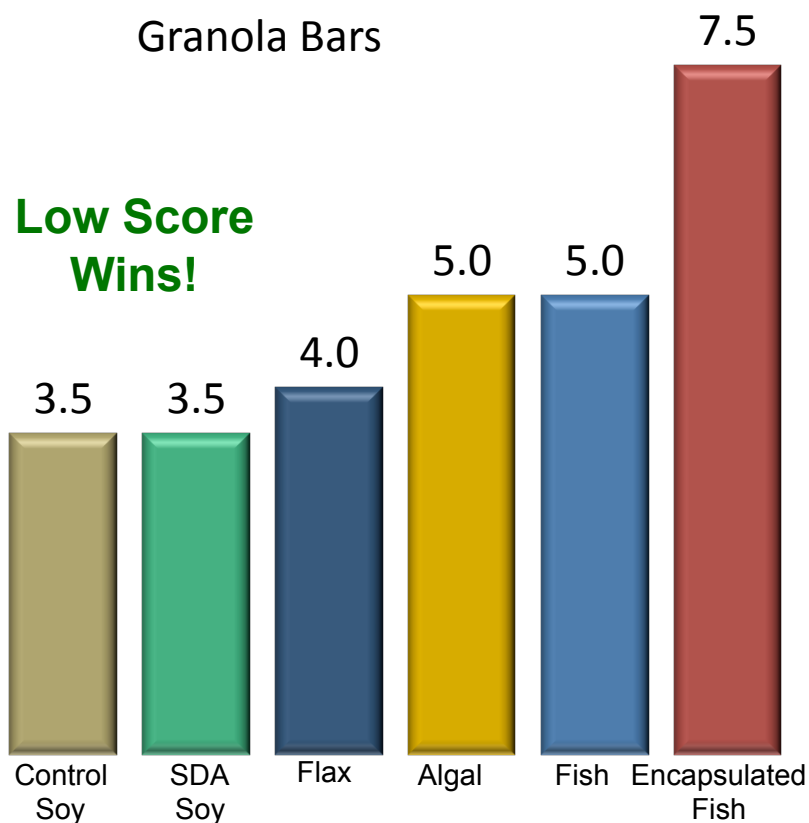
Pre-Launch

Launch

# SDA Omega 3 Hitting Food Application Targets

*SDA Omega 3 soybean oil flavor profile outperforms alternative sources of Omega-3*

Total Off Flavor - 12 months  
Granola Bars



- SDA provides excellent flavor and shelf life in taste tests
- SDA works in a broad variety of foods from cereal bars to beverages and spreads
- “We have a strong interest in evaluating SDA in foods based on these impressive samples”

Food Company Feedback



# Vistive® Gold Soybeans Provide Low Saturated Fat, High Stability, Zero Trans Fat Oil for Food

PRODUCT CONCEPT: *Specified by Food Companies*



- Improve consumer health (reduce trans & sat fat)
- Improve food product performance (increase oxidative stability)
- Establish soybean oil as preferred domestic source (>20M acres potential)
- Key applications: High Stability Frying, Snack Foods and Baked Goods

Soybean Oil - Fatty Acid Composition (%)					
	16:0 Palmitic	18:0 Stearic	18:1 Oleic	18:2 Linoleic	18:3 Linolenic
Commodity Soybean Oil	11	4	20	55	8
Vistive Gold Soybean Oil	3	3	75	15	< 3

Benefits

Reduce Saturates

Increase Stability

Reduce Trans Fat

Discovery	Phase 1 Proof of Concept	Phase 2 Early Development	Phase 3 Adv. Development	Phase 4 Pre-Launch	Launch
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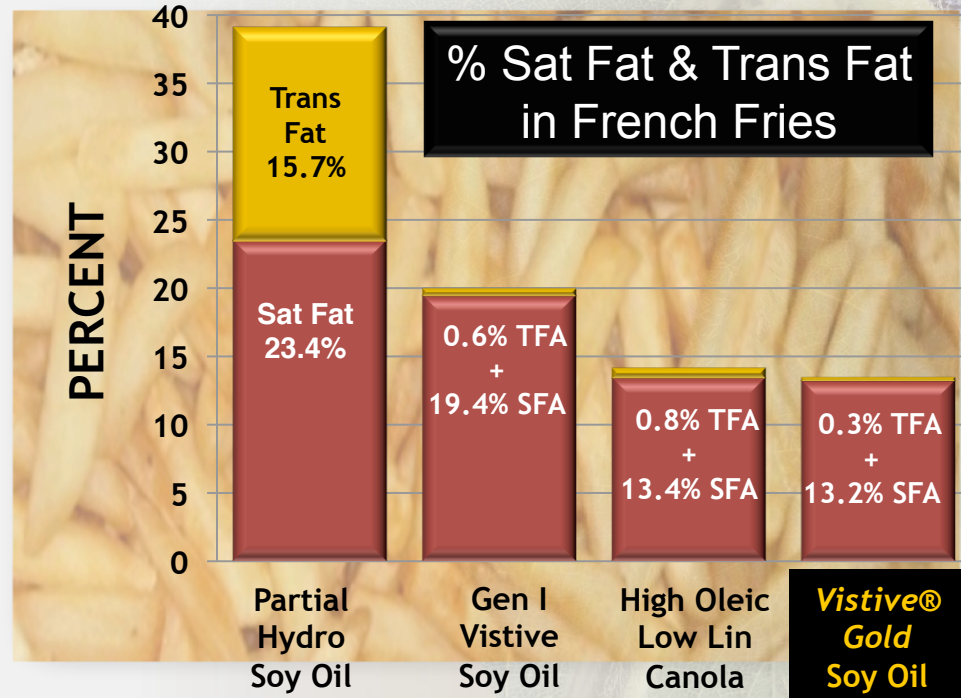
# Vistive® Gold Designed to Deliver Food Nutrition Benefits and Establish Consumer Platform



- Designed to provide food companies a cost-effective vegetable oil that enables them to create new and better food products that provide improved functional performance.
- Consumer health benefits
  - High Oleic
  - Lowers saturated fats
  - Eliminates trans fat

**Phase 4**  
Pre-Launch

## French Fry Study



Source: 2009 Merlin Development and Monsanto

- Reduced saturated fat 43 percent and trans fat 98 percent in French fries
- Enables Zero Trans Fat on nutrition facts and “Clean Labels” (no trans-fat, low saturated fat)

Questions?

Thank you for your time!!

