

New Product Opportunities: Future Growth of Crop Biotechnology

Biotechnology & Crop Production Agriculture - Background on Sector Impacts

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Monsanto Company



**Second Decade of
Crop Biotechnology**

Opportunities and Challenges for the Food System

Westin City Center • Washington D.C. • January 16-17, 2008

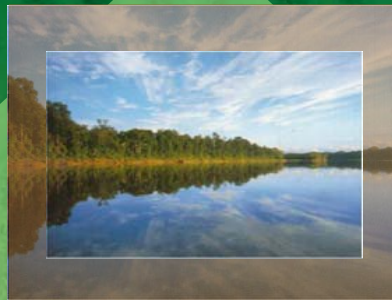
At the End of the First Decade:

- ◆ In 2006, farmers around the world harvested biotech crops for the 11th year
- ◆ 11 years of commercial experience on over 1.4 billion acres demonstrates
 - Proven economic and environmental benefits
 - Solid record of safety
 - Promising future benefits from new products

Biotech Crops Can Help to Address Urgent Global Challenges



Lack of reliable food source, malnutrition



Insufficient fresh water



Limited arable land



Soil degradation



Demand for food, feed and fuel



Biological competition

Agriculture's Imperatives

- ◆ **FOOD:** Deliver twice as much food in 2050 as is produced today.
- ◆ **ENVIRONMENT:** Reduce environmental impacts by getting more from each unit of land, water and energy devoted to crop production.
- ◆ **CLIMATE CHANGE:** Adapt to climate change by improving yield stability in the face of climate stress.
- ◆ **ECONOMIC SUCCESS:** Deliver economic benefits for all farmers, small and large.

The Environmental Challenge: The Role of GM Crops

53rd Brazilian Congress of Genetics, Águas de Lindóia, S.P., Brazil, September 2, 2007

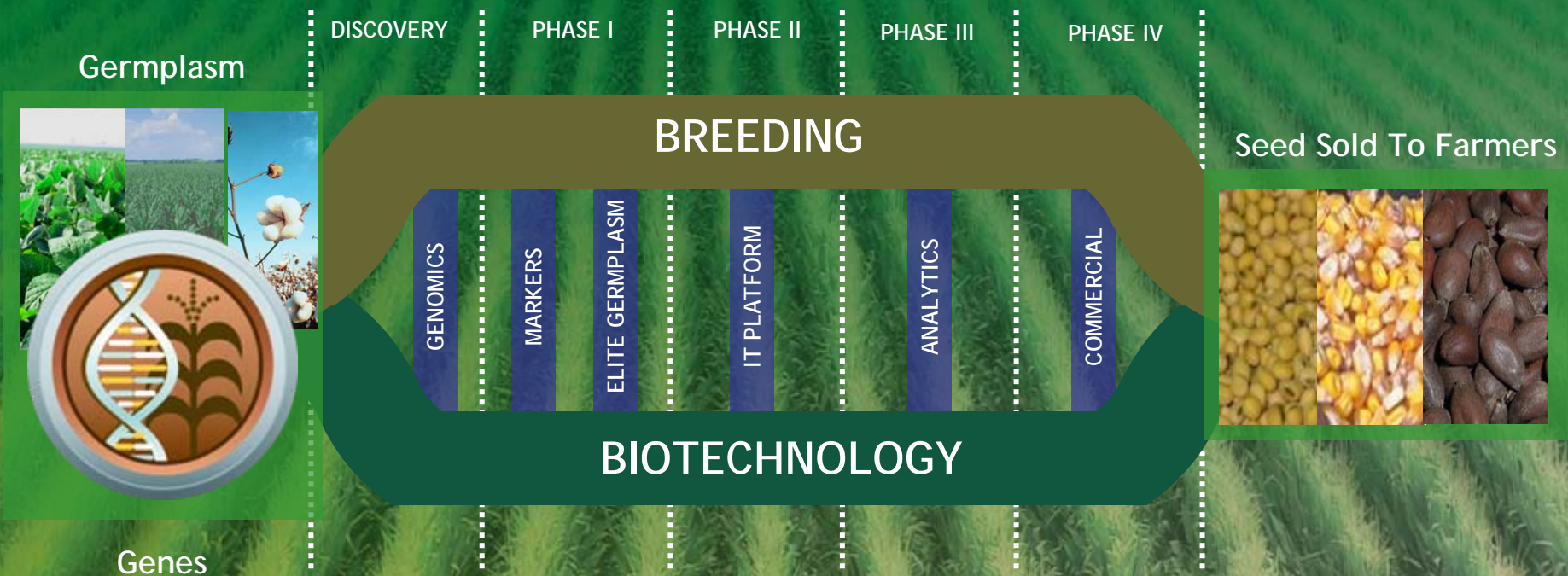
“Producing the food for the world’s 6.6 billion people on 20% less land than when the world population was 2.5 billion has, as we have seen, been possible through a combination of selection, breeding, improved irrigation systems, soil conservation, and the judicious application of fertilizers.”

“Certainly the more productive the lands devoted to agriculture may be, the less pressure will be felt on the remainder - high agricultural productivity in this sense leads directly to the preservation of biodiversity.”

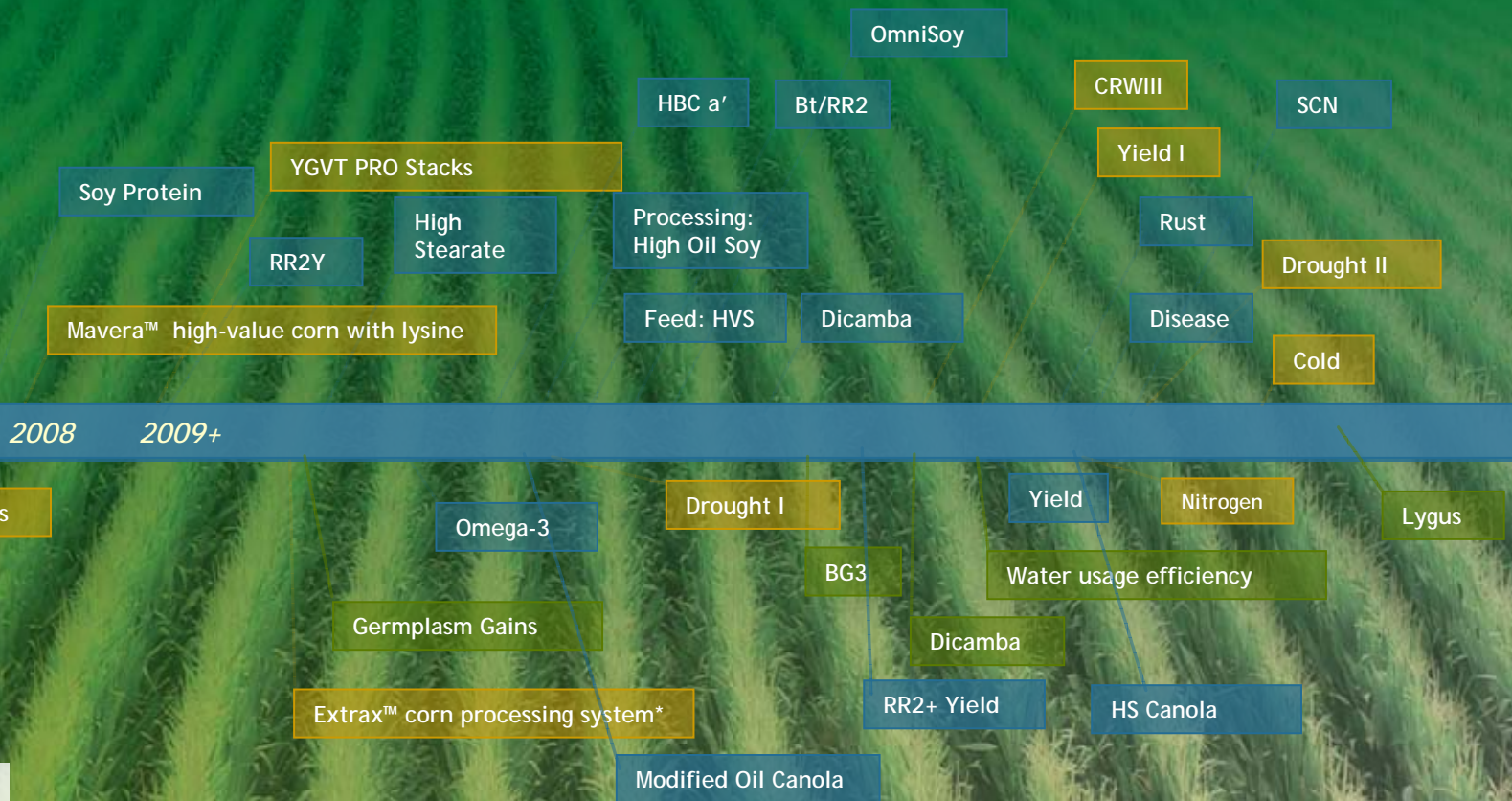
“Rational approaches to agriculture and food technology should lead gradually to the acceptance of GM and other technologies and to their widespread use to help solve the many problems of agriculture.”

Peter H. Raven, President, Missouri Botanical Garden, St. Louis
peter.raven@mobot.org

Success will Depend on a Continued Application of Breeding and Biotech Development Pathways



Future Products from Ag Biotech



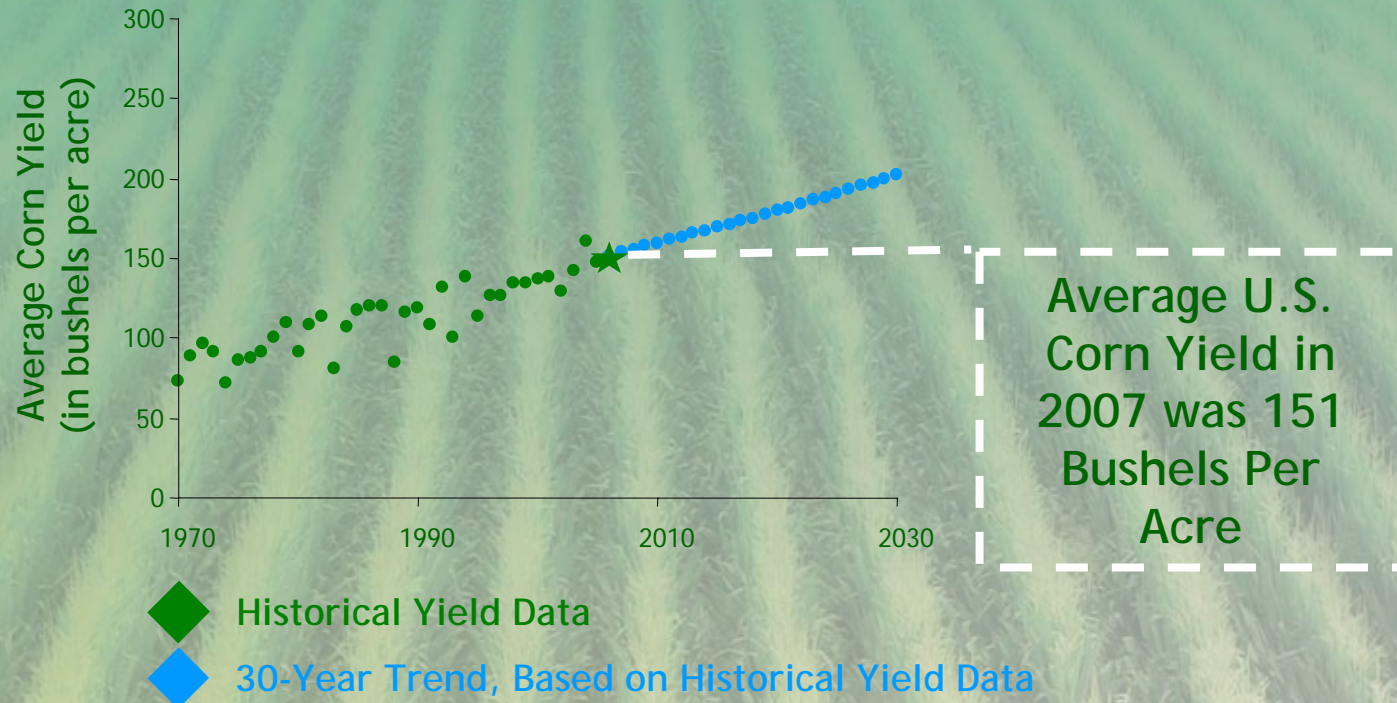
- CORN
- OILSEEDS
- COTTON

Commercialization dependent on many factors, including successful conclusion of regulatory process

* Ressen product; Ressen is a Monsanto/Cargill joint venture

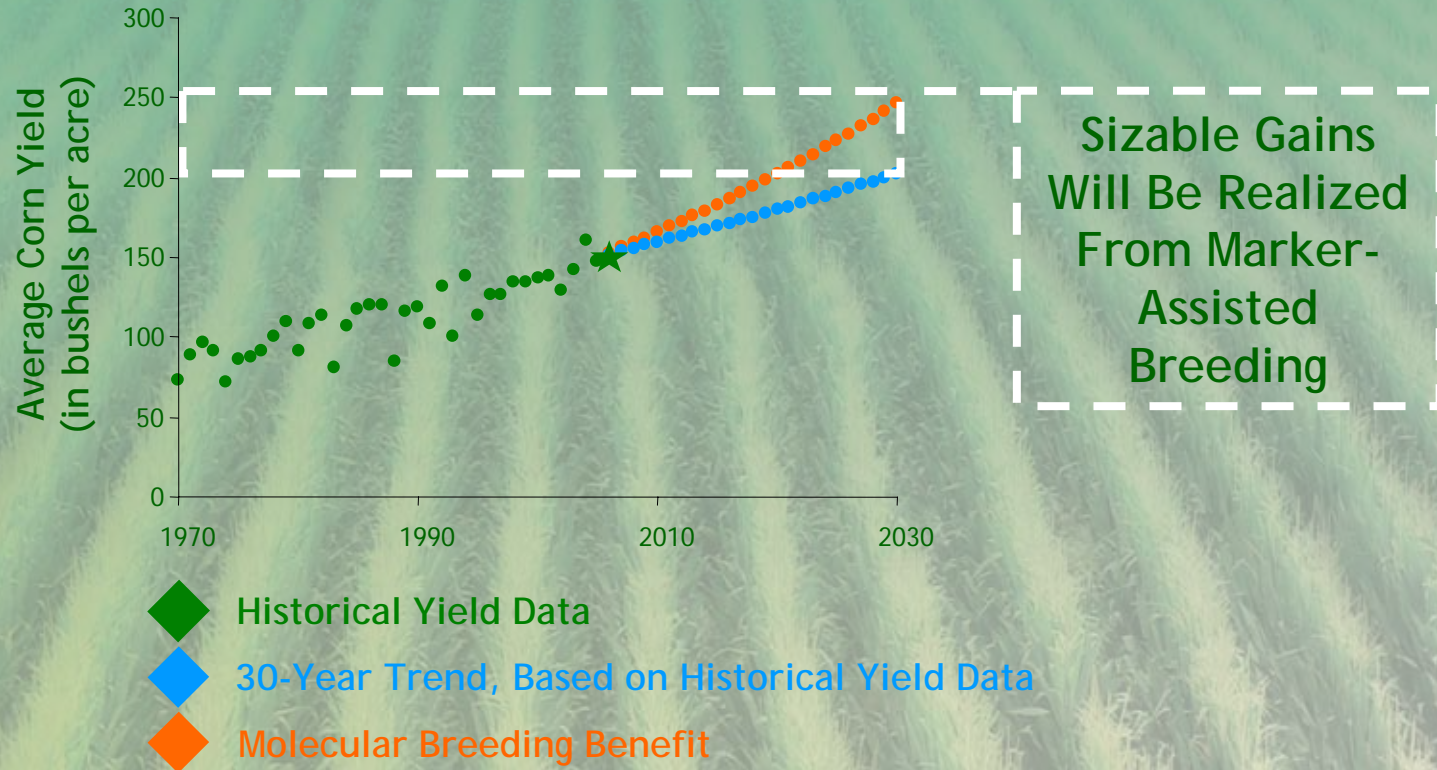
Innovations in Ag Technology Will Continue to Increase Yield Productivity

Advances Assisting in Protecting and Boosting Yields



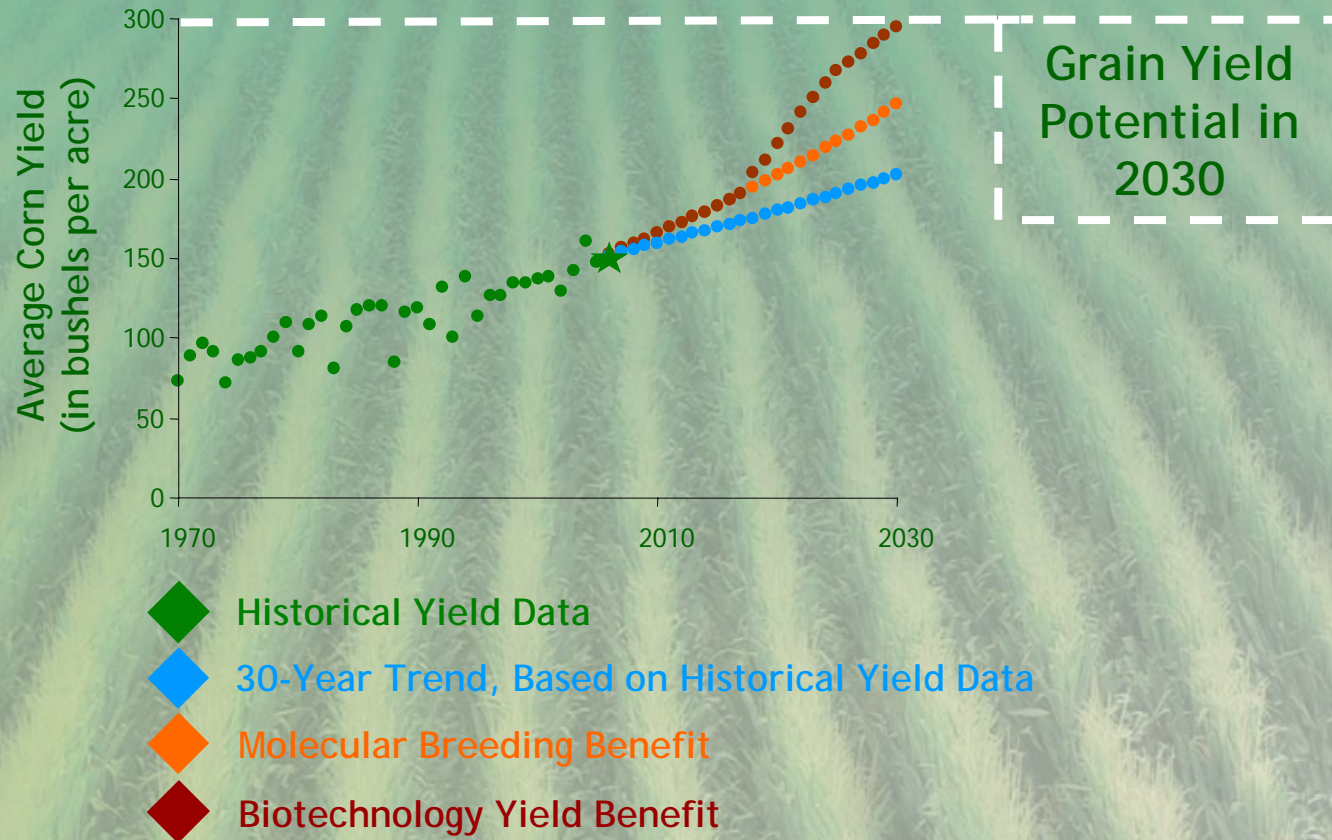
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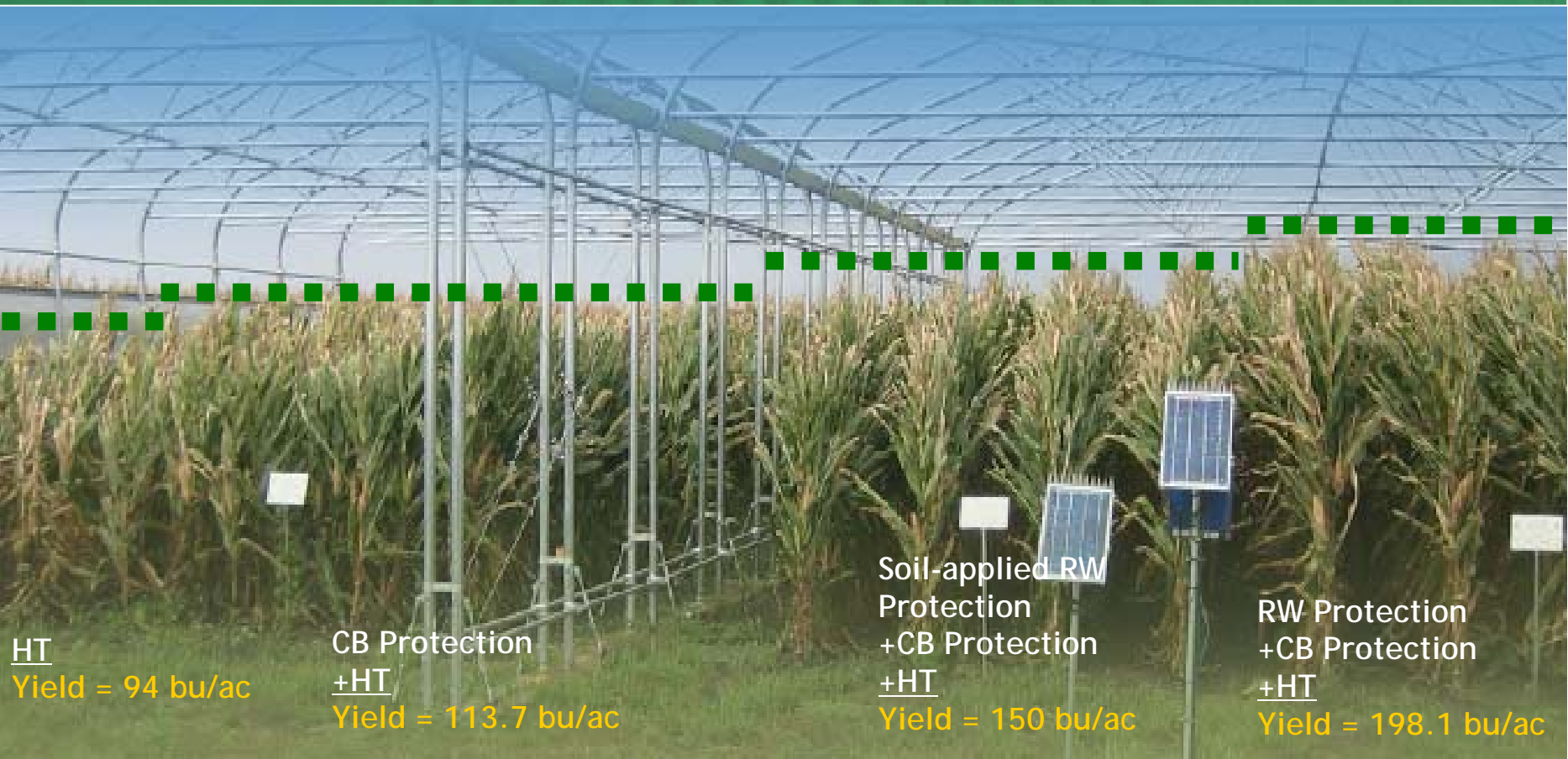
Innovations in Ag Technology Will Continue to Increase Yield Productivity

Advances Assisting in Protecting and Boosting Yields



Driving Yield Higher Depends on Stacking Traits

Rain Shelter Trial Corn Plot at A Monsanto Research Site



HT
Yield = 94 bu/ac

CB Protection
+HT
Yield = 113.7 bu/ac

Soil-applied RW
Protection
+CB Protection
+HT
Yield = 150 bu/ac

RW Protection
+CB Protection
+HT
Yield = 198.1 bu/ac

Roundup Ready® Corn 2

YieldGard® Corn Borer with Roundup Ready Corn 2

YieldGard Corn Borer with Roundup Ready Corn 2 + Force® insecticide

YieldGard Plus with Roundup Ready Corn 2

Corn Rootworm Protected Corn is Helping to Maximize Yield Under Drought Conditions

Rootworm-Protected Corn

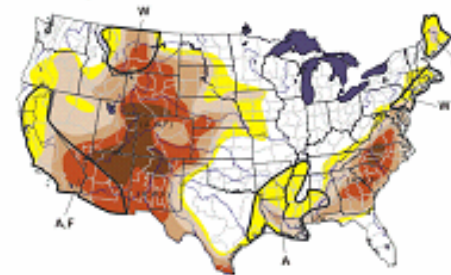
Soil Insecticide



The drought of 2002 reduced the value of US corn harvest by over \$2 b

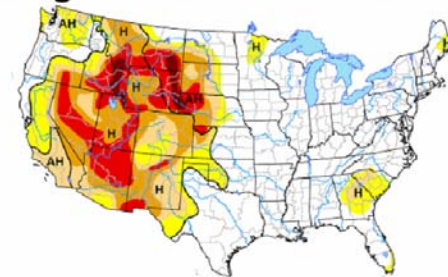
Av Yield = 129 bu/A 2002
Harvest value = \$10.32 b

U.S. Drought Monitor July 9, 2002
Valid 9 a.m. EDT



Av Yield = 160 bu/A 2004
Harvest value = \$12.8 b

U.S. Drought Monitor June 29, 2004
Valid 9 a.m. EDT



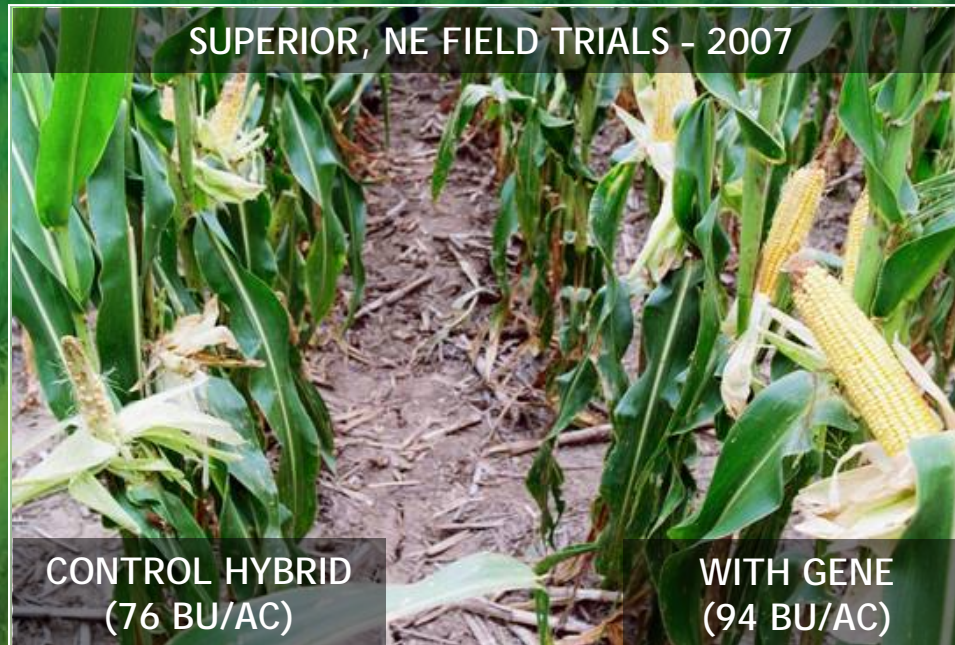
Corn Drought Event Offers Visual Evidence of Increased Yield in Stressed Conditions

DROUGHT-TOLERANT CORN FAMILY: Lead Project

COLLABORATION
WITH



- Drought-tolerance family aimed at providing consistent yield and buffering against effects of water limitations
- Targeting 8-10% yield improvement in water-stress environments



2007 FIELD TESTING SHOWS VISUAL PROOF OF YIELD IMPROVEMENT

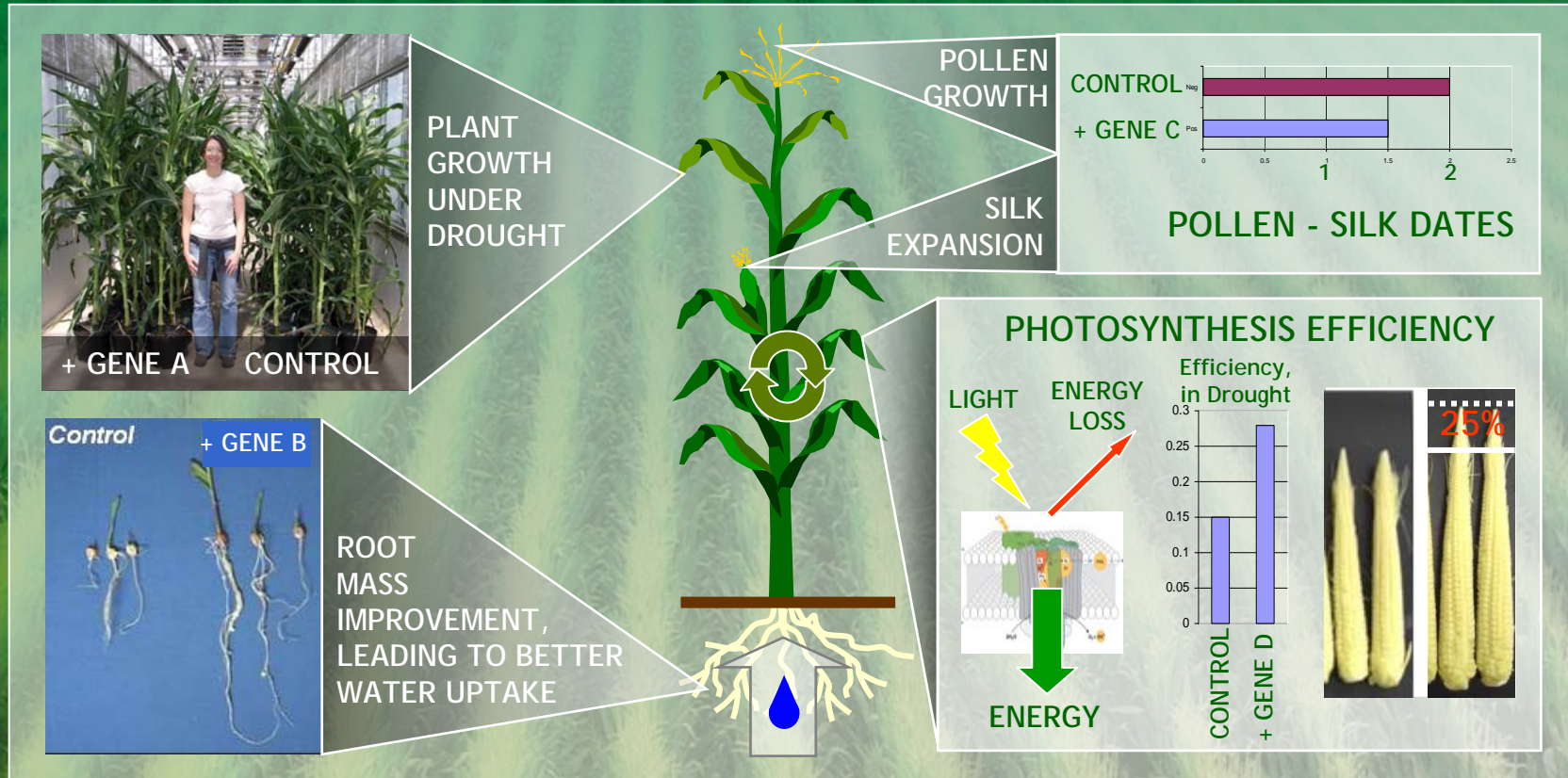
Water stress exposure during different stages of development can have significant effect on corn yield; Monsanto's lead drought-tolerance trait shows a significant yield advantage compared with controls under drought stress



Second-Generation Corn Leads Advancing Rapidly

Phase 2 Gene Leads Work To Improve Ways Plants Use Water

COLLABORATION
WITH



BUILDING A FAMILY OF GENES CONVEYING DROUGHT TOLERANCE

Drought Tolerant Cotton is in Early Development

Drought Tolerant Cotton

- Drought leads advancing to greenhouse screens
- First leads in field testing are showing promise
- Up next: Continued evaluation to assess drought performance



AS PHASE 1 PROJECT, TESTING MULTIPLE GENES FOR IN-FIELD PROOF OF CONCEPT

Discovery

Phase 1
Proof of Concept

Phase 2
Early Development

Phase 3
Adv. Development

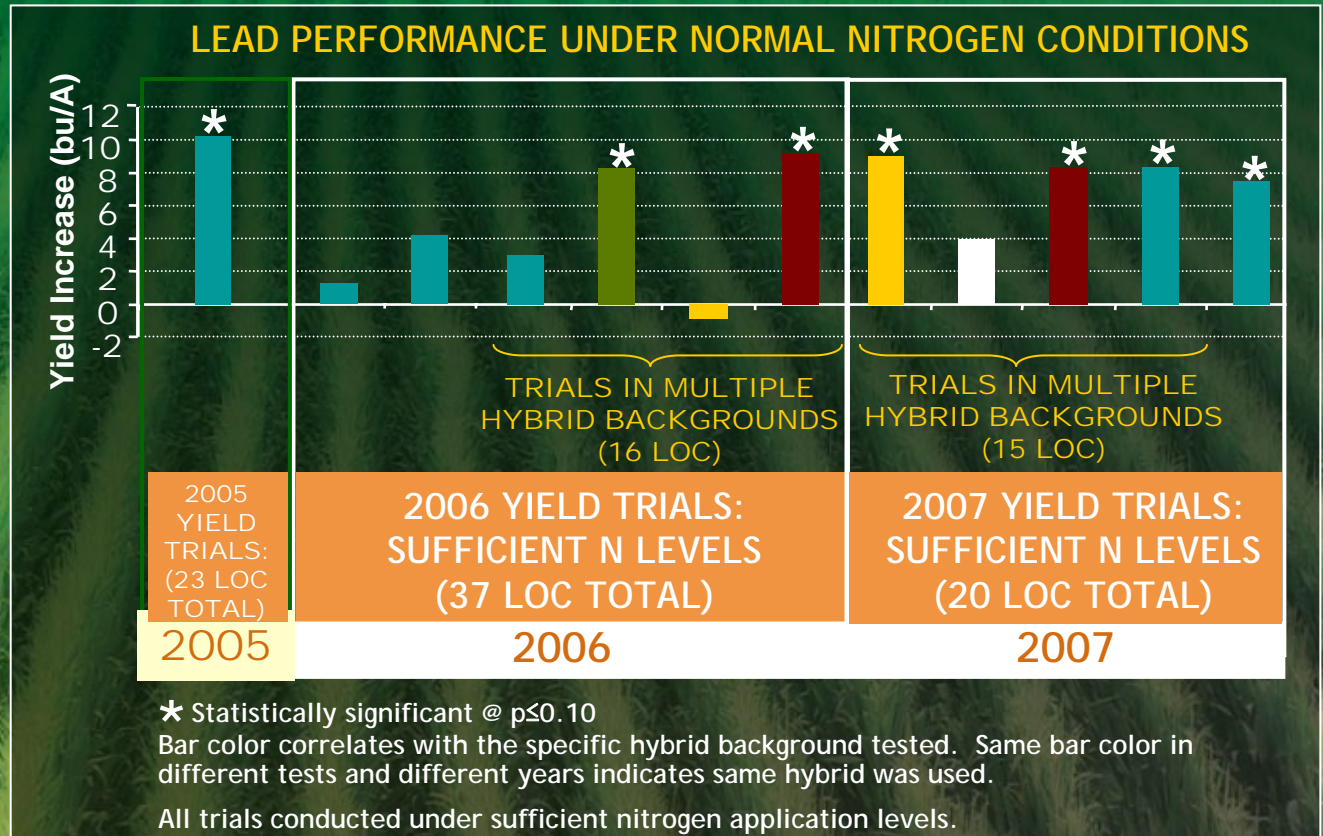
Phase 4
Pre-Launch

Launch

Nitrogen Use Efficiency Leads Show Yield Improvement Under Normal Nitrogen

- Targets ways to use nitrogen more efficiently, exploring potential to boost yield under normal nitrogen conditions or stabilize it in low nitrogen environments
- Under normal nitrogen conditions, lead trait has demonstrated yield advantages in multiple backgrounds over multiple years

COLLABORATION WITH



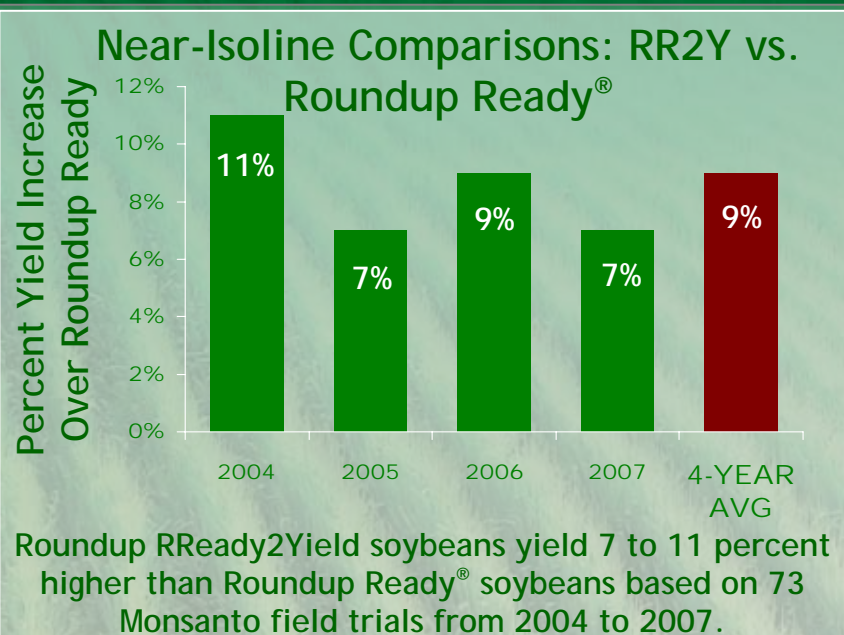
Discovery	Phase 1 Proof of Concept	Phase 2 Early Development	Phase 3 Adv. Development	Phase 4 Pre-Launch	Launch
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2nd Generation RR Soybean Offers Yield Advantage



Roundup RReady2Yield™ Soybeans

- Compared with Roundup Ready® soybeans, this new technology along with conventional and molecular breeding is expected to deliver increased yield
- Roundup RReady2Yield™ soybeans offer 7% - 11% yield advantage based on three years of field comparisons*
- Four years of data continue to validate 7-11% yield advantage



Discovery	Phase 1 Proof of Concept	Phase 2 Early Development	Phase 3 Adv. Development	Phase 4 Pre-Launch	Launch
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See notes on Roundup RReady2Yield on slide 24.

Yield estimates based on average yields of 64 bu/a obtained in 2004. Lower yielding environments may not see the same level of yield increase.

* This range represents a 95% statistical confidence interval. Individual results may vary, and performance may vary from location to location and from year to year.

Intrinsic Yield Soybeans Aimed at an Additional Yield Boost

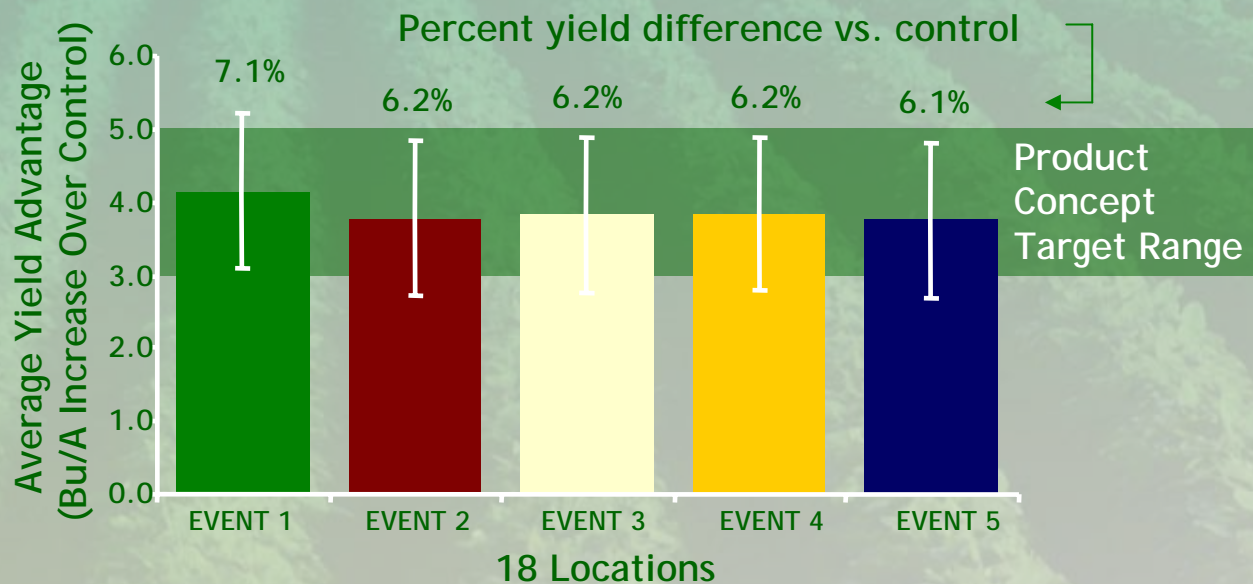
Higher-Yielding Soybeans

COLLABORATION
WITH



- Higher-yielding soybeans aimed at boosting intrinsic yield potential of soybeans through insertion of key genes
- Trait will be stacked on top of RR2Y and other soybean-pipeline traits with an additive yield boost

2007 HIGHER YIELDING SOYBEAN AGRONOMIC TESTING VERSUS CONTROLS



More than 60 events were tested at 18 locations, with lead events showing strong yield advantages over conventional controls

Discovery

Phase 1
Proof of Concept

Phase 2
Early Development

Phase 3
Adv. Development

Phase 4
Pre-Launch

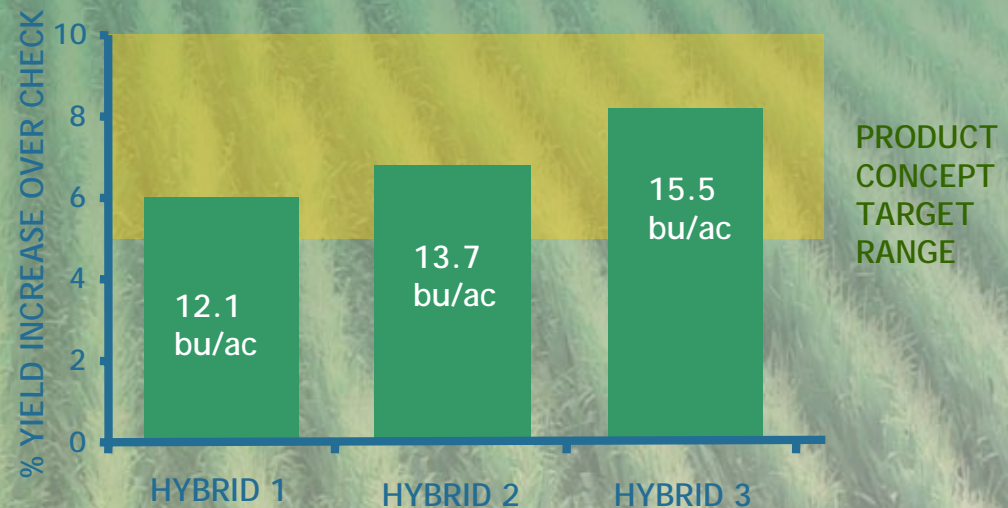
Launch

Intrinsic Yield Corn Also Showing Progress

Higher-Yielding Corn

- In 2006 field testing, lead event shows yield efficacy in different test hybrids
- 3 years of data demonstrate yield increase in multi-location trials with multiple hybrid combinations
- Commercial transformations will be made, with further testing to select for lead events

2006 Field Results Indicate Increased Yield Versus Conventional Checks



Discovery

Phase 1
Proof of Concept

Phase 2
Early Development

Phase 3
Adv. Development

Phase 4
Pre-Launch

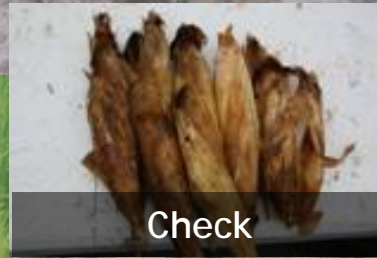
Launch

Second-Generation Bt Corn with Broader Insect Control and Reduced Aflatoxin Benefit

YieldGard VT PRO Produces Two New Bt Proteins in Corn



YieldGard VT PRO



Check

- Next-generation YieldGard® Corn Borer
- Field data demonstrate excellent control of targeted pests
- Outstanding yields, including stacks for rootworm control
- Reduced aflatoxin concentrations
- Undergoing regulatory reviews

Discovery	Phase 1 Proof of Concept	Phase 2 Early Development	Phase 3 Adv. Development	Phase 4 Pre-Launch	Launch
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The Reduction of Fumonisin Mycotoxin with Bt Corn has been Well-Established



A reduction in fumonisin levels could have important

COUNTRY	YEAR	SITES	Non <i>Bt</i>	<i>Bt</i>	Reduction
Italy	1997	3	19.8	2.0	10 <i>fold</i>
Italy	1998	4	28.3	2.1	13
Italy	1999	30	2.8	0.34	8
France	1997-99	26	1.0	0.03	33
Spain	1999	2	6.0	0.25	24
US (FACT)	2000	49	2.9	1.4	2
US (ACAD)	2000	16	14.0	4.2	3.3



Preliminary Results Indicate that 2nd Generation Bt Corn has the Potential to Reduce Aflatoxin



Conventional



YG VT Pro

- Conventional version (left) showed significant ear feeding damage and infection by *Aspergillus flavus* compared to YG VT Pro version (right)*
- YG VT Pro resulted in a 72% reduction in aflatoxin averaged across two hybrids*

Third-Generation Herbicide Tolerance in Cotton

Dicamba - Tolerant Cotton

- Provides a new, unique mode of action, designed to provide cotton growers with the most effective weed management system available
- The trait will likely be used in conjunction with a glyphosate-tolerant variety background



Discovery

Phase 1
Proof of Concept

Phase 2
Early Development

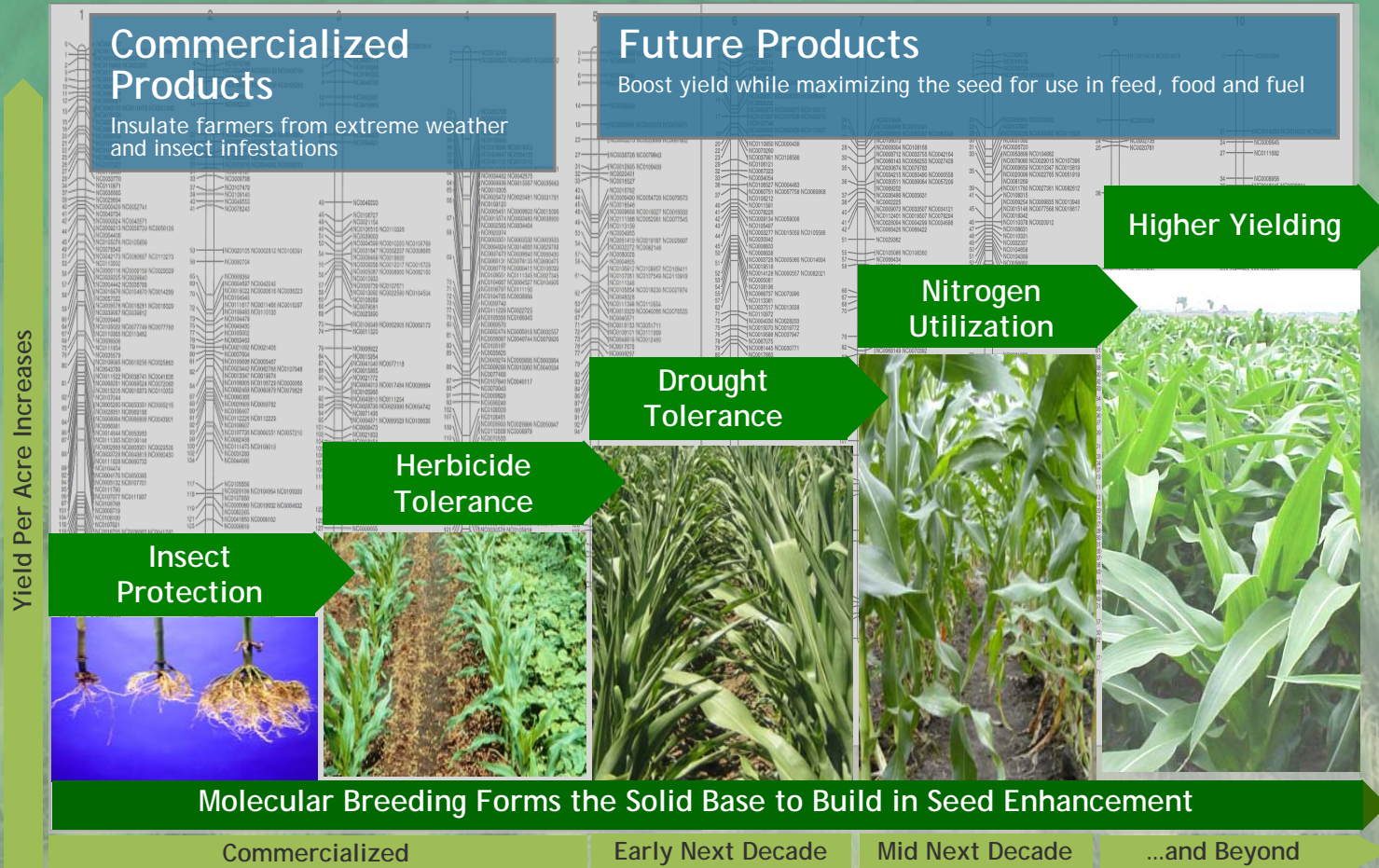
Phase 3
Adv. Development

Phase 4
Pre-Launch

Launch

Biotech is Helping to Address Global Imperatives

Advances Assisting in Protecting and Boosting Yields and Reducing Environment Impacts



R & D Efforts Are Focused on Global Imperatives

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**Ag Biotech
is ON TRACK**

Notes

Certain statements contained in this presentation are “forward-looking statements,” such as statements concerning the company’s anticipated financial results, current and future product performance, regulatory approvals, business and financial plans and other non-historical facts. These statements are based on current expectations and currently available information. However, since these statements are based on factors that involve risks and uncertainties, the company’s actual performance and results may differ materially from those described or implied by such forward-looking statements. Factors that could cause or contribute to such differences include, among others: continued competition in seeds, traits and agricultural chemicals; the company’s exposure to various contingencies, including those related to intellectual property protection, regulatory compliance and the speed with which approvals are received, and public acceptance of biotechnology products; the success of the company’s research and development activities; the outcomes of major lawsuits, including proceedings related to Solutia Inc.; developments related to foreign currencies and economies; successful operation of recent acquisitions; fluctuations in commodity prices; compliance with regulations affecting our manufacturing; the accuracy of the company’s estimates related to distribution inventory levels; the company’s ability to fund its short-term financing needs and to obtain payment for the products that it sells; the effect of weather conditions, natural disasters and accidents on the agriculture business or the company’s facilities; and other risks and factors detailed in the company’s filings with the SEC. Undue reliance should not be placed on these forward-looking statements, which are current only as of the date of this presentation. The company disclaims any current intention or obligation to update any forward-looking statements or any of the factors that may affect actual results.

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RR = Roundup Ready; YGCB = YieldGard Corn Borer; RR2 = Roundup Ready Corn 2; HVC = High Value Corn; YGVT = YieldGard VT; YGRW = YieldGard Rootworm; RR2Y = Roundup RReady2Yield

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