GMO Labeling
Science, Safety, and Ethics

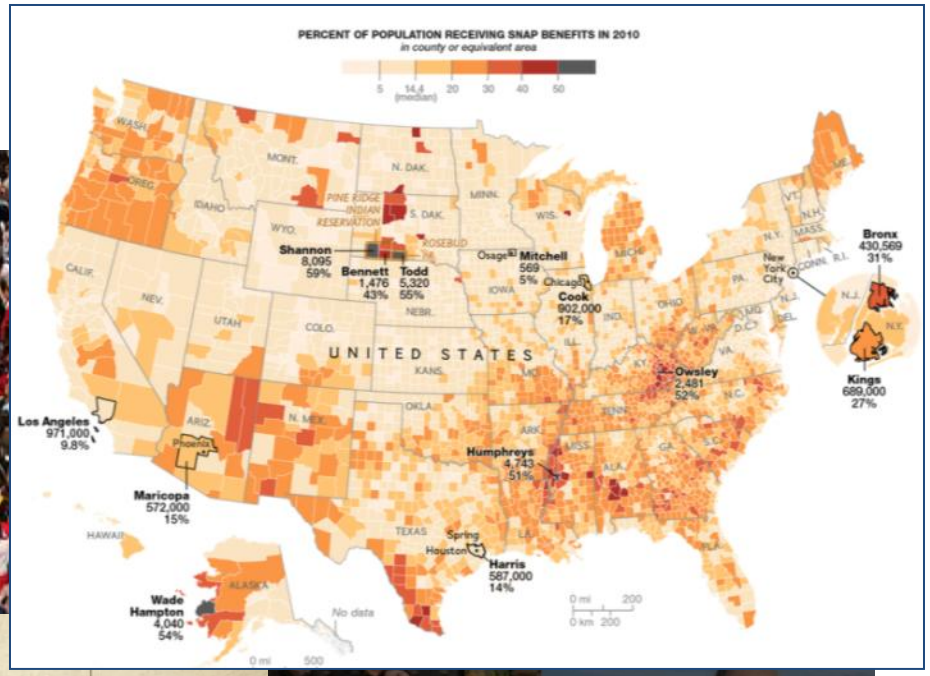
Steve Strauss

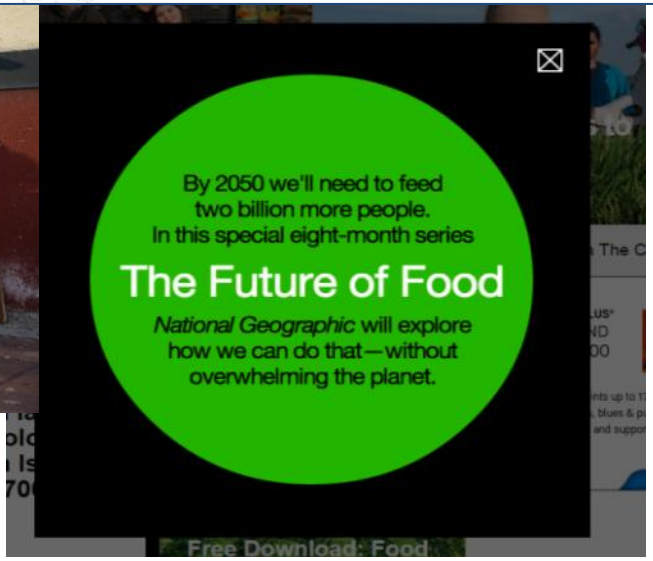
Oregon State University

Roadmap for talk

- Some broad perspectives
- Measure 92 – why I am strongly against it
- Measure 92-related science
  - Context: Crop domestication and breeding
  - What genetic modification is
  - Use and impacts
  - Newer products in the pipeline
  - Safety
- Back to labeling, with a broader take

Billions are malnourished now, and it's a very scary future





Climate change & travel creating urgent pest problems

takepart

IN THE NEWS | LIFESTYLE | FEATURES & COLUMNS | TAKE ACTIO

This Killer Fungus Could Force the Whole World to Go Gluten-Free

Rust is depleting our bread supply, but how do we feel about genetically modified wheat?

Wheat stem rust fungus (Photo: IAEA Imagebank/Flickr)

July 15, 2014 | *By Isabel Weisz*

Isabel Weisz is an editorial intern for Summer 2014. S
College as an Environmental Analysis & Policy majo
Cruz, Calif.

» full bio

The New York Times

July 27, 2013

A Race to Save the Orange by Altering Its DNA

By AMY HARMON

CLEWISTON, Fla. — The call Ricke Kress and every other citrus grower in Florida dreaded came while he was driving.

CORRESPONDENCE

Field trial of *Xanthomonas* wilt disease-resistant bananas in East Africa

To the Editor:

Banana is a major staple crop in East Africa pro-
duced mostly by smallholder subsistence farm-

response-assisting protein (*Hrap*) and plant ferredoxin-like protein (*Pflp*) from sweet pepper (*Capsicum annuum*). Both have been

to intensified production of active
species and activation of the hyper
response when plants are challeng

where the green revolution has had
influence. Banana is an important f
and cash crop in the Great Lakes reg
East Africa. Food security studies re
that in Uganda, Rwanda and Burun
bananas constitute >30% of the dail
capita caloric intake, rising to 60% i
regions[1]. As elicitor-induced resista
not specific against particular patho
this transgenic approach using *Hrap*
Pflp may also provide effective cont
other bacterial diseases of banana, s
moko or blood disease, in other par
world.

AUTHOR CONTRIBUTIONS

L.T. conceived the idea and led the study. L.
F.S. and W.K.T. designed the study. L.T. and
performed the experiments and S.K. analy
data. All authors contributed to the interp
data and writing of the paper.

ACKNOWLEDGMENTS

We thank T.Y. Feng, Academia Sinca, Taiw
providing the *Hrap* and *Pflp* gene construc
African Agricultural Technology Foundati
for negotiating a royalty-free license for the
from the patent holder. This research was

Pesticide poisoning common in developing world – eggplant, cotton

http://www.isaaa.org/resources/publications/briefs/47/download/isaaa-brief-47-2014.pdf

Natural toxins in food pose serious problems for the poor

Child with liver cancer in Mozambique due to consumption of mycotoxins

photo courtesy of Rick Roush

- Esophageal cancer
- Neural tube defects, spina bifida
- 155,000-172,000 cases per year from alflatoxin (F. Wu, Michigan State U.)

- Bt GMO corn above
- Fungal contaminated, mycotoxin-producing corn below

Billions suffer from micronutrient deficiency

Widespread, impacts severe, and decades of supplements unable to overcome

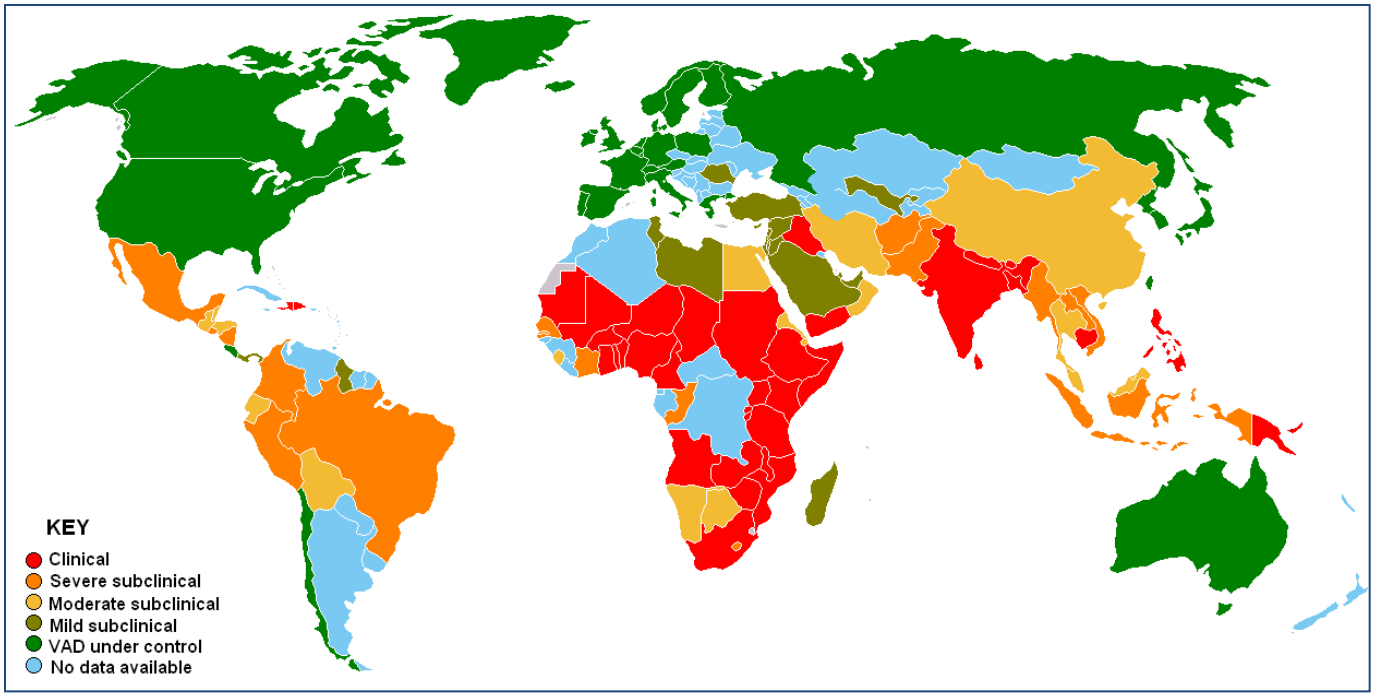
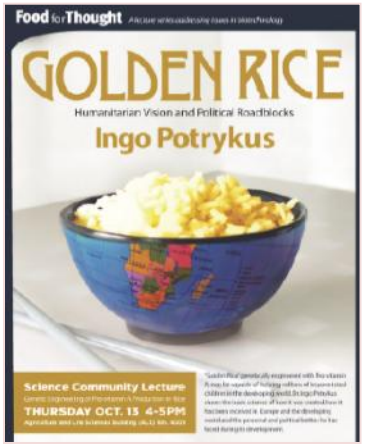


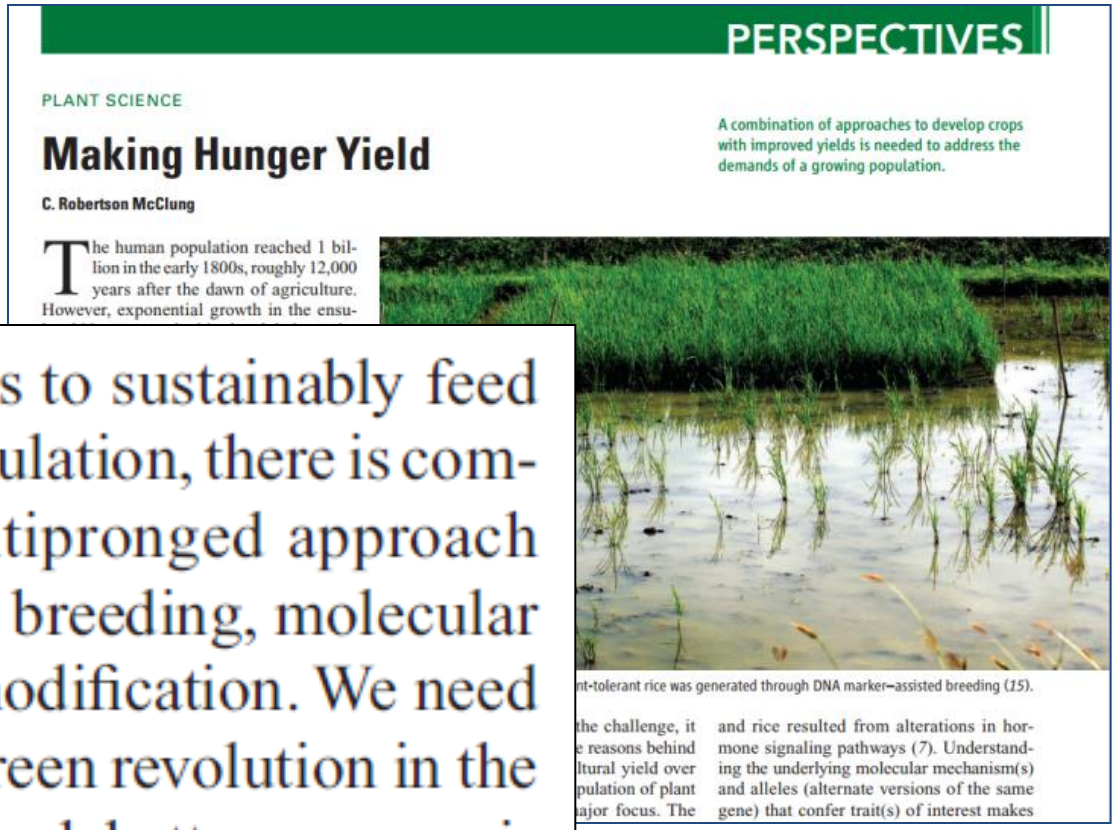
Image sources: Petaholmes based on WHO data;



Young women suffering blindness due to Vit A deficiency

Vitamin A deficiency affects <u>one-third of children</u> under the age of five around the world

GMOs are powerful tools, not silver bullets – BIG problems, prudent management



PERSPECTIVES

PLANT SCIENCE

Making Hunger Yield

A combination of approaches to develop crops with improved yields is needed to address the demands of a growing population.

C. Robertson McClung

The human population reached 1 billion in the early 1800s, roughly 12,000 years after the dawn of agriculture. However, exponential growth in the ensu-

nt-tolerant rice was generated through DNA marker–assisted breeding (*15*).

the challenge, it
e reasons behind
ltural yield over
pulation of plant
ajor focus. The

and rice resulted from alterations in hormone signaling pathways (*7*). Understanding the underlying molecular mechanism(s) and alleles (alternate versions of the same gene) that confer trait(s) of interest makes

In seeking new crops to sustainably feed an expanding world population, there is compelling need for a multipronged approach that includes traditional breeding, molecular breeding, and genetic modification. We need to accelerate this new green revolution in the lab, in the field, and through better communication outside the scientific community if we are to address the nearly 3 billion chronically undernourished people worldwide.

http://www.sciencemag.org/content/344/6185/699.full.pdf

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Why I am against measure 92

Its about method, not content of food

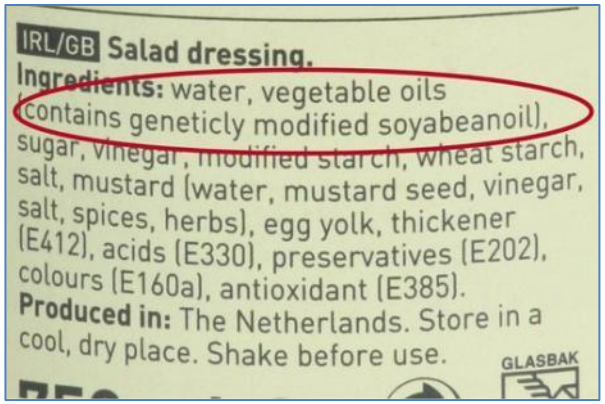
- It stigmatizes one method of genetic modification among many – when there is clear scientific consensus that its “product not process” that matters
  - USA National Academy of Sciences: “There is no evidence that unique hazards exist either in the use of rDNA techniques or in the movement of genes between unrelated organisms.”
- Clearly safer products, such as more healthy corn and potato, will be “warning labeled”

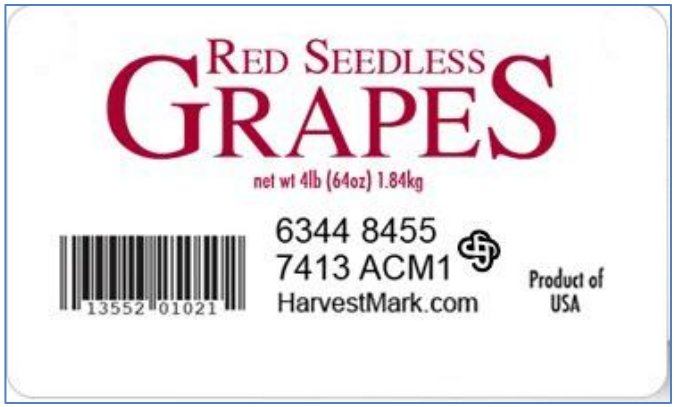
Why I am against measure 92

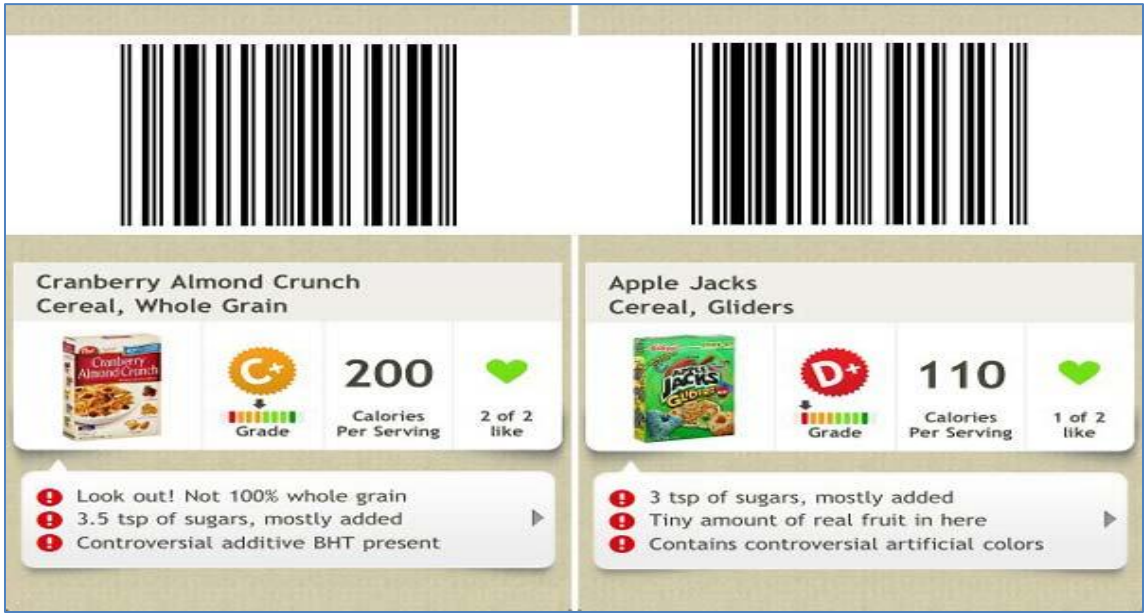
It is of no value for making health decisions

- It does not account for different types or amounts or activities of GMO materials in food
- It may require a label with trace GMOs present = zero tolerance – according to some legal opinions (misbranding, section 4)
- It requires labels on GMO gene & protein-free materials – like oils and sugars
- Much of the food we eat is exempted from any sort of labeling (e.g., restaurants, cafeterias)

Smart labels might make sense, especially as breeding and biotech advance







Why I am against measure 92

We have reliable, standardized, national GMO-free choices

- Organic food is now common and cannot be made with GMO ingredients
- The GMO-free label is rapidly growing, and is more rigorous for those with concerns (e.g., meats from GMO-fed animals are excluded)
- The costs are not imposed on others, they are borne by those with strong concerns

Why I am against measure 92

The cost of food will be increased, disproportionately hurting the poor

- Recent studies from Cornell University and the Washington Academy of Sciences suggest it may be hundreds-$$ per family
  - Oregon administrative cost alone in millions/yr
- Main costs are segregation, tracking, and compliance inspection, not printing
- The stigma of the prominent label is likely to prompt many producers to use higher priced, non-GMO ingredients – raising food prices
  - Ben and Jerry's now trying – 5-20% (Wall St. Journal)
  - Reduced choice? Companies likely to discontinue many products just for Oregon

Why I am against measure 92

Investments in consumer education by labeling should start with issues of highest consumer and health concern

High Risk

Diet: sufficiency, adequacy, over-nutrition

Food borne Illness

Untested: organic food, dietary supplements

Natural toxicants

Food allergy

Chance additives

Pesticide and herbicide residues

Food ingredients and additives

GMO foods

Low Risk

Source: Dr. Bruce Chassy, Prof. Emeritus, U. Illinois

Microbial food contamination a major problem – often from organic crops

- The US Centers for Disease Control (CDC; Atlanta) reports that in 2012, there were 128,000 cases of food-borne illnesses leading to hospitalizations, with 3,000 deaths (http://www.cdc.gov/foodborneburden/index.html)

E. Coli in German organic sprouts Fall 2011

Public survey: Contamination, handling main food safety concerns

Food Safety Concerns

- Disease/contamination and handling/prep are still the most mentioned food safety concerns, although to a lesser degree than previous years.

Food safety concerns	Total 2014 (A) n=1000	Total 2012 (B) n=751	Total 2010 (C) n=750	Total 2008 (D) n=1000
Disease/contamination	18%	29% A	29% A	38% ABC
Handling/preparation	18%	21%	23% AD	17%
Preservatives/Chemicals	12% D	13% CD	8% D	6%
Agricultural production	10% CD	7%	7%	5%
Packaging/labeling	9% BCD	5% D	4%	2%
Health/nutrition	7% D	8% D	6%	4%
Biotech	7% BCD	2%	2%	1%
Food sources	6%	7%	8%	9% A
Processed foods	3% BCD	1%	1%	1%
Other	3% CD	1%	1%	<1%

A/B/C/D indicate statistical significance between years

Q12. What, if anything, are you concerned about when it comes to food safety? [OPEN END]

IFIC International Food Information Council

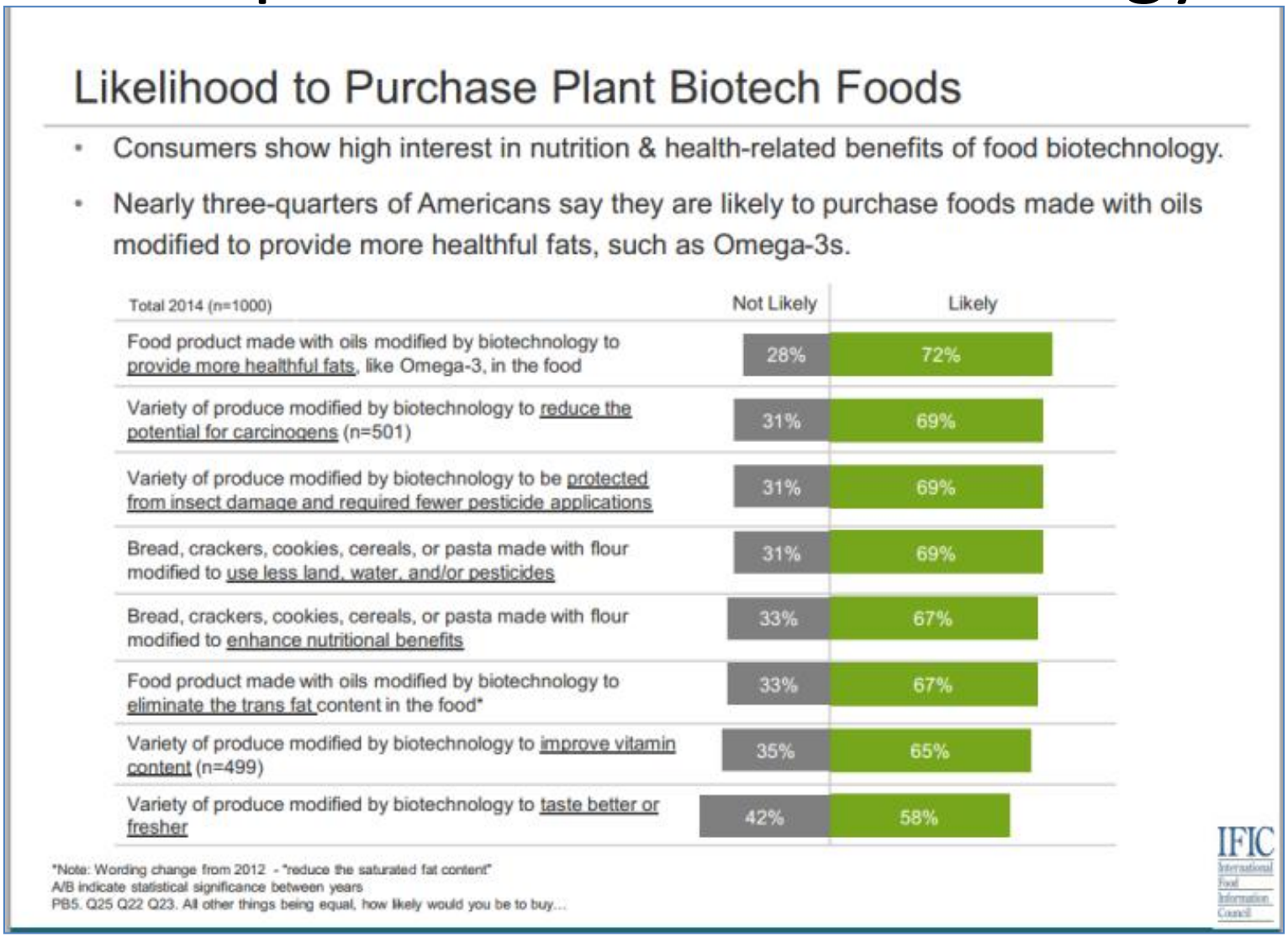
http://www.foodinsight.org/sites/default/files/FINAL%20Full%20Report_IFIC%202014%20Food%20Tech%20Survey.pdf

Why I am against measure 92

The stigma and cost will impede future biotechnology innovations, against American's interests

- Regardless of benefits, it will be risky for companies to produce products with a marketplace stigma and added cost
- Investment in R & D will decline
- New crops in the commercial pipeline with clear benefits may be abandoned, and new innovations left on the shelf

Poll: A majority of Americans wish to purchase products of biotechnology



Likelihood to Purchase Plant Biotech Foods

- Consumers show high interest in nutrition & health-related benefits of food biotechnology.
- Nearly three-quarters of Americans say they are likely to purchase foods made with oils modified to provide more healthful fats, such as Omega-3s.

Total 2014 (n=1000)	Not Likely	Likely
Food product made with oils modified by biotechnology to provide more healthful fats, like Omega-3, in the food	28%	72%
Variety of produce modified by biotechnology to reduce the potential for carcinogens (n=501)	31%	69%
Variety of produce modified by biotechnology to be protected from insect damage and required fewer pesticide applications	31%	69%
Bread, crackers, cookies, cereals, or pasta made with flour modified to use less land, water, and/or pesticides	31%	69%
Bread, crackers, cookies, cereals, or pasta made with flour modified to enhance nutritional benefits	33%	67%
Food product made with oils modified by biotechnology to eliminate the trans fat content in the food*	33%	67%
Variety of produce modified by biotechnology to improve vitamin content (n=499)	35%	65%
Variety of produce modified by biotechnology to taste better or fresher	42%	58%

*Note: Wording change from 2012 - "reduce the saturated fat content"
A/B indicate statistical significance between years
PB5. Q25 Q22 Q23. All other things being equal, how likely would you be to buy...

IFIC International Food Information Council

http://www.foodinsight.org/sites/default/files/FINAL%20Full%20Report_IFIC%202014%20Food%20Tech%20Survey.pdf

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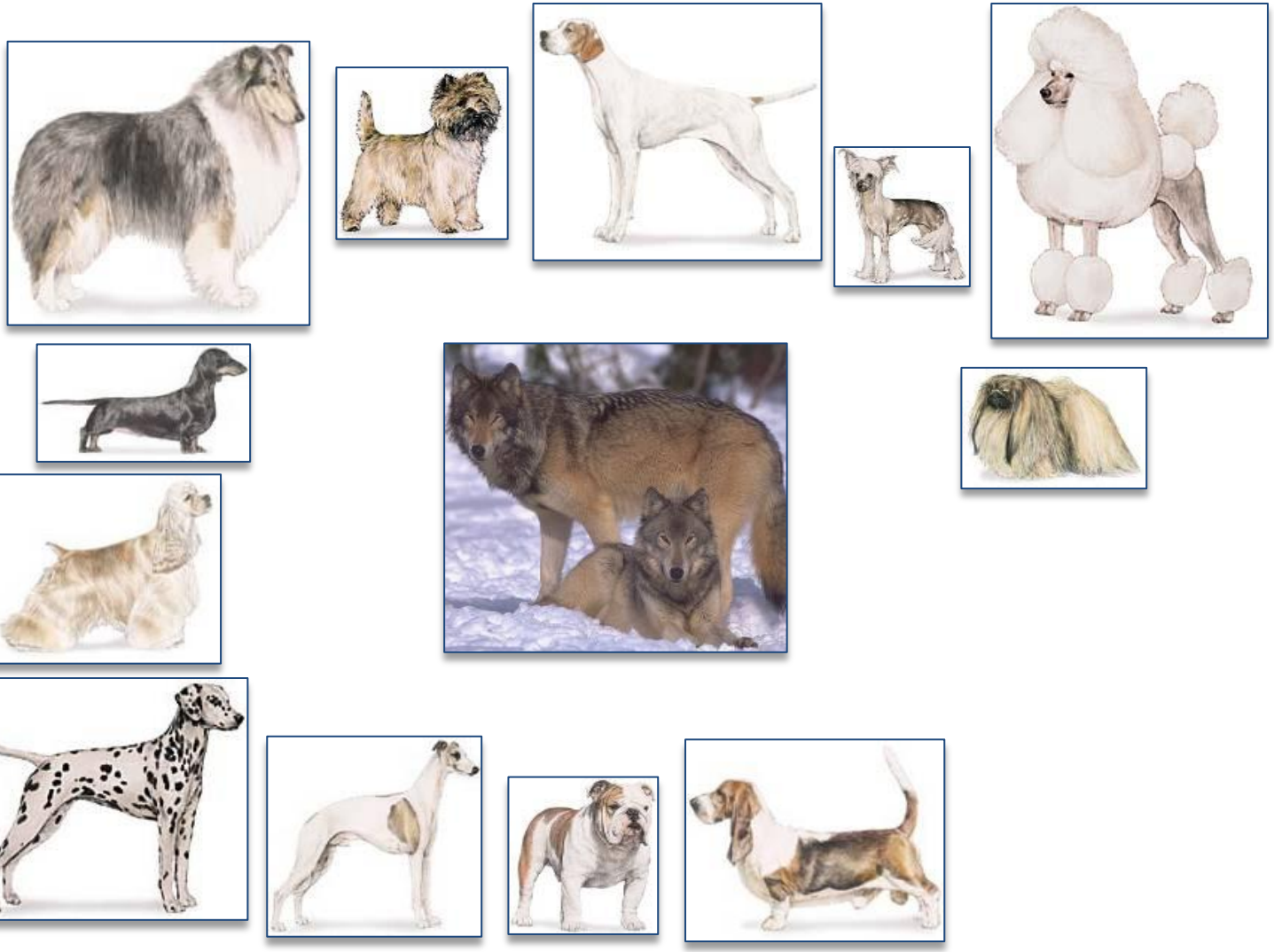
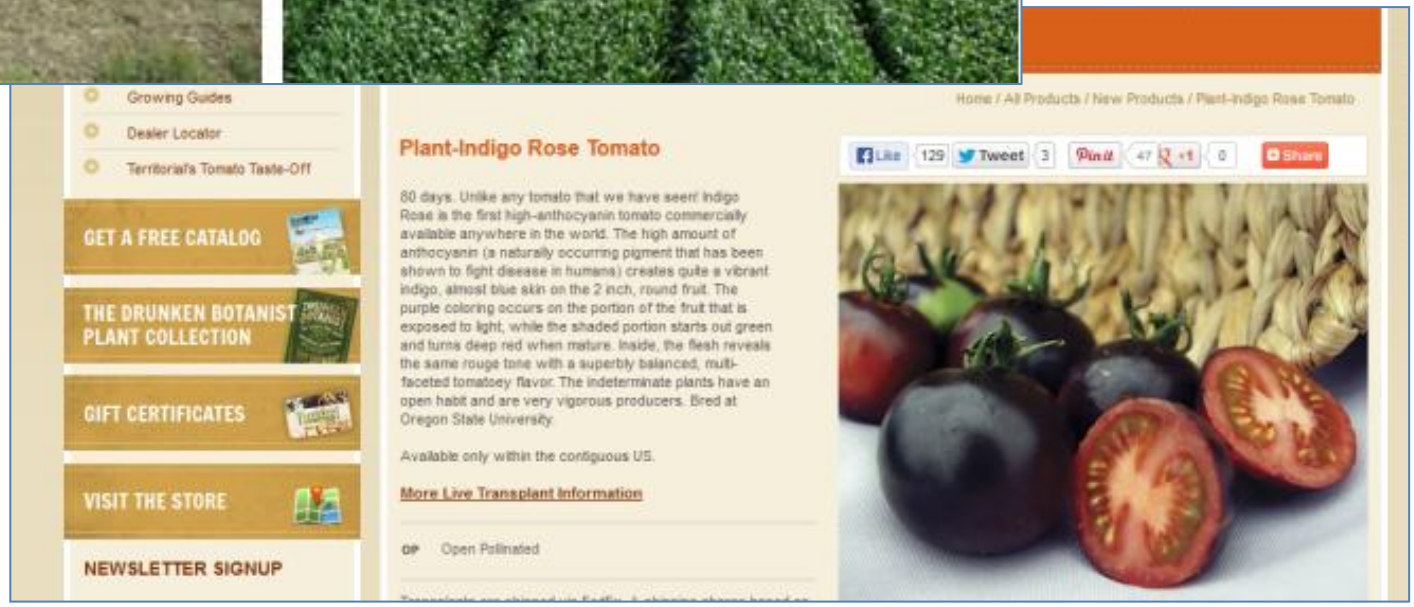
Crop domestication the basis of agriculture, enabled civilization

Radical changes in domesticated animals:

All dogs derived from the wolf by breeding



Breeding continues and is accelerating in age of massive DNA sequencing



Natural genetic processes radical, have continued to surprise

CSH PRESS GENOME RESEARCH

Research

Widespread and frequent horizontal transfers of transposable elements in plants

Moaine El Baidouri,[1,2] Marie-Christine Carpentier,[1] Richard Cooke,[1] Dongying Gao,[2] Eric Lasserre,[1] Christel Llauro,[1] Marie Mirouze,[3] Nathalie Picault,[1] Scott A. Jackson,[2] and Olivier Panaud[1,4]

[1]Université de Perpignan Via Domitia, Laboratoire Génome et Développement des Plantes, UMR5096 CNRS/UPVD, 66860 Perpignan Cedex, France; [2]Center for Applied Genetic Technologies, University of Georgia, Athens, Georgia 30602, USA; [3]Institut de Recherche pour le Développement, UMR232, 34394 Montpellier, France

Vertical, transgenerational transmission of genetic material occurs through reproduction of living organisms. In addition to vertical inheritance, horizontal gene transfer between reproductively isolated species has recently been shown to be an important, if not dominant, mechanism in the evolution of prokaryotic genomes. In contrast, only a few horizontal transfer (HT) events have been characterized so far in eukaryotes and mainly concern transposable elements (TEs). Whether these are frequent and have a significant impact on genome evolution remains largely unknown. We performed a computational search for highly conserved LTR retrotransposons among 40 sequenced eukaryotic genomes representing the major plant families. We found that 26 genomes (65%) harbor at least one case of horizontal TE transfer (HTT). These transfers concern species as distantly related as palm and grapevine, tomato and bean, or poplar and peach. In total, we identified 32 cases of HTTs, which could translate into more than 2 million among the 13,551 monocot and dicot genera. Moreover, we show that these TEs have remained functional after their transfer, occasionally causing a transpositional burst. This suggests that plants can frequently exchange genetic material through horizontal transfers and that this mechanism may be important in TE-driven genome evolution.

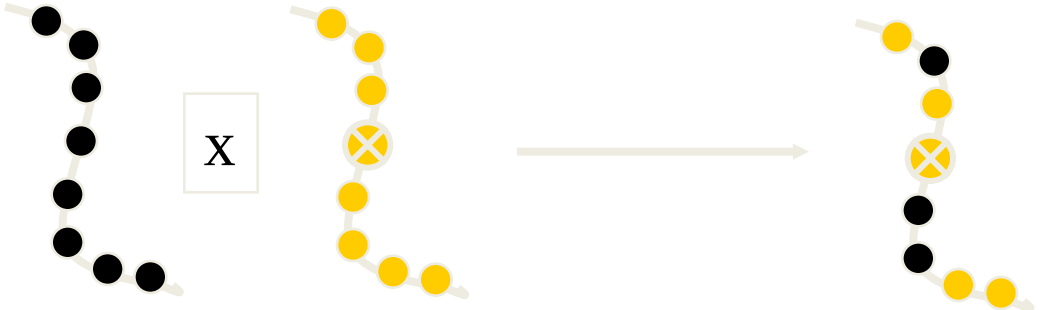
[Supplemental material is available for this article.]

Transposable elements (TEs) are mobile genomic DNA sequences that are found in almost all living organisms (Finnegan 1985). They so densely populate the genomes of many eukaryotic species that they are often the major components, as in human (>50%) (Prak and Kazazian 2000) or bread wheat (>95%) (Bennetzen 2000). In this regard, TEs have been shown to have a major impact

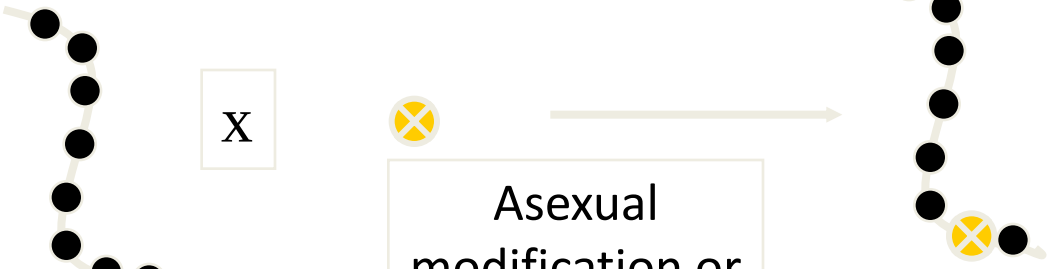
rious nature has raised the question of their persistence in eukaryotic lineages, especially after it was shown that TEs are strictly controlled by several silencing pathways (Slotkin and Martienssen 2007; Rigal and Mathieu 2011) and efficiently eliminated from their host genomes through deletions (Vitte and Panaud 2005). Horizontal transfers could allow TEs to escape this process

Genetic engineering defined

Traditional plant breeding



Genetic engineering



The GMO acronyms

- **GE (genetic engineering) = GM (genetic modification) = transgenic = asexual modification and/or insertion of DNA**

  GMO = genetically modified organism

  GEO = genetically engineered organism

  The terms "biotechnology" or "modern biotechnology" often used interchangeably with GE or GM

Regeneration of GE plants

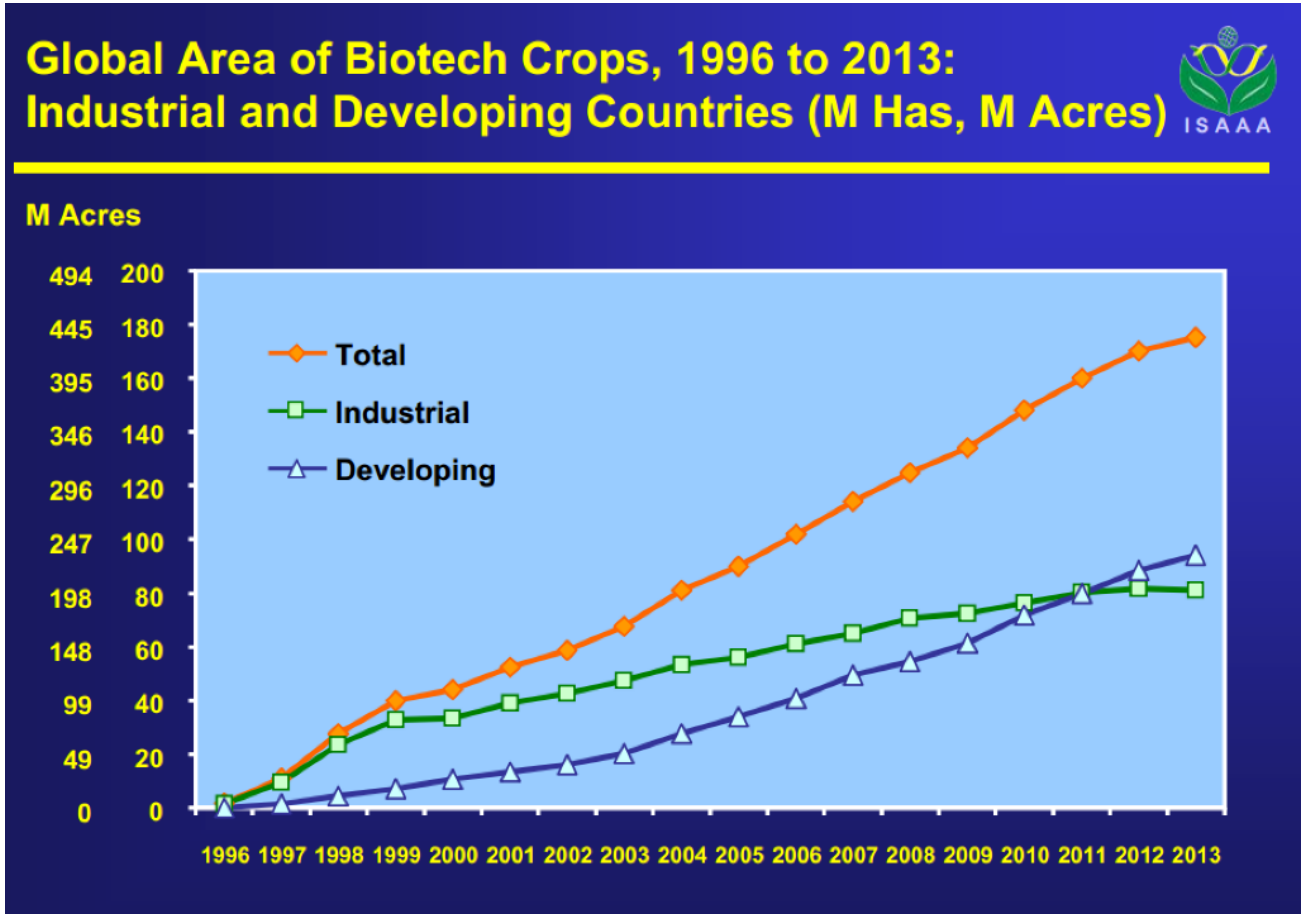
Then propagated normally (seeds, cuttings) and tested for health and new qualities, incorporated into breeding programs

Propagation of poplars in tissue culture

Growth in the field

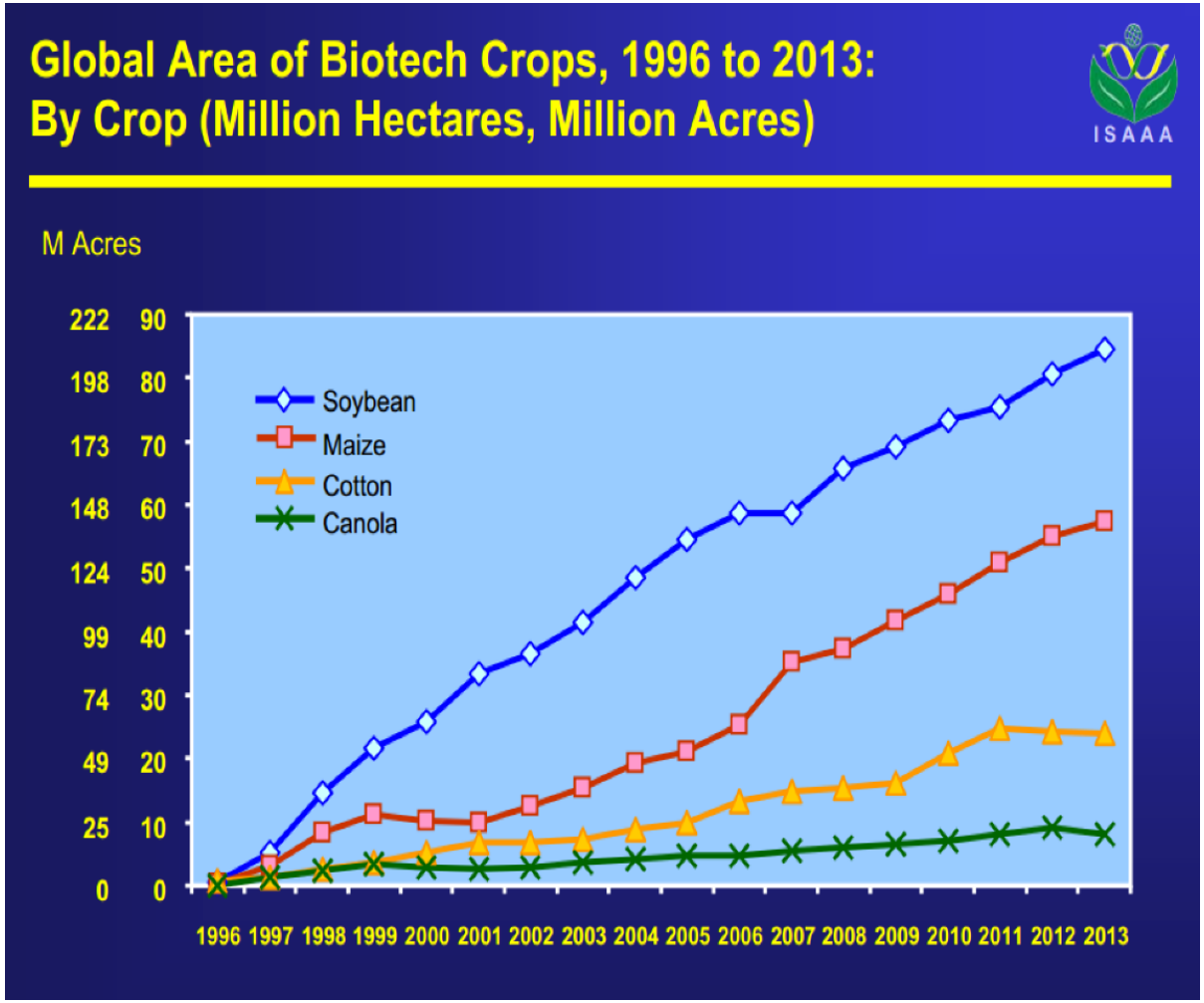
GMO crops widespread, rapidly adopted

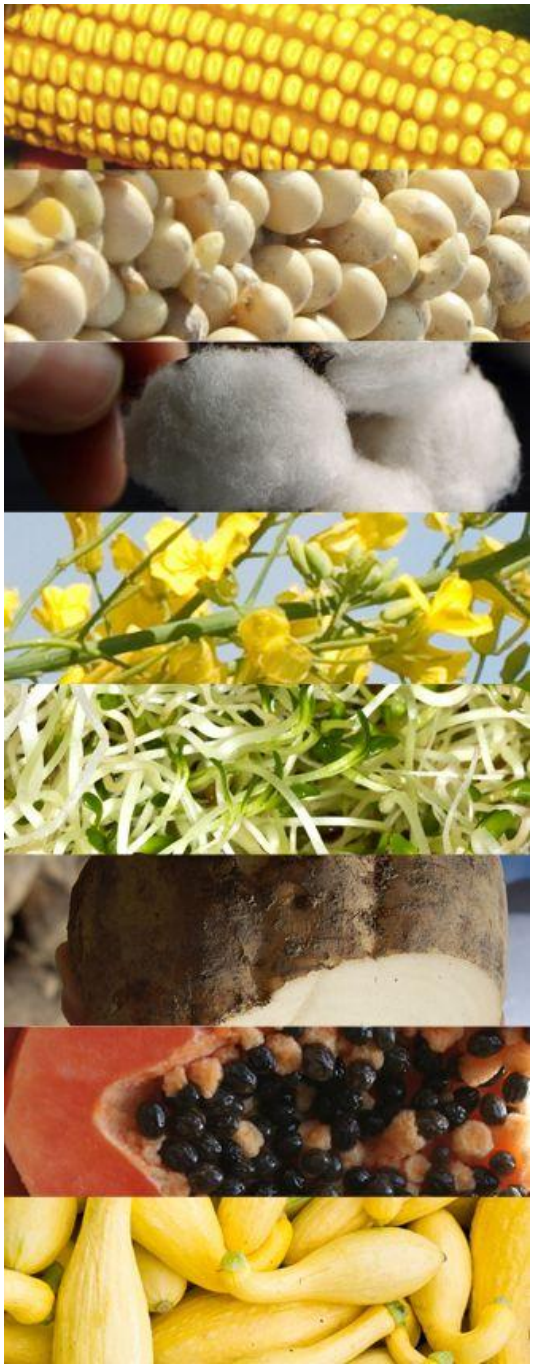
Grown on >10% arable land on planet, extensive uptake in developing world



http://www.isaaa.org/resources/publications/briefs/46/pptslides/Brief46slides.pdf

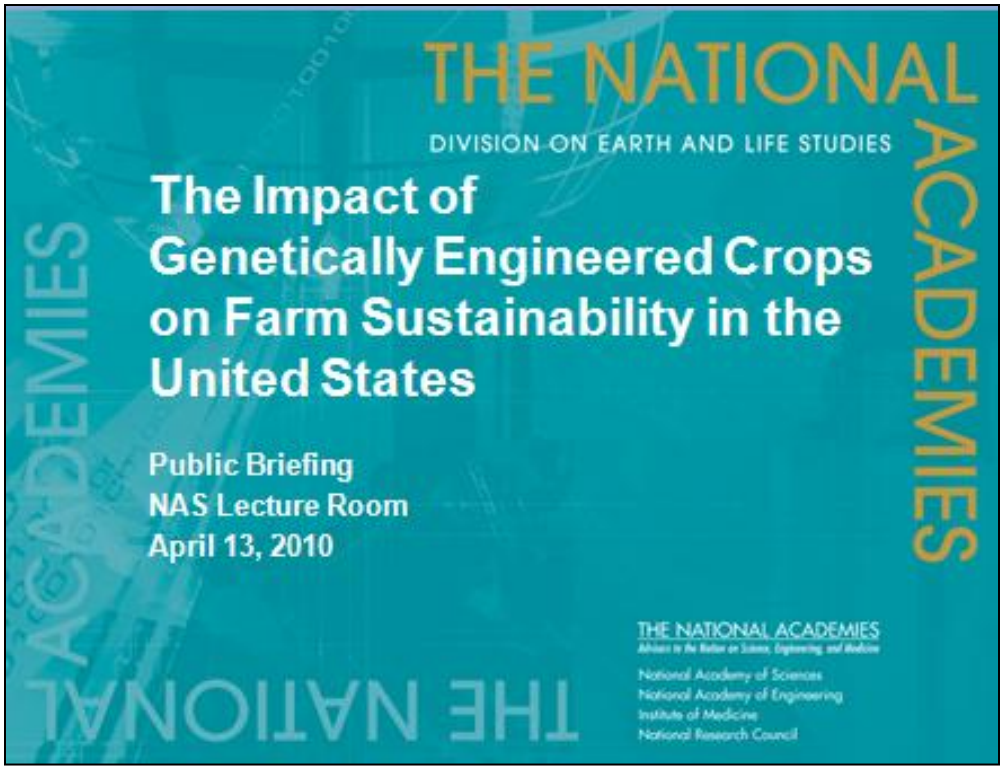
Four crops dominate, 8 crops grown in USA





http://www.isaaa.org/resources/publications/briefs/46/pptslides/Brief46slides.pdf

Major reports on GMO crops show very large positive impacts on economics, sustainability, in USA and worldwide



Main beneficial impacts are economic value, reduced pesticide use or ecological impact, and reduced tillage with its many environmental benefits

Benefits provided by biotech crops, on a global scale: 1996-2012

- Increased crop production valued at **US$116.9 billion**
- Conserved biodiversity (indirectly) by saving 123 million hectares of land from 1996-2012
- **Helped alleviate poverty** for >16.5 million small farmers and their families totaling **>65 million people**, who are some of the poorest in the world

http://www.isaaa.org/resources/publications/briefs/46/topfacts/default.asp

There are legitimate concerns that GMOs with pest management traits have not been managed well

THE TROUBLE WITH GMOs

AGAINST MY BETTER JUDGMENT, I'm dipping my toe into the genetically modified organism debate.

These are rough waters. GMOs seem to polarize people more than almost anything else — especially in terms of whether they are safe to eat or to grow. I try to stay open-minded on the topic, but it's obvious that the use of GMOs in agriculture has created some big problems.

The problem facing GMOs isn't with the technology per se; it's with how they have been deployed. Despite promises of improved food security, increased yields, decreased chemical use and more nutritious crops, GMOs end up causing many disappointing failures.

To begin, while GMO efforts may have started with good intentions to improve food security, they ended up focusing on crops that are better at improving profits, such as feed corn (mostly for animal feed and ethanol), soybeans (mostly for animal feed), cotton and canola. While the technology might have "worked," it wasn't applied to crops that actually feed the world's poor.

Furthermore, GMOs have had uneven success in boosting yields. Instead of improving plant growth, they have mainly replaced GMO crops, this was apparently more than offset by an increase in *herbicide* use on U.S. croplands, likely because weeds have become resistant to Roundup. Here there seems to have been a lack of systems thinking — which would have anticipated the "rebound" problems inherent in chemical weed control.

I also become skeptical when GMO approaches are pursued instead of simpler ways to address the same problem. For example, we hear a lot about biotech crops that are drought tolerant, fix their own nitrogen and so on, but they are a long way from being ready for the real world. Why not focus on agronomic approaches — such as using cover crops, mulching and organic-style techniques — instead, which could yield results *today*? Similarly, instead of engineering better nutrition into crops to make GMOs such as golden rice, why not grow conventional nutrient-rich crops such as fruits and vegetables? Why focus on more technical solutions, where a simple approach might be as (or more) effective?

Finally, many GMO advocates bristle at efforts to require labeling of GMO food because they see "no substantial biological difference" between GMO and traditional crops. Maybe, but that's not the point. It's

thinking, where the focus is on technology and business models, and less on the social and environmental impacts.

I urge GMO advocates to take a step back and think more *holistically* about GMO technologies in the context of the larger systems connecting agriculture, food, culture, people and the environment. I encourage them to build more *interdisciplinary* research teams — with social scientists, ecologists, organic farmers and GMO critics. I suggest supporting more of their work with public funding, to help ensure that social and environmental benefits are put ahead of profits. And I would strongly urge *both* sides of the GMO debate

GMOs have frequently failed to live up to their potential, not because they are inherently flawed, but because

ensia

SPRING 2014 | ENVIRONMENTAL SOLUTIONS IN ACTION

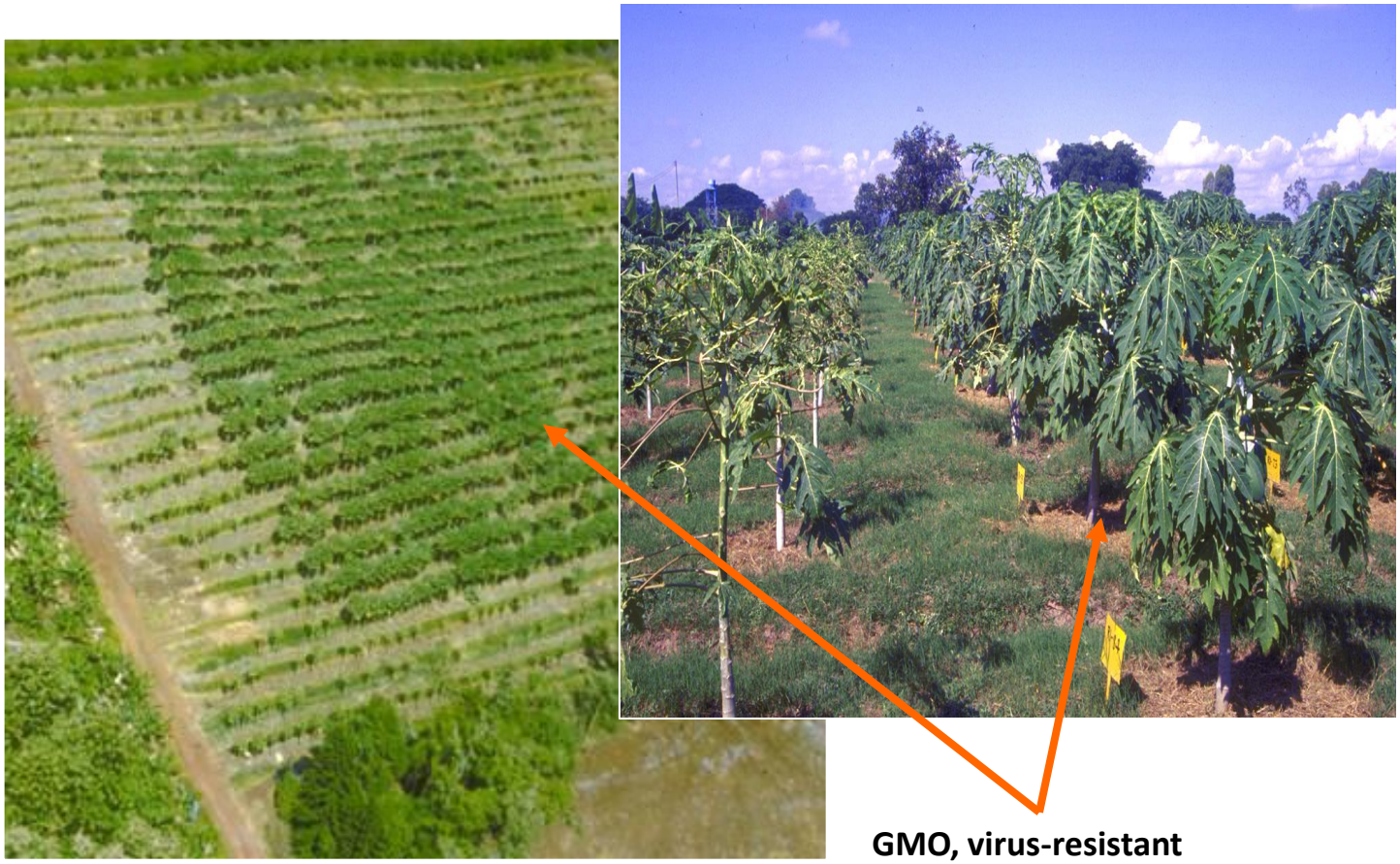
GMOs have frequently failed to live up to their potential, not because they are inherently flawed, but because **they have been poorly deployed into the complex social and environmental contexts of the real world.**

The method has diverse applications

Many other crops and traits starting to be used, or in the pipeline for near term use

Virus-resistant papaya saved the Hawaiian industry in the mid-1990s / ~80% of papaya today

- Nobel prize winning "immunization" in plants – **stimulates natural defenses**
- Great humanitarian potential in developing world

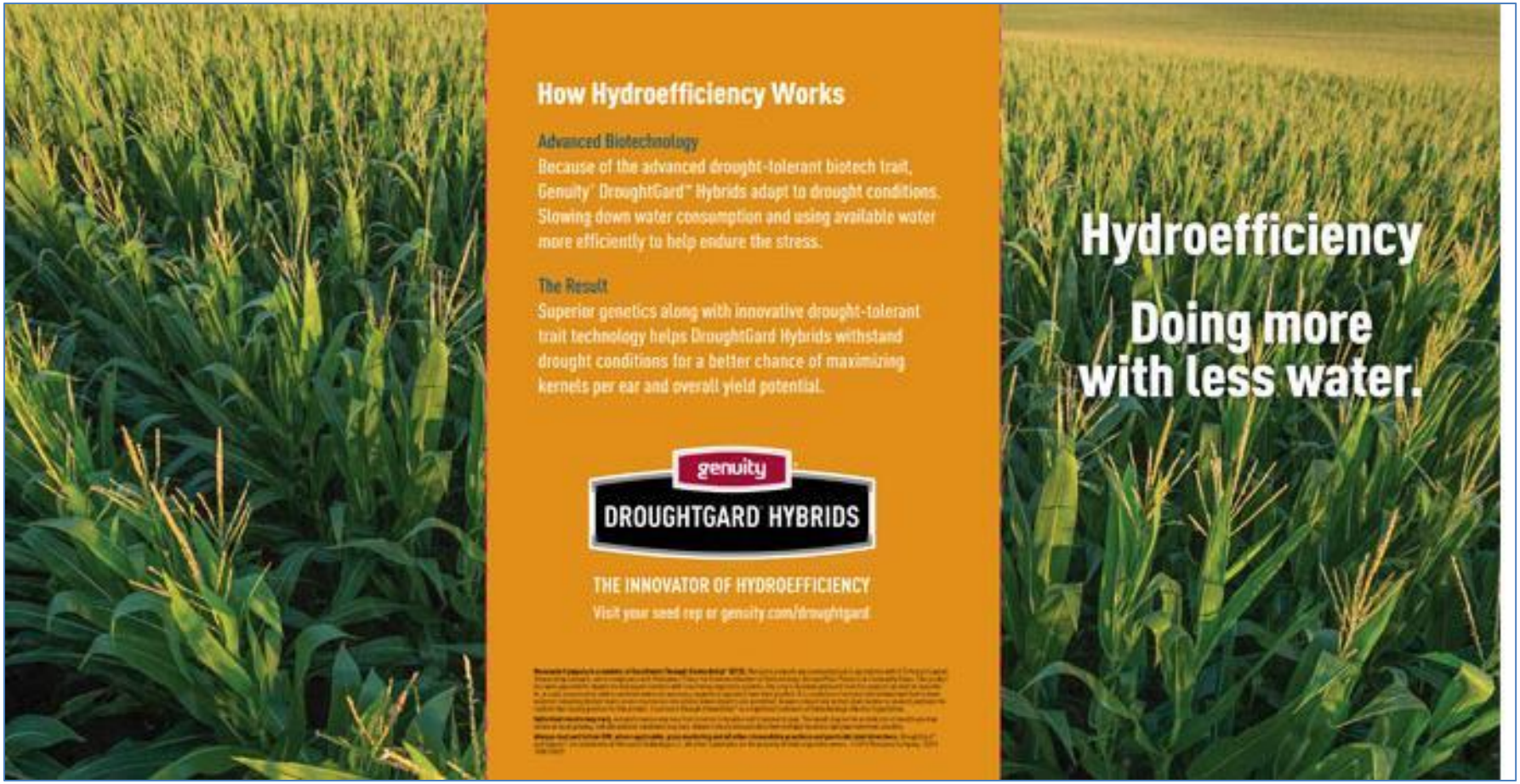


Courtesy of Denis Gonsalves, formerly of Cornell University

GMO, virus-resistant trees

Drought-tolerant maize – Planted on ~150,000 acres – Also tested in Africa

Important tool given climate change, water shortages?



Many more stress tolerance innovations in the pipeline

NEWS FEATURE

Beating the heat

Despite the complexity of drought tolerance, researchers are making progress in the search for crops that can produce seed with limited water. Emily Waltz reports.

A revolution is quietly underway in the mid-West and Great Plains of the US. Following water shortages that have ravaged corn yields, the first of a new generation of drought-tolerant crops are being put to the test in the field. In March, Johnston, Iowa-based DuPont Pioneer announced that its newly developed transgenic corn, which downregulates production of the phytohormone ethylene, enhances grain yield after exposure to drought stress[1]. It could join DroughtGard maize, a variety expressing a *Bacillus subtilis* cold-shock protein made by Monsanto of St. Louis, that has already been planted on more than 200,000 ha by thousands of farmers.

With registrations elsewhere in the world—last year, Indonesia approved a sugarcane expressing choline dehydrogenase with enhanced resistance to water deprivation—and a half-dozen other transgenic approaches to drought tolerance and water use efficiency (WUE) in testing (**Table 1**), biotech is making strides in bolstering crop resistance to drought. But it may not be happening fast enough. Global population increases are put-

Interest in drought tolerance as a trait has been on the rise over the past decade, both in industry and academia. At least 117 field trials for drought tolerance were given the green light in 2013 by US regulatory authorities alone, up from just 29 in 2004, according to data from Information Systems for Biotechnology (ISB) in Blacksburg, Virginia, a group that tracks regulatory activity. And these numbers may not include trials of drought-tolerant plants that are categorized under a more general description or as an undisclosed phenotype.

Monsanto is currently conducting far more field trials of drought-tolerant crops than anyone else in the US, according to data from ISB

protein CspB, which binds and thereby stabilizes RNA, and unfolds RNA secondary structures, which often fold in response to environmental stress. This chaperoning of RNA is thought to minimize the effects of drought on photosynthesis, stomatal conductance and carbon fixation—cellular functions that affect grain yield. "The plant acclimates to the stress more quickly and utilizes water more efficiently, leaving it with more water to help it through critical periods of growth," says John Fietsam, a technology development manager at Monsanto. "It allows the plant to put more

Drought tolerant crops are making an appearanc
in the US.

basis to farmers in
states, where the c
Corn Belt states of t
farmers participate
planting no more

Table 1 Transgenic drought tolerant crops in commercial development and on the market

Developer	Crop	Mechanism	Implementation location and status	Field trial results
Monsanto	Corn	Expresses a cold-shock protein B from *B. subtilis*, which stabilizes RNA	Deregulated in US in December 2011; stewarded commercialization in US western Great Plains and Midwest	Average increase of five bushels of corn per acre during drought
PT Perkebunan Nusantara XI; University of Jember (East Java, Indonesia); Ajinomoto	Sugarcane	Expresses glycine betaine from *Rhizobium meliloti*	Approved in Indonesia by the National Genetically Modified Product Biosafety Commission in May 2013	20–30% higher sugar production than conventional counterparts during drought
Performance Plants (Kingston, Ontario)	Canola, corn, petunia and rice	Uses RNAi driven by conditional promoters to suppress farnesyltransferase; shuts down stomata	Licensed to Scotts (Marysville, Ohio), Syngenta (Basel), Bayer CropScience (Monheim, Germany), DuPont Pioneer, Mahyco (Jalna, India), RiceTec (Houston) and DBN (Beijing)	Canola, 26% higher yield; petunia, double the number of flowers
DuPont Pioneer	Corn	Expresses an ACS6 RNA construct to downregulate ACC synthase and decrease biosynthesis of ethylene	Field trials in the US and Chile	2.7–9.3 bushel per acre advantage over nontransgenic varieties in drought conditions
Arcadia Biosciences	Rice and canola	Expresses isopentenyltransferase from Agrobacterium, which catalyzes the rate-limiting step in cytokinin synthesis; accompanied by SARK promoter from bean	Two years of US field trials in rice with combined water use efficiency, nitrogen use efficiency and salt tolerance; technology licensed to developers who have put the gene into their own varieties of soybean, wheat, rice, cotton, sugar beets, sugarcane and tree crops	13–18% under various nitrogen application rates; 12–17% under water stress conditions; 15% under combined stress
Verdeca, a joint venture of Arcadia Biosciences and Bioceres	Soybean	Overexpresses Hahb-4, from sunflower thought to inhibit ethylene-induced senescence	Field trials in Argentina and the US	7–15% yield advantage over comparable varieties during drought and other stress
Japan International Research Center for Agricultural Sciences	Wheat, soybean and sugarcane	Expresses DREB1A transcription factor under the control of the rd29A promoter	Field trials via collaborations with International Maize and Wheat Improvement Center, International Rice Research Institute, International Center for Tropical Agriculture, Brazilian Enterprise for Agricultural Research	Varies
University of Tokyo and Japan International Research Center for Agricultural Sciences	Rice and peanut	Expresses DREB1A transcription factor under the control of the rd29A promoter	Field trials via collaborations with University of Calcutta (India, rice) and International Crops Research Institute for the Semi-Arid-Tropics (India, peanut)	Varies
Agricultural Genetic Engineering Research Institute (Giza, Egypt)	Wheat	Expresses HVA1 gene from barley, which confers osmotolerance	Conducting field trials and generating biosafety data required for approval by Egypt's regulatory authorities	Not disclosed
Indian Agricultural Research Institute (New Delhi)	Tomato	Overexpressing osmotin-encoding genes under the control of the 35S CMV promoter	Greenhouse studies in India	Better survival and growth; yield data not yet available

Purple GM tomatoes with increased antioxidants and rot resistance

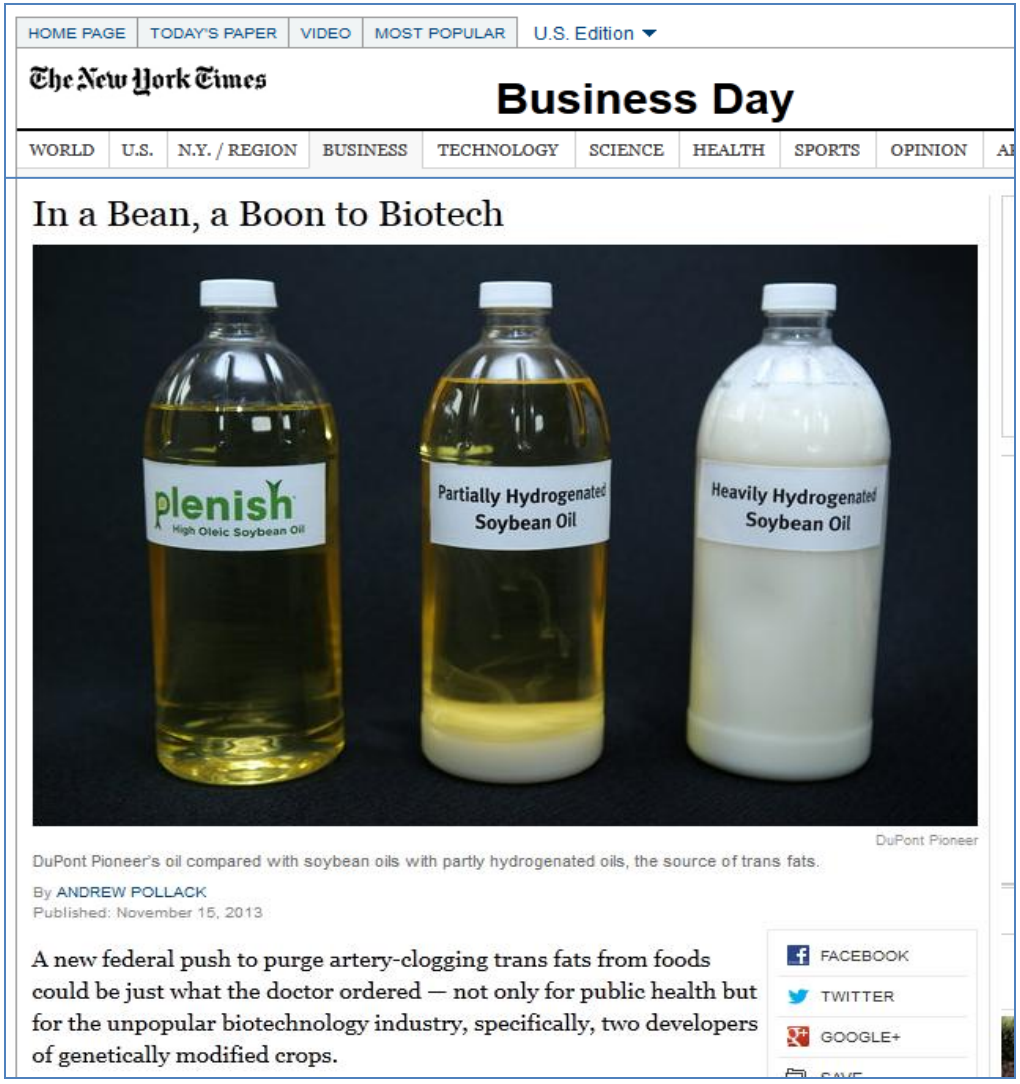
Current Biology 23, 1094–1100, June 17, 2013 ©2013 Elsevier Ltd All rights reserved http://dx.doi.org/10.1016/j.cul

Anthocyanins Double the Shelf Life of Tomatoes by Delaying Overripening and Reducing Susceptibility to Gray Mold

Yang Zhang,[1] Eugenio Butelli,[1] Rosalba De Stefano,[2] Henk-jan Schoonbeek,[1] Andreas Magusin,[1] Chiara Pagliarani,[3] Nikolaus Wellner,[4] Lionel Hill,[1] Diego Orzaez,[5] Antonio Granell,[5] Jonathan D.G. Jones,[6] and Cathie Martin[1,*]
[1]John Innes Centre, Norwich Research Park, Norwich, NR4 7UH, UK

They are produced by plants t
dispersers [9]. Anthocyanin p
induced under stress condition
gens [11]. Besides physiologica
cyanins are associated with pro
[12], cardiovascular diseases [
disorders [13].

Healthier soy oil: High oleic acid



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The New York Times

Business Day

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In a Bean, a Boon to Biotech

DuPont Pioneer

DuPont Pioneer's oil compared with soybean oils with partly hydrogenated oils, the source of trans fats.

By ANDREW POLLACK
Published: November 15, 2013

A new federal push to purge artery-clogging trans fats from foods could be just what the doctor ordered — not only for public health but for the unpopular biotechnology industry, specifically, two developers of genetically modified crops.

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"It almost mirrors olive oil in terms of the composition of fatty acids."

Healthier soy oil: Omega-3 enhanced

Science & the Public

SCIENCE & THE PUBLIC

TECHNOLOGY, HUMANS & SOCIETY, NUTRITION, GENES & CELLS, EARTH & ENVIRONMENT, CHEMISTRY, PLANTS, BODY & BRAIN, OTHER, AGRICULTURE

Fishy fat from soy is headed for U.S. dinner tables

For most Americans, it could help redress a critical shortfall in a beneficial nutrient

BY JANET RALOFF 11:27PM, APRIL 9, 2011

WASHINGTON, D.C. Most people have heard about omega-3 fatty

https://www.sciencenews.org/blog/science-public/fishy-fat-soy-headed-us-dinner-tables

“Innate” Potato – reduced browning and acrylamide by gene suppression (↓waste, ↑safety)

Trait #1 - Silenced PPO (Enzyme)

- Non-browning when cut
- Reduced black spot bruise

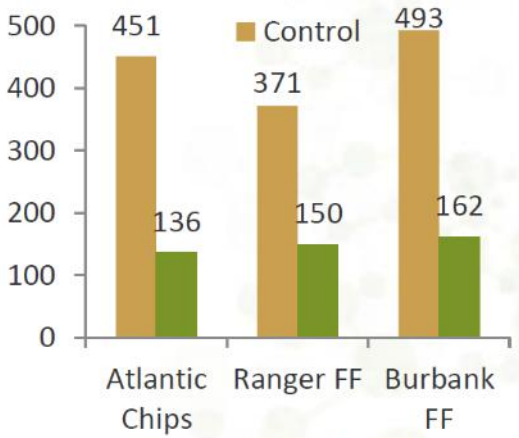
Trait #2 - Reduced Asparagine (Amino Acid)

- Yields a 50-80% reduction in acrylamide when baked or fried
- Meets Prop 65 in California

Four Improved Varieties

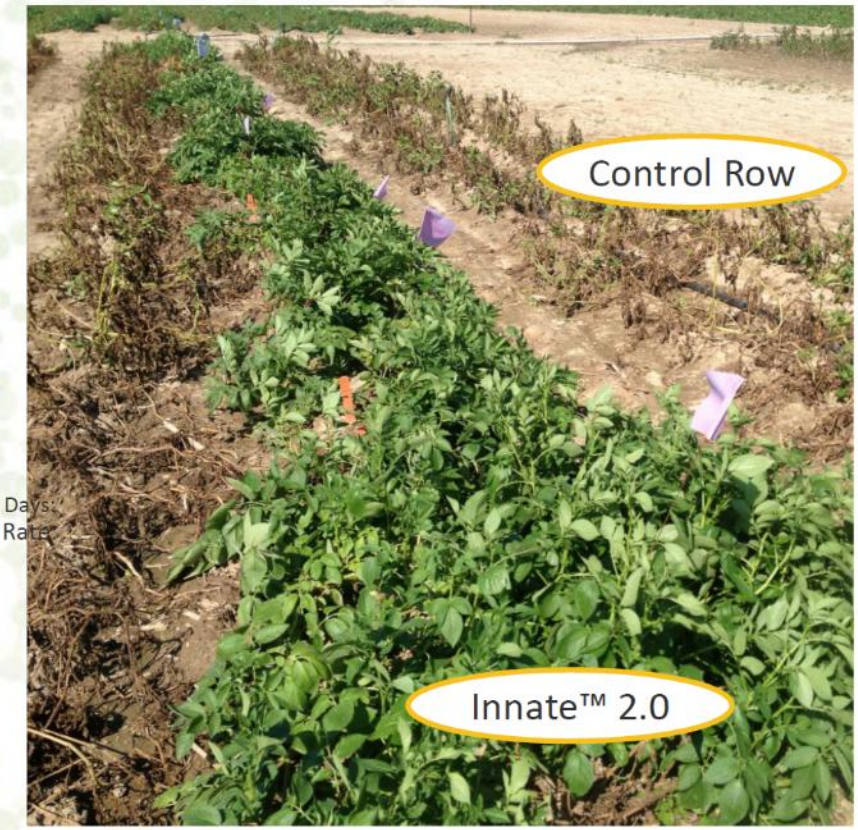
- Russet Burbank, Ranger Russet, Atlantic, Snowden
- No effect on taste, texture, or performance
- USDA approval expected in 2014

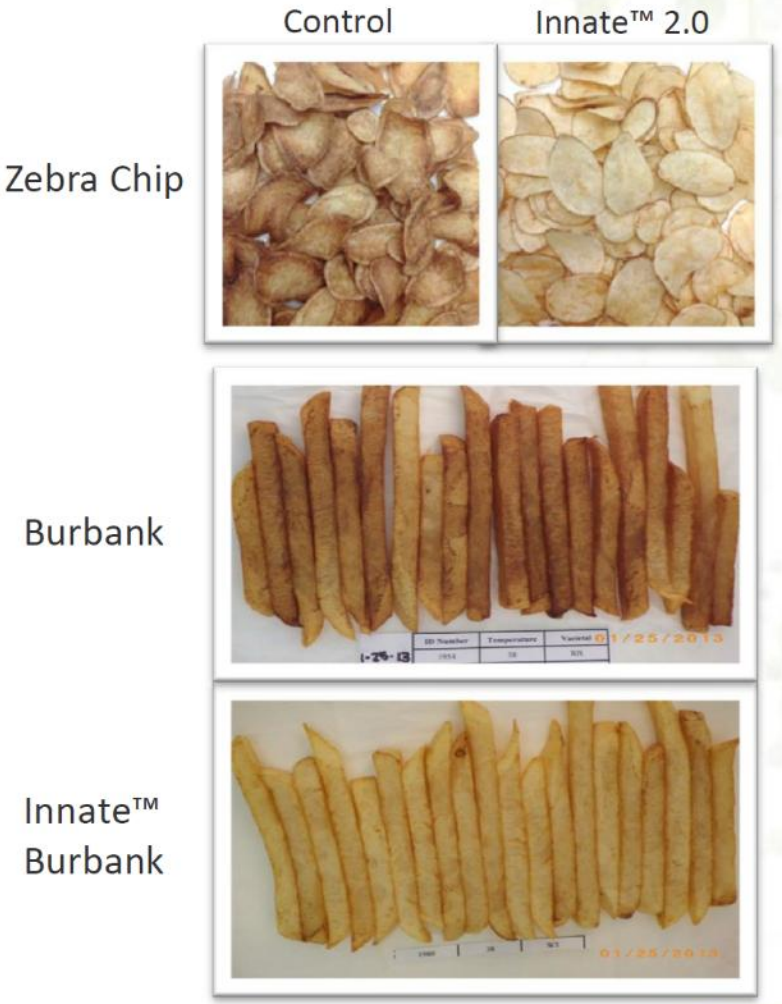
Non-Browning



Lower Acrylamide

2nd gen “Innate” potato – late blight resistant, less sprouting & over-ripening (↓pesticide, ↓waste, ↑yield)





Helping forests: American Chestnut restoration by genetic modification

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The American Chestnut's Genetic Rebirth

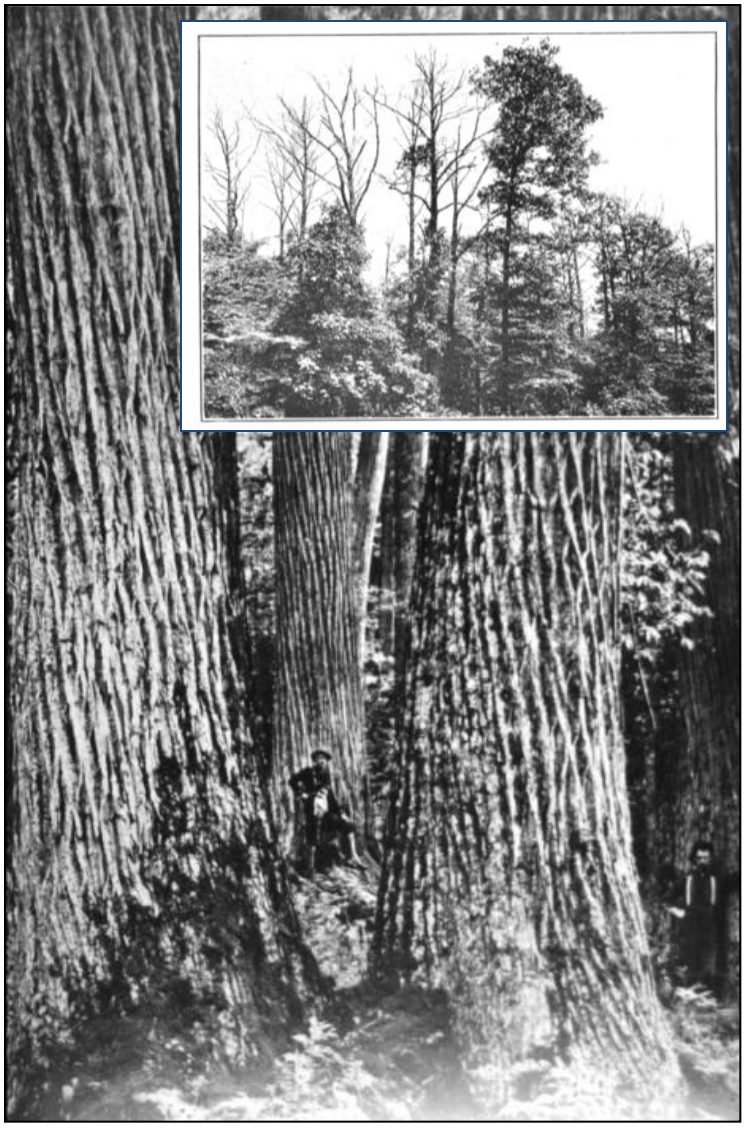
A foreign fungus nearly wiped out North America's once vast chestnut forests. Genetic engineering can revive them

By William Powell

In 1876 Samuel B. Parsons received a shipment of chestnut seeds from Japan and decided to grow and sell the trees to orchards. Unbeknownst to him, his shipment likely harbored a stowaway that caused one of the greatest ecological disasters ever to befall eastern North America. The trees probably concealed spores of a pathogenic fungus, *Cryphonectria parasitica*, to which Asian chestnut trees—but not their American cousins—had evolved resistance. *C. parasitica* effectively strangles

More In This Article

A New Generation of American Chestnut Trees May Redefine America's Forests



March 2014 issue - Scientific American

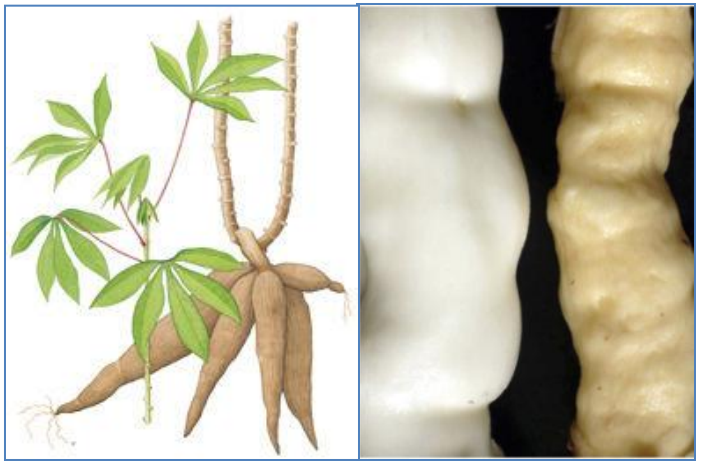
Biofortified plants are improving nutrition for many, and can do much more with aid of biotechnology

Sources: HarvestPlus; CIMMYT

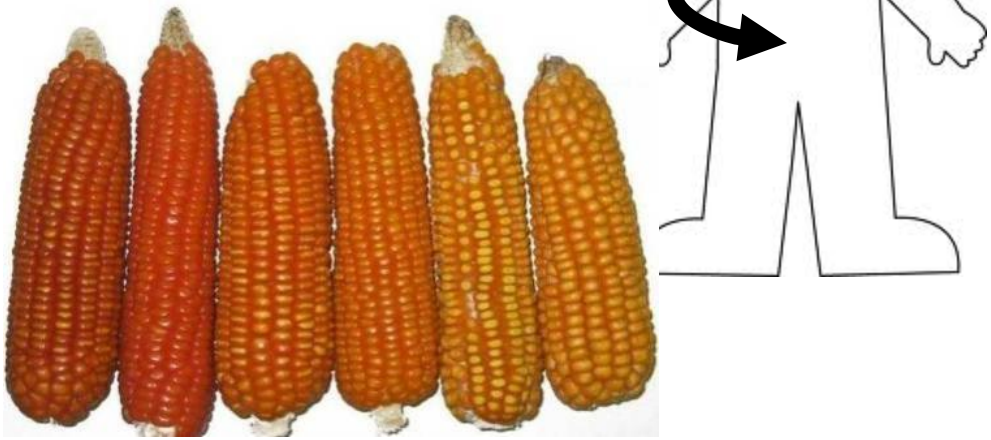
HarvestPlus
Breeding Crops for Better Nutrition

The non-profit organization HarvestPlus focuses on the development of biofortified crops for the developing world, including a provitamin A enriched sweet potato that is **currently** being grown by half a million families. Other biofortification projects are underway to increase levels of protein, iron, zinc, antioxidants, and other beneficial components in food.

Breeding and GMO methods can enhance plant nutritional quality



β-carotene makes the rice look golden



β-carotene

Vitamin A

The β-carotene enriched foods shown here have been produced using GM and non-GM approaches

Photo credit: Golden rice humanitarian board

Vitamin A enrichment for the poor in Africa - Sorghum

DuPont reports breakthrough in introducing beta carotene in Sorghum

In Africa, up to half a million children become blind from Vitamin A Deficiency (VAD) with increased risk of cognitive impairment, disease and death from severe infections. Furthermore, nearly 600,000 women die from c..

20 Feb 2014

IOWA, USA: Dupont has achieved a breakthrough in introducing pro-vitamin (beta carotene) into sorghum, a stap food in Africa which is naturally deficient in key nutrients.

This is epxected to help improve nutrition for nearly 300 mn people in Africa dependent on Sorghum. DuPont said that the ability to achieve 100 % of the recommended daily allowance of vitamin A in children from Sorghum has never been achieved before.

In Africa, up to half a million children become blind from Vitamin A Deficiency (VAD) with increased risk of cognitive impairment, disease and death from severe infections. Furthermore, nearly 600,000 women die from childbirth-related causes, many from complications that could be reduced through more vitamin A in their diet.

http://www.commodityonline.com/news/dupont-reports-breakthrough-in-introducing-beta-carotene-in-sorghum-58036-3-58037.html

Vitamin A enrichment for the poor in Africa – “Super banana”

Vitamin A Super Banana in human trials

The first human trial to test the efficacy of a genetically modified (GM) nutritionally enhanced banana is starting in the US. Conceived by researchers at the Queensland University of Technology (QUT) in Brisbane, Australia, to provide a good source of beta carotene, the Super Banana has $10 million in backing from the Bill and Melinda Gates Foundation. The genetically enriched, golden-colored banana may help prevent blindness caused by vitamin A deficiency in Ugandan children whose diets are deficient in this nutrient (*Nat. Biotechnol.* **30**, 1017–1019, 2012). But leaders of the banana project are embarking on a historically precarious path. Golden Rice, the previous GM crop developed to alleviate vitamin
ity a
deve
been commercialized in its target country, the Philippines. Whether the banana will meet a similar fate remains to be seen.

Opposition from anti-biotech activists in the media so far has been minimal, and radical activist presence in Uganda and other African countries is generally small. “I don’t have the feel-

Erika Fish, QUT

But is it golden? Stephen Buah (left) and James Dale, from Queensland University of Technology, display the Super Banana.

Roadmap for talk

- Some broad perspectives
- Measure 92 – why I am strongly against it
- Measure 92-related science
  - Context: Crop domestication and breeding
  - What genetic modification is
  - Use and impacts
  - Newer products in the pipeline
  - **Safety**
- Back to labeling, with a broader take

By far the most carefully studied crops for safety – no question

- Of 129 GE crops commercialized in the US and 129 have had FDA consultation
  - EPA and/or USDA also do evaluations for most types of crops
- Foreign regulatory bodies repeat and verify most safety assessments
  - Health Canada, FSANZ, EFSA, Korea FDA, EFSA, Chinese Ministry of Agriculture, Japan Food Safety Commission

Components of pre-market safety assessment

- Characterization of inserted DNA and insertion sites
- Characterization and toxicology of newly introduced proteins
- Optional whole food animal studies
- Detailed composition analysis
- Search for unintended adverse effects such as introduction of toxins, anti-nutrients, introduction of an allergen or changes in allergenicity
- Analysis of mode of action in relation to non-target organism physiology and environmental fate

Hundreds of scientific studies of GM crop food and environmental safety

Critical Reviews in Biotechnology

http://informahealthcare.com/bty
ISSN: 0738-8551 (print), 1549-7801 (electronic)

Crit Rev Biotechnol, Early Online: 1–12
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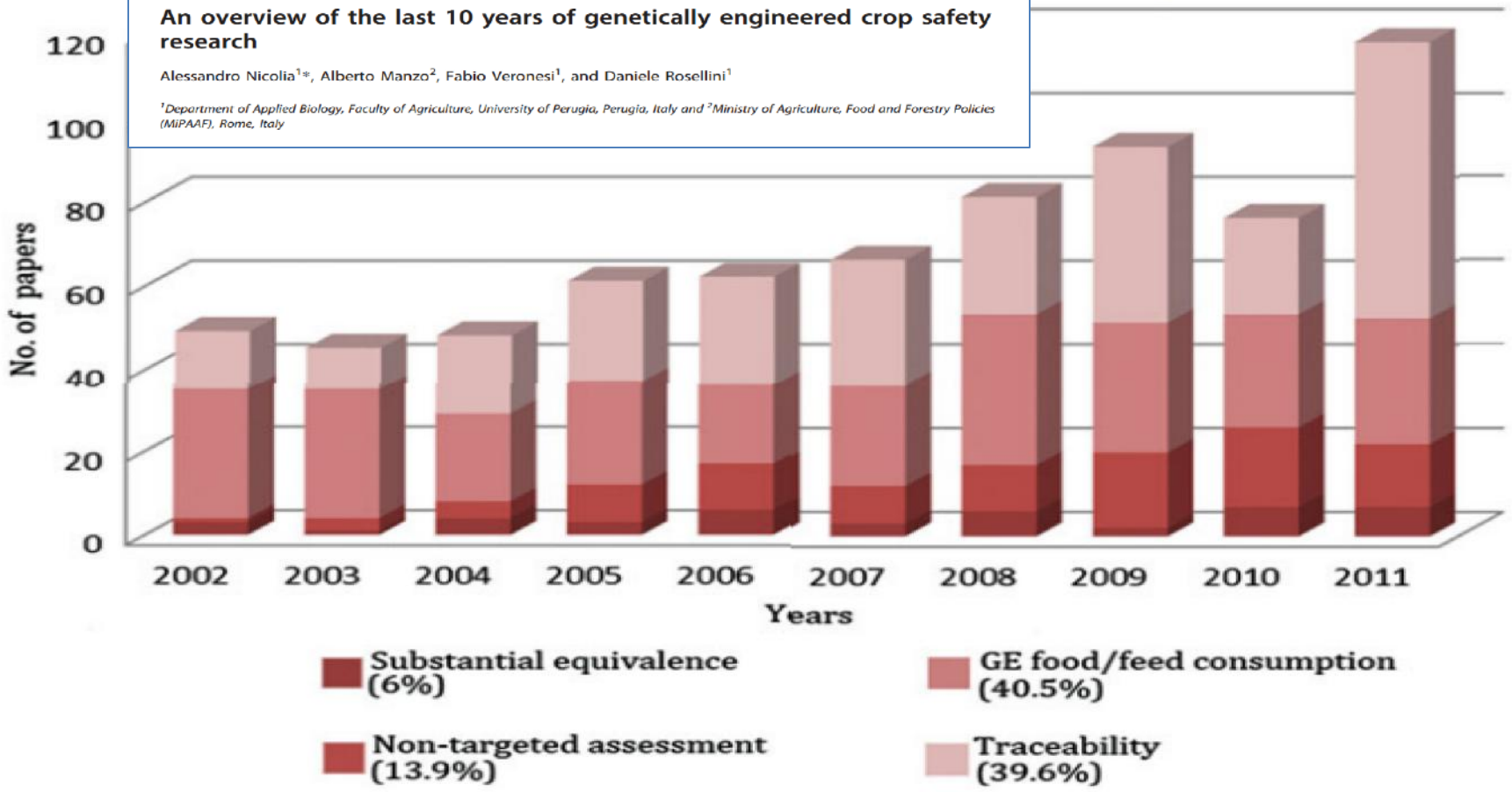
REVIEW ARTICLE

An overview of the last 10 years of genetically engineered crop safety research

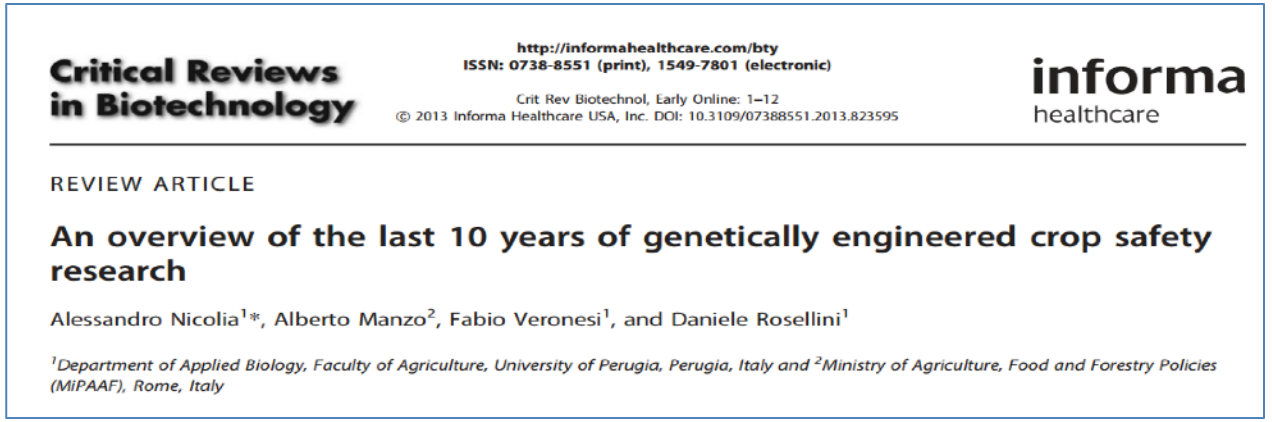
Alessandro Nicolia[1]*, Alberto Manzo[2], Fabio Veronesi[1], and Daniele Rosellini[1]

[1]Department of Applied Biology, Faculty of Agriculture, University of Perugia, Perugia, Italy and [2]Ministry of Agriculture, Food and Forestry Policies (MiPAAF), Rome, Italy



Overwhelming conclusion of food/feed safety

"The experimental data collected so far on authorized GE crops can be summarized as follows: (a) there is no scientific evidence of toxic or allergenic effects...."



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Numerous studies independently conducted

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Studies with independent funding

This is a *partial* list of independently-funded studies on genetically engineered crops that we have collected as part of the GENetic Engineering Risk Atlas (GENERA). This list is out of date as we have been working on GENERA. About 1/3 of the studies about risks of genetic engineering are from independent funding sources. Visit the full Studies for GENERA list.

Independent studies on GMOs:

1. Powell M, Wheatley AO, Omoruyi F, Asemota HN, Williams NP, Tennant PF. 2009. Comparative effects of dietary administered transgenic and conventional papaya on selected intestinal parameters in rat models. Transgenic research 19(3):511-8.
2. Batista R, Saibo N, Lourenço T, Oliveira MM. 2008. Microarray analyses reveal that plant mutagenesis may induce more transcriptomic changes than transgene insertion. PNAS 105(9):3640-5. (full text)
3. Böhme H, Rudloff E, Schöne F, Schumann W, Hüther L, Flachowsky G. 2007. Nutritional assessment of genetically modified rapeseed synthesizing high amounts of mid-chain fatty acids including production responses of growing-finishing pigs. Archives of animal nutrition 61(4):308-16. 2007.
4. Baudo MM, Lyons R, Powers S, Pastori GM, Edwards KJ, Holdsworth MJ, Shewry PR. 206. Transgenesis has less impact on the transcriptome of wheat grain than conventional breeding. Plant biotechnology journal 4(4):369-80.
5. Brake DG, Thaler R, Evenson DP. 2004. Evaluation of Bt (Bacillus thuringiensis) corn on mouse testicular development by dual parameter flow cytometry. Journal of agricultural and food chemistry 52(7):2097-2102.
6. Brake DG, Evenson DP. 2004. A generational study of glyphosate tolerant soybeans on mouse fetal, postnatal, pubertal and adult testicular development. Food and chemical toxicology 42(1):29–36.
7. Atkinson HJ, Johnston KA, Robbins M. 2004. Prima facie evidence that a phytocystatin for transgenic plant resistance to nematodes is not a toxic risk in the human diet. Journal of Nutrition 134(2):431–434. (full text)
8. Bakan B, Melcion D, Richard-Molard D, Cahagnier B. 2002. Fungal growth and Fusarium mycotoxin content in isogenic traditional maize and genetically modified maize grown in France and Spain. Journal of agricultural and food chemistry 50(4): 728–731.
9. Aulrich K, Böhme H, Daenicke R, Halle I, Flachowsky G. 2001. Genetically modified feeds in animal nutrition 1st communication: Bacillus thuringiensis (Bt) corn in poultry, pig and ruminant nutrition. Archiv für Tierernährung (Archives of Animal Nutrition) 54(3):183-195.
10. Böhme H, Aulrich K, Daenicke R, Flachowsky G. 2001. Genetically modified feeds in animal nutrition. 2nd communication: glufosinate tolerant sugar beets (roots and silage) and maize grains for ruminants and pigs. Archiv für Tierernährung (Archives of animal nutrition) 54(3):197-207.
11. Arencibia A, Gentinetta E, Cuzzoni E, Castiglione S, Kohli A, Vain P, Leech M, Christou P, Sala F. 1998. Molecular analysis of the genome of transgenic rice (Oryza sativa L.) plants produced via particle bombardment or intact cell electroporation. Molecular breeding 4(2):99–109.
12. Bub A, Möseneder J, Wenzel G, Rechkemmer G, Briviba K. 2008. Zeaxanthin is bioavailable from genetically modified zeaxanthin-rich potatoes. European journal of nutrition 47(2):99-103.
13. Catchpole GS, Beckmann M, Enot DP, Mondhe M, Zywicki B, Taylor J, Hardy N, Smith A, King RD, Kell DB, Fiehn O, Draper J. 2005. Hierarchical metabolomics demonstrates substantial compositional similarity between genetically modified and conventional potato crops. PNAS 102(40):14458-62. (full text) The metabolite analysis and statistical work was funded by the Food Standards Agency (London) as part of its G02006 project.
14. Chambers PA, Duggan PS, Heritage J, Forbes JM. 2000. The fate of antibiotic resistance marker genes in transgenic plant feed material fed to chickens. Journal of antimicrobial chemotherapy 49(1):161–164. Novartis, formerly Ciba-Geigy, provided the genetically modified maize seeds used in this study. This work was funded by a grant from the Food Standards Agency.
15. Chen ZL, Gu H, Li Y, Su Y, Wu P, Jiang Z, Ming X, Tian J, Pan N, Qu LJ. 2003. Safety assessment for genetically modified sweet pepper and tomato. Toxicology 188(2-3):297-307.
16. Cheng KC, Beaulieu J, Iquira E, Belzile FJ, Fortin MG, Strömvik MV. 2008. Effect of transgenes on global gene expression in soybean is within the natural range of variation of conventional cultivars. Journal of agricultural and food

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Chuck Lasker on One Thousand Celebrations of Science!

http://www.biofortified.org/genera/studies-for-genera/independent-funding/

126 independent studies as of July 2014 600 total

http://www.axismundionline.com/blog/the-new-is-gm-food-safe-meme/

European safety science has concluded the same

Very weak science in a number of highly publicized GMO toxicity studies

Partial list of world food safety authorities critical of Seralini et al. 2012

- **Health Canada**
- **Canadian Food Inspection Agency**
- **European Food Safety Authority**
- **Food Standards Australia New Zealand**
- **German Federal Institute of Risk Assessment**
- **German Federal Office of Consumer Protection and Food safety**
- **France- ANSES (Agency for Food, Environmental, and Occupational Health and Safety)**
- **France- HCB (High Counsel for Biotechnology)-**
- **Six Academies of Science (France)**
- **Denmark- DTU National Food Institute**
- **Netherlands-Bureau for Risk Assessment (Food and Consumer Product Safety Authority)**
- **Brazil- CTNBio (Brazilian National Technical Commission on Biosafety)-**
- **Belgium- BAC (Biotechnology Advisory Council)**
- **Romania (Food Safety Authority)**
- **Belgium- VIB (Life Sciences Institute)**
- **French Society of Toxicological Pathologists (SFPT)**
- **European Federation of Biotechnology**
- **AFBV (French Association for Biotechnology Vegetables)**
- **ABNE (African Biosafety Network of Expertise)**
- **ACB (African Center for Biosafety)**
- **European Society of Toxicological Pathology**

Handful of other animal studies showing adverse effects critiqued here

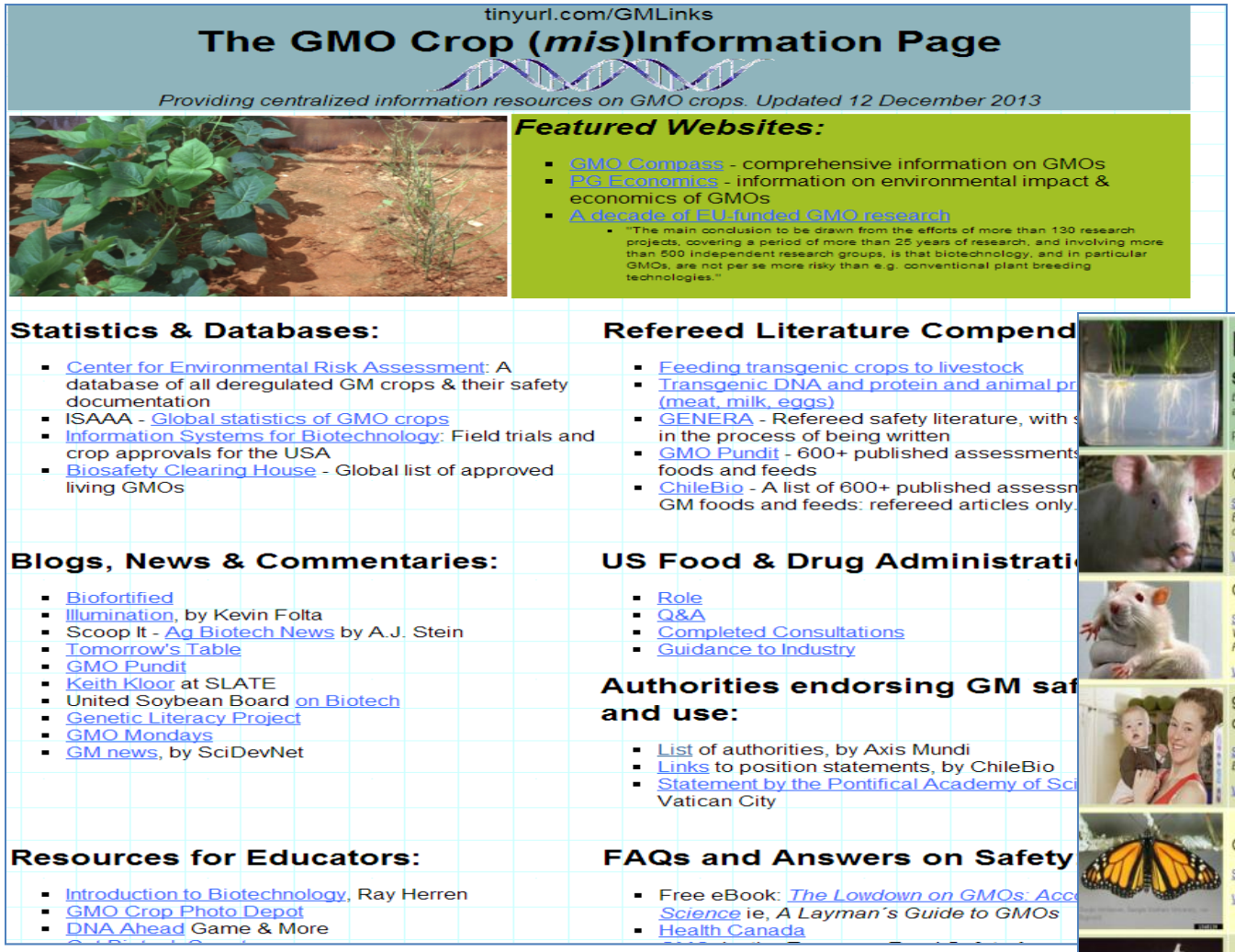
Prevalence and impacts of genetically engineered feedstuffs on livestock populations[1]

A. L. Van Eenennaam[2] and A. E. Young

Department of Animal Science, University of California, Davis 95616

ABSTRACT: Globally, food-producing animals consume 70 to 90% of genetically engineered (GE) crop biomass. This review briefly summarizes the scientific literature on performance and health of animals consuming feed containing GE ingredients and composition of differences in the nutritional profile of animal products derived from GE-fed animals. Because DNA and protein are normal components of the diet that are digested, there are no detectable or reliably quantifiable traces of GE components in milk, meat, and eggs following consump-

Prof Parrott / GMO crop information and misinformation web page



tinyurl.com/GMLinks

The GMO Crop (*mis*)Information Page

Providing centralized information resources on GMO crops. Updated 12 December 2013

Featured Websites:

- GMO Compass - comprehensive information on GMOs
- PG Economics - information on environmental impact & economics of GMOs
- A decade of EU-funded GMO research
  - "The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research, and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are not per se more risky than e.g. conventional plant breeding technologies."

Statistics & Databases:

- Center for Environmental Risk Assessment: A database of all deregulated GM crops & their safety documentation
- ISAAA - Global statistics of GMO crops
- Information Systems for Biotechnology: Field trials and crop approvals for the USA
- Biosafety Clearing House - Global list of approved living GMOs

Refereed Literature Compend

- Feeding transgenic crops to livestock
- Transgenic DNA and protein and animal pr (meat, milk, eggs)
- GENERA - Refereed safety literature, with s in the process of being written
- GMO Pundit - 600+ published assessments foods and feeds
- ChileBio - A list of 600+ published assessn GM foods and feeds: refereed articles only

Blogs, News & Commentaries:

- Biofortified
- Illumination, by Kevin Folta
- Scoop It - Ag Biotech News by A.J. Stein
- Tomorrow's Table
- GMO Pundit
- Keith Kloor at SLATE
- United Soybean Board on Biotech
- Genetic Literacy Project
- GMO Mondays
- GM news, by SciDevNet

US Food & Drug Administrati

- Role
- Q&A
- Completed Consultations
- Guidance to Industry

Authorities endorsing GM saf and use:

- List of authorities, by Axis Mundi
- Links to position statements, by ChileBio
- Statement by the Pontifical Academy of Sci Vatican City

Resources for Educators:

- Introduction to Biotechnology, Ray Herren
- GMO Crop Photo Depot
- DNA Ahead Game & More

FAQs and Answers on Safety

- Free eBook: *The Lowdown on GMOs: Acc Science* ie, *A Layman´s Guide to GMOs*
- Health Canada

Professor Parrott

singles out some GMO articles that earn a faili

because the peer review system is not perfect, and some articles that shouldn't still get throug and because junk science never takes a rest.

For more resources, see the GMO (mis)Information Page and Academics Review

GMO-fed pigs have irritated stomachs and thicker uteruses

Source: Carman JA, HR Vlieger, LJ Ver Steeg, VE Sneller, GW Robinson, CA Clinch-Jones, Edwards. 2013. A long-term toxicology study on pigs fed a combined genetically modified (GI diet. Journal of Organic Systems 8(1):38-54.

Why does this article fail?

GMO corn gives rats cancer

Source: Séralini GE, E Clair, R Mesnagea, S Gress, N Defarges, M Malatesta, D Hennequin Vendômois. 2012. Long term toxicity of a Roundup herbicide and a Roundup-tolerant genetic Food and Chemical Toxicology 50:4221–4231.

Why does this article fail?

93% of pregnant women and 69% of non-pregnant women te derived Bt protein in their blood

Source: Aris A, S Leblanc. 2011 Maternal and fetal exposure to pesticides associated to gene Eastern Townships of Quebec, Canada. Reproductive Toxicology. 31(4):528-33.

Why does this article fail?

GMO corn kills monarch butterflies

Source: Losey JE, LS Rayor, ME Carter. 1999. Transgenic pollen harms monarch larvae. Na

Why does this article fail?

GMOs cause intestinal issues in rats

Source: Ewen SW, A Pusztai. 1999. Effect of diets containing genetically modified potatoes e nivalis lectin on rat small intestine. Lancet 354(9187):1353–1354.

Why does this article fail?

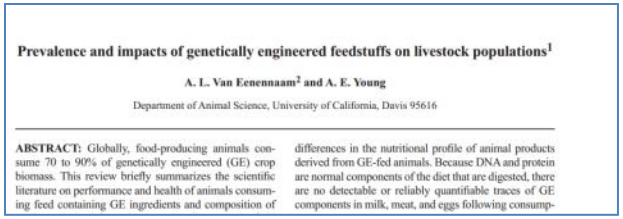
http://parrottlab.uga.edu/parrottlab/forum2.htm

“Big data” analysis of farm animal health before and after introduction of GE crops

Table 3. Estimated cumulative number of livestock raised in the United States during the period from 2000 to 2011

Industry[1]	United States
Broilers	94,683,600,000
Layer Hens	3,722,708,000
Turkeys	2,733,500,000
Beef cattle	339,350,000
Dairy Cows	33,550,000
Hogs	1,219,460,000
Total	102,732,168,000

[1]Numbers for broilers, hogs (barrows and gilts), and beef cattle (steers) are for slaughtered animals during calendar year. Dairy animals are number of dairy cows in a calendar year divided by 3 to account for 3 lactations per animal.



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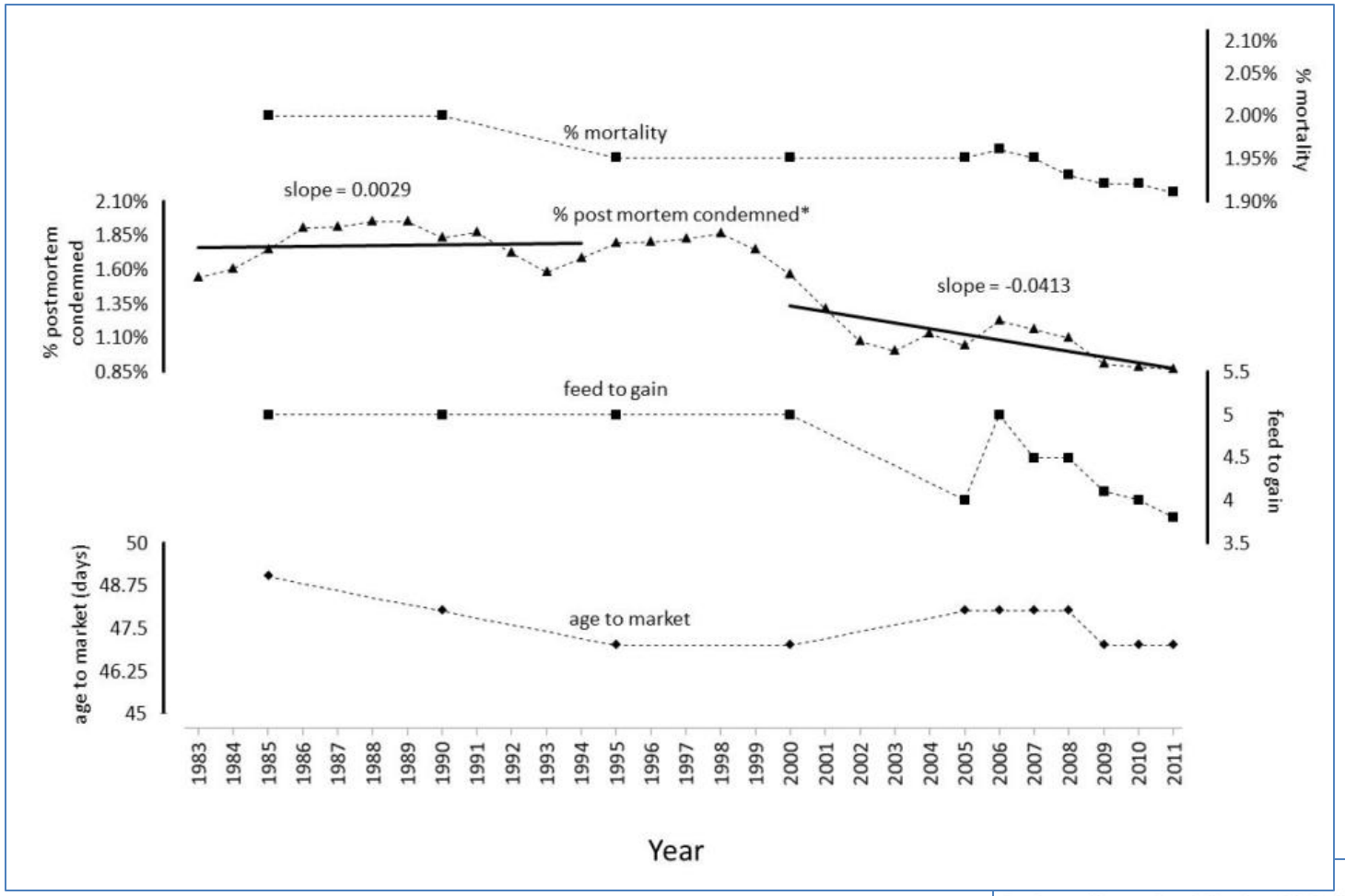
ABSTRACT: Globally, food-producing animals consume 70 to 90% of genetically engineered (GE) crop biomass. This review briefly summarizes the scientific literature on performance and health of animals consuming feed containing GE ingredients and composition of differences in the nutritional profile of animal products derived from GE-fed animals. Because DNA and protein are normal components of the diet that are digested, there are no detectable or reliably quantifiable traces of GE components in milk, meat, and eggs following consump-

Absence of evidence for reduced animal health after zillions of meals



Prevalence and impacts of genetically engineered feedstuffs on livestock populations[1]

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This science has not stopped ideolog/y driven frenzy over health impacts

THE NEW YORKER

ANNALS OF SCIENCE | AUGUST 25, 2014 ISSUE

SEEDS OF DOUBT

An activist's controversial crusade against genetically modified crops.

BY MICHAEL SPECTER

Early this spring, the Indian environmentalist Vandana Shiva led an unusual pilgrimage across southern Europe. Beginning in Greece, with the international Pan-Hellenic Exchange of Local Seed Varieties Festival, which celebrated the virtues of traditional agriculture, Shiva and an entourage of followers crossed the Adriatic and travelled by bus up the boot of Italy, to Florence, where she spoke at the Seed, Food and Earth Democracy Festival. After a short planning meeting in Genoa, the caravan rolled on to the South of France, ending in Le Mas d'Azil, just in time to celebrate International Days of the Seed.

Vandana Shiva accuses multinational corporations such as Monsanto of attempting to impose "food totalitarianism" on the world.

Shiva's fiery opposition to globalization

Pervasive online filters of information entrench

https://www.ted.com/talks/eli_pariser_beware_online_filter_bubbles

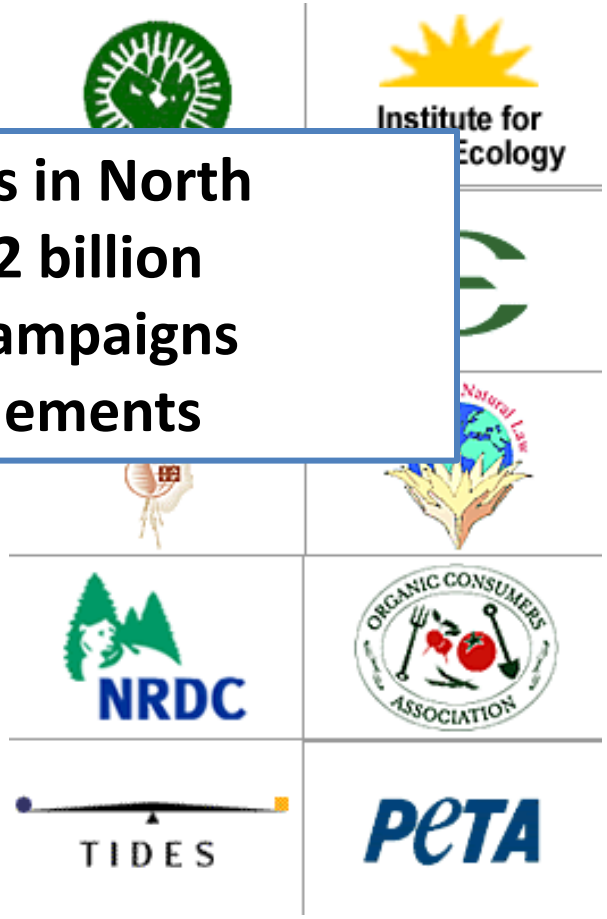
We are programmed to adopt polarized, simplified, emotionalized, and tribalized views

See also his TED talks

Money: Advocacy targeting food & agriculture is large and growing

- Agbiotech Info Net
- Agribusiness Examiner
- ACGA
- American Pasturage
- APHA
- Anim
- Beyo
- NCRI
- Cent
- Cent
- Cent
- CSPI
- Chef
- Chilo
- Common Dreams
- Consumer Federation of America
- Consumers Union
- Crop Choice
- David Suzuki Foundation
- Dawn Watch
- Deep Ecology
- Eco-Trust
- Economic Democracy
- Earth Spirit
- Earth First
- Environmental Defense
- Environmental Media Services
- FAIR
- Family Farm Defenders
- Farm Animal Reform Movement
- Farm Aid
- Farm Sanctuary
- Friends of the Earth
- Local Harvest
- NFFC
- Nishoren
- No Spray coalition
- NWARN
- Organic Consumers Association
- PANNA
- PETA
- PCRM
- PIRG
- Public Citizen
- Purdey Fund
- Sierra Club
- SEAC
- Water Keeper Alliance

More than 500 activist organizations in North America are spending in excess of $2 billion annually engaging in food-related campaigns targeting biotech and many other elements



Jay Byrne, 2012, V-fluence

Roadmap for talk

- Some broad perspectives
- Measure 92 – why I am strongly against it
- Measure 92-related science
  - Context: Crop domestication and breeding
  - What genetic modification is
  - Use and impacts
  - Newer products in the pipeline
  - Safety
- **Back to labeling, with a broader take**

IS LABELING REALLY ABOUT OUR "RIGHT TO KNOW"?

"We are going to force them to label this food. If we have it labeled, then we can organize people not to buy it."

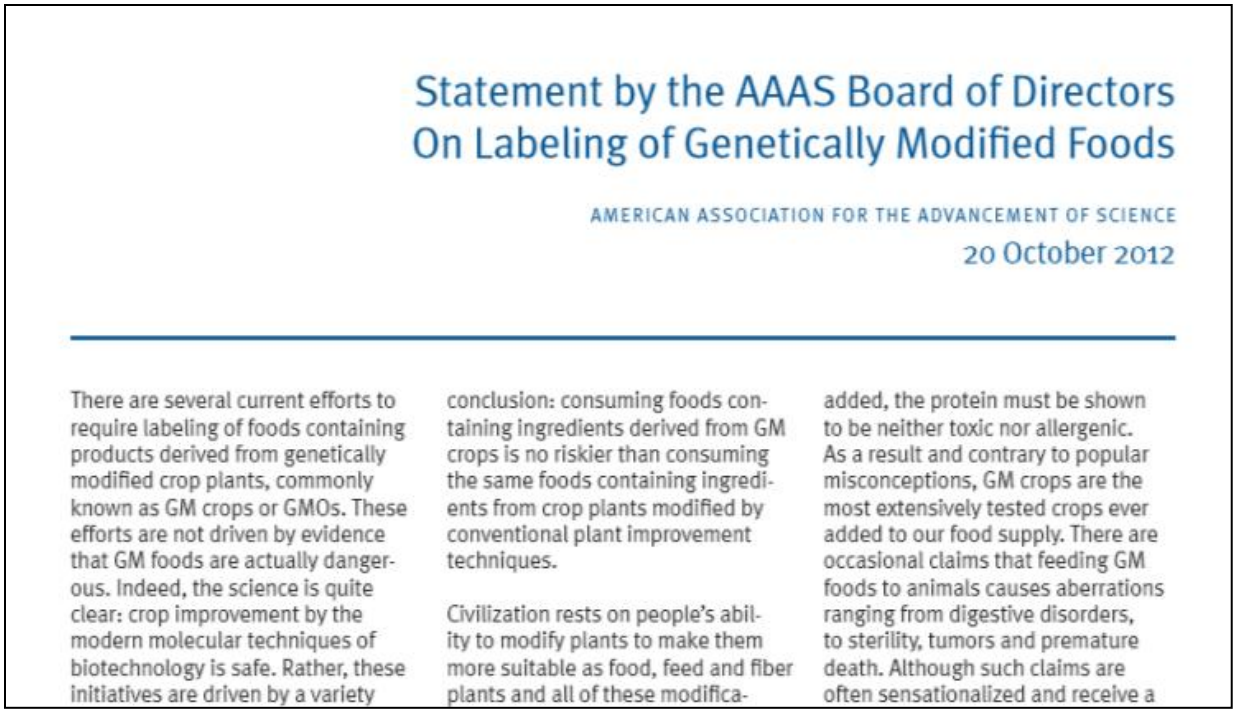
—Andrew Kimbrell, Executive Director, Center for Food Safety

"Personally, I believe GM foods must be banned entirely, but labeling is the most efficient way to achieve this. Since 85% of the public will refuse to buy foods they know to be genetically modified, this will effectively eliminate them from the market just the way it was done in Europe."

—Dr. Joseph Mercola, Mercola.com

Once examined seriously, labeling does not look so appealing – serious issues include science, cost, choice, and overall ethics

"Legally mandating such a label can only serve to mislead and falsely alarm consumers"



Statement by the AAAS Board of Directors On Labeling of Genetically Modified Foods

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

20 October 2012

There are several current efforts to require labeling of foods containing products derived from genetically modified crop plants, commonly known as GM crops or GMOs. These efforts are not driven by evidence that GM foods are actually dangerous. Indeed, the science is quite clear: crop improvement by the modern molecular techniques of biotechnology is safe. Rather, these initiatives are driven by a variety

conclusion: consuming foods containing ingredients derived from GM crops is no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques.

Civilization rests on people's ability to modify plants to make them more suitable as food, feed and fiber plants and all of these modifica-

added, the protein must be shown to be neither toxic nor allergenic. As a result and contrary to popular misconceptions, GM crops are the most extensively tested crops ever added to our food supply. There are occasional claims that feeding GM foods to animals causes aberrations ranging from digestive disorders, to sterility, tumors and premature death. Although such claims are often sensationalized and receive a

Approved by the AAAS Board of Directors on 20 October 2012

AAAS

ADVANCING SCIENCE, SERVING SOCIETY

Vermont labeling law passed – but in legal limbo amidst lawsuits

The New York Times

DEALBOOK
Sotheby's and Loeb End Fight Over Board

Europe Expects Its Economy to Grow 1.6% This Year

China Tightens Rules for Foreign-Made Milk Powders

Pfizer Profit Tumbles

BUSINESS DAY

Vermont Will Require Labeling of Genetically Altered Foods

By STEPHANIE STROM APRIL 23, 2014

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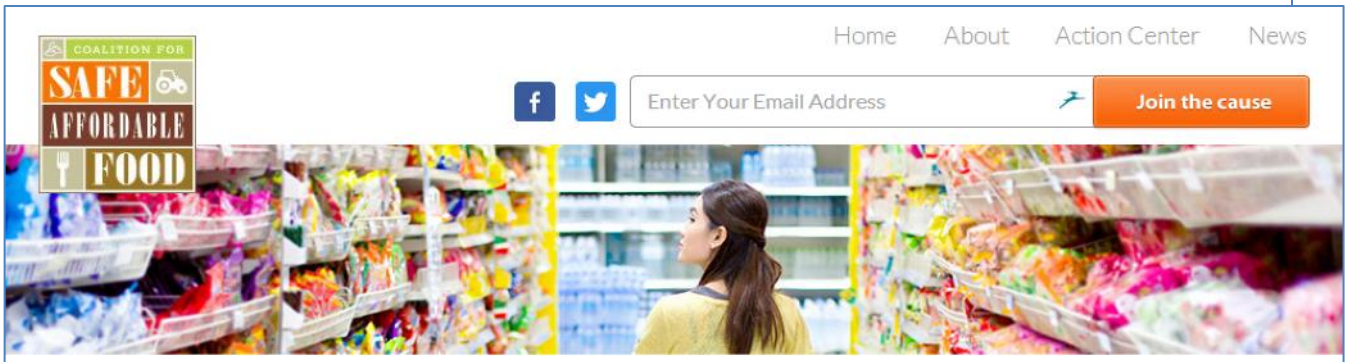
Going further than any state so far, Vermont on Wednesday passed a law requiring the labeling of foods that contain genetically engineered ingredients.

Though the move came in a tiny state far from the nation's population centers, proponents of such labeling immediately hailed the legislative approval as a significant victory. Labeling efforts are underway in some 20 other states, and the biotech and food industries have been pushing for federal legislation that would pre-empt such action.

Effort underway to standardize and prohibit Balkanization of GE regulations throughout USA

- American Bakers Association
- American Beverage Association
- American Farm Bureau Federation
- American Feed Industry Association
- American Frozen Food Institute
- American Seed Trade Association
- American Soybean Association
- American Sugarbeet Growers…….

AND 20 MORE



Broad-Based Coalition Launched to Advocate for Congressional Action on a Federal GMO Labeling Solution

February 5, 2014

Broad-Based Coalition Launched to Advocate for Congressional Action on a Federal GMO Labeling Solution

Legislation Needed to Protect Consumers by Eliminating Confusion and Advancing Food Safety

(Washington, D.C.) American farmers and representatives from a diverse group of almost thirty industry and non-governmental organizations today announced the formation of the Coalition for Safe Affordable Food (www.CFSAF.org) and urged Congress to quickly seek a federal solution that would establish standards for the safety and labeling of food and beverage products made with genetically modified ingredients (GMOs).

Major newspapers are against measure 92-like labeling proposals

Tuesday, October 8, 2013 | TRAFFIC | 53°F

The Seattle Times
Winner of Nine Pulitzer Prizes

Editorials

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24:00 HR ANY TIME News that matters. All the time.

IN THE NEWS: 'Boarding' mentally ill | Hazing expulsions | Government shutdown | Ocean acidification | Seahawks

Originally published Saturday, October 5, 2013 at 4:06 PM

Editorial: Vote No on Initiative 522, the GMO labeling initiative

Efforts to label foods with GMOs have failed in Oregon and California. Shoppers want useful information not scare tactics. Vote No on I-522.

Share: Recommend 208

Comments (177)
E-mail article
Print

Seattle Times Editorial

INITIATIVE 522 is a clumsy, emotion-based campaign to require labeling of selective food products containing genetically modified organisms.

The issue for proponents of I-522 seems to be less about outcomes — the products themselves — but rather finding the modern processes offensive.

Farmers and science have nurtured and bred hybrid versions of plants and animals for selective characteristics for centuries. But the efforts of the last few decades have stirred critics whose alarmist concerns are not supported by the mainstream scientific community.

Multistate efforts to require labeling of products as containing genetically modified organisms are ostensibly about a bold warning on packaging. The intent is more pointed, if a bit more subtle.

Labeling is one part of an effort to make the use of GMOs more expensive, arduous and complicated for farmers, processors, shippers, inspectors and regulators.

The Oregonian is against measure 92

OPINION

Contact: Editorial: 503-221-8150 • commentary@oregonian.com • letters@oregonian.com

GMO food-labeling mandate would only sow confusion

Backers claim labels on GMO products will prevent consumer confusion, but the exact opposite is likely to be true

Editorial

Backers of an initiative that would require labels for food produced using genetic engineering turned in more than 155,000 signatures this week, virtually guaranteeing a spot on the November ballot. Similar initiatives having failed in California in 2012 and in Washington in 2013, it's now Oregon's turn on the label-it movement's West Coast swing. With any luck, voters here will do justice to the state animal, the beaver, commonly known as nature's engineer.

Even the NY Times is against meausre 92-like labeling!

The New York Times

The Opinion Pages

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH

EDITORIAL

Why Label Genetically Engineered Food?

By THE EDITORIAL BOARD
Published: March 14, 2013

Whole Foods Market caused a stir last week when it announced that it would require all products sold in its stores in the United States and Canada to carry labels indicating whether they contain genetically modified ingredients by 2018. Food advocacy groups hailed its action as a possible "game changer" that would push the entire food industry to adopt similar labels.

Even our very green Corvallis Gazette-Times is against measure 92!

Send letters to the editor:
By mail to the Corvallis Gazette-Times, P.O. Box 368, Corvallis, OR 97339
By email to opinion@gtconnect.com
By fax to 541-758-9505

www.gazettetimes.com

Publisher: Jeff Precourt
General manager/Editor, Mid-Valley Newspapers: Mike McInally, 541-758-9502
City editor/Opinion page editor: Theresa Novak, 541-758-9527

GMO labeling measure 92 merits a 'No'

EDITORIAL

The campaign over Oregon's Measure 92, which would require the labeling of raw and packaged goods produced by "genetic engineering," has lived up to its early billing as potentially one of the costliest ballot measures in state history.

As of the first of the month, the two main organizations duking it out over the issue had raised more than $8 million, with opponents holding roughly a 2-to-1 edge in fundraising.

This big-bucks marketing blitz comes as no surprise: The Oregon campaign comes on the heels of a similar battle in Washington state, a campaign that also attracted millions of dollars.

Voters in Washington rejected the measure by a narrow margin. Our recommendation is that Oregon voters follow that example.

The measure would require that genetically engineered raw or packaged food include labels to that effect. It defines "genetically engineered" food as food produced from organisms with genetic material changed through in vitro nucleic acid techniques and certain cell-fusing techniques. It exempts traditional plant-breeding techniques such as hybridization.

If voters approve the measure, it would take effect in January 2016. At that time, supporters of the measure have said, as consumers stroll through their favorite grocery store, most of the items on the shelves will bear a GMO label.

If enacted, the measure won't be particularly costly: The best current estimate is that the measure would cost Oregonians about $2.30 a year.

But it's always hard to swallow paying any additional amount for something that's unnecessary.

Here's why it's unnecessary: Manufacturers of GMO-free products increasingly are taking advantage of the growing market for those foods by making sure their labels say so, in much the same way that products that have been gluten-free since the beginning of time now brag about that on their labels. In other words, the market is making it easier for consumers who want to avoid GMOs to do so — and that trend likely will only gather speed, along with the whole local-food movement.

There is something unfair about Measure 92 as well, and U.S. Rep. Kurt Schrader of Oregon has put his finger on the reason why: These types of mandatory labels always carry the implication that there's something wrong with the product. Look no further than the labels that have been slapped on cigarettes for a vivid example.

Of course, there is something wrong with cigarettes: They're one of the few products that, used as the manufacturer recommends, will kill you.

But the scientific consensus about GMO foods is that they do not pose a health risk. A committee of faculty members at Oregon State University's College of Agricultural Sciences reinforced that consensus in a white paper issued this spring. While emphasizing that the committee was taking no position on Measure 92, it reached this conclusion:

"The available scientific evidence suggests that the biotechnology currently used in genetically engineered organisms does not present food safety issues that differ from traditional agricultural or breeding practices.

Furthermore, there is no verifiable scientific evidence that consumption of a GE organism has resulted in adverse health effects."

Oregon voters should reject this unnecessary and unfair ballot measure.

In summary

- Its not about right to know, its about whether the label truly informs or misleads consumers about what matters to health and environment
- Its about setting up a costly government system to do this when the private sector has already done it quite well
- Its about creating a warning label that goes against the clear and overwhelming scientific consensus about safety of the method
- Its about the ethics of promoting a system that increases food costs for all, and further impedes economically beneficial and life-saving innovations – in Oregon and abroad