

GMOs in Regulation & the Marketplace

Informed by, or Distorted with,
Science?

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Leonard Pitts, Jr., Syndicated Columnist, Pulitzer Prize Winner, Miami Herald

February 2016



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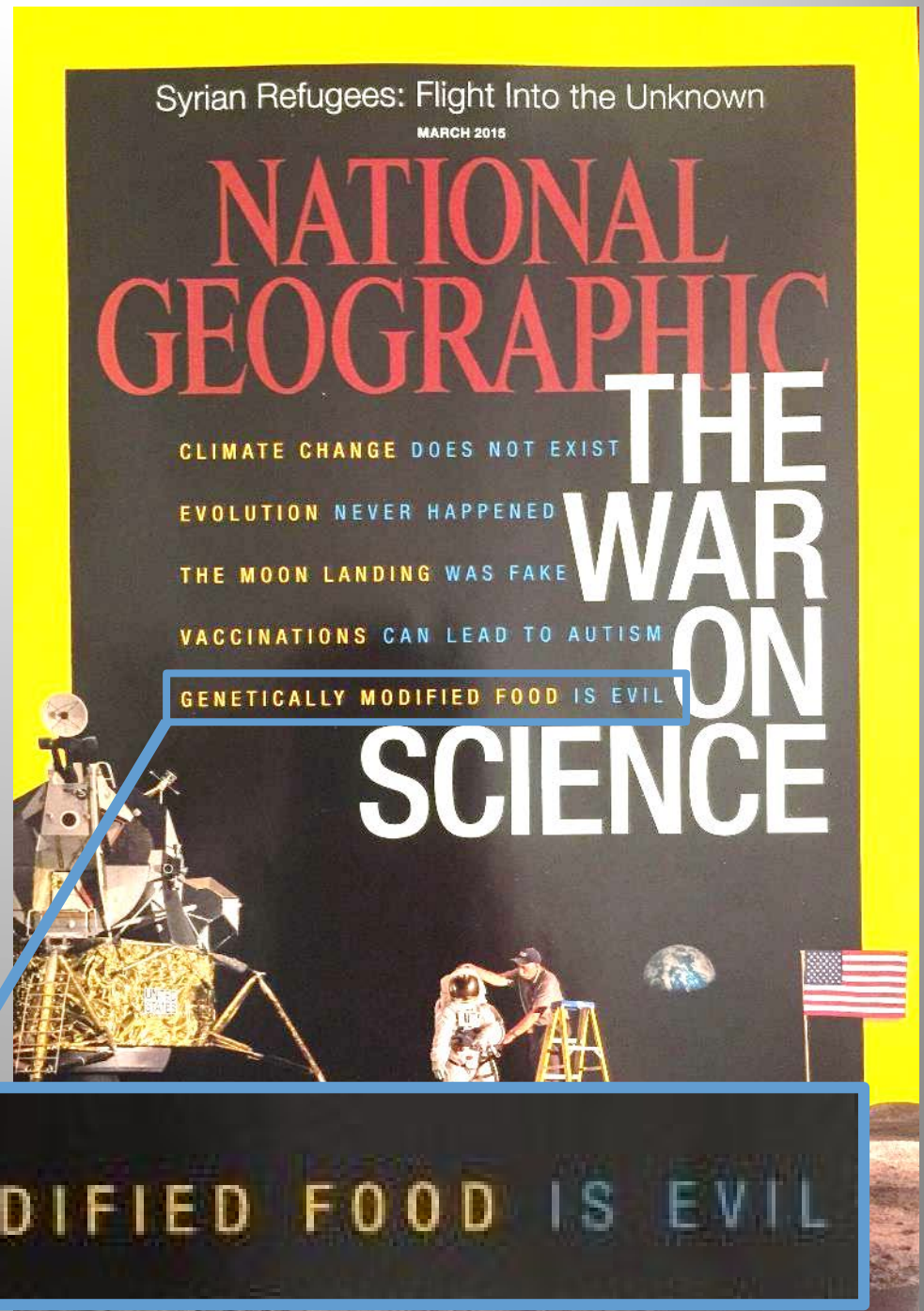
Miami Herald

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LEONARD PITTS JR. JANUARY 30, 2016 2:00 PM

Leonard Pitts Jr.: Planned Parenthood hoax backfires

This perception
also inspired
this cover
article



GENETICALLY MODIFIED FOOD IS EVIL

The GMO method is powerful and thus socially disruptive

- Controversy expected about it's uses
- But when the controversy subverts, distorts science...
- Robs society, or minimizes important benefits...
- Then scientists must take action



Agenda

- Science record
- GMO communication in commerce and regulation
- Findings, implications for society

Is GM food safe?

if an overwhelming majority of experts say something is true, then any sensible non-expert should assume that they are probably right



The American Association for the Advancement of Science (AAAS) is an international non-profit organization devoted to the promotion of science and scholarship.

The premier body of physicians in the United States is the American Medical Association (AMA).

The World Health Organization (WHO) is the directing and coordinating authority for health within the United Nations system.



The National Academy of Sciences is a major U.S. organization in the field of science in the United States.

England's top medical society, the Royal Society of Medicine is an independent educational organization for doctors, dentists, scientists and others involved in medicine and health.

The European Commission (EC) is the executive body of the European Union.



The American Council on Science and Health is a non-partisan group of scientists, public health experts, and environmentalists.

Epigenetics is the study of how gene expression is regulated. It is a field of research that is rapidly expanding.

The European Commission (EC) is the executive body of the European Union.



The American Society for Microbiology (ASM) represents over 42,000 microbiologists worldwide.

The American Society for Plant Biologists is a professional society devoted to the advancement of the plant sciences.

The American Society for Cell Biology is a professional society devoted to the advancement of cell biology.



The American Society for Microbiology (ASM) represents over 42,000 microbiologists worldwide.

The Crop Science Society of America (CSSA) is a professional society devoted to the advancement of the plant sciences.

The International Food Foundation (IFF) is a non-profit organization devoted to the advancement of food science.



The International Commission on Genetic Engineering in Food (ICGEF) is a non-profit organization devoted to the advancement of food science.

The International Society of Agricultural Biologists (ISAB) is a professional society devoted to the advancement of agricultural biology.

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The Federation of Animal Societies (FAS) is a professional society devoted to the advancement of animal science.

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The Society of Toxicology (SOT) is a professional society devoted to the advancement of toxicology.

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The Union of German Academies of Sciences and Humanities (DFG) is a professional society devoted to the advancement of German science.

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The American Association for the Advancement of Science is an international non-profit organization AAAS serves some 261 affiliated societies and academies of science.

The premier body of physicians in the United States "There is no scientific justification for special labeling of genetically modified foods."

The World Health Organization (WHO) is the directing and coordinating authority for health within the United Nations system.

"The science is quite clear: crop improvement by the modern molecular techniques of biotechnology is safe."

Bioengineered foods have been consumed for close to 20 years, and during that time, no overt consequences on human health have been reported and/or substantiated in the peer-reviewed literature."

"No effects on human health have been shown as a result of the consumption of GM foods by the general population in the countries where they have been approved."



The National Academy of Sciences is a non-profit organization in the United States. It is the premier scientific body in the United States

England's top medical society, the Royal Society of Medicine is an independent educational organisation for doctors, dentists, scientists and others involved in medicine and health care

The European Commission (EC) is the executive body of the European Union

"To date more than 98 million acres of genetically modified crops have been grown worldwide. No evidence of human health problems associated with the ingestion of these crops or resulting food products have been identified"

"Foods derived from GM crops have been consumed by hundreds of millions of people across the world for more than 15 years, with no reported health problems."

"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 no more risky than e.g. conventional plant breeding technologies."

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

Safety of foods supported by many dozens of international science organizations

The scientific consensus around the safety of genetically modified foods is as strong as the scientific consensus around climate change. These foods are subjected to more testing than any other, and everything tells us that they're safe.

GM a technology with diverse outcomes, including many.....

- genes/traits
- types of crops
- places
- values
- approaches

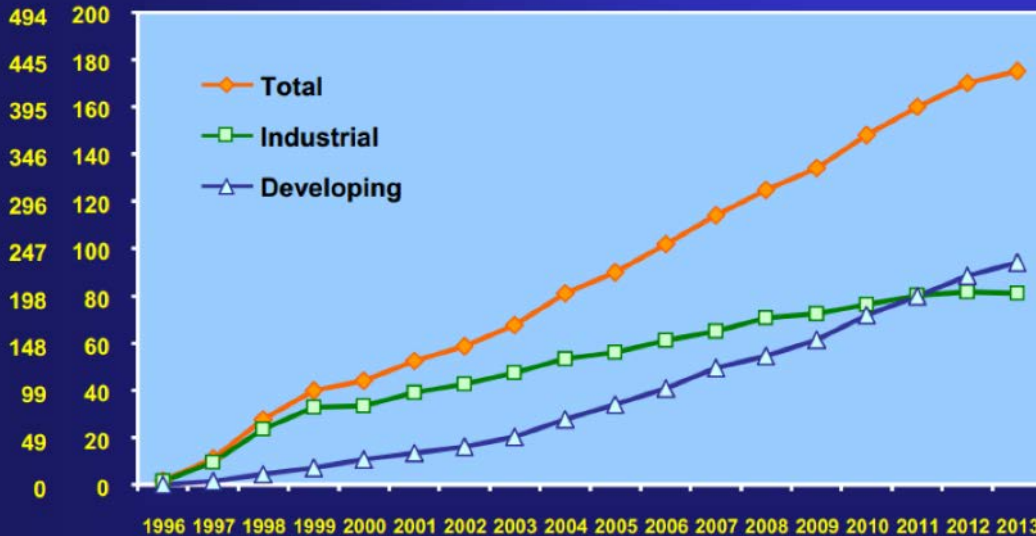
First generation herbicide and insect resistant crops were rapidly adopted by farmers, both in the developed and developing world



Global Area of Biotech Crops, 1996 to 2013:
Industrial and Developing Countries (M Has, M Acres)



M Acres



Global “meta-analysis” of early GMO crop impacts: 2014

The screenshot shows the PLOS ONE website interface. At the top left is the PLOS ONE logo. Navigation links for 'Subject Areas', 'For Authors', and 'About Us' are visible. A search bar with a magnifying glass icon and a link to 'advanced search' is on the right. Below the navigation, there are icons for 'OPEN ACCESS' and 'PEER-REVIEWED'. The article title is 'A Meta-Analysis of the Impacts of Genetically Modified Crops' by Wilhelm Klümper and Matin Qaim. The publication date is November 3, 2014, and the DOI is 10.1371/journal.pone.0111629. On the right side, there is a statistics table:

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“147 original studies were included.”

“On average, GM technology adoption has reduced chemical pesticide use by 37%, increased crop yields by 22%, and increased farmer profits by 68%.”

A human face: Insect-resistant crops with large benefits for welfare, public health in developing world



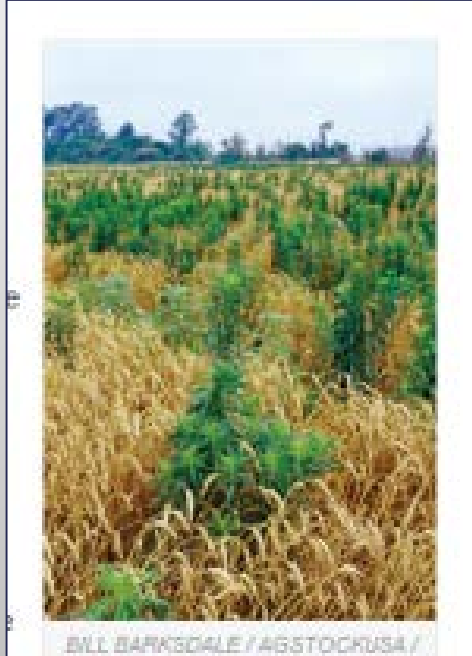
**Non-
Biotech**



Biotech



Herbicide tolerant crops reduced soil tillage, but over-reliance on a single herbicide accelerated development of resistant weeds



[nature.com](#) + [journal home](#) + [archive](#) + [issue](#) + [news](#) + [full text](#)

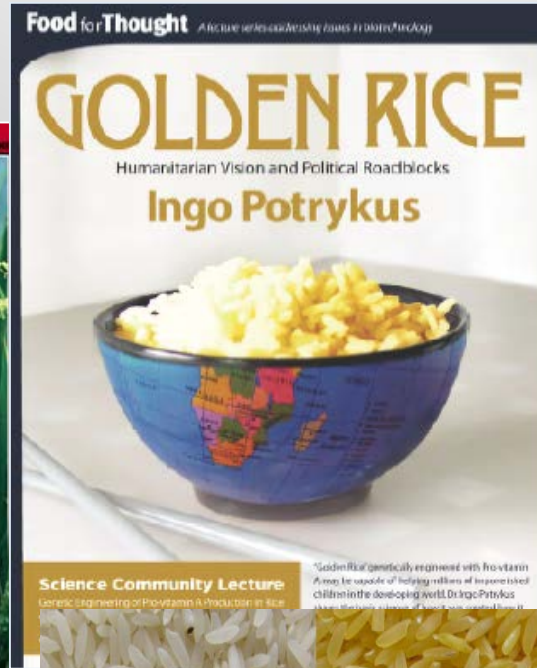
NATURE BIOTECHNOLOGY | NEWS

Glyphosate resistance threatens Roundup hegemony

Confirmed Glyphosate Resistant Weeds in the U.S.

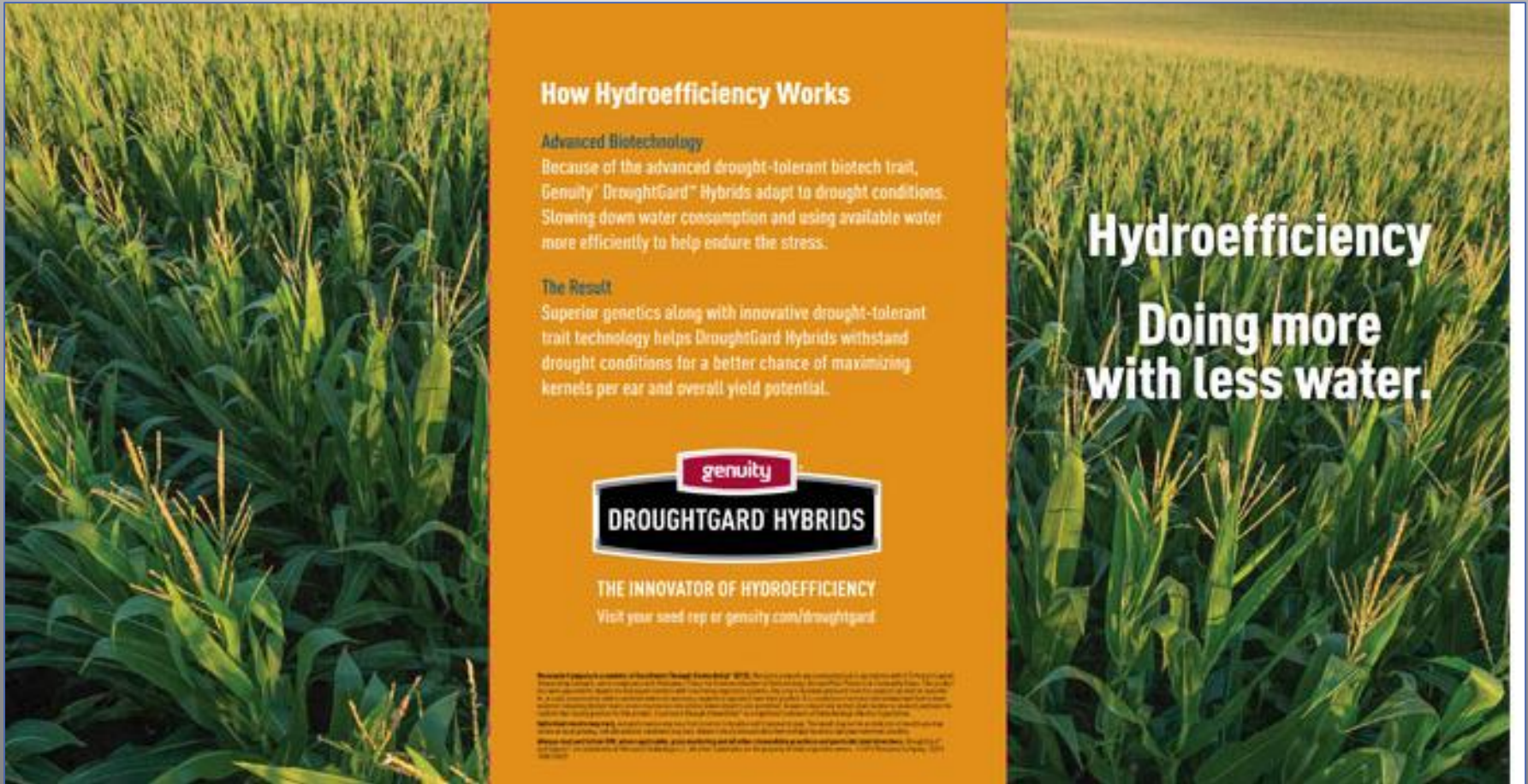


Diverse pipeline of biofortification products = enhancement of critical vitamins or nutrients



Abiotic stress-tolerant crops emerging

Important tool given climate change, rising ocean levels, water shortages?



How Hydroefficiency Works

Advanced Biotechnology
Because of the advanced drought-tolerant biotech trait, Genuity® DroughtGard™ Hybrids adapt to drought conditions. Slowing down water consumption and using available water more efficiently to help endure the stress.

The Result
Superior genetics along with innovative drought-tolerant trait technology helps DroughtGard Hybrids withstand drought conditions for a better chance of maximizing kernels per ear and overall yield potential.

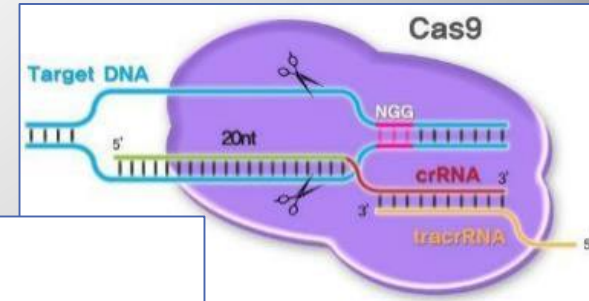
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Doing more with less water.

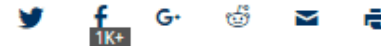
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Increasing precision in modifying native genes



Science magazine names CRISPR 'Breakthrough of the Year'

By Robert Sanders | DECEMBER 18, 2015



In its year-end issue, the journal *Science* chose the CRISPR genome-editing technology invented at UC Berkeley 2015's Breakthrough of the Year.

A runner-up in 2012 and 2013, the technology now revolutionizing genetic research and gene therapy "broke away from the pack, revealing its true power in a series of spectacular achievements," wrote *Science* correspondent John Travis in the Dec. 18 issue. These included "the creation of a long-sought 'gene drive' that



Gene suppression with RNAi (RNA interference) has already produced diverse traits



The Nobel Prize in Physiology or Medicine 2006



Photo: L. Cicero
Andrew Z. Fire



Photo: J. Mottern
Craig C. Mello



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The New York Times Business Day

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

In a Bean, a Boon to Biotech

Plenish Soybean Oil Partially Hydrogenated Soybean Oil Heavily Hydrogenated Soybean Oil

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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Agenda

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- Findings, implications for society

Vicious anti-GMO messages widespread



And many more

I'm no ordinary apple
I'm a genetically modified one that never rots

[facebook.com/theorganicindian](https://www.facebook.com/theorganicindian)



TAKE A BITE



My
collaborator
Steve Savage's
favorite!



GMO-free identification common in the marketplace



Meteoric rise of no-GMO labels

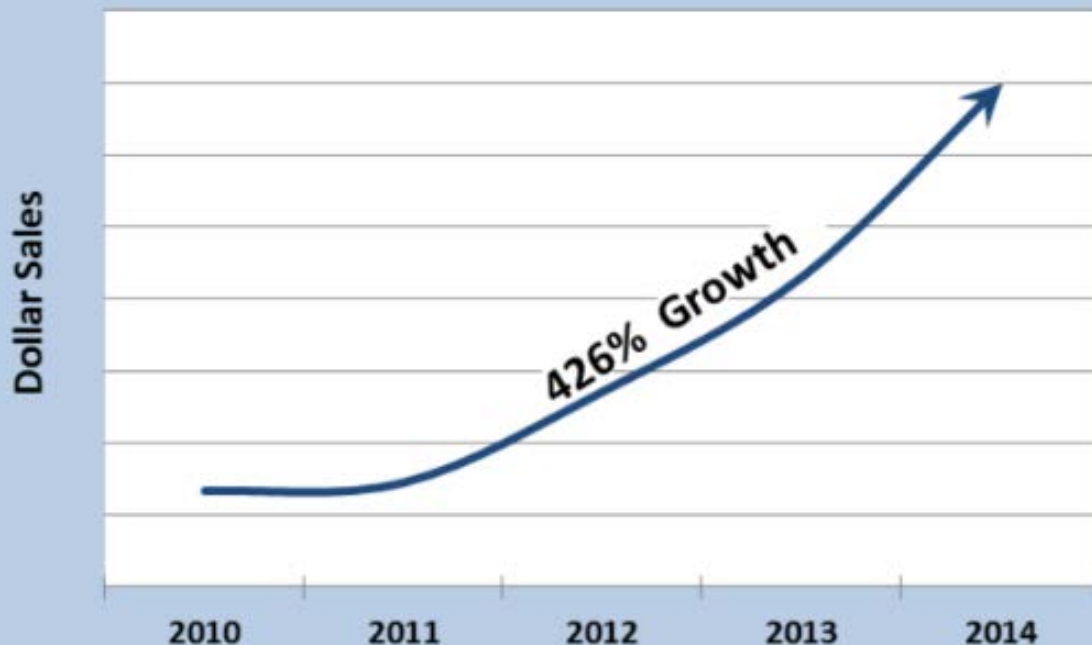
- GMO-free claims jumped 237% in new products 2012 to 2013



Organic and Non GMO Market
Growth 2015

Errol Schweizer
Executive Global Grocery Coordinator
Whole Foods Market

Non-GMO SALES



ORGANIC SALES



Abundance of non-GMO labels today



Organic and Non GMO Market Growth 2015

Errol Schweizer

Executive Global Grocery Coordinator
Whole Foods Market



Estimated Industry Volume 2014

- 22,000+ products
- 1500+ companies



It goes beyond labels: Social media, video

The image shows a screenshot of the Chipotle website. At the top left is the Chipotle logo, a red circle with a white chili pepper and the text 'CHIPOTLE MEXICAN GRILL'. To the right of the logo is a navigation menu with links: MENU, NUTRITION, FOOD WITH INTEGRITY, WHAT'S HAPPENING, CATERING, TALK TO US. Further right are links for careers and gift cards, and a search bar with a magnifying glass icon. Below the search bar are buttons for LOCATIONS and ORDER NOW. The main content area features a large banner with the text 'FOOD WITH INTEGRITY' and 'G-M-OVER IT' in large white letters. Below this text is a close-up image of a burrito with a green leaf icon above it. To the right of the burrito is a video player for the documentary 'FARMED AND DANGEROUS'. The video player has a title bar with 'WATCH • CHARACTERS • MUSIC' on the left, 'FARMED AND DANGEROUS' in the center, and 'BEHIND-THE-SCENES • TRIVIA • GET' on the right. Below the title bar is a red button with the Chipotle logo and the text 'CHIPOTLE'. The video player shows a scene with three people (two men and one woman) and a trident symbol in the background. Below the video player is a white text box with the text 'WHEN IT COMES TO OUR FOOD, GENETICALLY MODIFIED INGREDIENTS DON'T MAKE THE CUT.' Below the text box is a small text box with the text 'Now Playing on hulu'.

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FOOD WITH INTEGRITY

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FARMED AND DANGEROUS

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CHIPOTLE

WHEN IT COMES TO OUR FOOD, GENETICALLY MODIFIED INGREDIENTS DON'T MAKE THE CUT.

Now Playing on hulu

The pushback, irony, is striking

Chipotle's silence on sustainability practices make it a target for CSR advocates

Chipotle is copping flack on all sides for refusing to demonstrate that its regarding GMOs and other sustainable practices are supported by fact and action

NEW YORK

CHIPOTLE

Chipotle Is Promoting Opportunistic Anti-Science Hysteria

By Jesse Singal [Follow @jessesingal](#)



CHIPOTLE

theguardian

JANUARY 6, 2016

POSTS COMMENTS



Food Poisoning Bulletin

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You are here: [Home](#) / [Featured](#) / CDC Investigating Another E. coli Outbreak at Chipotle in OK, KS

CDC Investigating Another E. coli Outbreak at Chipotle in OK, KS

December 21, 2015 by Linda Larsen

The Centers for Disease Control and Prevention reported today that they are investigating another E. coli outbreak linked to Chipotle Mexican Grill restaurants. This new outbreak is a different strain of E. coli O26 bacteria from the older outbreak.

That ongoing, older outbreak of E. coli O26 linked to those restaurants has sickened at least 53 people in 9 states. One more ill person who is part of the older outbreak has been reported from Pennsylvania since the last update. But that person did not eat at Chipotle the week before November 11, 2015, when the illness



latest+news

Why Did Norovirus Outbreak Spark Criminal Probe of Chipotle?
Shrimp Balls Recalled for Undeclared Egg
FDA Bans Three Chemicals From Food Packaging
Wegmans Recalls Chicken Produced Without Inspection

food+outbreaks

But there are many others

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Top ten ways humanity is being murdered in the name of 'evidence-based science' (#1 GMOs)


Thursday, April 04, 2013
by Mike Adams, the Health Ranger
Editor of NaturalNews.com (See all articles...)

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GMO OMG

a film by
JEREMY SEIFERT



Dr. Oz and GMOs: When controversial meets controversy

by Mark Koba APRIL 23, 2015, 12:41 PM EDT

✉ 🐦 f in



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Many companies have avoided GMOs due to brand risk from activists/consumers



No-GMO labels on potatoes, in contrast to expected benefits of new GMO products

Food should taste good. It kind of wrote itself.
Pete
 Founder, Food Should Taste Good, Inc.
NOT MADE WITH GENETICALLY ENGINEERED INGREDIENTS

RECIPES: Sweet Potato Recipe: Use real sweet potatoes, don't have a waxy, starchy, and watery texture.

Nutrition Facts
 10 Sweet or 20 Potato Chips
 100g (3.5 oz) (about 4)

Calories	
Calories from Fat 50	100
% Daily Value*	
Total Fat 10g	20%
Sodium 200mg	4%
Total Carbohydrate 15g	3%
Protein 2g	4%

INGREDIENTS:
 Stone Ground Corn, High Oleic Sunflower Oil and/or Safflower Oil, Potatoes, Cane Sugar, Sweet Potatoes, Sea Salt.

FOOD SHOULD TASTE GOOD
 I love food. I've been working in restaurants and grocery stores my whole life, and I've learned something: it's that food tastes best when it's made with real ingredients. That's why I founded my own company, dedicated to making wholesome snacks. As for the name, Food Should Taste Good, it kind of wrote itself.
Pete
 Founder, Food Should Taste Good, Inc.

NOT MADE WITH GENETICALLY ENGINEERED INGREDIENTS

GF CERTIFIED GLUTEN FREE

CERTIFIED VEGAN

SWEET POTATO chips are delicious alone or with:
 Fruit Salsa
 Raspberry Jam
 Apple Butter

Visit foodshouldtastegood.com for coupons and recipes or "like" us at [facebook.com/foodshouldtastegood](https://www.facebook.com/foodshouldtastegood) to enter our giveaways and contests.

JACKSON'S HONEST
Organic
 MADE WITH MULTIPLE CERTIFIED COCONUT OIL

SEA SALT POTATO CHIPS

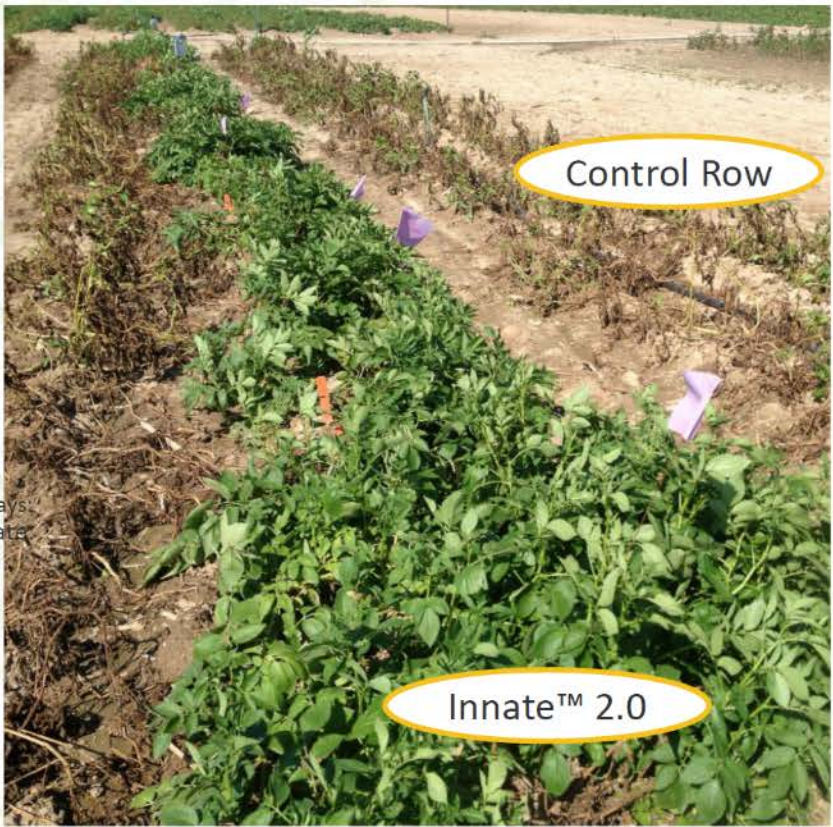
Handmade in a small kitchen. Love it. Always.

USDA ORGANIC

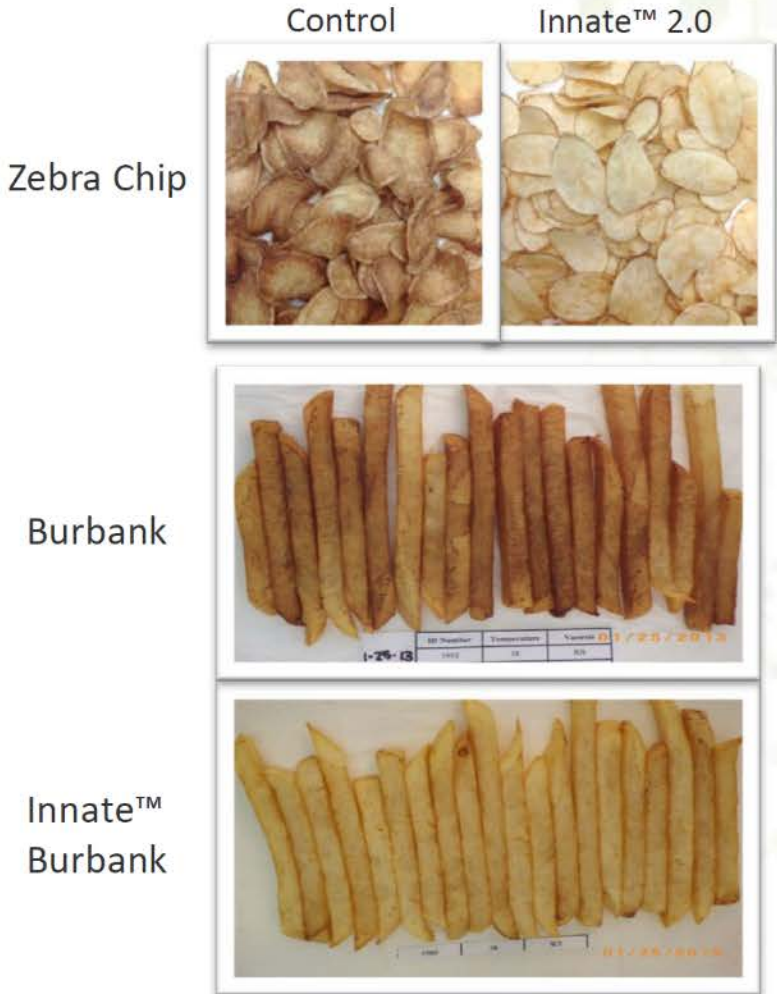
NON-GMO VERIFIED

“Innate 2.0” potato – late blight resistant, and reduced sprouting and browning (↓ waste, ↑ safety, ↓ pesticide, ↑ yield)

Midwest - Sept 4th 2013



Days
Rate

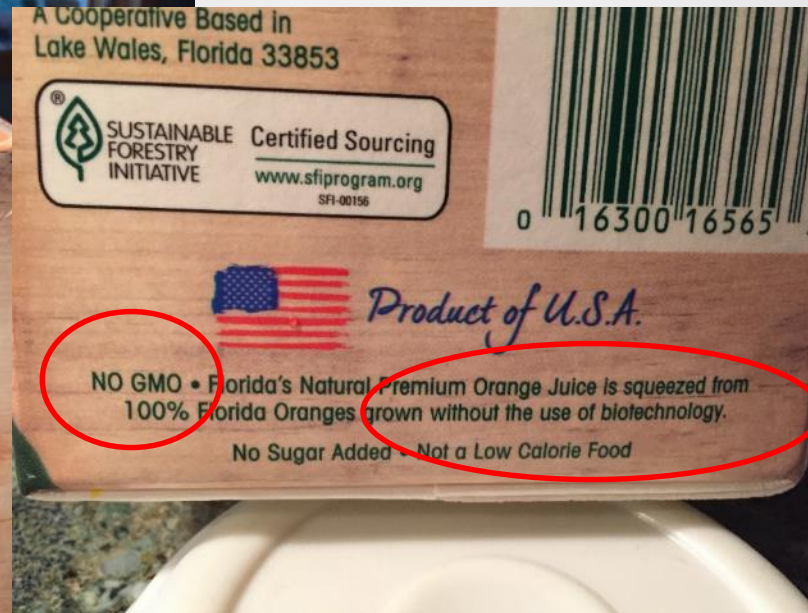


Potential Innate Potato benefits

- If all USA potatoes had it's improved traits, each year....
- Waste reduced by 5 billion pounds
- CO₂ emissions reduced by 734 million pounds
- Water use reduced by 84 billion gallons
- 2.5 million fewer pesticide acre-applications
- Marketable yields increase ~ 20%
- Growers save \$240 million in production costs



No-GMO claims on orange juice



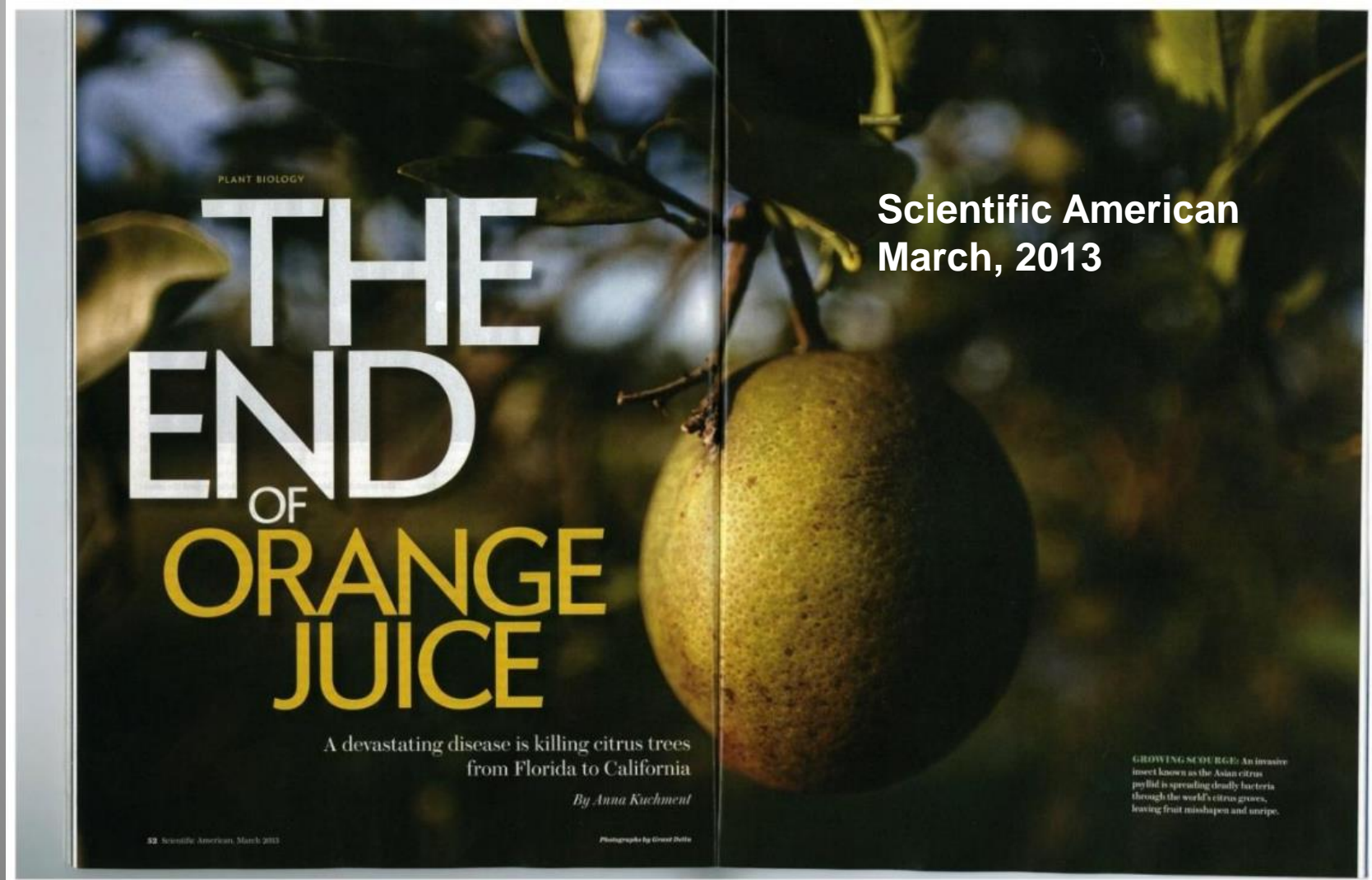
BUSINESS DAY

Some Tropicana and Other PepsiCo Products to Carry Non-GMO Project Seal

By STEPHANIE STROM DEC. 10, 2015

The New York Times

In spite of devastating 'citrus greening' that is threatening the entire industry



Scientific American
March, 2013

PLANT BIOLOGY

THE END OF ORANGE JUICE

A devastating disease is killing citrus trees
from Florida to California

By Anna Kuchment

52 Scientific American, March 2013

Photographs by Girard Dufin

GROWING SCOURGE: An invasive insect known as the Asian citrus psyllid is spreading deadly bacteria through the world's citrus groves, leaving fruit misshapen and stunted.

GMO solutions promising

Defensin-like proteins from spinach for citrus greening disease resistance



Courtesy of Eric Mirkov, Texas A & M

Agenda

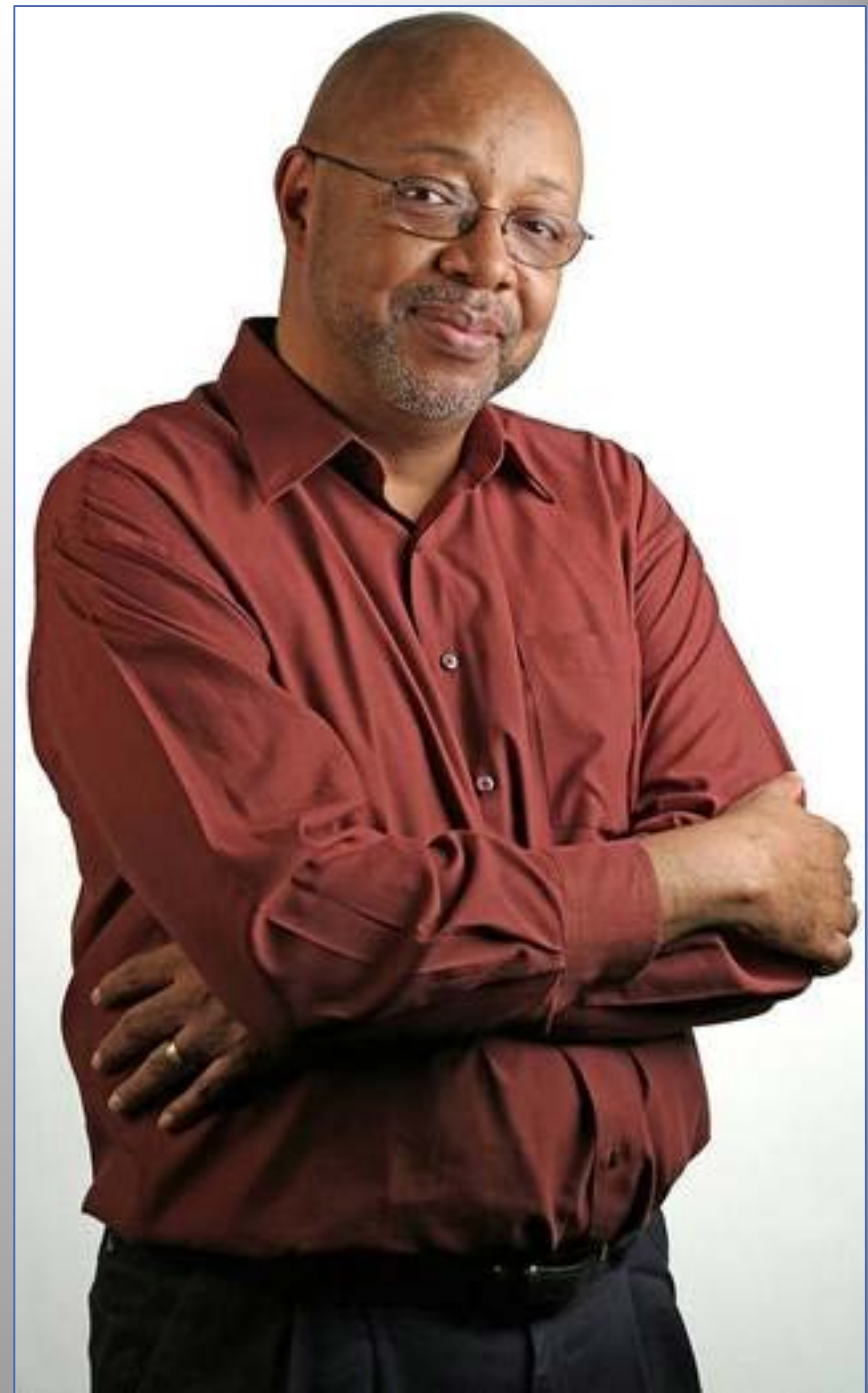
- Science record of GMOs
- GMO communication in commerce and regulation
- Findings, implications for society

Conclusion / Implications

- Generic, stigmatizing GMO labels and campaigns at odds with science findings of large benefits, safety, and trait/crop diversity
- Prevents most products from reaching markets (or even being researched)
- Impedes the ability of the developing world, and the poor, to benefit from GMO technology
- Induces consumers to make bad decisions regarding welfare, health, and environment

Leonard Pitts, Jr.

“... the lie is so broadly
and brazenly told as
to cower truth
itself....”



Thanks for discussions and materials

- Dr. Benjamin Cohen, Lafayette College
- Dr. Steve Savage, Agricultural Consultant
- Jimmy McWilliams, Texas State University