

A Field Guide to GMOs
What “they” don’t want you to know

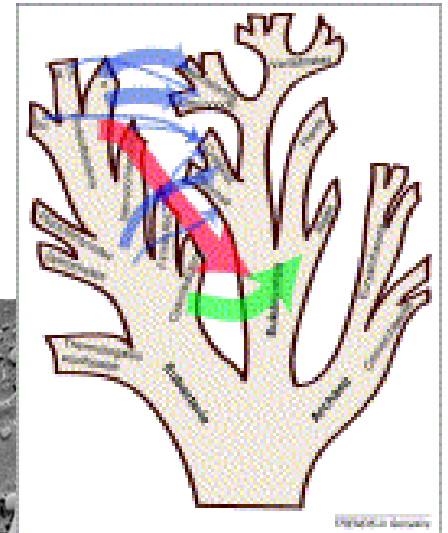
Norman Ellstrand
Distinguished Professor of Genetics
UCR

What's genetic engineering?

Human-mediated variant of a natural process

Horizontal transfer (the oldest kind of sex)

- Transformation– transferring a gene or genes from ≥ 1 species to another
 - via Agrobacterium
 - via gene “gun”



Quiz 1a. Where are the GMOs?

Transgenic crops are cultivated in 28 countries.
How many/few countries account for > 75% of
the world's acreage?

- 1.
- 3
- 11

Which country ranks 2nd globally for acreage?

- Brazil
- Canada
- China
- Russia



UCR



Quiz 1b. Where are the GMOs?

How many EU countries grow GMOs?

- 1
- 4
- Zero



Quiz 2.

How many different crop species account for most GMO products that we (Americans) encounter on a daily/weekly basis?

1. 5
2. 80
3. More than 100

There are dozens of different engineered crops in our markets. So we need labelling to help us know what's engineered.

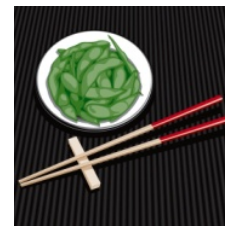
1. True
2. False

Is labeling necessary?

Regarding GMO plant products

Organic? Not GMO

Otherwise, it's a short list, five biggies



account for >> 95% of the products you encounter

Simpler still

Regarding GMO plant products

Organic? Not GMO

Otherwise, you'll often find one or more of the big five in the "ingredients lists" for ca. 80% of processed foods: snack bags, soda cans, cookie boxes, candy bars, as well as in your gas tank and possibly your undies ...



Did you know?



Congress Just Passed A GMO Labeling Bill. Nobody's Super Happy About It

July 14, 2016 · 5:34 PM ET

Heard on [All Things Considered](#)



DAN CHARLES




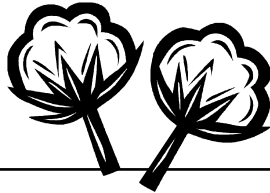

Quiz 3.



The vast majority of global GMO plant acreage is associated with which traits?

1. Herbicide tolerance
2. Insect resistance
3. 1 and 2 only
4. Fungus disease resistance
5. Bacterial disease resistance
6. Virus disease resistance

Major traits of the major crops.

| Crop ----- Trait | Corn  | Cotton  | Soybean  | OSR/ Sugarbeet |
|------------------------|---|--|--|-------------------|
| Insect-resistant | X | X | x | |
| Herbicide-tolerant | X | X | X | X |

Transgenics: Good or Bad? Yes!

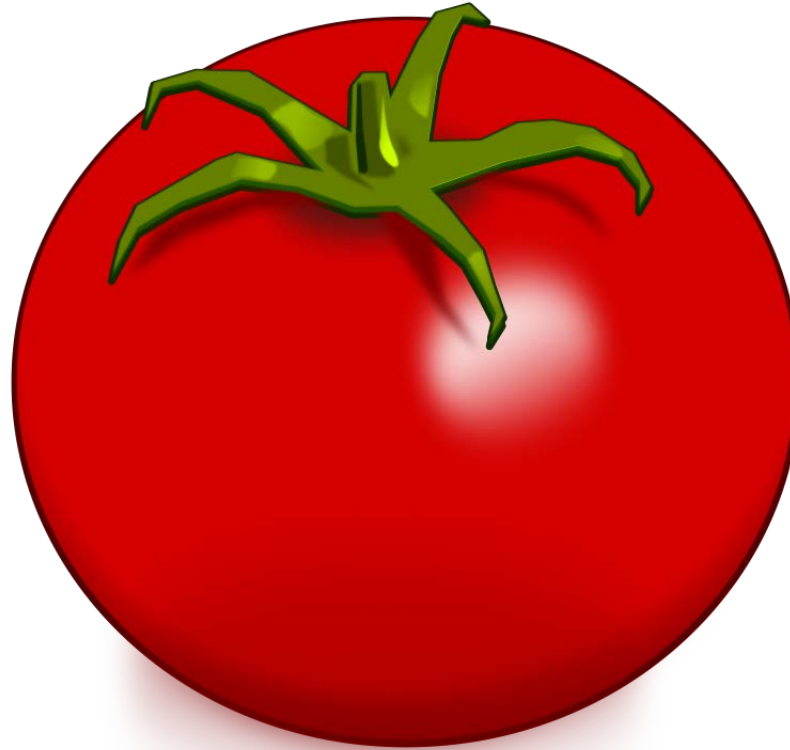
› Good



› Bad (at least failed)



No more GMO tomatoes



Quiz 4.

What's the newest GM crop on the market?

1. Freeze-tolerant eucalyptus
2. Herbicide-tolerant creeping bentgrass
3. Fungus-resistant peanut
4. Browning-resistant apple
5. Virus-resistant squash



Quiz 5. Who's making the GMO's?

How many United States universities are regularly commercializing new transgenic crops?

1. Zero
2. Three
3. Ten
4. Thirteen
5. More than 20

Zero universities as major commercializers ...



syngenta



DOW



PIONEER
A DUPONT COMPANY



®



Bayer CropScience

MONSANTO

Historically,
5 major commercializers ...

Mergers/ acquisitions since January 2016 ...



MONSANTO



Quiz 6

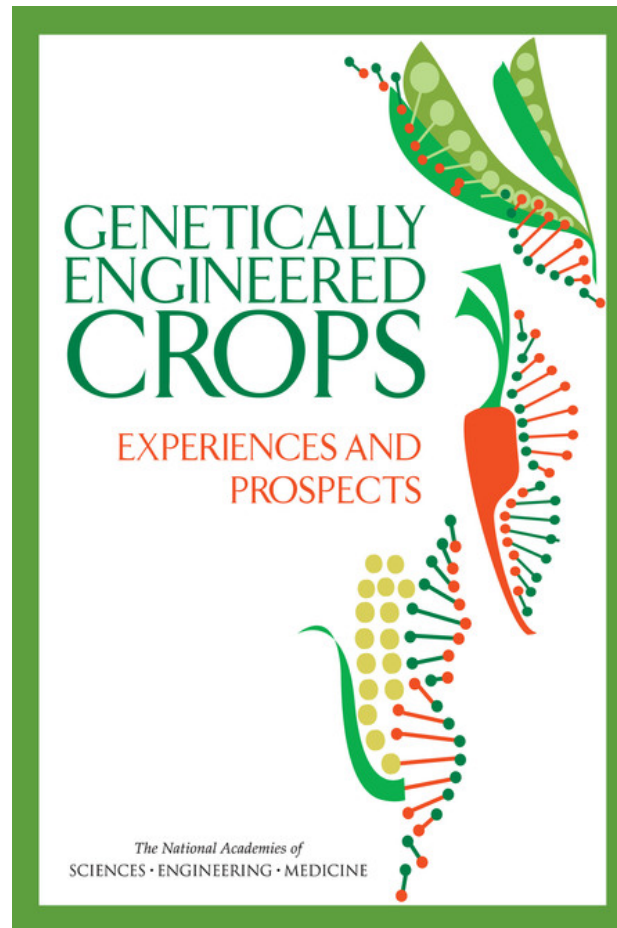


Who regulates US GMOs?

1. US Department of Agriculture
2. US Environmental Protection Agency
3. US Food and Drug Administration
4. “Coordinated Framework” of 1, 2, and 3
5. President Trump declared yesterday that GMOs will no longer be regulated in the United States (leading to trade embargoes from Austria, France, Japan, China, Saudi Arabia, etc.)

Want to learn more?

State-of-the-art, deeply researched, carefully written report **released last year.**

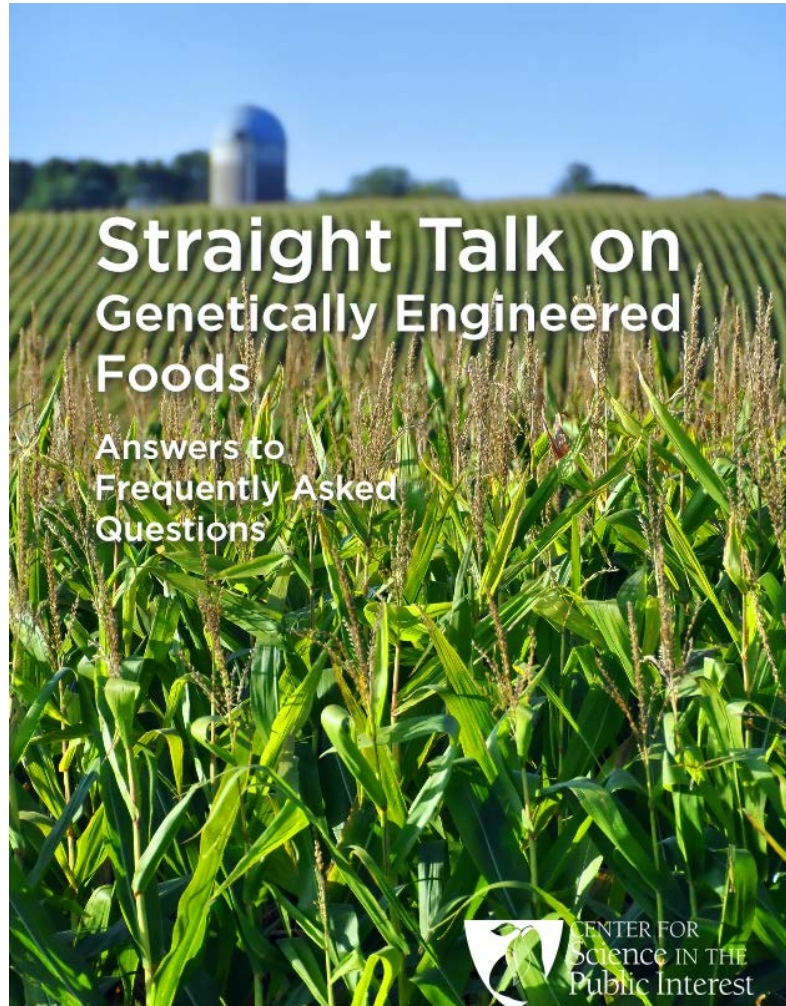


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Free
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Want to learn more?



... in less than several hundred pages?



Want to learn more? Websites



+ Best/only source of global info on approvals, acreage, etc. pro-attitude

www.isaaa.org/

+ Database: Bulk of commercially available items

www.biotradestatus.com/

+ Database: Most field-based US GMOs – permits, notifications, and deregulated items

<https://www.aphis.usda.gov/aphis/ourfocus/biotechnology/>

+ The other US GMOs – “Under the radar”

www.aphis.usda.gov/aphis/ourfocus/biotechnology/am-i-regulated

Thank you!



3C. Science Session

Science and Public Perceptions about Technology and Food Production: Current and Emerging Trends

As researchers and the face of science to the public, we must present the science that will cover research related to GMOs, antibiotics, new technologies and their benefits by adopting production systems using (or not using) these technologies. This session will cover research related to GMOs, antibiotics, new technologies and their benefits by adopting production systems using (or not using) these technologies. This session will cover research related to GMOs, antibiotics, new technologies and their benefits by adopting production systems using (or not using) these technologies.

This session will start with clips from the 2014 movie "Food Evolution" and presentations about creating a narrative for skeptical audiences. This session will start with clips from the 2014 movie "Food Evolution" and presentations about creating a narrative for skeptical audiences. This session will start with clips from the 2014 movie "Food Evolution" and presentations about creating a narrative for skeptical audiences.

Moderator: [Name], Southern California

Clips from movie "Food Evolution"

9:30 Simple Facts that Everybody Should Know - Norm Ellstrand, Distinguished

Chair in Food and Agriculture, UC Riverside

9:45 The Power of narrative storytelling: Results and Impacts from the movie "Food Evolution"

Enennaam, CE Specialist in Animal Genomics and Biotechnology, Dept of Animal Science, UC Davis

Scott Hamilton Kennedy, Director and Writer (Invited)

9:30 Antimicrobial Resistance in Food Animals and Foods: Where we think we are and where we're going

Maurice Pitesky, CE Specialist, Population Health & Reproduction, Vet Med, UC Davis

9:45 Emerging Science, food trends (organic, natural...), future application, and moving to the future - N

Professor, Dept. of Plant Pathology, UC Davis

10:00 End



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