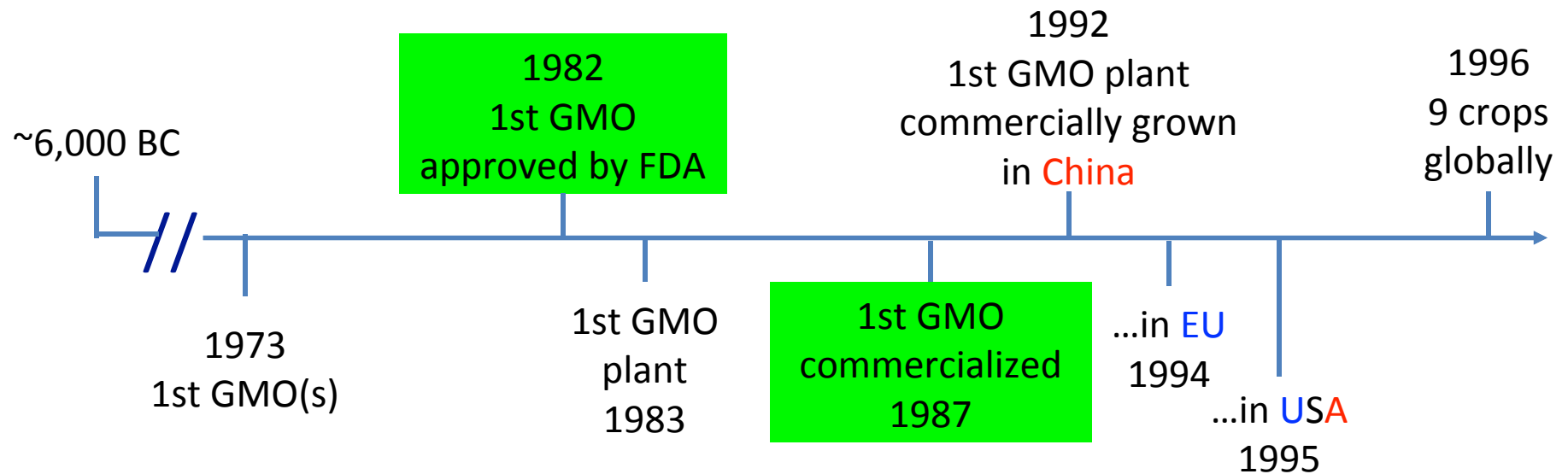


GMOs are beneficial

Sunny D. Gilbert, Ph.D.

Chicago IFT Debate

February 13, 2017



James, Clive (1996). "Global Review of the Field Testing and Commercialization of Transgenic Plants: 1986 to 1995" (PDF).
The International Service for the Acquisition of Agri-biotech Applications

FOOD & CULTURE



Natural GMO? Sweet Potato Genetically Modified 8,000 Years Ago

May 5, 2015 · 1:19 PM ET

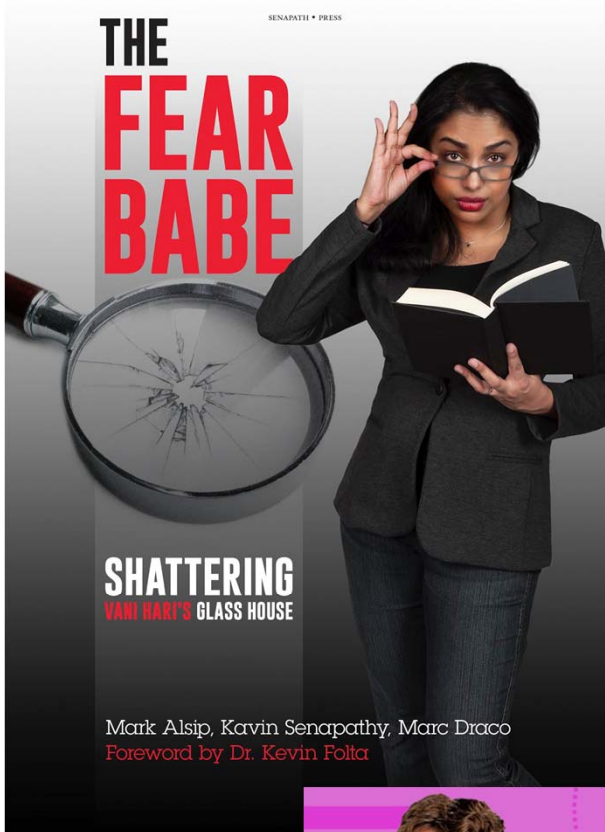


MICHAELEEN DOUCLEFF



291 Varieties of sweet potato world-wide. - www.npr.org

How did **WE** get here?



How did I get here?



*First Fruit: The Creation of the Flavr Savr
Tomato and the Birth of Biotech Food.*
Belinda Granger

GMO technology is safe for consumption

American Association for the Advancement of Science

American Medical Association

American Society for Microbiology

Australian Academy of Sciences

Brazilian Academy of Sciences

British Medical Association

Chinese Academy of Sciences

Council for Agricultural Science

European Commission

European Food Safety Authority

Federation of Animal Production

Food and Agriculture Organization

French Academy of Sciences

Indian National Science Academy

Institute of Food Technologists

International Council for Science

International Union of Pure and Applied Chemistry

Italian National Academy of Science

Mexican Academy of Sciences

National Academies of Science (United States)

Organization for Economic Cooperation and Development

Pontifical Academy of Sciences

Royal Society (United Kingdom)

World Health Organization

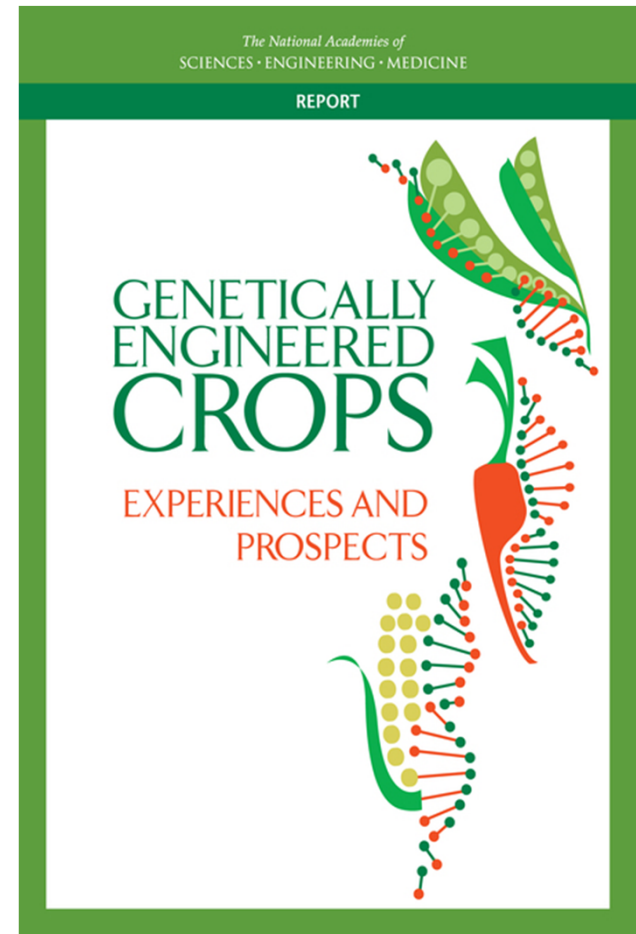
Approved

59 countries

2,497 approvals

1,129 are for food use

www.isaaa.org



May 16, 2016

GMO versions of crops approved for consumption

BIOTECH



potato



apple

10 Common Crops Commercially Available Use Biotech Seeds, reducing crop loss to insect and plant diseases as well as drought and other environmental conditions.

GMOs can reduce food waste

Polyphenol oxidase reduction using
gene interference (RNAi)



Okanagan Specialty
Fruits Inc.



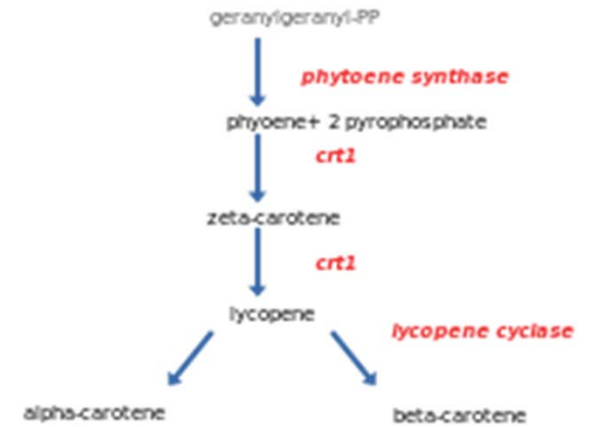
Pam Riemenschneider Dec.
28, 2016
mother two, editor of
Produce Retailer Magazine

<http://www.produceretailer.com/pamelaskitchen>

GMOs enhance nutrition

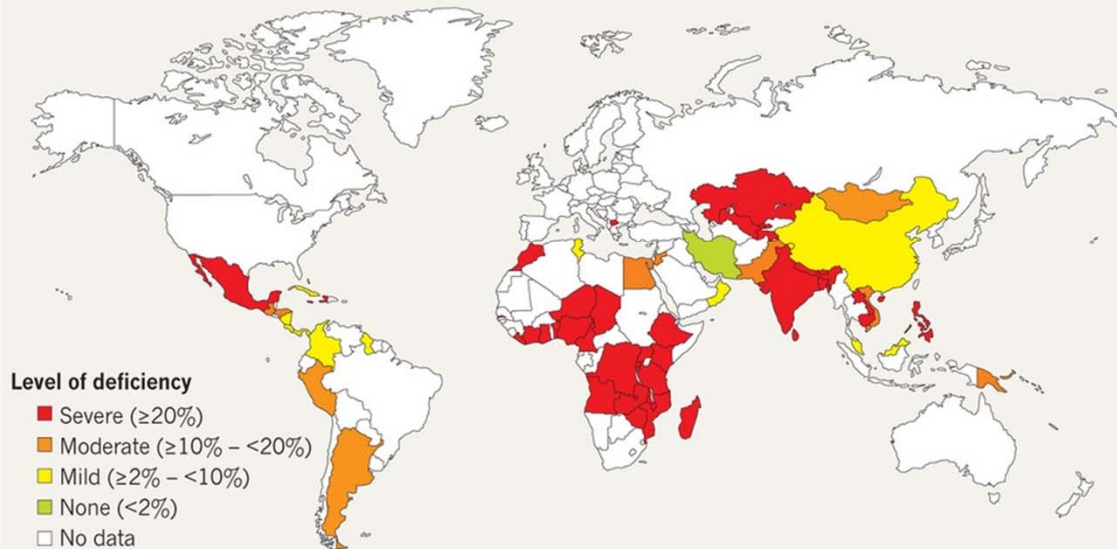


The case for Golden Rice



PREVALENCE OF VITAMIN A DEFICIENCY

Map showing level of serum retinol (an indicator of vitamin A deficiency) in pre-school age children. Data were collected by the World Health Organization between 1995 and 2005 from populations at risk.

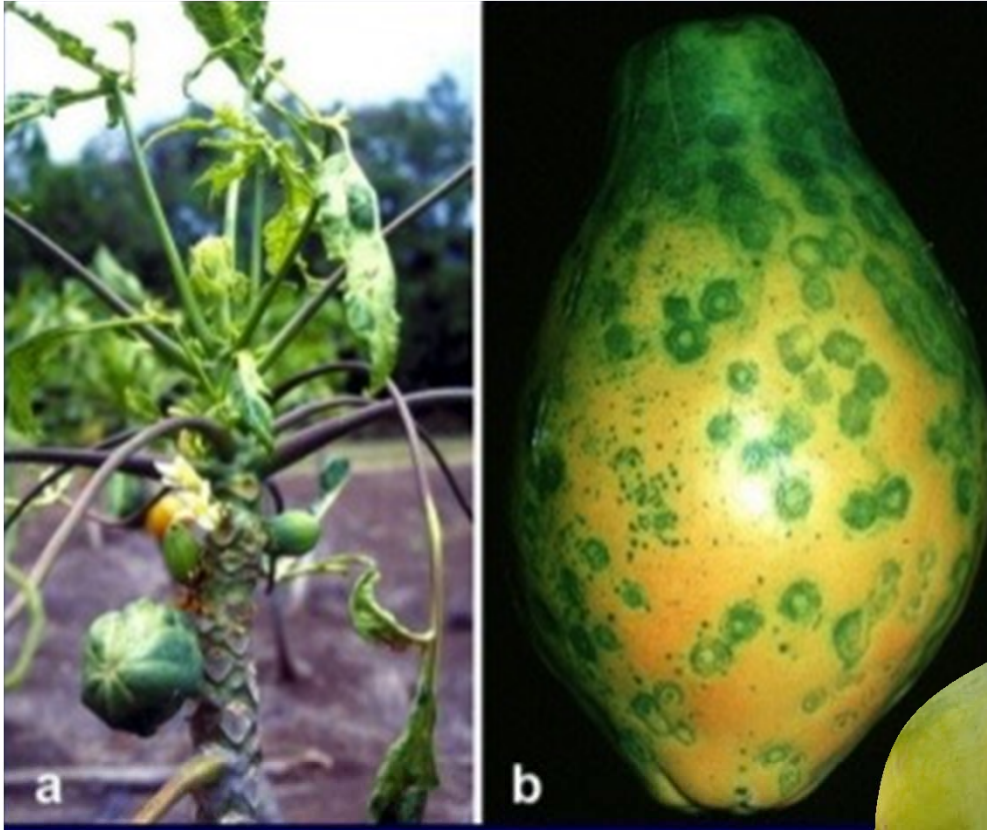


Estimates of vitamin A deficiency are based on low serum retinol concentration $<0.70 \mu\text{mol l}^{-1}$



<http://www.goldenrice.org/>

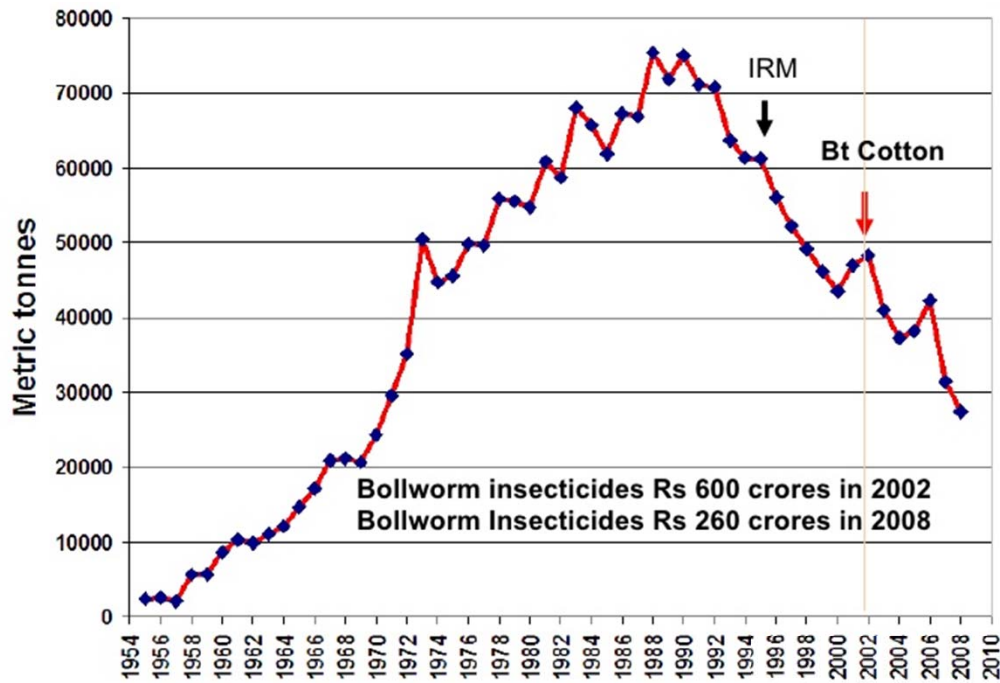
GMOs save crops



**Papaya Ringspot Virus
nearly wiped out an entire
foodstuff**



“Bt cotton has created large and sustainable benefits, which contribute to positive economic and social development in India.”



Dr. K. R. Kranthi Director, Central Institute for Cotton Research, Nagpur

GMOs can...

- ☑ Reduce insecticide use
- ☑ Decrease food waste
- ☑ increase economic and social development (Bangladesh)

www.allianceforscience.cornell.edu/topic/bt-eggplant

Bt Eggplant



GMO produced a healthier soybean oil

Contains larger amounts of oleic fatty acids (good fat)

Longer shelf-life

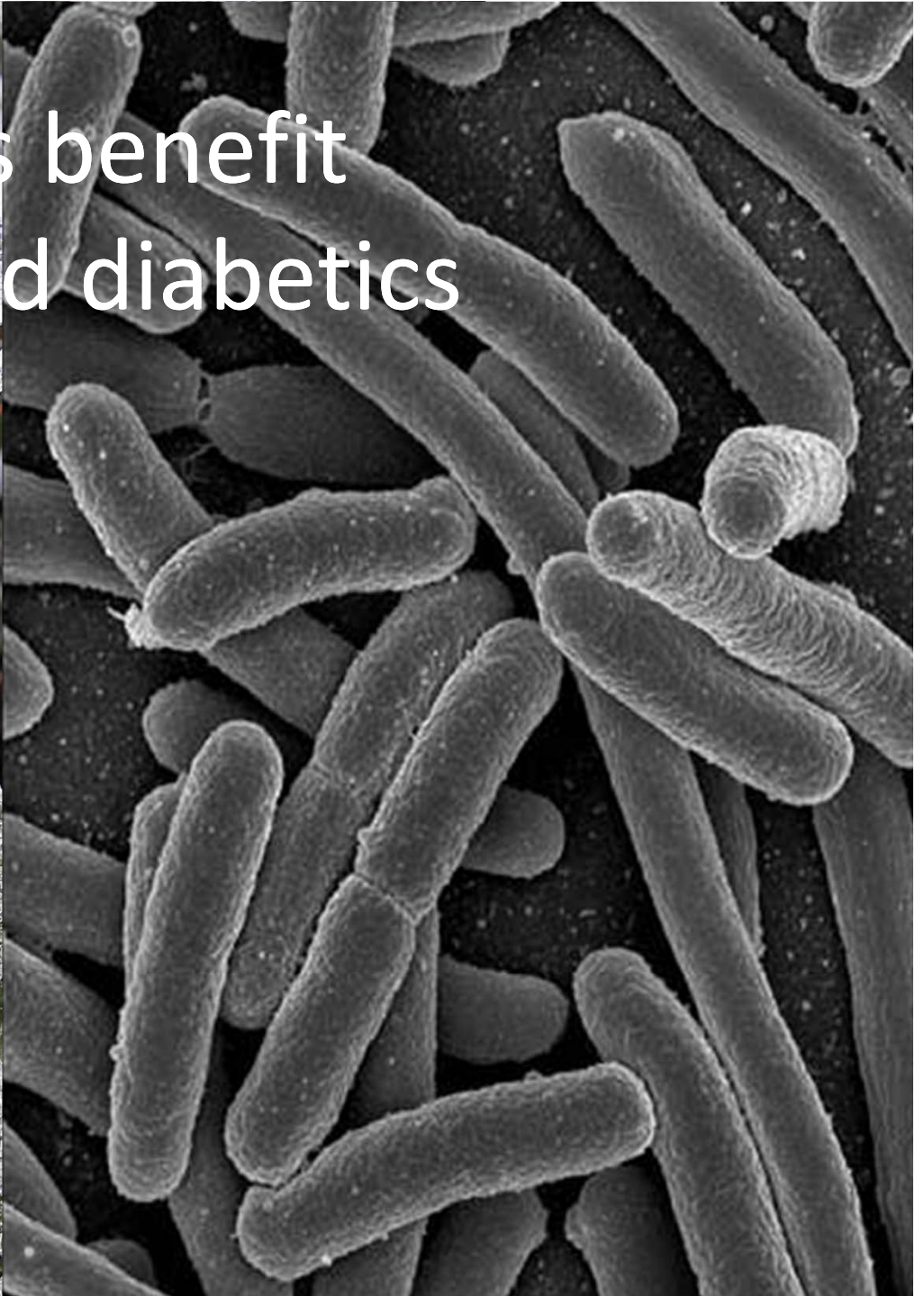
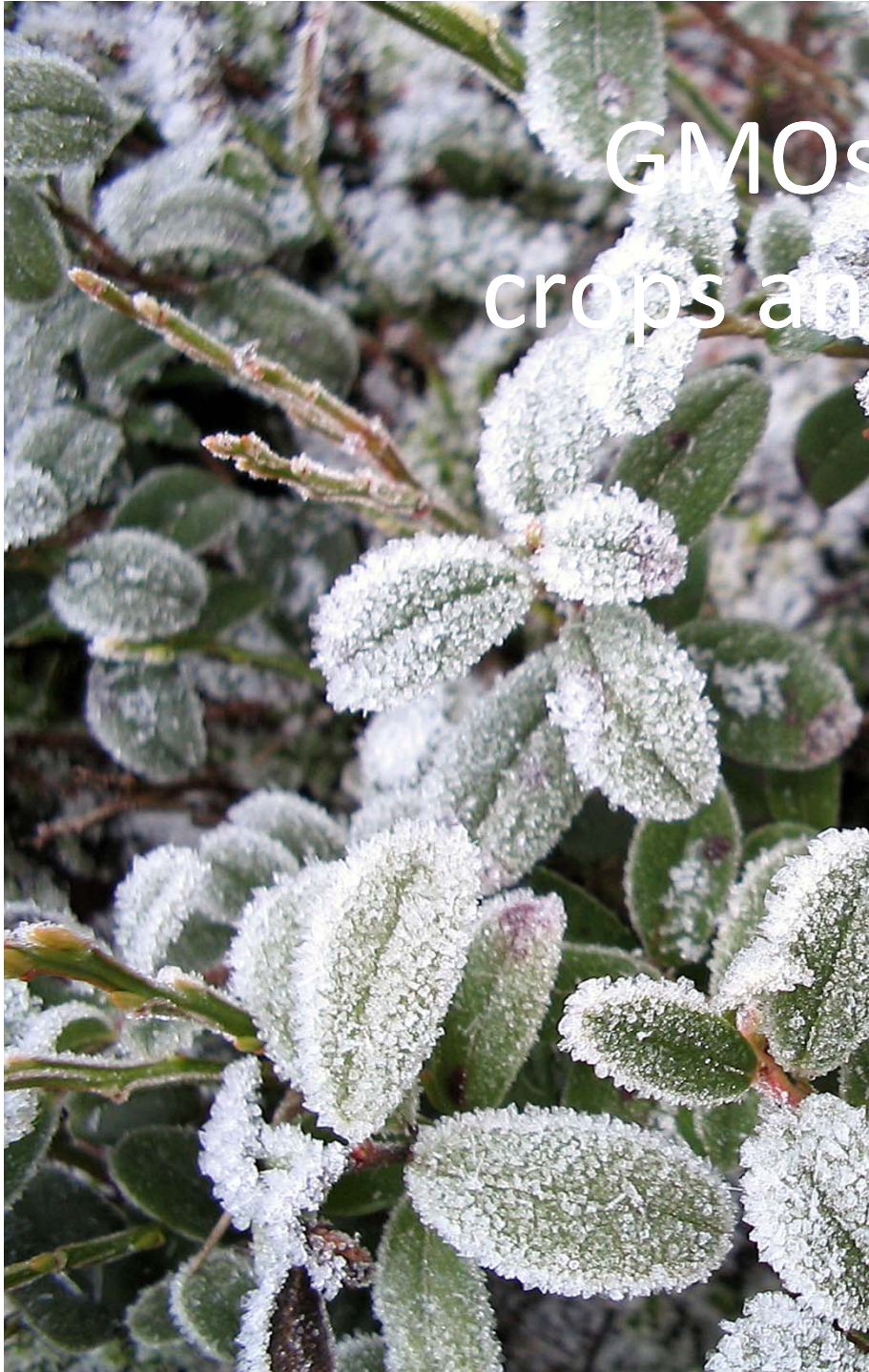
Lower amounts of trans and saturated fats

Longer shelf-life (w/o added preservatives)

Used by food companies!



GMOs benefit
crops and diabetics



Tomorrow's Table



Tomorrow's Table: Organic farming, genetics, and the future of food.
Pamela C. Ronald and R. W. Adamchak

Our forebears seemed to have had a sweet tooth.

PNAS PNAS PNAS

The genome of cultivated sweet potato contains *Agrobacterium* T-DNAs with expressed genes: An example of a naturally transgenic food crop

Tina Kyndt^{a,1}, Dora Quispe^{a,b,1}, Hong Zhai^c, Robert Jarret^d, Marc Ghislain^b, Qingchang Liu^c, Godelieve Gheysen^a, and Jan F. Kreuze^{b,2}

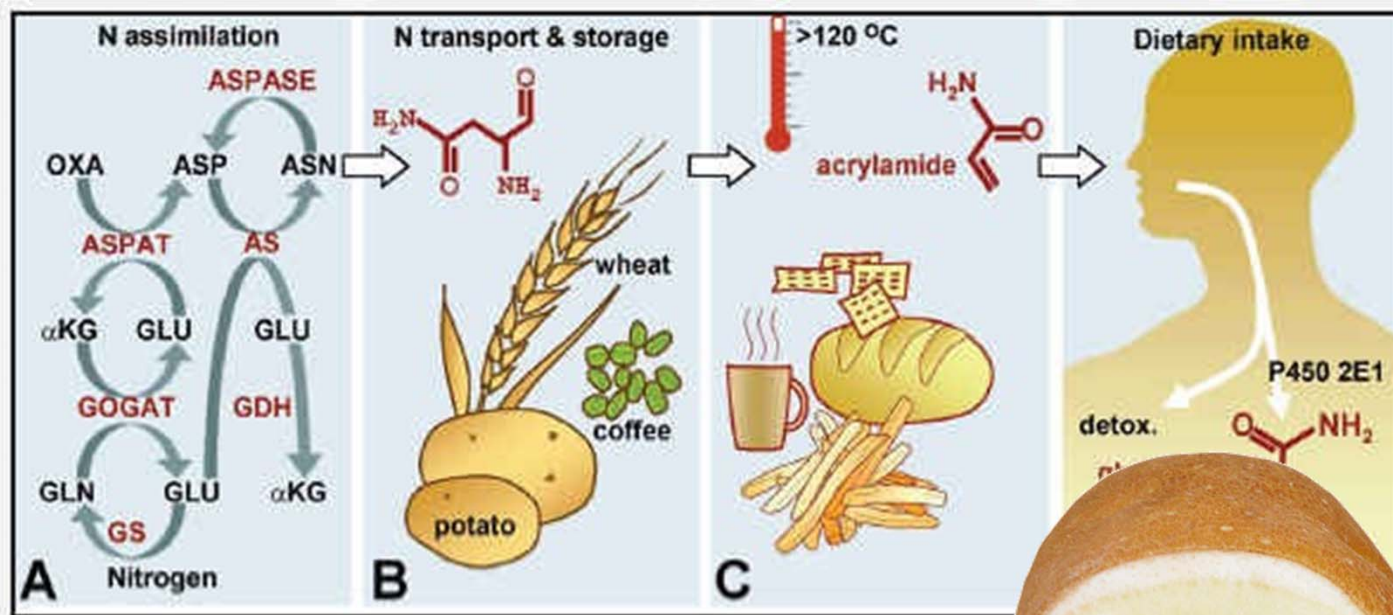
^aDepartment of Molecular Biotechnology, Ghent University, 9000 Ghent, Belgium; ^bInternational Potato Center, Lima 12, Peru; ^cBeijing Key Laboratory of Crop Genetic Improvement/Laboratory of Crop Heterosis and Utilization, Ministry of Education, Beijing, China, 100193; and ^dPlant Genetic Resources Unit, US Department of Agriculture, Agricultural Research Service, Beltsville, Maryland, USA

Edited by Eugene W. Nester, University of Wisconsin-Madison

Agrobacterium rhizogenes plant pathogenic bacteria can transfer DNA (T-DNA) into the plant genome. This naturally occurring process is mimicked by plant biotechnologists that today are grown on more than 100 million hectares, although their use can result in the assembly of small interfering RNA (siRNA) plants for metagenomic analysis. Sequences from *Agrobacterium* T-DNAs were identified by quantitative PCR, Southern blotting, and an artificial chromosome library. We have previously demonstrated that two T-DNAs (*IbT-DNA1* and *IbT-DNA2*) are present in the genome of *Ipomoea batatas* [L.] Lam.) and that the genes they encode are expressed at detectable levels in different tissues of the potato plant. *IbT-DNA1* was found to contain four open reading frames (ORFs) and two physically separated T-DNA regions (the TR-DNA and the TL-DNA).



GMOs can reduce food waste and make foods safer



Low-acrylamide, non-browning potato

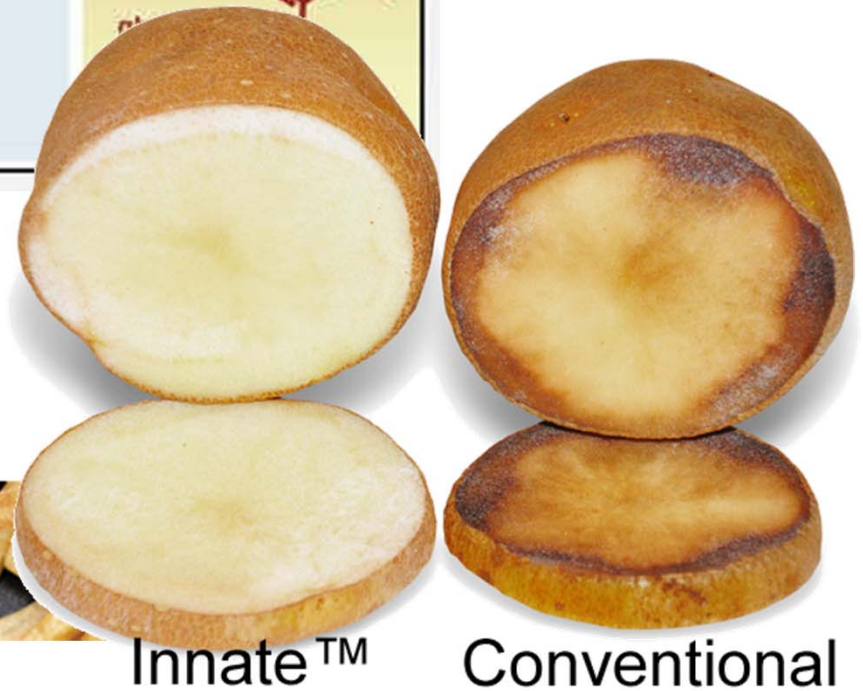
US approves low acrylamide spud

25 November 2014 Rebecca Trager

Like 362 Tweet 32 G+ 1 Share 11

The US Department of Agriculture (USDA) has approved the first genetically engineered (GE) potato variety designed to produce less of the suspected carcinogen acrylamide when cooked. The approval means that the Idaho-based J R

Simplot, Inc.



Innate™

Conventional

New diseases are threatening major crops, and GMO is one answer

Transgenic Res (2012) 21:855–865
DOI 10.1007/s11248-011-9574-y

ORIGINAL PAPER



Transgenic banana expressing *Pflp* gene confers enhanced resistance to *Xanthomonas* wilt disease

B. Namukwaya · L. Tripathi · J. N. Tripathi ·
G. Arinaitwe · S. B. Mukasa · W. K. Tushemereirwa

Received: 30 June 2011 / Accepted: 11 November 2011 / Published online: 11 November 2011
© Springer Science+Business Media B.V. 2011

Abstract Banana Xanthomonas wilt (BXW), caused by *Xanthomonas campestris* pv. *musacearum*, is one





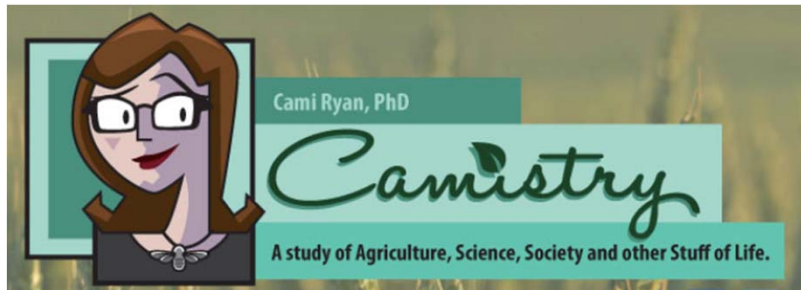
New diseases are threatening major crops, and
GMO is one answer

Citrus Greening

- Many technologies are showing promise: Spinach defensin, NPR1, lytic peptides.
- Earliest deregulation is 2019

Some further reading of interest

- The blog/twitter feed of Dr. Cami Ryan.
<https://doccamiryan.wordpress.com/cv/>



- The Fear Babe - Researched and written by a dedicated international team of pro-science authors and firmly rooted in facts, science and logic.

