



# GENETIC ENGINEERING IN CALIFORNIA AGRICULTURE



Alison Van Eenennaam, Ph.D.  
Cooperative Extension Specialist  
Animal Biotechnology and Genomics  
[alvaneenennaam@ucdavis.edu](mailto:alvaneenennaam@ucdavis.edu)

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# General public has a very sketchy understanding of science

A 2003 study of public knowledge about biotechnology, genetic engineering, and genetic modification by Rutgers University found that the majority of Americans claim to know “**very little**” (55%) or “**nothing at all**” (22%) about biotechnology

## 2: Knowledge of Science and Genetic Modification.

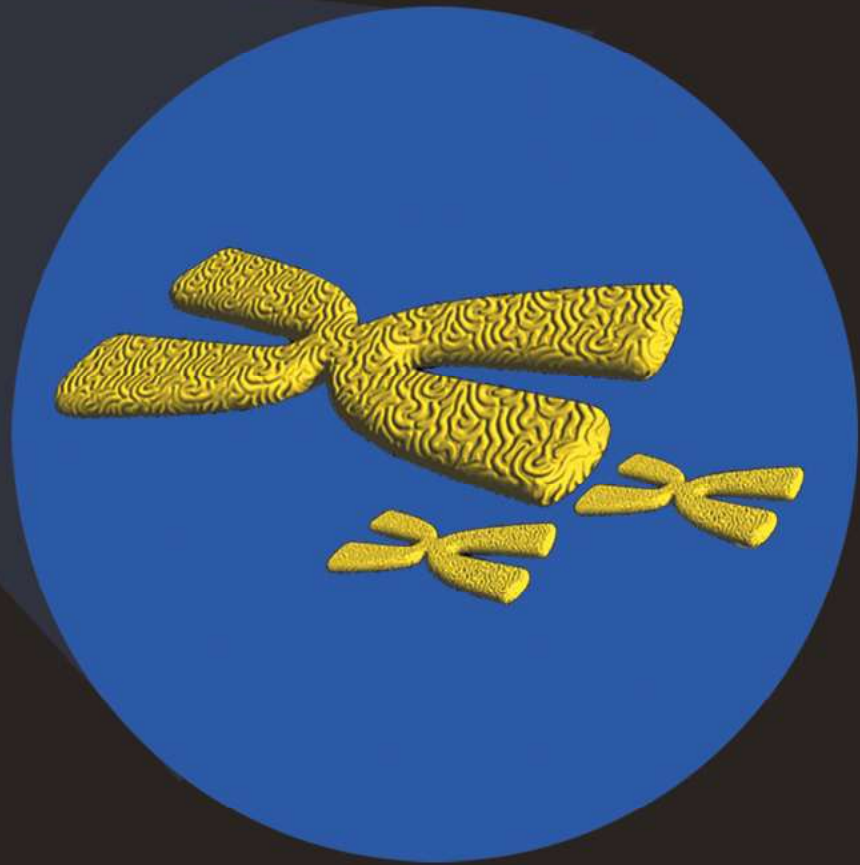
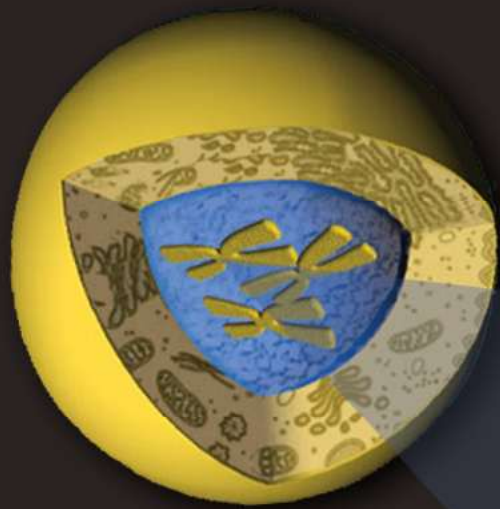
	% correct	
	U.S.	Europe
There are some bacteria which live on wastewater. (True)	94%	84%
Ordinary tomatoes do not contain genes, while genetically modified tomatoes do. (False)	57%	36%
By eating a genetically modified fruit, a person's genes could also become modified. (False)	68%	49%
The mother's genes determine whether the child is a girl. (False)	73%	53%

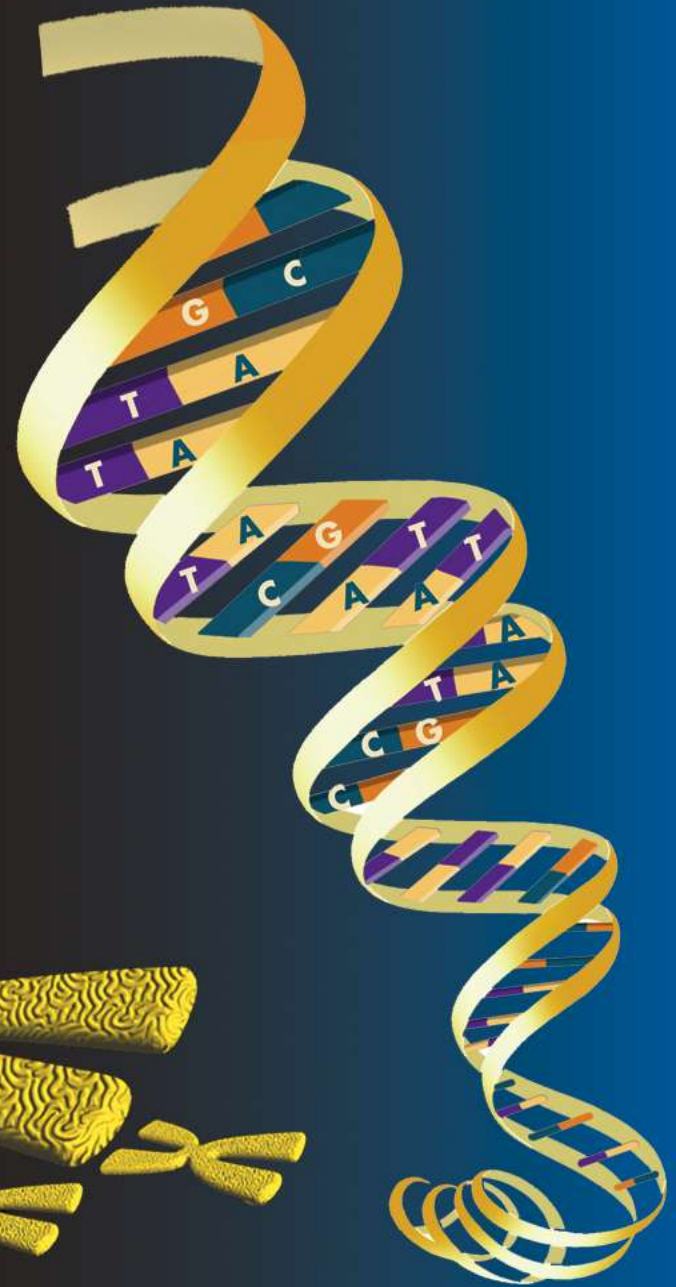
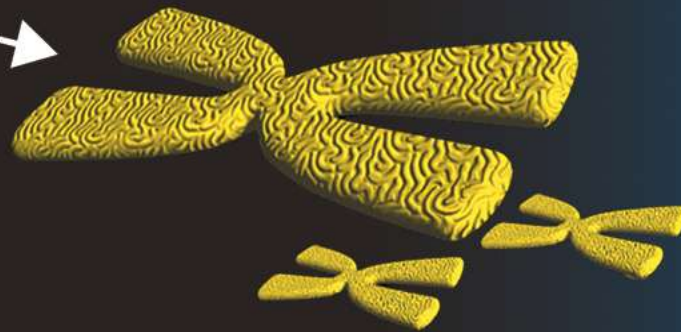
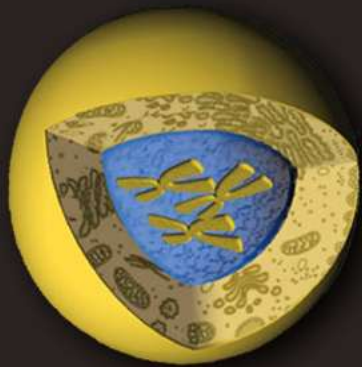
Hallman, W. K., Hebden, W. C., Aquino, H.L., Cuite, C.L. and Lang, J.T. 2003. *Public Perceptions of Genetically Modified Foods: A National Study of American Knowledge and Opinion*. Rutgers - The State University of New Jersey.



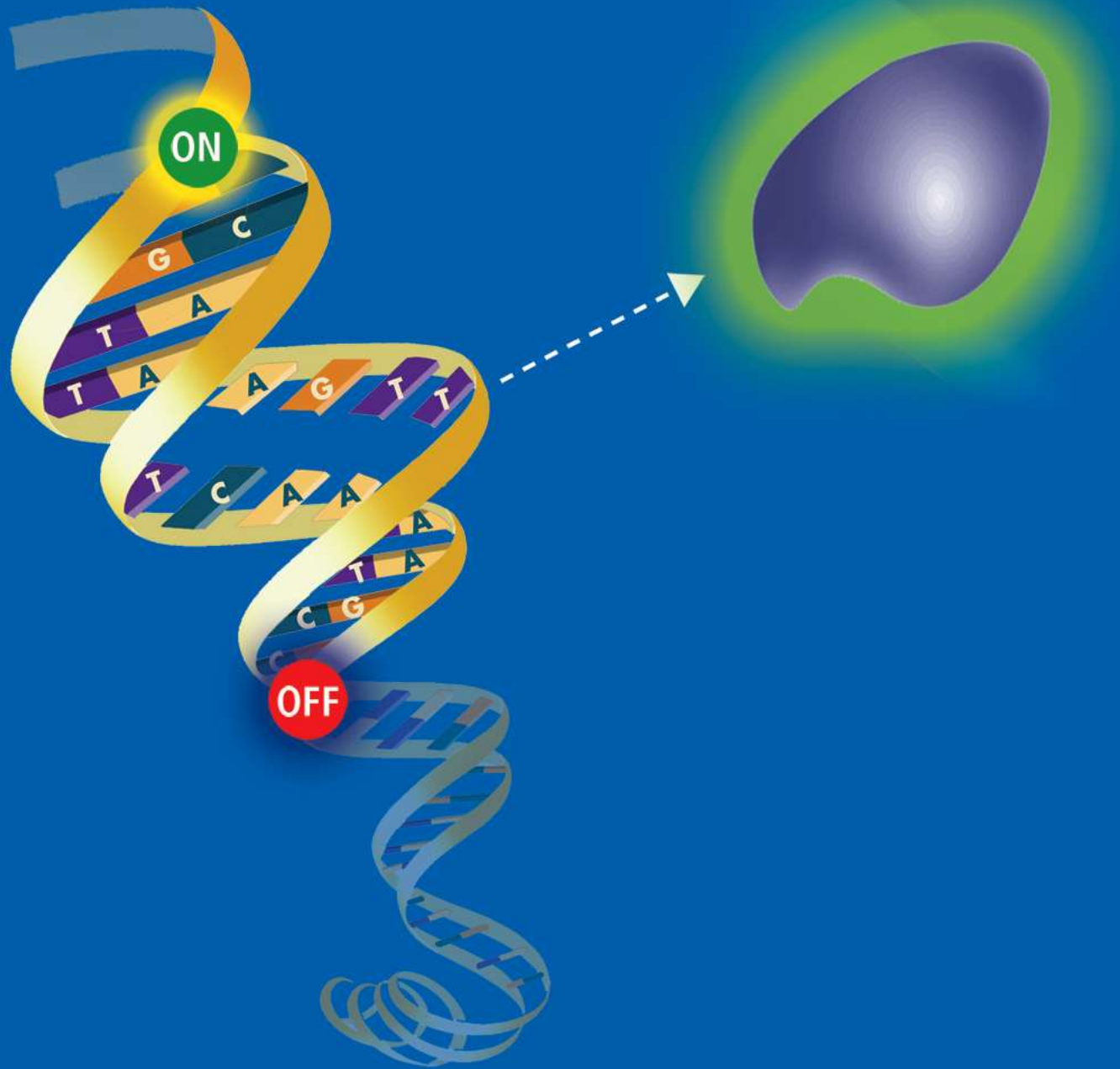
# Most people do not consider themselves informed about biotechnology

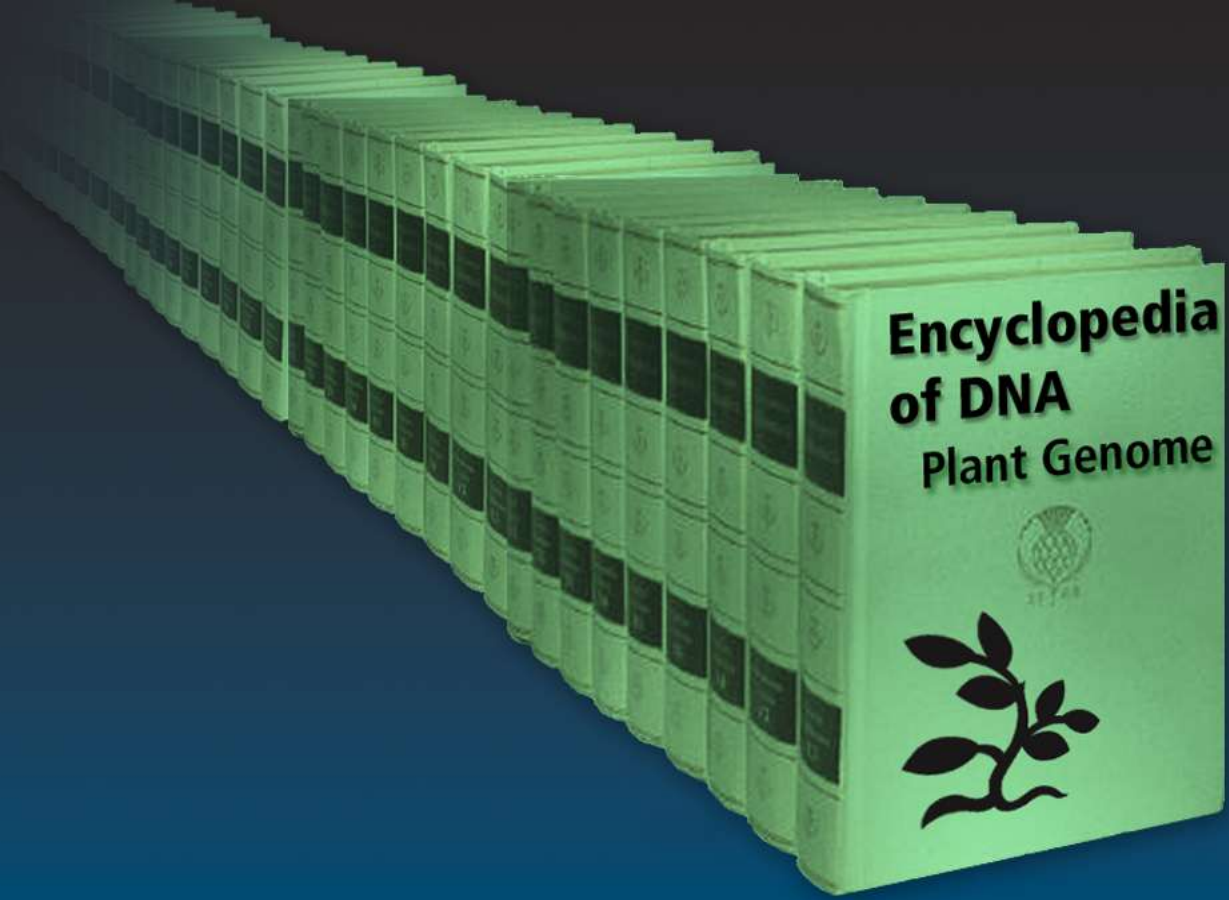
- Biotechnology remains an abstract and unfamiliar concept that, in the absence of other information or knowledge, seems to evoke negative reactions.
- Many people change their attitudes when presented with information on why the technology is being used, and if they view the potential benefit(s) as being important.

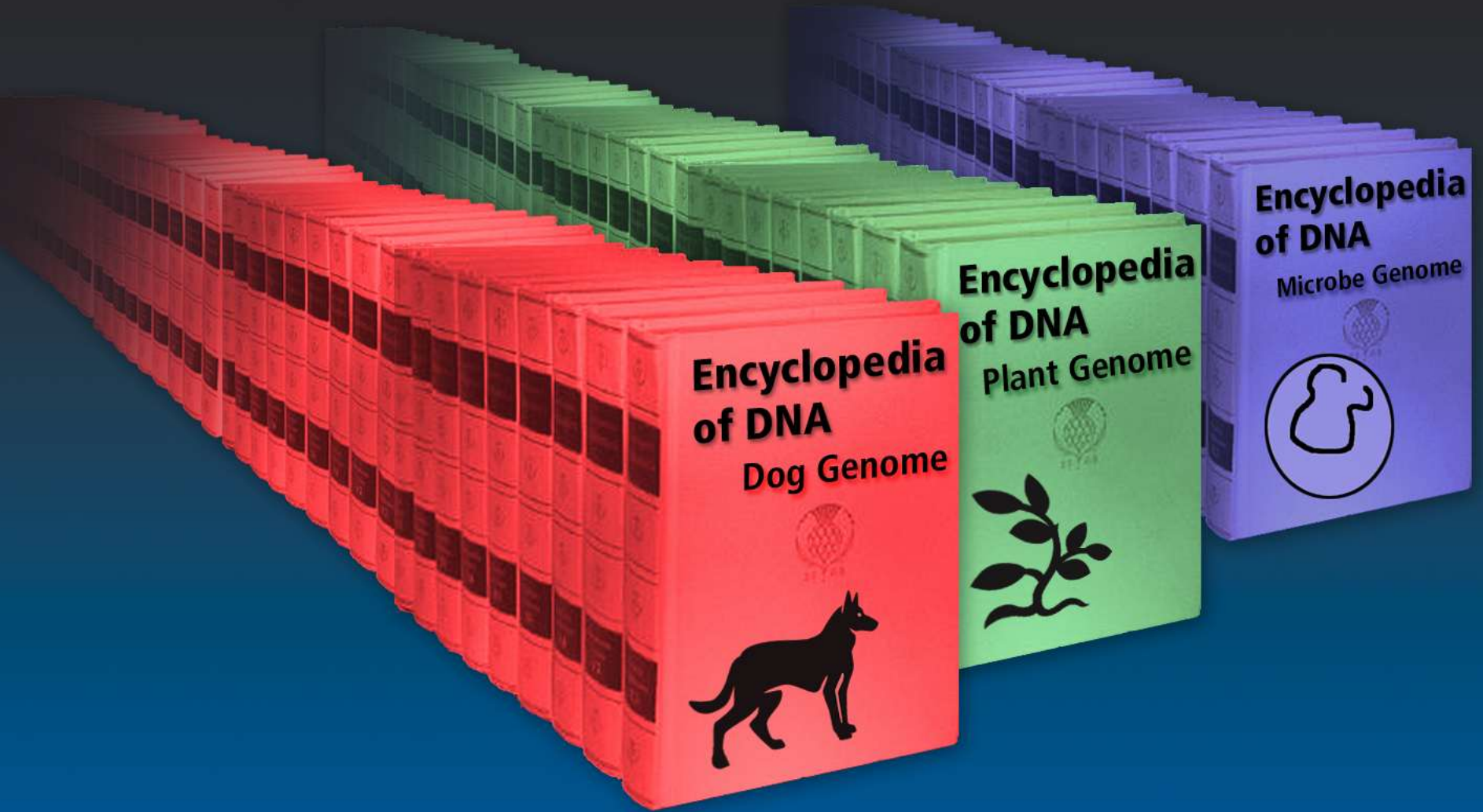












**Encyclopedia  
of DNA**  
Dog Genome



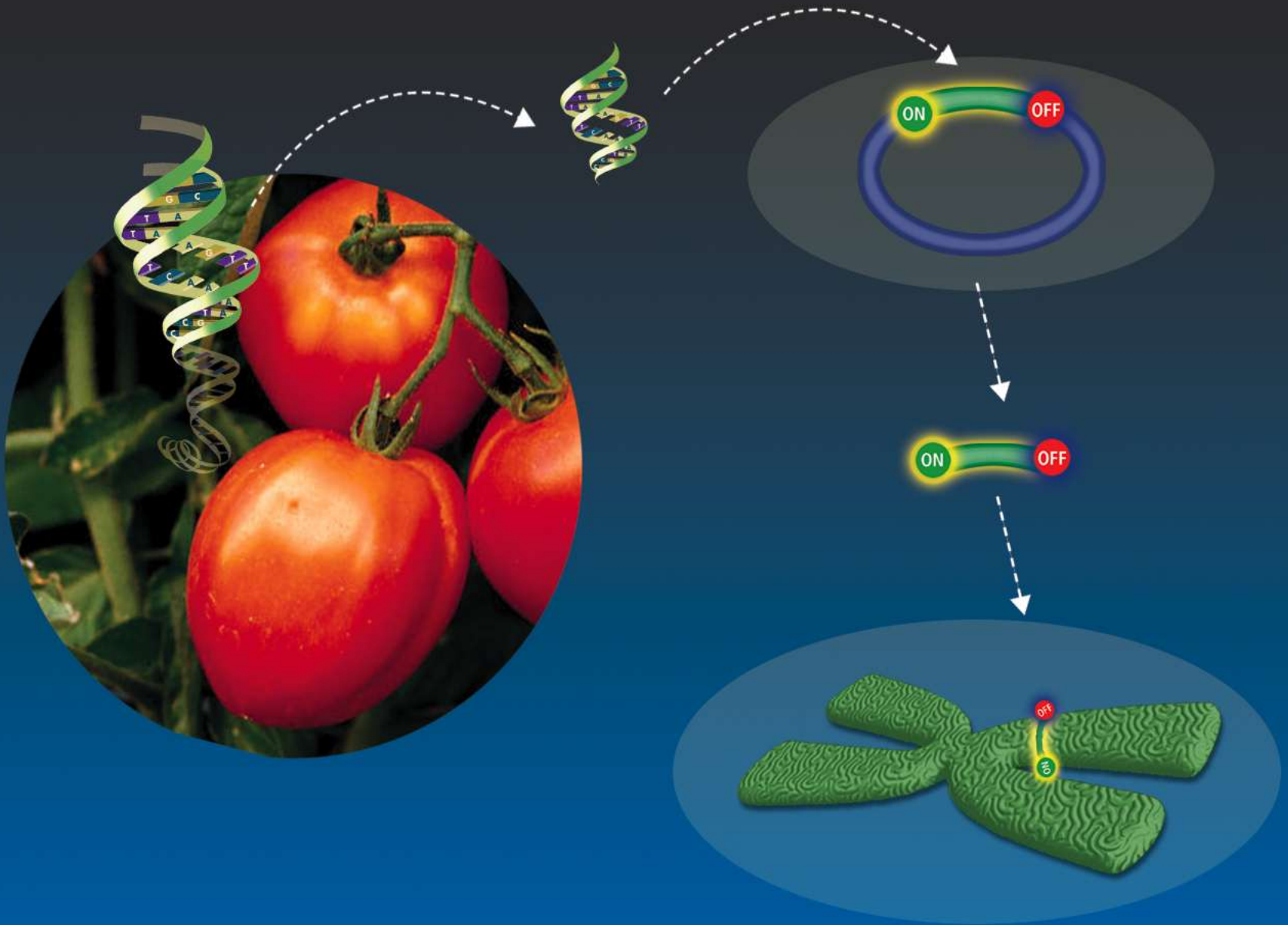
**Encyclopedia  
of DNA**  
Plant Genome

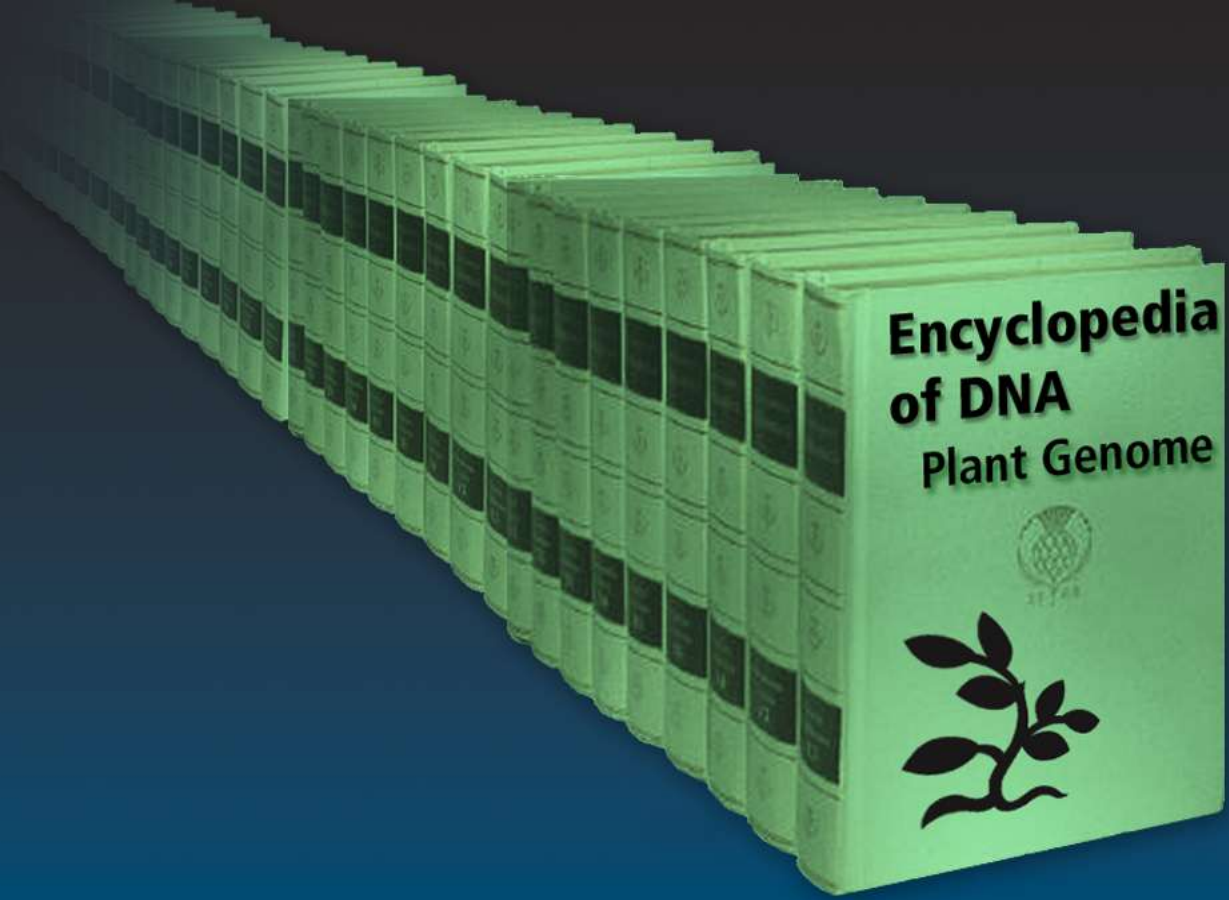


**Encyclopedia  
of DNA**  
Microbe Genome



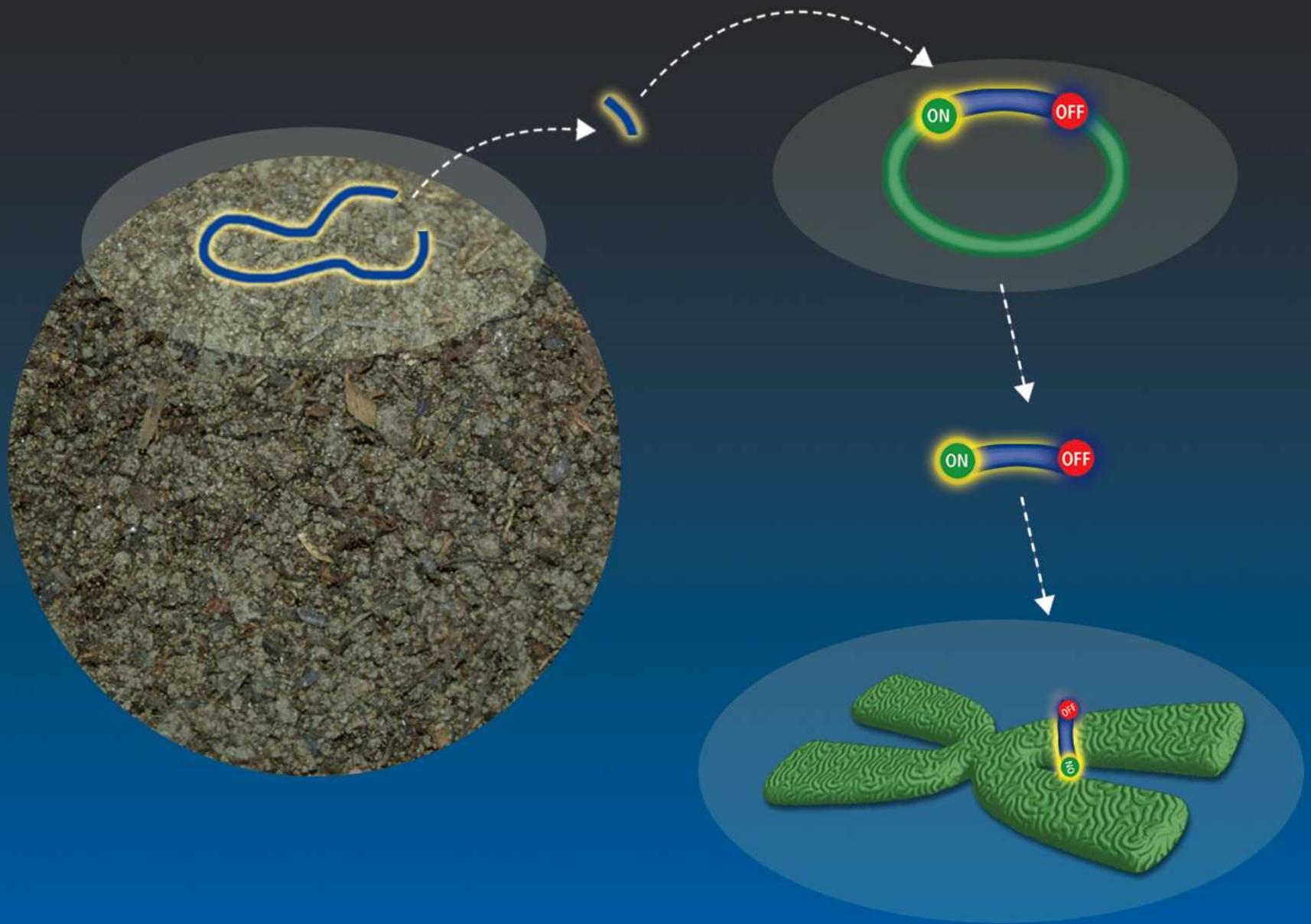




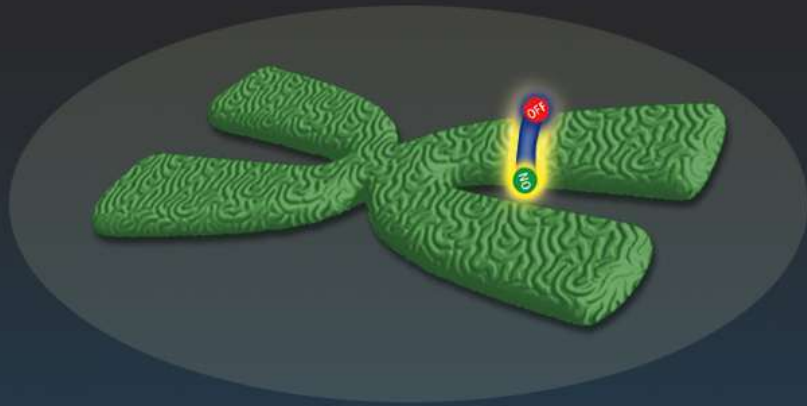


A circular inset with a glowing yellow border. Inside, the text "New Protein 12,090" is written in blue. Below this, there are two columns of DNA sequences in blue. The sequences are: ATATCGTA, CGATCGTA, ATATCGTA, TAATCGTA, ATATCGTA, CGATCGTA, ATATCGTA, CGATCGTA, and ATATCGTA. The sequences are arranged in a grid-like pattern. The background of the inset is white with some faint green DNA-like patterns.



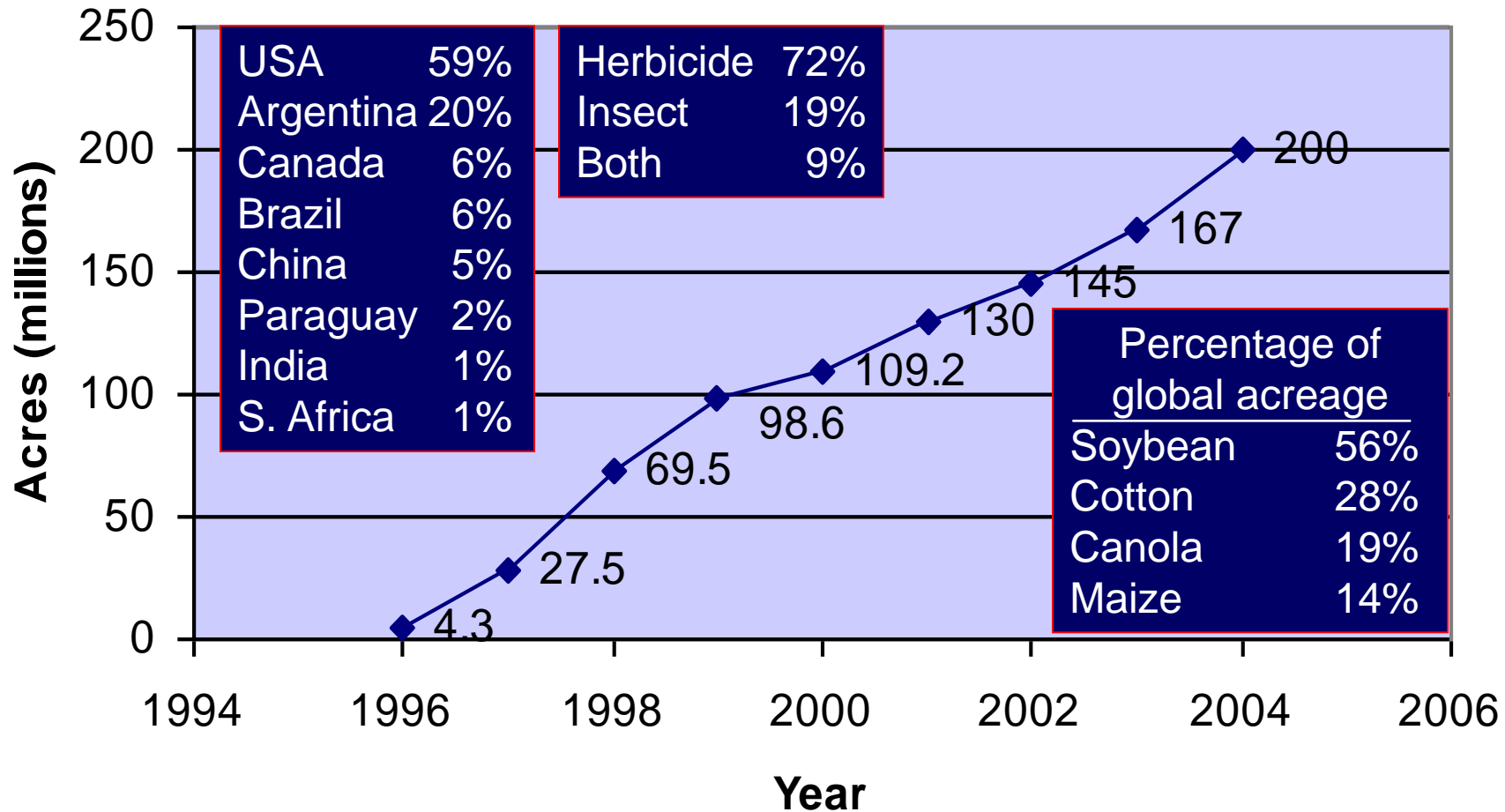








# Global Acreage of Transgenic Crops

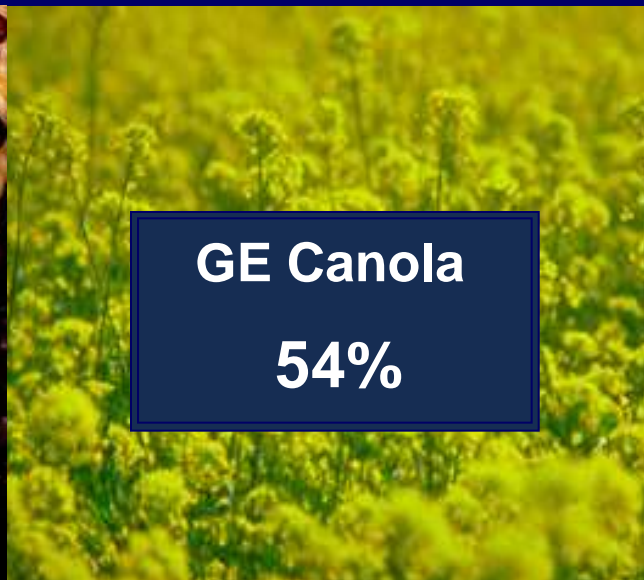


C. James (2004) Preview: Global Status of Commercialized Biotech/GM Crops: 2004. ISAAA Briefs No. 32. [www.isaaa.org](http://www.isaaa.org)

# Why have farmers adopted GE ?



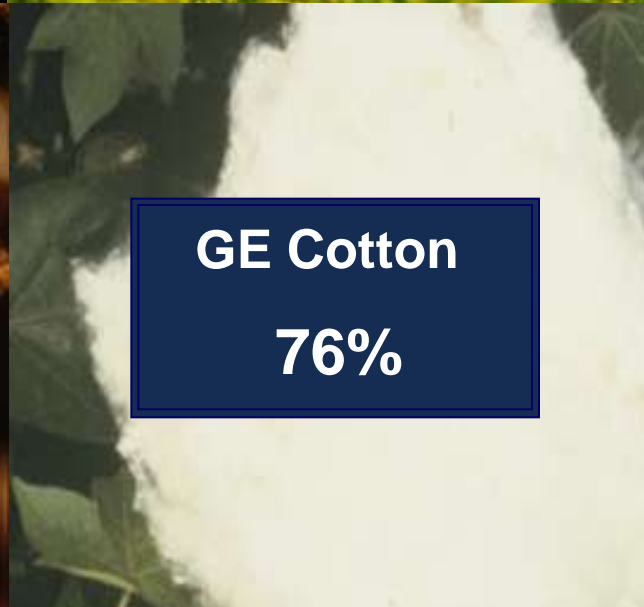
**GE Corn**  
**46%**



**GE Canola**  
**54%**



**GE Soybean**  
**86%**



**GE Cotton**  
**76%**

# 39% Agricultural Productivity Is Lost to Pests

L.T. Evans (1993) Crop Evolution, Adaptation and Yield. Cambridge University Press.

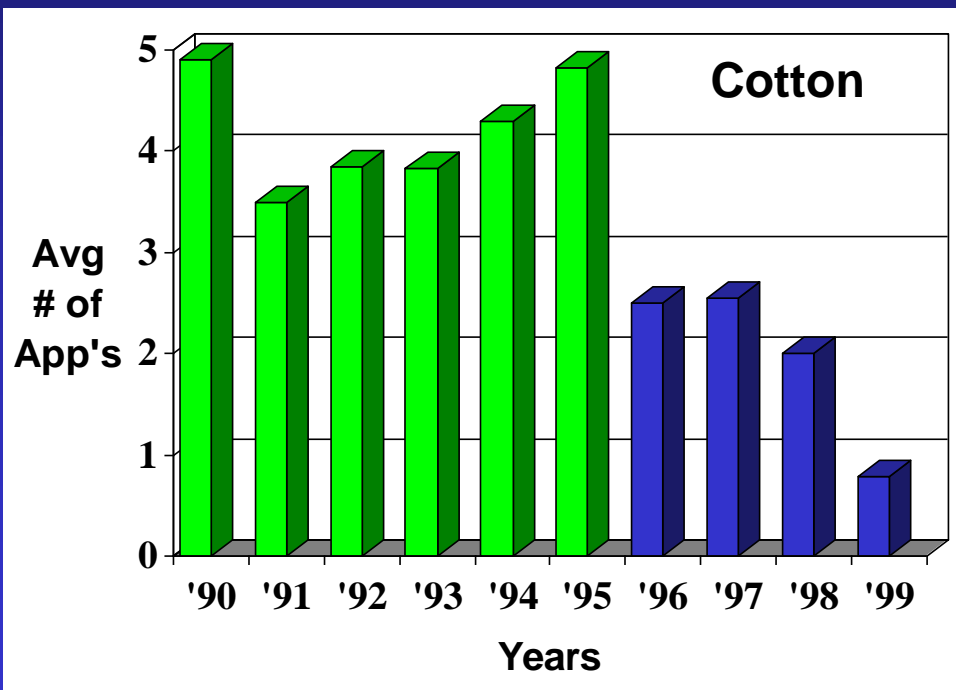
Crop	Losses due to			Total
	Insects	Diseases	Weeds	
All	13.8	11.6	9.5	34.9%





# *Insect-resistant Crops Reduce Insecticide Use*

- Reduce applications of insecticides to control pests



J.P. Carpenter and L.P. Gianessi  
(2001) *Agricultural Biotechnology:  
Updated Benefit Estimates.*  
National Center for Food and  
Agricultural Policy. [www.ncfap.org](http://www.ncfap.org)



## *Herbicide-Tolerant Crops Encourage No-till Practices*

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**Over 63 percent of soybean growers who reduced their tillage since 1996 cited herbicide-tolerant technology as the key factor in doing so**



<http://www.purdue.edu/UNS/images/evans.notill.jpeg>

# *Genetic Engineering Enables Environmentally Beneficial Practices*

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## *Herbicide-tolerant crops...*

- Reduce herbicide use (0 to 10%).
- Allow shift to safer herbicides (glyphosate).
- Enable soil-conserving management practices.



American experience from the ninth year of planting biotechnology-derived crops indicate that these crops have provided reliable and flexible alternatives to traditional pest management choices, reduced the total amount of input costs in farming, and improved crop yields, all of which have translated to direct economic benefits to farmers. The numeric value of the benefits reaped from 118 million acres of crop land planted to biotechnology-derived crops in 2004 was improved grower net returns of \$2.3 billion.



**A coalition committed to ecologically responsible and economically viable agriculture. We provide education, training and resources in support of the rights of farmers and communities to protect themselves from the environmental, human health and economic risks of genetic engineering in agriculture.**



**Coalition Members**

- California Certified Organic Farmers - CCOF
- The Center for Environmental Health
- Center for Food Safety Community Alliance with Family Farmers
- Ecological Farming Association - EFA
- Four Elements Farm
- Genetic Engineering Action Network
- Occidental Arts and Ecology Center
- Organic Consumers Association

**Funding sources**

- Ben and Jerry's Foundation
- Patagonia
- Columbia Foundation
- John Merck Fund
- Firedoll Foundation
- Gaia Fund
- Sierra Fund: Funk Charitable Trust
- Wendy P. McCaw Foundation
- William Zimmerman Foundation
- Pacific Chapter of the National Cooperative Grocers Association
- Chico Natural Foods
- Co-opportunity Consumers Co-op
- North Coast Co-op
- Ocean Beach People's Food Co-op
- Quincy Natural Foods
- Sacramento Natural Foods Co-op
- Briar Patch Community Market
- Ukiah Natural Foods

Address: http://www.registercalifornia.com/cgi-bin/signup.pl

Promoting economically, agronomically and ecologically sustainable farming in California.

**Join The Action Network of Californians for GE-Free Agriculture**

**\*(required fields)**

\*First Name: \_\_\_\_\_  
 Last Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \*City: \_\_\_\_\_  
 \*State/Province: **California** [dropdown]  
 \*County: [dropdown]  
 \*Zip/postalcode: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Phone2: \_\_\_\_\_  
 Fax: \_\_\_\_\_  
 \*Email: \_\_\_\_\_

**Interests** (check all that apply)

I am a (check all that apply):	I would like to be involved in these ways
<input type="checkbox"/> Farmer	<input type="checkbox"/> Receiving action alerts by email
<input type="checkbox"/> Concerned Consumer	<input type="checkbox"/> Receiving an electronic newsletter
<input type="checkbox"/> Food Industry Businessperson	<input type="checkbox"/> Becoming a donor/Helping with fundraising
<input type="checkbox"/> Media Member	<input type="checkbox"/> Coordinating activities in my region
	<input type="checkbox"/> Doing regional outreach (tabling, leafleting)
	<input type="checkbox"/> Organizing on my college campus
	<input type="checkbox"/> Contacting/monitoring the media
	<input type="checkbox"/> Contacting/monitoring corporations
	<input type="checkbox"/> Organizing educational events

(text is limited to 840 letters & spaces = double the area shown)

Special skills & interests: \_\_\_\_\_

\*Telephone Area code: [ ] (enter at least one so we can inform you of \_\_\_\_\_)

# Business

## Seeds of dissent: Anti-biotech effort takes root

Foes aim to put ban on  
Mendocino County ballot

By Mike Lee -- Bee Staff Writer  
Published 2:15 am PDT Friday,  
**September 26, 2003**

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Sacramento Bee headlines and  
breaking news. [Sign up here.](#)

UKIAH -- A campaign to make Mendocino County the first in the United States to ban genetically modified crops is brewing inside a century-old building in downtown Ukiah.

There, at the nation's only certified organic brew pub, owners Allen and Els Cooperrider are collecting signatures for an initiative they hope will resonate in a region best known for artisans, aging hippies and alternative farmers.

Their goals are both local and global -- preventing genetic contamination of Mendocino County's robust organic produce industry and defying the seemingly unstoppable worldwide spread of genetically engineered crops.



Allen Cooperrider, center, collects signatures supporting a ballot measure that would ban planting genetically engineered crops in Mendocino County.

▪ [See additional images](#)

**Sacramento Bee/Renée C. Byer**



# Makes it unlawful for any person, firm, or corporation to propagate, cultivate, raise, or grow genetically modified organisms in Mendocino County

CRAIG BELL



KATRINA FREY



DR. LUOTO



TONY CRAVER

## On Measure H

- Protect our health!
- Protect our farmers!
- Protect our economy!
- Protect our environment!
- Protect our private property!

Keep Mendocino County  
GMO FREE!

Join us!

**GMO initiative heads**  
By GLENDA ANDERSON  
The Daily Journal

County supervisors on Tuesday unanimously voted to place on the March ballot an initiative that would prohibit the growing of genetically modified organisms in Mendocino County. The initiative is only other choices were to turn it further into a county ordinance or to adopt it for further study because signature gatherers had turned in enough names to qualify the measure for the ballot.

**Employers hear from scientists on GMOs**  
By MARK HIGGINS  
The Daily Journal

What "might come along" ... "strawberries resistant to molds, tomatoes not attacked by nematodes, grapes resistant to Pierce's disease, drought-tolerant lettuce" and "peppers resistant to bacterial diseases," to name a few.  
— Peggy Lennarz  
UC Extension specialist

**Letters from our readers**

**Measure H opponents**  
e GMO makers

To the Editor:  
Recently the Daily Journal reported on the lawsuit filed against the language of the ballot initiative in support of Measure H, the voter initiative to prohibit GMO plants in Mendocino County.

The lawsuit was filed by the California Plant Health Association — the name seems benign enough, after all, who is not in favor of plant health? The Journal reports that many of this group are not farmers and soil scientists, but not all of them are like me, the last time I checked, this band of multi-national corporations includes the leaders in the genetic engineering of food crops. Incidentally, they just happen to be the leading producers of the herbicides and pesticides which they patented and seeds are designed to use exclusively.

It's also interesting to note a Novartis 2003 study from the Northwest Science and Environmental Policy Center in Idaho, which "... concludes that the million acres of GM corn, soybeans and cotton planted in the US since 1990 increased pesticide use (herbicides/insecticides) by about 50 million (emphasis is mine).

So I ask you, dear reader, who is interested in the CPHA initiative?

**GMO issue misunderstood**

To the Editor:  
The first question I must ask of Marie White article on GMOs, is where is the list of corporations and organizations that have agreed that the GMO petition should be rescinded? Mendocino Organic Network can provide a corresponding list of Mendocino County citizens who support the GMO petition. ([www.mendocinorganicnetwork.com](http://www.mendocinorganicnetwork.com))

Second, the petition does not prohibit plants, animals, fish, fire retardant, native wines, apple juice, beer, coffee, food, wish to purchase genetically modified foods available in your supermarket, you are free to do so. What the petition does prohibit is the growing of live genetically modified organisms that live genetically other means can cross-pollinate with natural grapevines and other non-GMO food crops and destroy their marketability, and subject those who consume these crops to uncontrolled health risks and seriously disrupt the local ecosystem. This does not require the label. This is and exempt from the CPHA initiative.



# The discourse was inflamed by alarming assertions and facts that are not derived from, nor supported by, the scientific literature

*"I will be voting yes on Measure H for many reasons, but mostly because GMOs have affected me personally. When my son was 6 months old and receiving chemotherapy for leukemia, he was also receiving soy lipids (fat) intravenously because he had lost the ability to eat or drink. The longer he received the lipids, the higher the dose of chemo. When I asked why I was told that the soybeans used were genetically modified to be "Round Up Ready," they were putting food into my son's veins that could withstand the chemicals they were using to kill the leukemia blood cells, making the chemo less effective. In order to keep my son alive nutritionally, the higher doses of chemo almost took him away"*

Jenny Shattuck-Hale, Ukiah Daily Journal, 2/20/04.





# March 2, 2004, Mendocino. Measure H passed 56.3% for and 43.7% against.

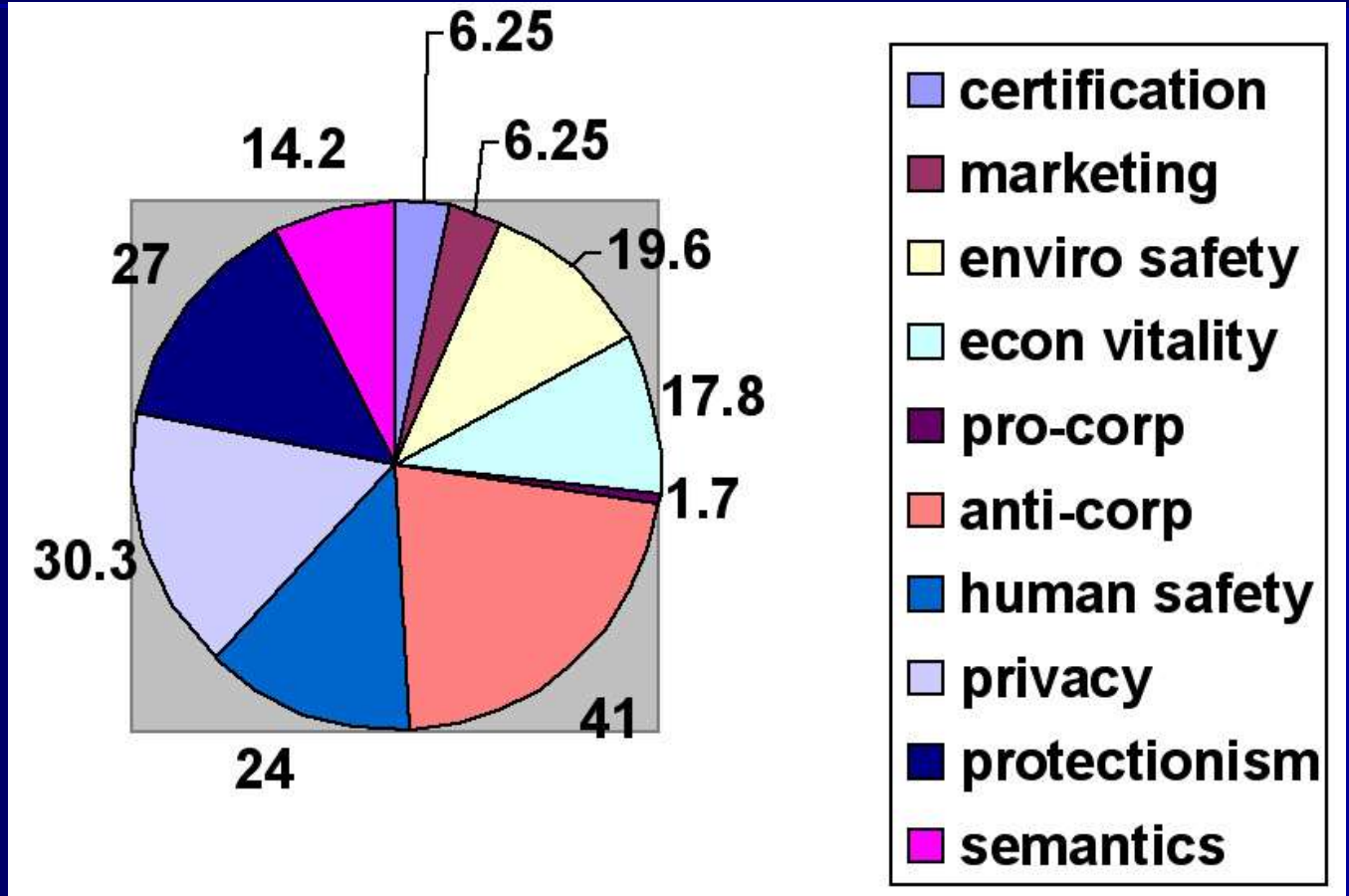


- And so now in Mendocino county if nowhere else in the world “DNA or deoxyribonucleic acid means a complex protein that is present in every cell of an organism”
- Measure won by ~ 3,240 votes.
- Shortly thereafter Board of Supervisors voted to ban GE in Trinity county (8/04) .
- At the time of these votes, there were no GE plants or animals in production in either Mendocino or Trinity County.





# CHARACTERIZATION OF MEASURE H ELECTION RELATED MATERIALS IN MENDOCINO COUNTY



"Political Cronyism"

## We Can Protect Sonoma County From Environmental Contamination By Genetically Engineered Crops

Genetically engineered (GE) crops and food threaten our children's health – they are untested, unlabeled and not proven safe. Our children should not be used as guinea pigs for genetic engineering.

"Gross Incompetence"

"Government Malpractice"

"He just doesn't care"



# Who do you trust with your family's health and safety?

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

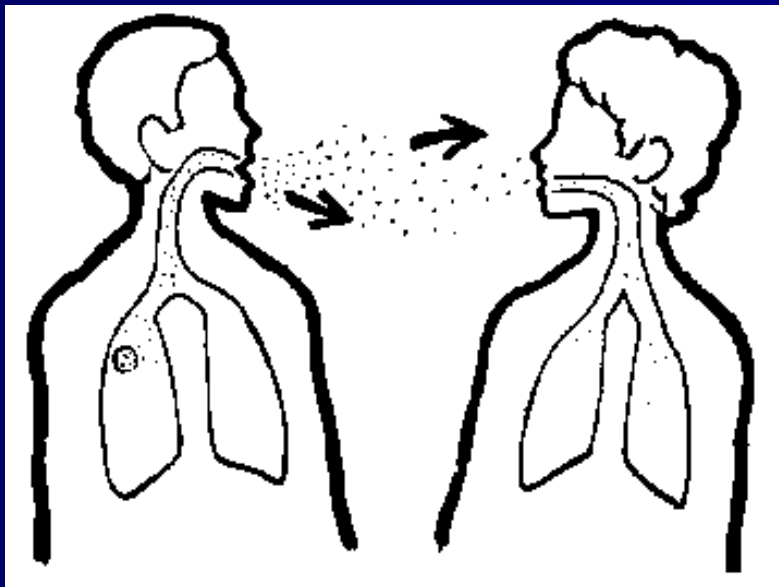
Official FEMA Hurricane Katrina Photo





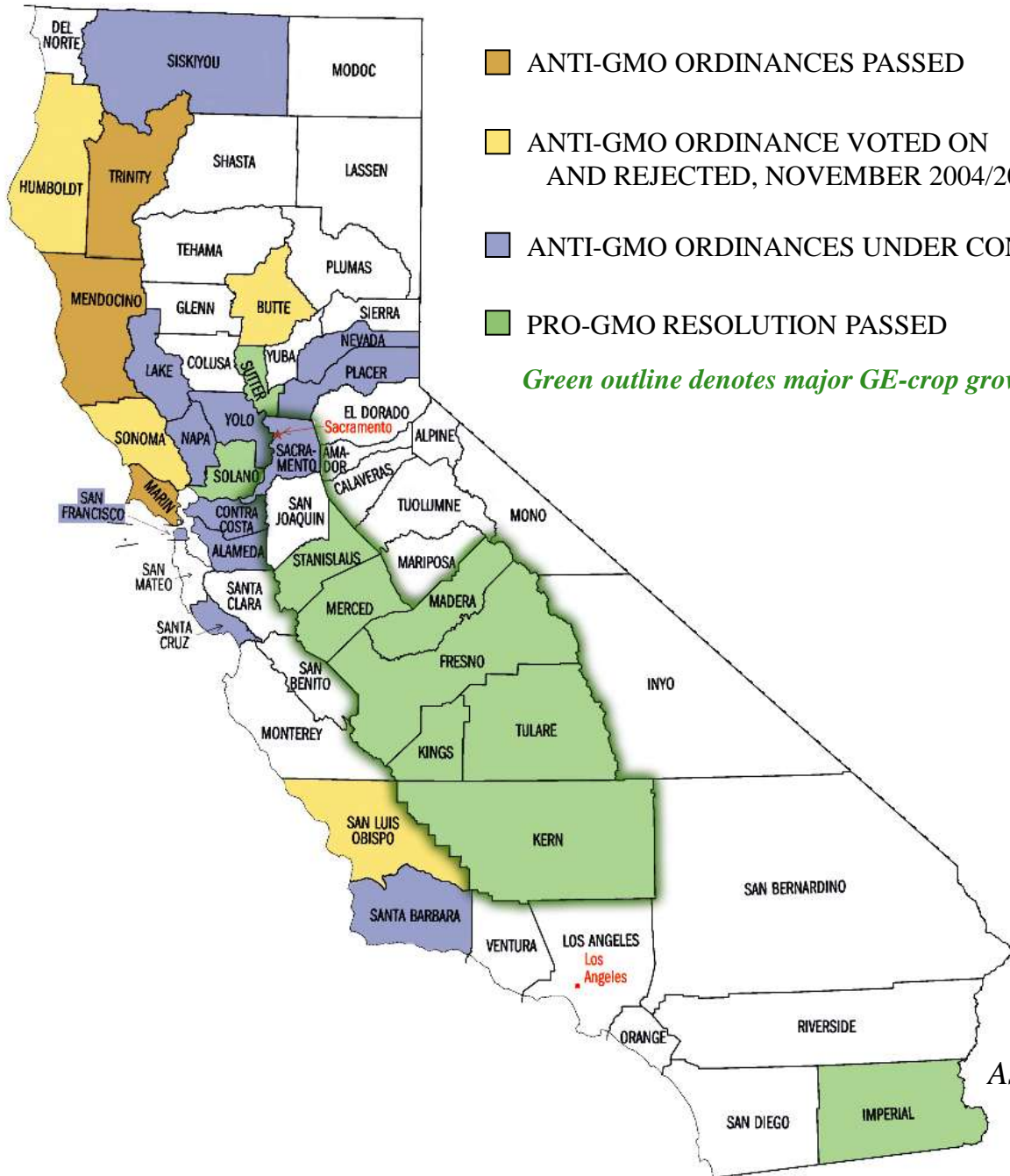
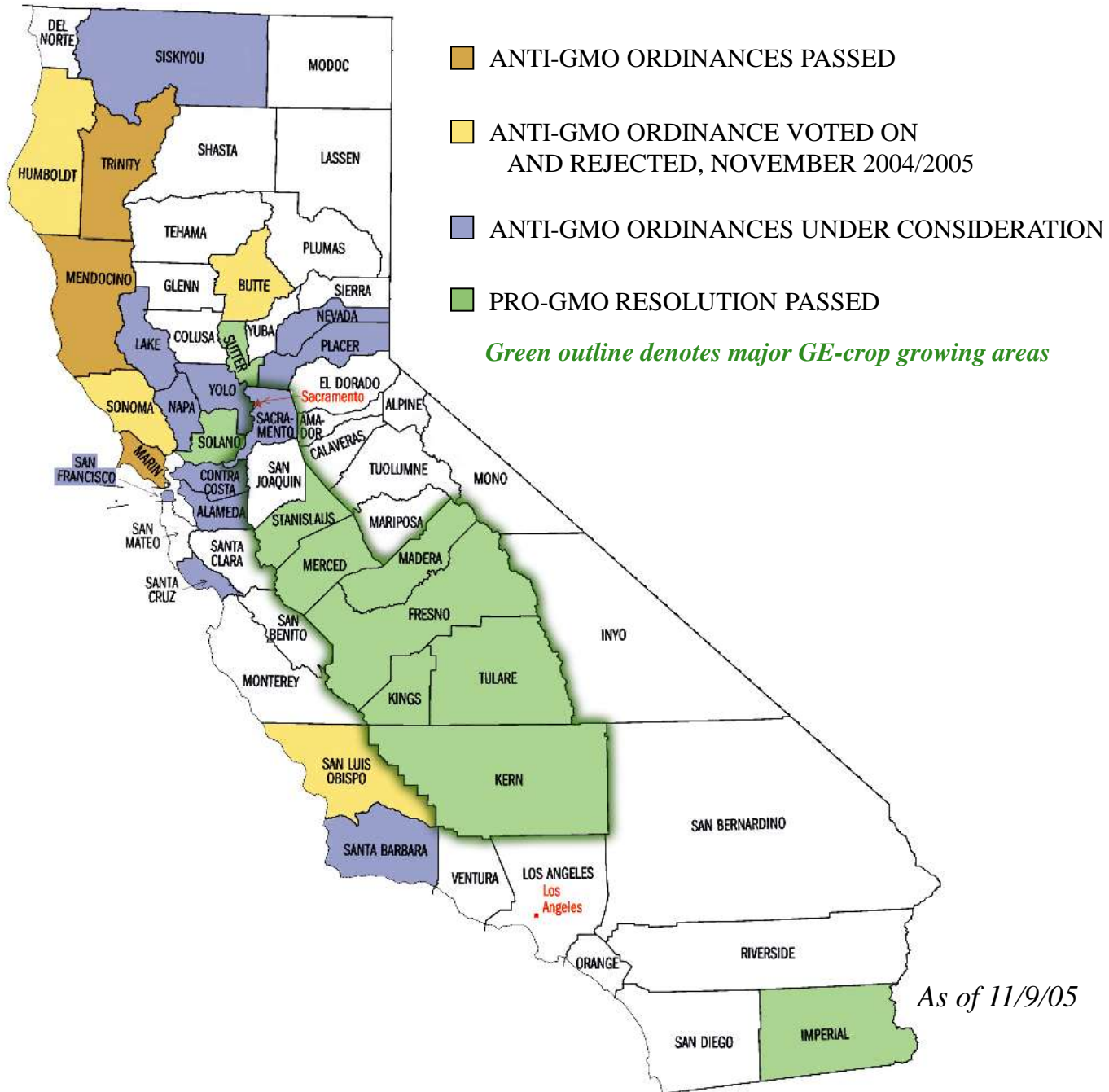
# BSL 3: Biosafety Level 3

- **BSL 3** is applicable to clinical, diagnostic, teaching, research, or production facilities in which work is done with indigenous or exotic agents which may cause serious or potentially lethal disease as a result of exposure by the inhalation route.



- Examples of microorganisms assigned to BSL 3 include **mycobacterium tuberculosis, St. Louis encephalitis virus, and Coxiella burnetii.**







# Board Resolution: Stanislaus County 8/9/05

## RESOLUTION SUPPORTING THE USE OF BIOTECHNOLOGY IN THE AGRICULTURAL INDUSTRY IN STANISLAUS COUNTY

NOW, THEREFORE, BE IT RESOLVED that the Stanislaus County Board of Supervisors supports the use of biotechnology in the agricultural industry in Stanislaus County as a valuable and important tool for progressive and viable agricultural production.

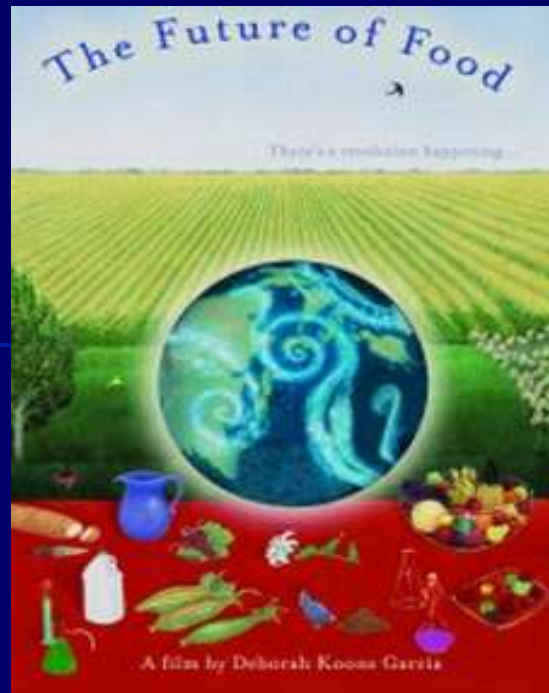
Passed 5-0 vote



# Status of county-based ordinances on GE

- **Three** counties have banned it
- **Four** counties voted NOT to ban it
- The board of supervisors from **nine** counties have passed pro-GE resolutions
- Senate Bill 1056 (Florez) and Assembly Bill 1508 (Salinas & Arambula) – GE crops are statewide concern – not subject to local regs.
- Senate Bill 984 (Laird) Make the growing of GE plants subject to strict liability





**THE FUTURE OF FOOD** examines the complex web of market and political forces that are changing what we eat as huge multinational corporations seek to control the world's food system. The film also explores alternatives to large-scale industrial agriculture, placing organic and sustainable agriculture as real solutions to the farm crisis today.

# The Future of Food

**Genetic Engineering**  
**"... is probably the largest biological experiment humanity has ever entered into."**  
 — Ignacio Chapela —

**Learn what you can do to protect the future of your food!**

**March 31, 2005 - Crest Theater, 1013 K St, Sacramento**  
 - or -  
**April 1, 2005 - Veterans Memorial Theater, 203 E. 14th St, Davis**

**6:00 p.m.** Social Hour: GE-free information and food samples  
**7:00 p.m.** *The Future of Food* documentary screening  
**8:45 p.m.** Panel Discussion with feature film producer Deborah Koons Garcia (widow of the Grateful Dead's Jerry Garcia), scientist Ignacio Chapela (former Berkeley professor), and farmer Judith Redmond (Full Belly Farm)  
**9:30 p.m.** Optional intimate After-Reception with panelists, including hors d'oeuvres and wine

-----  
 \$10 admission includes GE-free goodie bag, food tasting, film screening, panel discussion, and raffle. There is an additional \$10 fee for the After-Reception (call for details).  
 -----

Learn the disturbing truth behind the unlabelled, patented genetically engineered foods that have quietly filled U.S. grocery store shelves, and what you can do to determine the future of your food!

For more information or to purchase tickets in advance:  
**[www.organicssacramento.org](http://www.organicssacramento.org) or call (530) 756-8518 ext. #22**

Co-hosted by: Organic Sacramento, GE-Free Yolo, Community Alliance with Family Farmers, and Sacramento Natural Foods Co-op

Do you really know what you are eating?



University of California  
ANR on UCTV Special Project

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Video Production Team

### Sales Information-Genetic Engineering in California Agriculture



This program is not available in the ANR Catalog.

This 30-minute videotape or DVD can be purchased by:

- **calling** ANR Communication Services at **530-757-8930**
- order by program number: **ANRUCTV 04-06** and title: **Genetic Engineering in California Agriculture**
- or submit an **online** request. To do this, fill out this [ANRonUCTV Online Order Form](#). This method is unsecure, however, and we suggest you call 530-757-8930 to complete your credit card information.

This 30 minute peer-reviewed video explains the science behind genetic engineering, outlines its uses in food crops and animals, details where and why this technology is being used by California farmers, and examines the science-based concerns pertaining to the use of genetic engineering in agricultural production systems.

*If you want to view the movie*

**[mms://STREAM.ucanr.org/Windows Media/UCTV\\_04\\_06.asf](mms://STREAM.ucanr.org/Windows Media/UCTV_04_06.asf)**



**One of the most divisive issues regarding genetic engineering is the suggestion that a choice must be made between either “organic agriculture” OR “genetic engineering”.**

**“Co-existence** is related to the principle that all farmers should be able to cultivate freely the crops of their choice using the production system they prefer. The general concept of co-existence is already well established in California agriculture with conventional, organic, and integrated pest management systems working successfully together.”



# Parting thought



**As long as groups polarize the issue of genetic engineering into “all is permitted” or “nothing is permitted”, rational social progress on the issue is impossible. Dualism, or dilemma thinking (right versus wrong), is the enemy of compromise and the archenemy of the middle way.**

**“We have recently advanced our knowledge of genetics to the point where we can manipulate life in a way never intended by nature.”**

**“We must proceed with the utmost caution in the application of this new found knowledge.”**

**LUTHER BURBANK, 1906**

**Creator of over 800 new plant varieties through plant breeding.**

