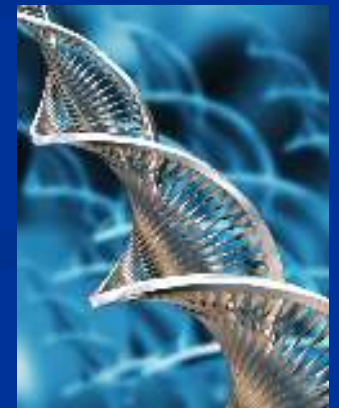


OGMs: To be or not to be

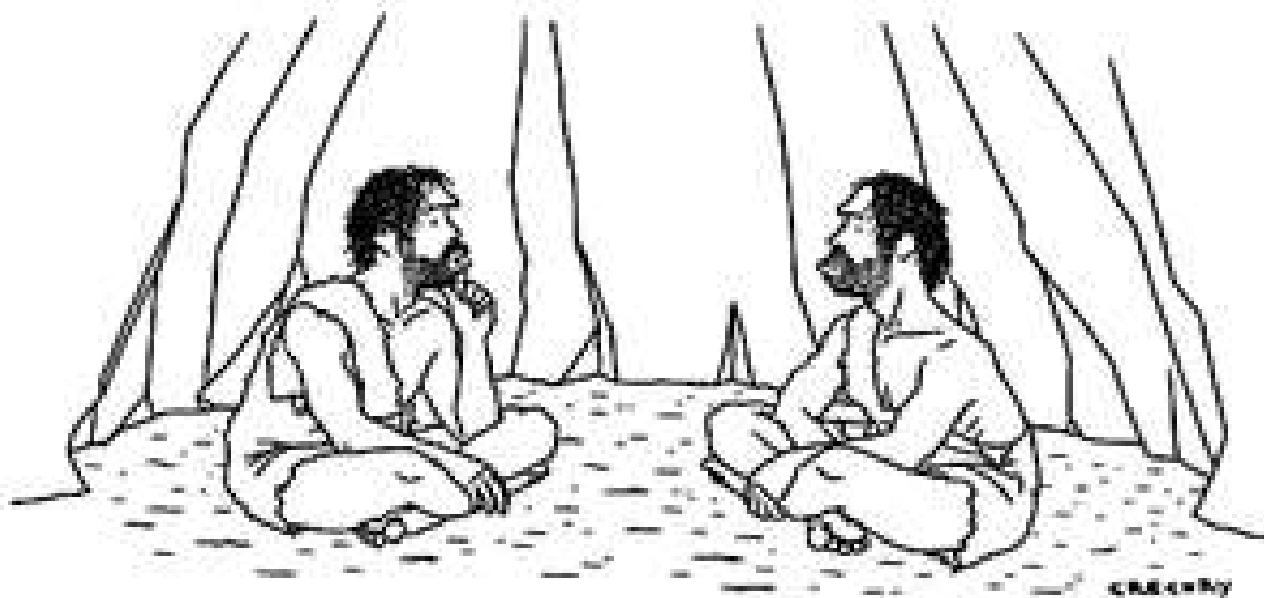


Luis De Stefano Beltrán, PhD
Unidad de Genómica
Universidad Peruana Cayetano Heredia
luis.destefano@upch.pe



Programa

- **Introducción: Desafíos de la Agricultura**
- **¿Por qué necesitamos OGM's?**
- **Breve introduc. a la Biotecnología Moderna**
- **“El Mundo es Plano” para la Biotecnología Moderna.**
- **Lecciones y Conclusiones**



“Something’s just not right—our air is clean, our water is pure, we all get plenty of exercise, everything we eat is organic and free-range, and yet nobody lives past thirty.”

“Algo no está bien: ... nuestro aire es limpio, nuestra agua es pura, hacemos mucho ejercicio, todo lo que comemos es orgánico... y sin embargo, ninguno de nosotros llega a los 30.”

18,000 años de Agricultura (Siria)

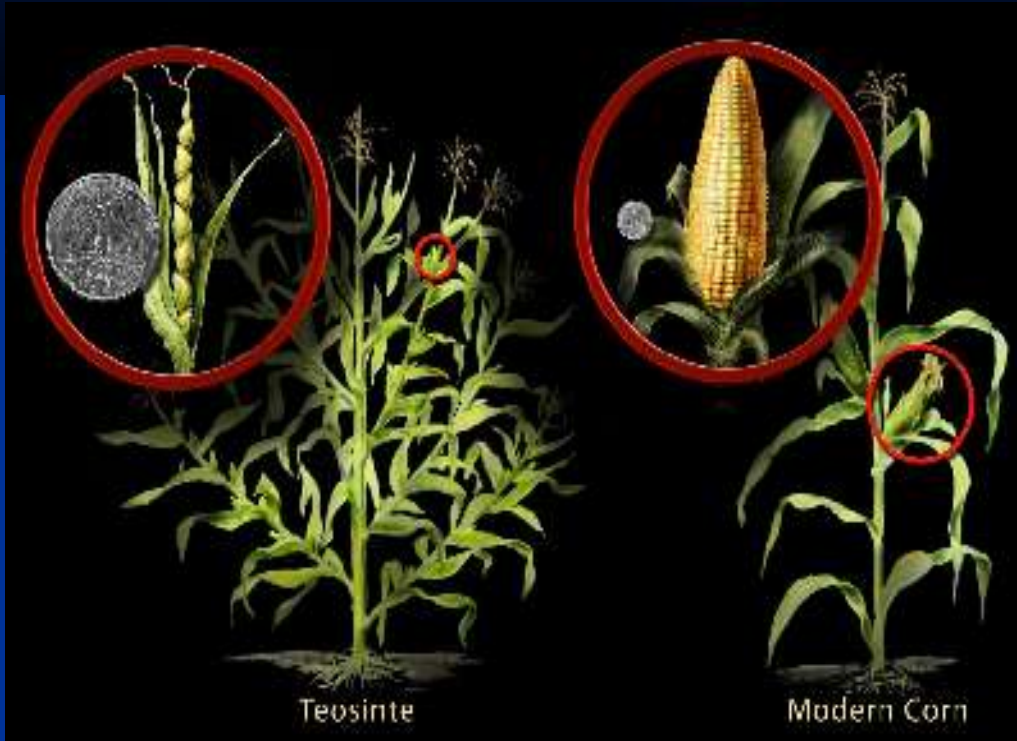




El ser humano ha modificado genéticamente a las plantas desde el comienzo mismo de la civilización



El Maíz moderno tiene como ancestro al Teosinte



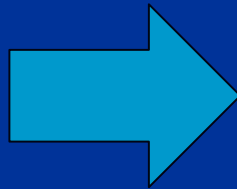
Genoma del Maíz es muy variable

- El inbred B73 (USA) y Palomero (México) se separaron hace 9 mil años.
- Palomero es 400 millones de pbs más pequeño que B73 (3 genomas de Ath o 1 genoma de arroz, Vielle-Calzada, J.-P. *et al. Science* 326, 1078 (2009)).
- Springer *et al*, (2009) comparan las sec's de B73 y Mo17: Miles de secuencias, incluyendo 180 genes de copia única, presentes en uno pero no el otro.

¿ Son las zanahorias modernas “naturales”?



Zanahoria silvestre

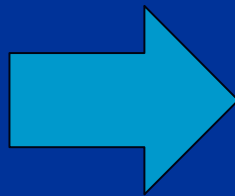


Zanahorias comerciales

¿ Son las lechugas modernas “naturales”?



Lechuga silvestre



UNICUM



A. BROWN



BERIVKA



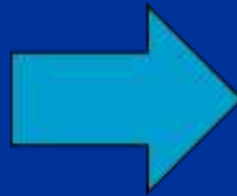
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Lechuga comerciales

¿ Son los bananos modernos “naturales”?



Banano silvestre



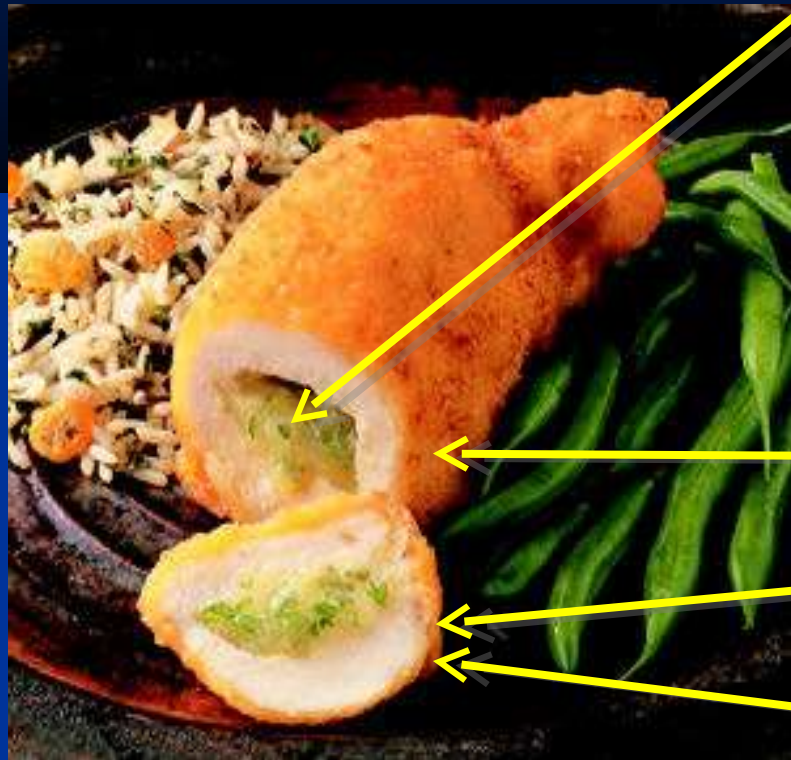
Bananos comerciales

Nuevas oportunidades

**... pero los problemas de
siempre subsisten**

Globalización de los Alimentos:

“El Mundo en tu Plato”



Relleno

Mantequilla: Irlanda

Puré de Ajo: China, USA,
España

Limón: USA

Perejil: Francia, UK

Pimienta: Indonesia

Agua: Irlanda

Pechuga: Francia, Bélgica,
Irlanda, UK

Batido Harina: Bélgica, Francia
Agua: Irlanda

Cubierta de Pan

Pan: Irlanda, UK

Aceite de Canola: USA, Australia

“Chicken a la
Kiev”

Los enemigos de siempre





Phthorimaea operculella
Polilla de la papa



Phytophthora infestans
Tizón tardío en papa



Heliothis zea
Gusano de la cápsula

Pérdidas en Cacao por Enfermedades

Table 1. Estimated annual reduction in potential cocoa production by major diseases.

Diseases	Pathogen	Region	Reduced Production	
			(tons x 1000)	(\$ million)*
Black Pod	<i>Phytophthora</i> spp.	Africa/Brazil/Asia	450	423
Witches' Broom	<i>Crinipellis perniciosa</i>	Latin America	250	235
Frosty Pod Rot	<i>Moniliophthora roreri</i>	Latin America	30	47
Swollen Shoot	CSSV	Africa	50	28
Vascular-streak dieback	<i>Oncobasidium theobromae</i>	Asia	30	28

*January, 2001: value = \$940.00/ metric ton.

Source: The World Cocoa Situation, M. Taylor, LMC International Ltd/Trade Discussions (36).

Sequías en Texas



y en África . . .



El Mundo sin Herbicidas



Mujeres limpiando sus campos de arroz de la mala hierba *Oryza longistaminata* a mano en el sur de Mali.



Mujeres deshierbando campos de quinua a más de 3,200 msnm



Wisconsin, 2008



Agosto 18 a Agosto 19, 2008: más de 15 pulgadas de lluvia

Campos de Maíz en Iowa, Junio – 2008 (16% de cultivos bajo agua)



Perú será el cuarto país más afectado por el cambio climático

TALLER INTERNACIONAL: CÓMO ADAPTARNOS FRENTE AL CAMBIO CLIMÁTICO

El calentamiento global tendrá severos efectos en el agro de la región andina

■ **Exporta argentina** señala que el aumento de la temperatura alterará los cultivos

"Hay que ser conscientes de que los cambios que se vienen son irreversibles e intensos, y si no estamos preparados para ello las secuelas serán mucho más severas por el enorme impacto que causarán".

Quien así reflexiona es Graciela Magrín, ingeniera agrónoma y experta argentina en temas de cambio climático. Señala que los estragos que causa el calentamiento global en todo el mundo y, en especial, en los países del área andina, son cada vez más frecuentes, pero sorpren-

CLAVES

■ La reducción de nevados en los países de la Comunidad Andina y el consiguiente descenso de la cantidad de agua impactará, según la ingeniera Graciela Magrín, en el Perú, donde no solo habrá menor disponibilidad de agua para el consumo humano, sino que la generación de energía eléctrica a partir de la capital será menor.

■ En Bolivia afectará los sectores de turismo y en La Paz, la generación de la energía eléctrica. En Ecuador habrá menos cantidad de agua de riego para los cultivos.

denientemente estos no son catalogados en su debida dimensión.

"Los impactos más notables en los países de la Comunidad Andina y que se agudizarán en los próximos años son en la reducción de glaciares, la cual tiene relación con la cada vez menor disponibilidad de agua y el impacto en el consumo de agua para la gente, como en la agricultura".

Advierte que el Perú es uno de los países más afectados por la reducción de nevados, lo cual tiene y tendrá directo impacto en la disponibilidad de agua en los próximos años, razón por la que recomienda a los organismos competentes y a la población a realizar esfuerzos marcomunados que incidan en acciones de adaptación frente a estos cambios.

IMPACTO EN LA AGRICULTURA

Graciela Magrín, quien fue una de las ponentes en el taller internacional Gestión del riesgo y adaptación al cambio climático en el sector agropecuario en las subregiones andina y amazónica, que se realiza en nuestra capital, hizo notar que en las zonas rurales los impactos se reflejarán principalmente en las alteraciones en la producción agrícola.

"Con el aumento de temperatura, generalmente el ciclo de crecimiento de los cultivos se vuelve más rápido y ello sin duda tiene beneficios, pues influye en la menor producción y por tanto en la aparición de mayores plagas y enfermedades", anotó la experta argentina.

Tendencia de lluvias en Sudamérica

Desde las últimas décadas del siglo XX, por causa del calentamiento global, las lluvias en la mayor parte del continente están aumentando en forma significativa, pero también en algunas zonas hay reducción de las precipitaciones.



EL COMERCIO

Nuevas tendencias y amenazas en los mercados

Sorpresa: lo natural no es necesariamente seguro

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HEALTH

Peanut allergy can be deadly

Even trace amounts can trigger severe reaction

Thursday, May 19, 2005 Posted: 10:22 AM EDT (7:22 PM)

BALTIMORE, Maryland (CNN) -- Peanuts are as American as baseball -- Americans ate nearly 1.7 billion pounds of them last year, according to the Georgia Peanut Council.

But for those with peanut allergies, even the tiniest amount of peanut can cause a severe reaction.

The mother of 15-year-old Robert Digiovanni told CNN that her son had a severe allergic reaction to a peanut butter sandwich he ate at school. He had been told that the sandwich was safe because it was made with peanut butter. He died in the emergency room.

Food allergic reactions caused an estimated 30,000 emergency room visits and kill 150 to 200 people a year.

Anaphylaxis, the massive allergic reaction that can be fatal, can be triggered by bee stings,



Some schools have created peanut-free tables where peanut products are prohibited.

Image [v]

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VIDEO

Parents struggle to manage reactions and [v]

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From The Sunday Times
January 16, 2006

Cancer chemical found in coffee

Jon Ungood-Thomas and Tom Daild

COFFEE is responsible for as much as a third of daily consumption of the cancer-causing chemical acrylamide, research by the United Nations has found.

The study reveals that coffee may give those who drink it anything from 13% to 39% of the acrylamide they consume — only chips and crisps are responsible for greater quantities on average.

Acrylamide is produced during cooking, particularly high-temperature processes such as frying and roasting. Some of the highest levels are found in chips, crisps, biscuits and bread, but it has now emerged that roasting coffee beans also produces significant amounts.

The original concern with acrylamide was related to french fries, chips and crisps. Continued analysis of other food products has shown that they contribute to overall exposure as well," said Dr Angela Kitchener, a scientist with the center that conducted the study.

The new research has been carried out jointly by two UN agencies — the World Health Organization and the Food and Agriculture

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COMMENT



Fitodermatitis causada por alta concentración de psoralenos en una variedad convencional de apio

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AN OUTBREAK OF PHYTOPHOTODERMATITIS DUE TO CELERY

EVE FINKELSTEIN, M.D. B.¹, LIZIATOK, PH.D.¹, ELLIS GROSS, M.D., M.P.H.¹, NICHEMIAH ARONI, PH.D.¹, LOR ROSENBERG, M.D.¹, SIMA HALEVY, M.D.¹

¹ Departments of Dermatology and Plastic Surgery, Soroka Medical Center of the Kupat Holim, Faculty of Health Sciences, and Department of Nuclear Engineering, Ben-Gurion University of the Negev, Beer-Sheva, Israel; the Department of Fruit and Vegetable Storage, ARO, The Volcani Center, Rish Dagan, Israel, and the Ministry of Health, Ezer-Sheva, Israel.

Address for correspondence: Eve Finkelstein, M.D., Department of Dermatology, Soroka Medical Center, P.O. Box 151, Ezer-Sheva 34101, Israel.

ABSTRACT

 **Background:** Celery is known to contain psoralens, a group of substances that cause a toxic dermal reaction on exposure to ultraviolet A rays (UVA). An outbreak of phytophotodermatitis amongst 111 workers in a celery harvest in southern Israel is reported.

Methods: Analysis of the trigger factors was carried out. The patients were questioned regarding their working conditions. Samples of the celery that the workers had been harvesting were analyzed for levels of total psoralens by means of high performance liquid chromatography (HPLC). Levels of UVA were measured.

2.4. A diet high in fruits and vegetables cuts cancer rates in half

Block et al. (1992) summarise some 200 investigations on diet and cancer using cohort studies over the previous 20–30 years. These authors indicate that for virtually all the major cancers, a diet high in fruit and vegetables cuts cancer rates approximately in half. These investigations involved very large numbers of people, only in western countries, and those under investigation consumed conventional produce containing the inevitable pesticide traces. The fact that increased consumption of these supposedly damaging substances in fruit and vegetables actually makes you healthier, contradicts any simple assumptions concerning pesticide traces and cancer.

Furthermore we now know that fruits and vegetables contain an estimated 10,000 secondary products. When tested in exactly the same way as synthetic pesticides, at the MTD, 60% of each were carcinogenic (Ames and Gold, 2000). But a number of these like limonene, perillyl alcohol, quercetin, allyl isothiocyanate, all carcinogenic in high doses are now used to treat cancer but at low doses. (The notorious poison, arsenic, has also been used to treat leukaemia, (Trewavas and Stewart, 2003). These natural pesticides (so-called because they are synthesised by plants to poison insects and herbivores) will also be consumed in greater amounts with diets high in fruit and vegetables. The quantity on average consumed/day of natural pesticides outweighs synthetic pesticide residues by 20,000 to 1 (Ames and Gold, 1999). These results indicate that the tests and assumptions, used to identify synthetic pesticide traces as damaging to humans, lack meaningful

Más sorpresas:

**“... se sabe que las frutas y hortalizas contienen unos 10,000 metabolitos secundarios. Cuando estos fueron analizados en paralelo con los pesticidas sintéticos se encontró que en ambos grupos hasta un 60% eran carcinogénicos ...”
(Ames & Gold, 2000)**



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Organic food sales slump as struggling families opt for cheaper groceries

By NICK MODERMOULT

Last updated at 10:32 AM on 29th August 2008

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Organic food sales have slumped as families struggling with the credit crunch opt for cheaper groceries

Sales of organic goods - usually the most expensive on the supermarket shelves - fell by almost 20 per cent to £8.1m on last month compared to £10.0m on at the start of the year.

The findings by retail analyst TNS show that organic eggs have shown the sharpest decline, with sales of other popular goods falling such as chicken, dairy and fruit and vegetables.



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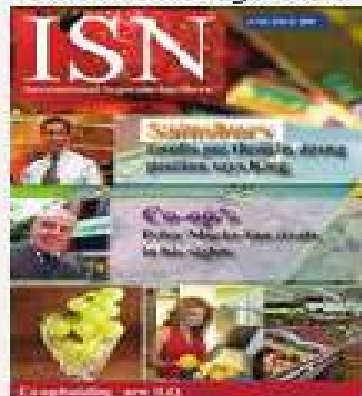


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ORGANIC SALES FALL IN SUPERMARKETS

News

Monday, 12 October 2009 09:24

Tesco and Asda have cut the number of **organic** products they carry as the **sales** of these have dropped significantly. A report compiled for The Grocer, released yesterday, informed readers that **sales of organic** goods have fallen by a third. Tesco had said the supermarket would try to help the **organic** produce recover **sales**, but they have reduced the range by 30 per cent. Asda have cut **organic** lines by 35 per cent, because customers have changed to more affordable foods in the current economic downturn.

“If you can choose ... Go Local”

Health


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16 Organic Apples and a Gallon of Gas


By **Christopher Wanjek**, LiveScience[®]'s Bad Medicine Columnist

posted: 27 June 2006 08:40 am ET

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Do you like the taste of juicy organic apples from Washington? They're not bad, but they could taste sweeter if each one didn't involve a cup of gasoline.

In your quest to eat healthier food and do better by the environment, you might want to place more value on local food products than on organic foods.

It might seem sacrilegious to pooch-pooch organic food—that is, food grown in pooch-pooch as opposed to synthesized fertilizers and pesticides. But as revealed in the June issue of *Sierra* magazine, the environmental price for organic foods is sometimes hidden.

Simply put, one must consider transportation costs. Apples grown in the state of Washington are trucked, on average, more than 1,700 miles. That adds up to a cup of gasoline used to ship each apple. California grapes require up to 4 cups of gasoline per bunch when shipped across the country. And so on.

These calculations were originally published in 2004 in a book chapter in "Environment, Development and Sustainability 6," by David Pimentel of Cornell University and his colleagues.

Go local

Also, mass-produced foods, either grown by organic or conventional methods, are usually picked well before ripening to prevent rotting during shipping. They are less tasty and contain fewer vitamins and minerals compared to local varieties. In fact, this summer is a good time to

Buy Fresh, Buy Local



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There are so many [great reasons to choose local foods](#)... and such an abundance and diversity to choose from. Our aim at Buy Fresh Buy Local is to make it easy to find what you're looking for... and perhaps more than you expected!



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Linking local food, farms and people

