

5th World Congress on BIOTECHNOLOGY  
June 25-27, 2014, Valencia, Spain

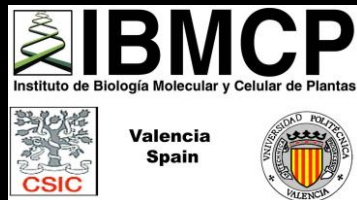
## Track 2: Biotechnology in Agriculture (June 25)

Symposium on:

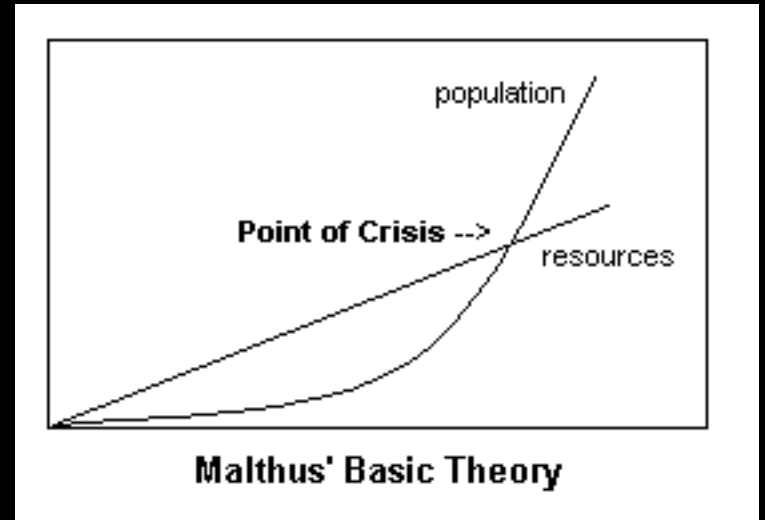
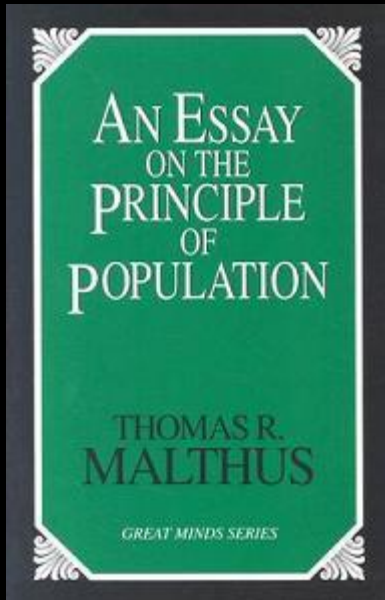
GM crops to feed the world in the XXI century and the risks posed by the irrational opposition of radical ecologists

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≈ 3,000 researchers, 45 institutes, 25 M euro/year



Thomas R. Malthus  
1766-1834

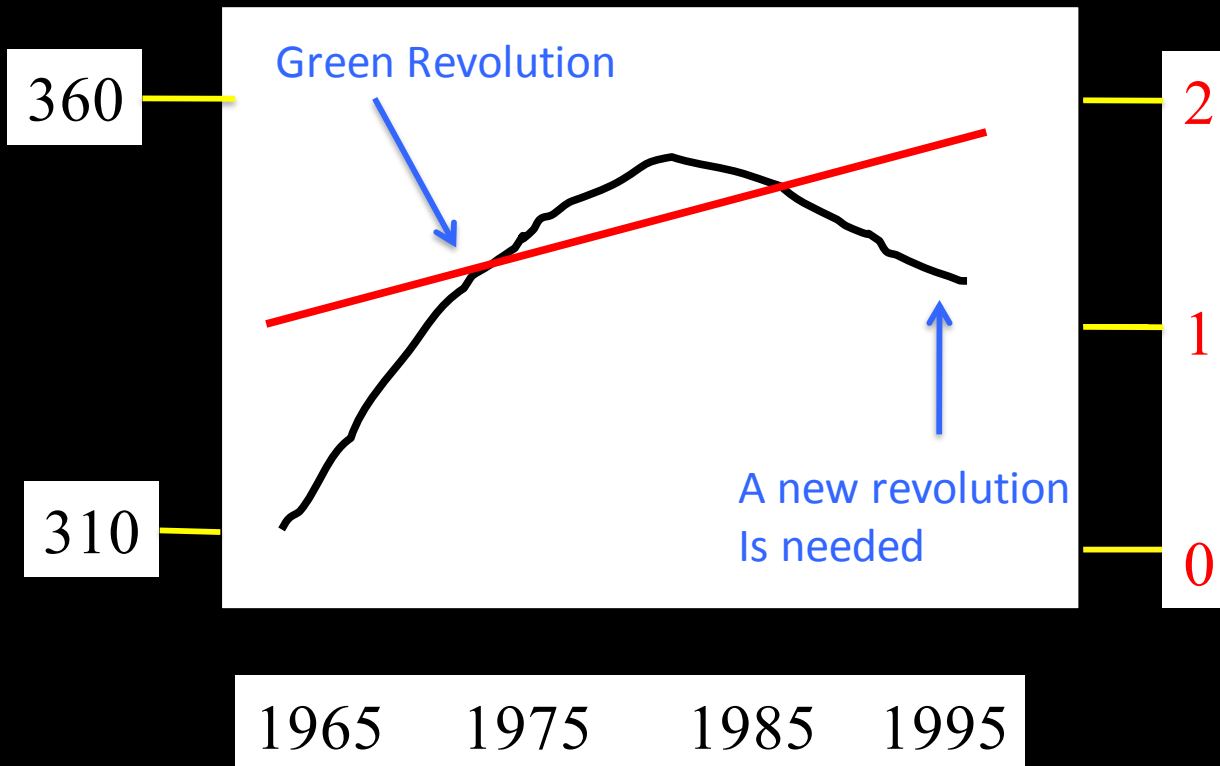
# EVOLUTION OF WORLD POPULATION AND AVAILABILITY OF LAND

Year	Million people		Millions hectares
10000 BC	0.1-1	Planet surface	51,000
1000 BC	50		
1 AD	200	Land surface	15,000
1000 AD	300		
1800 AD	1,000	Conventional farming	1,400
1900 AD	1,500		
2000 AD	7,000	Organic farming	37
2100 AD	10,000 FINAL LEVEL?	Forest and grasslands	2,100

# Evolution of grain production during the second part of XX century (Mann, 1999, Science 283: 310-314)

Kg per person

Total Kg ( $\times 10^{12}$ )



## CRUDE REALITY OF THE END OF XXI CENTURY

Food production should be doubled

With present yields of conventional farming it is possible but it implies almost complete destruction of forests and grasslands

With organic farming (yields less than 50% of conventional), it would be impossible to produce enough food for all population of Earth

With transgenic crops and modern technologies of water management, fertilizers and pesticides forests could be preserved and enough food produced

But in 1997 a very powerful organization, Greenpeace, promoted the GM issue to the top of campaign priorities. The strategy was to tell false stories about GM plants.

GM plants are:

Toxic to persons  
Damage environment  
Exploit farmers  
Only good for multinationals  
Etc.

ALL IS FALSE!!!!!!  
(but they have succeeded in  
creating a rejection in society  
because of fear to transgenesis)



Figure 2.14 European opposition to GM crops. In the fall of 2000, Greenpeace put billboards in the railway stations in the Netherlands that read, "Your lettuce stays nice and fresh because we put genes from rats in them. Bon appetit!" The board carries the identifier "Genetic Research Centre, Texas, USA" and the logo of Texas A&M University. No GM lettuce is on the market anywhere, and there are no plans to create GM crops that express rat genes.

The technology to make transgenic plants was developed in 1983 by the scientists who received the World Food Prize 30 years latter



## 2013 Laureates



Dr. Marc Van Montagu,  
Dr. Mary-Dell Chilton, and  
Dr. Robert T. Fraley

BELGIUM, UNITED STATES. UNITED STATES



Jeff Schell  
(1935-2003)

Rejection in Europe has practically stop development of GM crops

Two genes (traits; insect resistance, herbicide resistance)  
Four crops (corn, soy, cotton and canola)

BUT IT TOOK TWO CENTURIES FOR THE EUROPEANS TO EAT TOMATO AND POTATO  
BROUGHT BY THE SPANISH IN THE XVI CENTURY





## Ingo Potrykus, inventor of golden rice



Patrick Moore, one of the founders of Greenpeace who quit the organization because its rejection of golden rice



ANOTHER URGENT DEVELOPMENTS MAY BE CROPS MORE  
TOLERANT TO DROUGHT STRESS, TO POOR SOILS, TO  
EXTREME TEMPERATURES ...

(TO ALLOW CULTIVATION OF MARGINAL LANDS)

Symposium on:

GM crops to feed the world in the XXI century

and the risks posed by the irrational oposition of radical ecologists

Oscar Vicente

Alain Goossens

Eduardo Bueso

Roberto Gaxiola