GLOBAL TRENDS

GMO Growth – Where is it Growing and What are they Planting?

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GMOs (genetically modified organisms) are created when DNA from one species is inserted into another species in a laboratory, creating combinations of plant, animal, bacterial, and viral genes that do not occur in nature or through traditional cross-breeding.

Currently, the major biotech crops are soybean, cotton, maize, and canola. In terms of acreage, the top five producers are: the **United States** (62.5 million hectares), **Argentina** (21.0 million hectares), **Brazil** (15.8 million hectares), **India** (7.6 million hectares), and **Canada** (7.6 million hectares)[1].

This report will go into the arguments for and against GM crop production, where GM crops are growing and what is being produced.

Why Produce GMO?

Most GM research and commercialization have focused on herbicide tolerance, insect/virus resistance or a combination of both traits. Further advances are expected that will focus on drought tolerance and enhancing the nutritional value of foods. However, some research indicates that GM plants engineered to withstand drought or heat may perform poorly under rainy or cold conditions.

Biotechnology could play a crucial role in feeding 9.2 billion people by 2050

Proponents point out that GM crops have increased yields which increase food availability and as well as lower production costs which in turn helps to reduce food prices. With 9.2 billion people to be fed by 2050, it is believed that biotechnology could play a crucial role in helping satisfy the growing demand.

A recent report by the International Service for the Acquisition of Agri-Biotech Applications (ISAA) showed that farmers around the world have seen increases in yield, reductions in costs, improvements in crop

[1] Clive James, Founder and Chair of ISAAA, "Highlights of the Global Status of Commercialized Biotech/GM Crops: 2008," International Service for the Acquisition of Agri-Biotech Applications, February 11, 2009.

management and the sustainability of agriculture. GM production can create long-term economic stability by reducing losses due to insect infestation and disease. The report also indicated that in 2007, GM crops saved 14.2 billion kg of carbon dioxide.

Why Not GMO?

One company has more than a 90% share of the world's GM seeds

Some of those opposed to GM crops believe that they increase corporate control of food and increase herbicide use without increasing average yields. Monsanto is the world's largest seed company accounting for more than one-fifth of the global proprietary seed market[2]. Currently, they have more than a 90% share of the world's GM seeds and sell the top selling herbicide, Roundup. With such a large market share, there are issues around rising input costs due to control of both seeds and herbicides. Other GM suppliers include: Syngenta, Bayer CropScience, and Dupont.

Other concerns with GM crops include possible health risks to consumers, contamination risks to conventional and organic farmers, and increased use of herbicides to control weeds that develop glyphosate resistance.

In February 2009, the New York Times reported that twenty-six corn-insect specialists submitted a statement to the Environmental Protection Agency suggesting that independent research is being stymied on the effectiveness and environmental impact of GM crops. Seed buyer agreements prohibit growing the crops for research purposes without permission from the companies. If permission is granted sometimes the seed company insists on reviewing findings before they can be published. Biotech seed companies responded by saying their contracts are meant to protect intellectual property and meet regulatory obligations.

[2] ETC Group, 2007.

International GM Crop Producers

Internationally, 13.3 million farmers in 25 countries grew biotech crops in 2008, according to a report released by the International Service for the Acquisition of Agri-Biotech Applications.

The report states that five developing countries: **China, India, Argentina, Brazil** and **South Africa**, with a combined population of 2.6 billion, are exerting leadership with biotech crops, and driving global adoption – benefits from biotech crops are spurring strong political will and substantial new investments in biotech crops in several of these lead countries.

China has committed approximately $3 billion US for research and development of new varieties of biotech crops (to 2020). GM rice, already developed and field tested in China, has the potential to increase food availability and net income by about US$100 per hectare for approximately 440 million people in the country.

In April 2008, Swiss biotech Syngenta announced that it was investing US$65m in the construction of a new biotech centre in China to evaluate genetically-modified and native traits in soy and corn. The launch of commercial GM corn seed is expected in 2009.

Dr. Li Zhikang, chief scientist of the rice project, and researcher from Chinese Academy of Agriculture, estimates that 20 million poverty-stricken farmers will benefit

China started an international collaboration project on green super rice in Sanya, Hainan Province on March 23, 2009. The project received $18 million US of funding from the Bill and Melinda Gates Foundation. The project, titled "Green super rice for the resource poor of Asia and Africa ", aims to develop new varieties of rice that can withstand drought, flooding, cold weather, and toxic minerals such as salt and iron. [3]

India accounts for approximately half of the biotech acreage for cotton production. India surpassed the United States to become the second biggest producer of cotton in 2006/07 after adopting GM crops.

[3] Chinese Academy of Sciences, China-GM Green Rice, March 31, 2009. http://www.farminguk.com/news/China-GM-Green-Rice.13940.asp

In **Europe,** decisions on the commercial approval of GM crops are taken collectively at European Union (EU) level on a case-by-case basis. Various applications to grow GM crops are currently working their way through the EU system. European consumers are largely opposed to GM foods; however, politicians and food companies are beginning to question the justification for the effects of the opposition.

Some analysts believe that the EU will become more receptive to GMO products. Many large food exporters have incorporated GMOs into their products making it difficult and expensive to avoid them. Rising food and feed costs are putting pressure on the processed food and livestock sectors to reduce costs. Researchers working in the agriculture biotechnology sector have been forced to move to institutions (particularly in the United States) or drop activities due to political pressures. In some countries, "eco-warriors" have undertaken raids to destroy fields where field crops trials grown. There are also commercial concerns that Europe will not be a part of the growing agricultural biotechnology sector.

Recently the European Commission tried to get EU governments to back efforts to make **Austria** and **Hungary** allow farmers to grow a genetically engineered corn product (MON810). However, in March 2009, the Commission voted against removing the bans. MON 810 has been deemed safe and is the only genetically modified crop approved for commercial production in the European Union.

In **France**, 22,000 hectares (55,000 acres) were sown with the GM corn in 2007, less than one percent of the sown acreage. However, the Sarkozy government resorted to a special EU measure to outlaw the crop and suspended its cultivation last year. According to the Environment Minister, the ban was imposed due to the risk that fields of genetically modified maize could create wider environmental problems, notably contaminating other crops.

In the **United Kingdom**, various types of GM crop plants have been grown for research and development purposes at a number of field sites in England since 1993, but there has been no commercial cultivation of GM crops.

No genetically modified crops are grown commercially in **Japan**, perhaps one of the countries in the world with the strongest consumer opposition to "unnatural" GM foods.

Genetically Modified Crops

The goals for developing GM crops include:

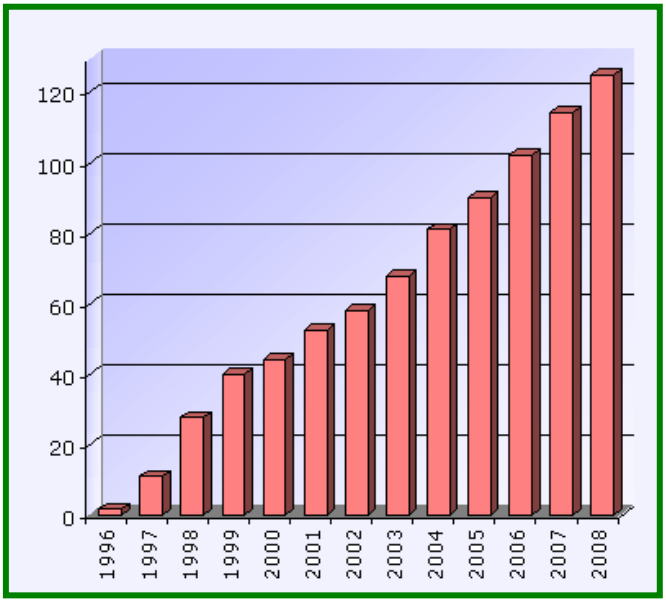
- herbicide resistance
- pest resistance
- disease resistance
- plants with altered composition (to produce healthier food or feed or crops optimized for industrial use)
- pharming (pharmaceutical, biodegradable materials for industry, or enzymes that can improve animal feed)
- stress resistance (tolerant to site-related, environmental challenges like drought, salinity or extreme temperatures)
- elimination of pollutants (using plants or microorganisms to remove toxic pollutants from the environment).

Plants can be engineered to have the ability to clean-up soils polluted with heavy metals or petroleum products

The major biotech crops commercially produced are soybean, cotton, maize, and canola. Other food crops include: sugar beets, squash, papayas, alfalfa, tomatoes, and peppers according to a report released by the International Service for the Acquisition of Agri-biotech Applications in January 2009.

In 1997, GM potatoes were planted on a small scale in Canada and the U.S. However, in 1999, the technology was basically shelved after consumer organizations, processors and a large foodservice buyer were against using the product.

Figure 1 - Worldwide cultivation areas with GM plants, 1996-2008, in millions of hectares



Source: http://www.gmo-compass.org/eng/agri_biotechnology/gmo_planting/257.global_gm_planting_2008.html

There was such controversy over the introduction of GM wheat into Canada and the United States that Monsanto dropped the marketing of Roundup Ready seeds in 2004. Farmers around the world were resistant to producing the GM wheat and buyers in Japan sent a strong message that they would stop buying the product. The Canadian

Wheat Board stated that GM production would put most of its market in jeopardy.

After nearly ten years of developing an insect resistant pea cultivar, pea weevil, an Australian research institute ended the research and development of the GM variety. Despite field trials showing the transgenic peas were 99.5 percent resistant to the insect, it was determined that humans could have allergic reactions to that variety of GM peas. However, these types of risks are not limited to GM plants and similar reactions have sometimes resulted from conventional breeding projects.

GM sugar beet was approved for cultivation in the U.S. and Canada. In 2008, herbicide-tolerant GM beet crops already reached a share of 57 per cent with acreage at almost 260,000 hectares.

Next article: GM Food Products …

On March 10, 2009, Reuters reported that the European Union's executive Commission authorized imports of a genetically modified (GM) rapeseed, clearing the way for a resumption of oilseed trading with Canada. The seed will be used in food and animal feed and will need to comply with the EU's strict labeling and traceability rules.

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