

GREENPEACE

CORN UNDER THREAT

Corn, or maize as it is called in many countries, it's one of the world's largest commercial food crops and is grown around the world. We use it on a large scale; it's in many of the common foods we eat in the form of syrup or starch.¹ Many people in developing countries are reliant on corn as one of their main staple food crops. It's used in animal feed.

Multinational agrochemical companies are trying to get control of this staple food crop by promoting genetically engineered (GE), patented varieties of corn.

Currently, the world's big GE firms – notably Monsanto which sells 90 per cent of genetically engineered seeds worldwide - are investing millions of public relations dollars every year to promote the use of their seeds. But the truth is that many farmers that have grown this GE corn have not seen any of the benefits promised by agrochemical companies. Worse still, GE corn poses a severe threat to the environment, animal and human health.

Below, we take seven statements the GE industry uses to green-wash its products and contrast them with the reality behind the adoption of GE corn. Further, our analysis shows that the best option for farmers, beekeepers, governments, markets and consumers is to reject GE corn and ensure the protection of one of the worlds most important food crops.

WHAT IS GENETIC ENGINEERING?

GE organisms are new life forms which have never before occurred in nature. Genetically modified organisms are produced by inserting genes from any other living organism into the genetic make-up of another one and therefore crossing the natural boundaries between species.

A fish and a strawberry will not breed in nature, but in the laboratory, scientists can take a gene from a fish, insert it into a strawberry, and essentially create an entirely new organism. Genetic engineering can manipulate genes from animals, plants, and even humans.

Once these man-made organisms are released into the environment and the food chain, they reproduce and contaminate conventional and organic crops. No one knows what the long-term effects of GE organisms on the environment will be, as they had never been released into the environment on a large scale before the mid-90s.

Myth 1: "It is safe for the environment"

Reality: Most of the world's GE maize is of a type called *Bt* (named for the bacteria *Bacillus thuringiensis*). This is a genetically engineered corn in which a gene from a type a soil bacteria has been inserted so that the corn produces its own toxin to protect the crop from certain specific pests such as European corn borer. This toxin may be harmful to certain beneficial insects including predators of pests. There are

¹ Greenpeace Shoppers Guide: <http://gmoguide.greenpeace.ca/>.

also concerns for the long-term health of the soil as the *Bt* toxin can accumulate in the soil.²

The genetic engineering industry has also created herbicide tolerant (HT) maize, such as maize T25 from the German firm Bayer and NK603 from US-based Monsanto. Cultivation of the GE herbicide tolerant maize will undoubtedly lead to increased weed resistance resulting in more and more herbicide being applied - a pattern that has been seen with other GE herbicide tolerant crops, (e.g. canola). The herbicides sprayed on GE maize are often extremely harmful for the environment. For example, glufosinate ammonium – the herbicide sprayed on Bayer's T25 maize – has been described as “a high risk to mammals” by the European Food Safety Authority.³

Myth 2: “It is safe to eat”

Reality: The GE industry has for years promoted GE foods as safe to eat but they have been reluctant to disclose vital information to the public that clearly shows problems with the consumption of GE foods. In 2005, in a case initiated by Greenpeace, a German court ordered biotech company Monsanto to publish studies into the effects on rats that had been fed GE *Bt* maize (MON 863). Monsanto's studies were then re-assessed by independent scientists, with shocking results.⁴ Among other things, the scientists revealed that Monsanto had been hiding serious negative effects (“*signs of toxicity*”) on the internal organs of the rats. Nevertheless, the GE maize was already approved in more than ten countries around the world- including the Canada, US, EU, Japan, and the Philippines. The authorities in all these countries had completely relied on the genetic engineering industry's own research and allowed a high risk product to slip through the authorization system. Other types of GE corn are also subjects of scientific controversy, in particular Monsanto corn MON810⁵ and NK603⁶. This regrettable situation underlines once more the urgent necessity for more independent risk studies on GE corn as well as all other GE crops, as the 2001 report of the Royal Society of Canada recommended to the federal government.⁷

Myth 3: “GE maize is needed to fight climate change”

When biomass is used to generate energy in an efficient and sustainable way, it has a role to play in the fight against climate change. However, independent studies confirm that “bio”-ethanol based on maize is one of the worst forms of bio energy and does not meet any sustainability criteria. The use of maize for ethanol drives up food prices and threatens the food security of the poor. There is wide agreement that the CO₂ savings from corn ethanol are small or even negative depending on the production techniques used and source of energy inputs.⁸

² Effects of transgenic Bt corn litter on earthworms *Lumbricus terrestris*. C. Zwahlen, A. Hirbeck, R. Howeld, and W. Nentwig, *Molecular Ecology*, 2003, vol. 12, pp. 1077-1086.

³ Summary of the EFSA scientific report (2005) 27,1-81

⁴ See: http://www.greenpeace.org/international/press/releases/seralini_study_MON863

⁵ How much Bt toxin do genetically engineered MON810 maize plants actually produce?: *Bt concentration in field plants from Germany and Spain*, Greenpeace report, 2007, http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/gentechnik/greenpeace_bt_maize_engl.pdf

⁶ *Report on NK 603 GM maize produced by Monsanto company*, <http://www.criigen.org/nk603.pdf>

⁷ Royal society of Canada expert Panel: http://www.rsc.ca//index.php?lang_id=1&page_id=119

⁸ J Hill, E Nelson, D Tilman, S Polasky, D Tiffany (2006) Environmental, economic and energetic costs and benefits of biodiesel and ethanol biofuels. *Proceedings of the National Academy of Sciences* 103:11206-11210.

In the case of genetically engineered maize matters get even worse. GE maize designed for industrial fuel contains proteins that are not normally present in the human diet. GE ethanol maize could easily contaminate the food chain, as more than a decade of experience with GE maize has shown.⁹ In other words, if the agrochemical industry gets its way your breakfast cornflakes could soon contain GE ethanol maize, an energy boost you don't need!

Among other things, GE maize for ethanol has the potential to be toxic and to cause allergies. This has recently been recognized by the South African department of agriculture which rejected Syngenta's application for the approval of its GE maize for ethanol. One of the key arguments for the rejection of the GE ethanol maize was that the company's testing was inadequate. However, so far neither Syngenta, nor any other biotech company has shown any willingness to improve its testing methods for the toxicity and allergenicity of GE ethanol maize.

Myth 4: "GE maize brings economic benefits"

Reality: The worldwide rejection of GE food by consumers, retailers and food companies has turned the production of GE crops into a risky business. After the introduction of GE maize in the US – by far the largest producer of GE crops, producing 60 per cent of all genetically engineered crops worldwide – many US maize farmers and traders lost their exports to key destinations. For example, the export of maize from the US to Europe declined from 3.3 million tonnes in 1995 to just 25,000 tonnes in 2002.¹⁰ Cutbacks in the European market lead to massive dumping of US corn in Canada and a four-fold increase in US corn imports between 1999 and 2002.¹¹

Contrary to what the agrochemical industry often suggests, GE crops do not have a higher yield. As a study by experts from the Iowa State University in the US has pointed out:

"Bt corn (the most widely used type of GE corn, ed) produced a return essentially equal to the non-Bt corn. This again raises the question of why people would adopt an equal technology at all, especially given the potential marketing problems associated with Bt corn".¹²

The negative economic impact of GE maize and other GE crops falls heavily on the most vulnerable, the rural poor in developing countries. GE seeds are often aggressively marketed and presented as miracle seeds by biotech companies such as Monsanto. These companies offer loans to resource poor farmers in order to allow them to buy the GE seeds, which are often much more (2-6 times) expensive than conventional seeds (see box 1). Then it turns out that the seeds are not a miracle and that they do not have higher yields. Consequently, the farmers end up in debt and have to take out even more loans to buy new seeds (agrochemical companies

⁹ See: www.gmcontaminationregister.org

¹⁰ Source: European Commission press release, 13 May 2003

¹¹ Canada US Corn Row, <http://www.bcstats.gov.bc.ca/pubs/exp/exp0702.pdf>

¹² Duffy, M. Who Benefits from Biotechnology. Iowa State University, presented at the American Seed Trade Association meeting December 5-7, 2001, Chicago, IL
http://www.leopold.iastate.edu/pubs/speech/files/120501-who_benefits_from_biotechnology.pdf.
accessed. April 21, 2007

do not allow farmers to save GE seeds for the next growing season as this is considered a breach of the agrochemical companies' patents.)

BOX1

“When I first planted Bt corn, the yield was good, but there were so many expenses that I did not earn anything. I was very disappointed with Monsanto’s seeds and I will never plant them again. I now only plant local varieties of corn for which a much lower capital investment is required.”

- Thomas Datinginoo, small-scale farmer in the municipality Naujan, on the island Mindoro in the Philippines

Myth 5: “GE maize will help to reduce hunger”.

Reality: Hunger is a problem of distribution, lack of access to land, water and income, not of availability of food. In India, for example, millions of tons of grain are rotting away while 300 million people go to bed hungry every night. The real problem is that too many people do not have enough income to get access to the available food and too few people have the land to grow food for themselves. These problems are not solved by introducing GE seed. On the contrary, GE crops are likely to aggravate the hunger problem and indebtedness of small farmers, because they require high investments in expensive seeds and huge amounts of pesticides. GE seeds are not designed to solve the hunger of the poor, but the hunger of greedy corporations and their shareholders for more profits.

Myth 6: “Coexistence between GE and non-GE crops is perfectly possible”

Reality: Scientific research has demonstrated that GE crops contaminate conventional and organic crops, foods and honey (see box two). And when GE crops are planted outside of the lab - even with stringent laws in place – it is impossible to control insects, pollen drift and wind flow. GE maize in particular is known as a notorious contaminant, e.g. the European Environment Agency (EEA) has described maize as a “medium to high risk” crop for contamination.¹³

Box 2

“A population of bees works an area of at least 30 square kilometres, so contamination of honey could originate from many different fields, if GMO cultivation becomes the rule. The costs of analysing honey in order to verify if it is GMO free, would make beekeeping uneconomic for most beekeepers. This would not only endanger honey production, but also pollination in agriculture and nature.”

- Walter Haefeker, beekeeper in Germany and vice-president of the European Professional Beekeepers' Association.

GE contamination not only poses a risk to food safety, but also to biodiversity and to food security, especially in the centres of origin and centres of diversity for maize, which are located in Mexico and Brazil. If GE maize contaminates the original maize plants that are grown in these regions, humanity may lose the “mother plants” from which all maize varieties originate. This has already been confirmed in the report of

¹³ http://reports.eea.eu.int/environmental_issue_report_2002_28/en

NAFTA's Commission for Environmental Cooperation report.¹⁴ This would be a major disaster, since diversity is essential to ongoing breeding programmes and the development of new varieties that can resist pests, diseases, drought and other agronomic challenges.

Myth 7: "It is impossible to stop this technology"

Reality: After more than a decade the biotech industry has not managed to take over the world's food supply, as they intended to do ten years ago. The vast majority of GE crops (more than 90 per cent) are grown in just four countries: the US, Argentina, Canada and Brazil. In many countries a majority of consumers are against genetically engineered foods and globally consumer awareness and opposition to genetically engineered food is still growing. In Europe alone 230 regions, over 4200 municipalities and other local entities and tens of thousands of farmers and food producers have declared themselves "GE-free".¹⁵ In British Columbia, the Powell River Regional District and the Southern Gulf Islands have declarations in place making these GE-free zones. This is due in no small part to the massive consumer backlash to GE foods.

Conclusion: Genetically engineered maize is an unnecessary, outdated and risky technology that poses serious threats to our health and the environment. GE maize is also a risky business from an economic point of view.

The best option for farmers, beekeepers, governments, markets and consumers is to reject GE maize and ensure the protection of one of the world's most important food crops. There are many viable alternatives for GE maize, such as organic agriculture and other forms of sustainable agriculture, while at the same protecting the environment. Greenpeace is campaigning for a global agricultural system based on biodiversity and sustainability, that protects the world's forests and other natural ecosystems, reduces greenhouse gas emissions, encourages soil and water health, uses less fertilizers and pesticides, protects biodiversity with no genetic engineering and provides fair trade and food security for all.

¹⁴ http://www.cec.org/pubs_docs/documents/index.cfm?id=1647

¹⁵ <http://www.gmo-free-regions.org/>