

Why GE field trials are a risky (and expensive) business

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Introduction

Greenpeace is opposed to the outdoor cultivation (deliberate release) of genetically engineered (GE, also called genetically modified, GM) crops because of the risks they pose to both human health and the environment. Cultivation of GE crops can also cause unwanted genetic contamination of our food. However, GE crops do not have to be commercially grown to cause contamination. Even experimental GE crops can cause contamination. Experimental GE crops can contaminate conventional crops from GE crop field trials or even illegal plantings. It is often unclear how contamination occurs, and in many cases it could be caused equally by cross-pollination (e.g. via insects) or by human error. Why does contamination from experimental GE crops matter? Why should we be worried about traces of experimental GE crops in our food? This does matter, and we should worry, because experimental GE crops have, by definition, undergone little or no safety testing to determine their possible impacts on either the environment or on human and animal health.

Globally, numerous serious incidences of contamination from experimental field trials have cost farmers their export markets, and put human health at risk. This fact sheet reviews the cases of contamination of human food supplies from experimental GE field trials from around the world. The only way to protect our food and environment is to stop releasing GE crops into the environment – and this has to include stopping field trials of GE crops.

Case Study 1: Field trials of GE Rice LL601 contaminate US rice supplies and exports

What happened?

During 2006 and 2007, traces of three varieties of unapproved GE rice owned by Bayer CropScience were found in US rice exports in over 30 countries worldwide.

What was the economic impact?

The US rice industry collapsed. In July 2011, Bayer eventually agreed to a \$750m US dollar settlement resolving claims with about 11,000 US farmers for market losses and clean-up costs¹. The total costs to the rice industry are likely to have been over \$1bn worldwide.

How did it occur?

Field trials were conducted between the mid 1990s and early 2000s. Bayer halted the trials in 2002 when US rice farmers made clear their customers did not want GE rice. The US Department of Agriculture (USDA) reported these field trials were the likely sources of the contamination between the GE rice and conventional varieties. However, it was unable to conclude if it was caused by gene flow (cross pollination) or mechanical mixing². Denying any culpability, Bayer's initial legal response blamed the escape of its gene-altered variety of long-grain rice, LL601, on 'unavoidable circumstances which could not have been prevented by anyone'; due to 'an act of God'; and on farmers' 'own negligence, carelessness, and/or comparative fault'.³

More information

'Bayer CropScience contaminates our rice' (Greenpeace International, October 2007)
www.greenpeace.org/raw/content/international/press/reports/bayer-cropsciencecontaminates.pdf

'Rice industry in crisis' (Greenpeace International, February 2007)
www.greenpeace.org/raw/content/international/press/reports/rice-industry-in-crisis.pdf

Case study 2: GE linseed contaminated Canadian linseed export market

What happened?

In 2009, unauthorised GE linseed (also known as 'flax') produced by a public research institution was discovered in food in several EU countries, having been imported from Canada. The initial discovery of unauthorised GE linseed was in Germany. Since that first discovery GE linseed continues to be discovered in Europe and is thought to have been imported to over 30 countries around the world⁴.

What was the economic impact?

Canada lost exports to its main European market⁵ worth hundreds of millions of dollars and non-GE linseed farmers have faced huge costs and market losses. The exact source of the contamination hasn't been determined⁶.

How did it occur?

In the late 1980s a public research institution, the Crop Development Centre in Saskatoon, Saskatchewan, developed a GE linseed variety FP967 that was later named 'Triffid' by its developers. It was authorised for commercial use in both Canada and the US in the late 1990s. However, concerns about the European export market meant Triffid was never sold for commercial production. It was de-registered by 2001 and it was believed that all known stocks had been identified and destroyed⁷.

Case study 3: Papaya seeds from GE field trial illegally distributed

What happened?

During 2004, the Thai government found that papaya samples from 85 farms were genetically modified. The contamination continued into 2006 and it is likely that the GE contamination reached the food chain.

What was the economic impact?

Exports of papaya to Europe have been hit because of fears that contamination could have spread. The Thai government said it was taking action to destroy the contaminated trees.

How did it occur?

GE papaya is not grown commercially in Thailand, so it was clear that the contamination originated from the government station experimentally breeding GE papaya trees. Following investigations, Thailand's Human Rights Commission conducted tests that showed that one third of papaya orchards tested in the eastern province of Rayong and the north-eastern provinces of Maharakham, Chaiyaphum and Kalasin had GE-contaminated papaya seeds in July 2005. The owners said that a research station gave them the seeds.⁸

Case study 4: Biotech seed producer used unapproved GE maize for breeding

What happened?

In 2005, the European Commission announced that illegal Bt10 GE maize produced by GE seed company Syngenta had entered the European food chain. The GE maize Bt10 contains a marker gene that codes for the widely-used antibiotic ampicillin, while the Bt11 does not.⁹

According to the international Codex Alimentarius Guideline for Conduct of Food Safety Assessment of Foods Derived from Recombinant-DNA:

Plants: 'Antibiotic resistance genes used in food production that encode resistance to clinically used antibiotics should not be present in foods' because it increases the risk of antibiotic resistance in the population.

What was the economic impact?

The European Commission blocked US grain import unless they could be guaranteed free of Bt10.¹⁰ The USDA fined Syngenta \$375,000.¹¹ There are no figures for the wider costs.

How did it occur?

The contamination arose because Syngenta's quality control procedures did not differentiate between Bt10 and its sister commercial line, Bt11. As a result, the experimental and substantially different Bt10 line was mistakenly used in breeding. The error was detected four years later when one of the seed companies developing Bt11 varieties adopted more sophisticated analytical techniques.

Case study 5: Prodigene pharmaceutical maize contaminated follow-on crop

What happened?

In the US in 2002, seeds from a GE maize pharma-crop containing a pig vaccine grew independently among normal soybean crops.¹² US authorities said the corn did not reach food crops or animal feed.

What was the economic impact?

Prodigene, the company responsible, was fined \$3m for tainting half a million bushels of soya bean with a trial vaccine used to prevent stomach upsets in piglets. Prodigene agreed to pay a fine of \$250,000 and to repay the government for the cost of incinerating the soya bean that had been contaminated with genetically altered corn.¹³ The episode has drawn attention to the dangers of GE pharm crops.¹⁴

How did it occur?

Seeds from the GE maize crop sprouted voluntarily in the following season.

Case study 6: Experimental GE rice planted illegally in China

What happened?

In 2005, Greenpeace discovered that GE rice seeds had been illegally sold in Hubei, China. Then, in 2006, GE rice event Bt63 was found in baby food sold in Beijing, Guangzhou and Hong Kong. In late 2006, GE rice Bt63 was found to be contaminating exports in Austria, France, the UK and Germany. In 2007 it was again found in EU imports to Cyprus, Germany, Greece, Italy and Sweden.¹⁵

What was the impact?

The European Commission adopted emergency measures (on 15 August 2008) to require compulsory certification for the imports of Chinese rice products that could contain the unauthorised GE rice Bt63.¹⁶ The Chinese government took several measures to try to stop the contamination¹⁷, which included punishing seed companies, confiscating GE seed, destroying GE rice grown in the field and tightening control over the food chain.

How did it occur?

The source of the contamination appears to have been the result of illegal planting of GE seeds. Seed companies in China found to have sold GE rice hybrid seed to farmers operated directly under the university developing GM rice. It has been reported that the key scientist sat on the board of one GE seed company.

Further examples of GE contamination and links at:

<http://gmcontaminationregister.org>

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References

- ¹ Bloomberg (2011). Bayer agrees to pay \$750 million to end lawsuits over gene-modified rice.
<http://www.bloomberg.com/news/2011-07-01/bayer-to-pay-750-million-to-end-lawsuits-over-genetically-modified-rice.html>
- ² USDA (2007). Report of LibertyLink rice incidents.
<http://www.aphis.usda.gov/newsroom/content/2007/10/content/printable/RiceReport10-2007.pdf>
- ³ Washington Post (2006). Firm blames farmers, 'Act of God' for rice contamination. 22 November
<http://www.washingtonpost.com/wp-dyn/content/article/2006/11/21/AR2006112101265.html>
- ⁴ Grain (2010). Contaminated Canadian flax barred from Europe.
<http://www.grain.org/article/entries/4080-contaminatedcanadian-flax-barred-from-europe>
- ⁵ AG Canada (2010). U of A's GM flax raises eyebrows
<http://www.agcanada.com/Article.aspx?ID=21873>
- ⁶ Greenpeace International (2010). GE contamination devastates Canadian linseed industry.
<http://www.greenpeace.org/international/global/international/planet-2/report/2010/1/ge-contamination-devastates-ca.pdf>
- ⁷ GE Contamination Register (2009). FP967 ('Triffid') flax has been grown illegally in Canada and exported around the globe.
http://www.gmcontaminationregister.org/index.php?content=nw_detail1
- ⁸ Davidson SN (2008). Forbidden fruit: transgenic papaya in Thailand. *Plant Physiology* 147: 487-493.
- ⁹ Nature (2005). Don't rely on Uncle Sam (Editorial). *Nature* 434:807.
<http://www.nature.com/nature/journal/v434/n7035/full/434807a.html>
- ¹⁰ BBC (2005). EU demands guarantees on US corn, 15 April.
<http://news.bbc.co.uk/2/hi/business/4450735.stm>
- ¹¹ Save or Seeds (undated). Syngenta's unapproved GM maize variety 'bt10' distributed worldwide since 2001.
<http://www.saveourseeds.org/en/library/maize-bt10.html>. Accessed 15 February 2012.
- ¹² APHIS-USDA (2002). USDA investigates biotech company for possible permit violations.
<http://www.aphis.usda.gov/lpa/news/2002/11/prodigene.html>
- ¹³ The Guardian (2002). Alarm as GM pig vaccine taints US crops, 24 December.
<http://www.guardian.co.uk/environment/2002/dec/24/food.research>
- ¹⁴ Fox JL (2003). Puzzling industry response to ProdiGene fiasco. *Nature Biotechnology* 21: 3-4.
<http://www.nature.com/nbt/journal/v21/n1/full/nbt0103-3b.html>
- ¹⁵ European Commission (2006). Rapid alert system for food and feed.
http://ec.europa.eu/food/food/rapidalert/reports/week39-2006_en.pdf
- ¹⁶ Food Standards Agency (2008). Emergency measures on Chinese rice products.
<http://www.food.gov.uk/news/newsarchive/2008/apr/bt643>
- ¹⁷ European Commission (2008). Commission requires certification for Chinese rice products to stop unauthorised GMO from entering the EU.
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/219&format=HTML&aged=0&language=EN>