

April 2007



**Friends of
the Earth**

Representation from Friends of the Earth on application for a part B consent from BASF Plant Science to release genetically modified potatoes with improved resistance to Phytophthora infestans (Application Reference 07/R42/01)

Friends of the Earth inspires solutions to environmental problems, which make life better for people

Friends of the Earth is:

- the UK's most influential national environmental campaigning organisation
- the most extensive environmental network in the world, with around 1 million supporters across five continents, and more than 70 national organisations worldwide
- a unique network of campaigning local groups, working in more than 200 communities throughout England, Wales and Northern Ireland
- dependent on individuals for over 90 per cent of its income.

Friends of the Earth objects to this application from BASF Plant Science to experimentally release blight resistant genetically modified potatoes into the environment of the East Riding of Yorkshire.

Our grounds for objection are as follows:

GM contamination

Although commercial potatoes are propagated via tubers, true potato seed production can also occur, and while not affecting the current tubers, it can create GM volunteers in future crops. Rates of outcrossing recorded under field conditions for potatoes range from 0 to 20%, with both wind and insect pollination likely to be involved¹. Some studies have detected pollen up to 20m from the source², but one study recorded outcrossing levels of 31% at 1000m, thought to be due to pollen beetles³.

Of the three varieties BASF will be using in the trials, P835 and P880 produce abundant flowers, while P698 is middling. P880 frequently sets berries, P835 sets few, and P698 rarely does, but no information on the viability or longevity of the seeds is given.

¹ Treu R & Emberlin J (2000). Pollen dispersal in the crops maize (*Zea mays*), oilseed rape (*Brassica napus* ssp. *oleifera*), potatoes (*Solanum tuberosum*), sugar beet (*Beta vulgaris* ssp. *Vulgaris*) and wheat (*Triticum aestivum*). Evidence from publications. A report for the Soil Association from the National Pollen Research Unit.

² Eastham K & Sweet J (2002). Genetically Modified Organisms (GMOs): The significance of gene flow through pollen transfer. European Environment Agency

³ Skogsmyr, I. (1994) Gene dispersal from transgenic potatoes to conspecifics: A field trial. Theoretical and Applied Genetics 88: 770– 774.

Groundkeeper control will be crucial to prevent contamination. True seed, unharvested tubers and damaged tuber pieces can all sprout in the following year to produce weed plants in subsequent crops, which will in turn produce small tubers which can persist to contaminate crops in future years. Control with herbicides is difficult in any following broad leaved crops. BASF say that groundkeepers will be quickly killed by frosts, but as a 2002 European Environment Agency report⁴ explains, “in recent years, the combination of reduced herbicide rates throughout the rotation due to declining arable margins, a succession of mild winters and the use of vigorous potato varieties has increased the numbers of volunteer potatoes.”

Friends of the Earth therefore objects to this application for growing experimental GM potatoes in the open air on the basis that it will be very difficult to prevent them contaminating other non-GM potato crops. Should Defra give the go ahead for these trials, strict measures must be put in place to ensure that these experimental potatoes cannot contaminate future crops via groundkeepers or volunteers derived from seed production. Nearby potato crops must also be protected from pollen transfer from the GM potatoes. As a minimum, Defra must require that the flowers be removed to prevent pollen dispersal, and repeated harvesting to ensure as far as it possible, that all groundkeepers are removed.

Local economic and environmental impacts

An important issue that BASF has failed to consider in its application is the impact these trials would have on local farmers. One particular example is the issue of borage production. Borage is grown in the local area. It's a high value crop grown for food supplements (starflower oil), worth between £1800 and £2300 per tonne⁵. Farmers and beekeepers have a mutually beneficial relationship where beekeepers bring their hives into the borage fields so the bees can collect the nectar to produce borage honey, and the bees help pollinate the borage crops. However, beekeepers are reluctant to bring their hives into the area if a GM potato crop is going to be grown because they are worried about GM pollen from the trials contaminating their honey. The British Beekeepers Association recommends beekeepers maintain a distance of 6 miles from any GM trials. If beekeepers don't bring their hives into the borage fields, this could affect the yields and therefore have a significant negative economic impact on local farmers⁶.

Bees provide important pollination functions for other crops, as well as other non-crop plants. No consideration has been taken by BASF or ACRE of the environmental or economic impact if beekeepers do not bring their hives into the area around the proposed trial site. This issue must be thoroughly investigated including detailed discussions with local farmers who have so far been excluded from this process.

Friends of the Earth understands that when BASF submitted its application to Defra, it did not disclose the 6-figure grid reference, and is not required to do so until a minimum of a week before planting commences. This means that any environmental risk assessment carried out by ACRE will fail to take into account the specific local

⁴ Eastham K & Sweet J (2002). Genetically Modified Organisms (GMOs): The significance of gene flow through pollen transfer. European Environment Agency

⁵ http://www.nnfcc.co.uk/downloadDataFile.cfm?name=nnfclibrary/publications/SEEDA_Final_Report.pdf

⁶ http://www.bbka.org.uk/articles/bbka_statement_gmos.php

conditions. A Dutch court has recently ruled that BASF trials of the same blight resistant potato had been given the go-ahead illegally and ordered their permits to be destroyed. The judge found that BASF had failed to provide the specific locations of the trials to allow the Dutch government to carry out a proper environmental risk assessment. It is unacceptable that the UK does not require a local risk assessment to be carried out which would reveal precisely those issues important to local environment and economy such as those of the borage farmers. Defra should require BASF to supply the six-figure grid reference to enable the public to provide more detailed and specific comments, and ACRE to conduct a thorough and relevant local risk assessment.

Safety

No evidence is provided in the application to rule out unexpected effects due to the GM insertion, and no safety data is provided on the potatoes. Yet experimental GM potatoes have resulted in entirely unpredicted outcomes in the past – for example a potato modified to have low levels of the NAD-malic enzyme showed increase starch content, which the researchers could not explain⁷. And an attempt to introduce yeast and bacterial genes into potatoes to increase starch content actually reduced starch content and produced unexpected compounds due to disruption of the plant metabolism⁸. Research on GM potatoes modified to produce GNA lectin⁹ suggested impacts on the gastrointestinal tract of rats, provoking scientific controversy¹⁰, yet no follow up research has ever been carried out.

Although BASF do not intend for these potatoes to enter the food chain, and crops are intended to be destroyed at the end of the trials, there is no guarantee that GM potato materials will not contaminated future potato crops grown on or near the site. The experience of LL601 rice in the USA, where an experimental GM rice line has contaminated worldwide rice supplies, illustrates that these experiments are not always containable. Rice, like potatoes, has always previously been considered a 'low risk' GM crop for contamination, due to the low levels of cross pollination expected. Yet recent events would indicate that even 'low risk' crops can be involved in serious GM contamination incidents. Because BASF has provided no safety data on these blight resistant potatoes, the company would be unable to provide assurances to Defra or to the public that they would be safe in the event of a contamination incident.

Friends of the Earth does not believe that these open-air GM trials should go ahead, but should permission be granted then publicly available safety data would help to provide reassurance in the event of a contamination incident similar to the US experience. Furthermore, reference material should be provided by BASF to allow monitoring and testing of neighbouring potato crops for any contamination.

Lack of need

Genetic modification is not the only way of producing blight resistant potatoes – breeding programmes have already produced a range of blight-resistant potatoes that are currently in use in the UK, and there are many more in the pipeline. The Sarvari Research Trust has developed the Sarpo blight-resistant varieties which are performing well in UK trials and taste tests. Of the 120 current varieties on the National List that

⁷ BBSRC Business, Jan 1998. "Making crops make more starch" p6-7

⁸ Gura, T (2000) Reaping the plant gene harvest. Science 287 412-414

⁹ Ewan, S.W.B. & Pusztai, A. (1999) Effect of diets containing genetically modified potatoes expressing Galanthus nivalis lectin on rat small intestine. The Lancet 354: 1353-1354.

¹⁰ The Royal Society (1999) Review of data on possible toxicity of GM potatoes.

have been field trialed by NIAB, 24 (20%) have good resistance for both foliar blight resistance and tuber resistance. Ten score very highly for both.

Phytophthora infestans is constantly mutating, existing as a large population with much genetic variation. Some blight resistant potatoes may have only short-lived resistance, while some individual varieties can last for several decades – the rate at which the pathogen can overcome resistance is impossible to predict. A single genetically modified variety of potato may not therefore offer a long-term solution for late blight. Plant breeders need to stay one step ahead of the pathogen, and given the tight regulations around the deliberate release of genetically modified organisms, and long periods of time required for approval, traditional breeding may in fact offer a speedier option.

Furthermore, it is unclear what level of reduction in fungicide use GM blight-resistant potatoes would actually deliver. Figures on reasons for use of fungicides do not appear to have been collected since 1998, when blight accounted for just 34% of fungicide use for ware potatoes¹¹. The genuine level of reduction of fungicide use must be investigated before any approval is given for these trials. There is also a significant discrepancy between what BASF claims blight costs farmers in crop losses (£50 million per year), and the figures cited by the British Potato Council (up to £3 million per year¹²). This discrepancy should be investigated by Defra as it is disingenuous if BASF are basing their claims of the supposed benefits of GM blight resistant potatoes on inaccurate data.

Lack of demand

Consumers have made it clear that they do not want to eat genetically modified food in numerous surveys, debates, and by voting with their feet – supermarkets have removed almost all genetically modified foods from their shelves due to consumer demand. The latest Eurobarometer poll reports that "Europeans think that GM food should not be encouraged. GM food is widely seen as not being useful, as morally unacceptable and as a risk for society"¹³.

It is unclear who BASF expects to eat these GM potatoes should they eventually make it onto the market. These trials therefore represent an unnecessary risk to the environment and could threaten the integrity of GM-free potato supplies in the UK.

Consideration of public comments

Friends of the Earth is concerned about the lack of consideration given to public comments received during the public consultation for the BASF application for GM trial sites in Cambridge and Derbyshire (Ref...). We understand that all responses received by Defra raised objections to the trials. Despite this, Defra gave consent in December 2006 and imposed weak conditions that failed to address the concerns outlined in the objections.

Conditions

Friends of the Earth objects to this application, and urges Defra to reject it.

¹¹ Garthwaite DG & Thomas MR (1998). Pesticide Usage Survey Report 159: Arable crops in Great Britain 1998. PUSG/CSL. <http://www.csl.gov.uk/science/organ/pvm/puskm/arable1998.pdf>

¹² http://www.potato.org.uk/media_files/FAB_GAs/01outgradehygiene2005.pdf

¹³ <http://www.ec.europa.eu/research/press/2006/pr1906en.cfm>

We are very concerned that the conditions listed by Defra in the consent for the Cambridge site are weaker than those imposed by the Irish Environmental Protection Agency, particularly the failure to require post market monitoring by an independent body; the failure to require safety tests before outdoor planting commences; the failure to require monitoring for pollen movement; and the failure to require the removal of berries. By imposing weak conditions on the trial in Cambridge, Defra has made it cheaper and easier for BASF to grow its GM potato trials in the UK. It is not the job of Government to ease the path of the introduction of GM crops into the UK, but instead it should insist on the highest levels of protection for the environment, health and the local economy as a priority.

Should Defra grant the consent, very strict conditions must be imposed, including:

- Detailed written instructions and procedures for trial management, which must include:
 - o Removal of flowers prior to pollination (NIAB staff have confirmed that this is possible but they have not been required to do so by ACRE for the Cambridge site¹⁴)
 - o A separation distance of 1.5km between the trial and the nearest non-GM potato crop, including allotments or gardens.
 - o Complete removal of tubers post-harvest with measures to minimise any remaining tubers
 - o Complete destruction of both GM and non-GM potatoes post-harvest
 - o Secure storage separate from non-GM potatoes prior to planting and after harvest, with detailed and accurate record-keeping
 - o Thorough cleaning of all farm machinery and equipment after sowing, field operations and harvesting
 - o Checking of all vehicles used for transport to ensure no spillage can occur
 - o Planting of a spring cereal crop after the trial and complete destruction of any sprouting tubers with herbicide
 - o Trial site must be monitored post-harvest by an independent body for eight years for any sign of emergence of groundkeepers or true potato seed
 - o Planting of commercial non-GM potatoes in trial area prohibited for ten years
 - o Trial site must be secured to prevent wild mammals entering the site
- A requirement for BASF to provide a validated protocol for identification of the GM traits, together with positive and negative control samples
- Post release monitoring, by an independent body, of impacts on biodiversity, gene and pollen flow, and persistence of tubers and true potato seed.
- Strict liability on BASF for any economic losses incurred by farmers, or any damage to the environment or human/animal health as a result of the trials.

All costs arising from the conditions must be borne by BASF, not the British taxpayer

¹⁴ Meeting held on 26 March 2007 between NIAB, BASF and local residents.