



GM Team  
 Department for Environment, Food and Rural Affairs  
 Area 4D  
 Nobel House  
 17 Smith Square  
 London SW1P 3JR

20 February 2008

By email

Dear Sir/Madam,

**Application 07/R31/01 from University for Part B Consent to release GM Potatoes near Tadcaster, North Yorkshire**

I am writing on behalf of the members of GM Freeze to request that the above application to release GM potatoes modified to repel potato cyst nematode be refused.

GM Freeze is an alliance of 55 organisations calling for a moratorium on GM foods, the growing of GM crops for any purpose and on patents on genetic resources in agriculture, food production and forestry until the need for and safety of GM technology has been established and alternative approaches have been fully evaluated.

Our members include consumer groups, farming organisations, environmental groups, development agencies, religious groups, animal welfare groups and food companies.

GM Freeze does not believe that this trial should go ahead at the present time for the following reasons:

- 1. There is no demand** for GM potatoes now or in the immediate future, and therefore the trials represent an unnecessary risk to the environment and the integrity of the GM-free potato supplies in the UK.
- 2. There is no need** to use GM for potato cyst eelworm repellent potatoes because conventionally bred resistant varieties are already available which, if used in combination with long rotations, trap crops and good hygiene, can minimize yield losses. It is unclear how the introduction of GM PCN repellent potatoes will fit in with other sustainability objectives for farming as they may lead to shorter rotations and increase risk of pollution, soil erosion and pest and disease build up.
- 3. There is a risk that pollen could be transferred** by insects to crops in the vicinity, and the GM seeds resulting could germinate to contaminate future non-GM crops.
- 4. GM groundkeepers (volunteers) could persist** in the field for a number of years, certainly into a subsequent potato crop in the rotation.
- 5. Small GM tubers could be transferred off field** by machinery or even wild mammals and re-establish feral populations.
- 6. Lack of evidence is provided that unexpected side effects of the GM insertion have taken place**, or that they have any data on the food safety of the GM potatoes (aside from toxicity report for cystatins).
- 7. The applicants make reference to synthetic repellent genes but provide no data** to support their safety.
- 8. The presence of the neomycin resistant gene raises concerns about the long term risk of increasing antibiotic resistance** in pathogenic bacteria should the GM potato receive commercial approval. It should be removed.

**9. The applicant should demonstrate that they have proven that the GM proteins in the potatoes have not developed allergenicity** as a result of the genetic engineering events before the experiment proceeds

We would like to draw out the following on these points:

**on point 1. No demand for GM potatoes and impact on local growers**

All major supermarkets have a policy of not stocking GM products. This has been the case for a decade, and there are no indications from the major retailers (during our interactions with them) that they would alter their policy in the case of potato cyst nematode (PCN) repellent potatoes given that the pest can be contained using a variety management techniques.

Leeds University do not appear to have attempted to consult with local growers and beekeepers about the potential impact on their crops and businesses of the proposed GM potato trials. Gardeners, allotment holders and farmers intending to grow potatoes have not been informed of the exact location of the GM plots and so are unable to form an opinion about the risk of cross pollination.

GM Freeze believes that Defra should require Leeds University to carry out local consultations to ensure that no one will be harmed by the trial going ahead.

**on point 2. GM potatoes are not needed and do not fit into a sustainable system**

Damaging infestations of PCN occur if potatoes are grown too close together in the rotation. The number of cysts present in the soil reduces over time if no further potato crops are grown on the land (there is no evidence that PCN is mobile and can move independently from field to field). The presence of potatoes stimulates cyst to hatch and infestation to commence. Most potato varieties can cope with low levels of infestation. PCN numbers can be prevented from building up by adopting a rotation of 5 years or longer. Testing for PCN prior to sowing can enable farmers to avoid fields with PCN infestations that would threaten the yield of a crop sown that year.

Research has shown that the sowing a trap crop, which does not produce tubers, can stimulate PCN hatching, eg *Solanum sisymbriifolium*. This crop can be destroyed using cultivation once it has stimulated a PCN hatch and the pest would fail to reproduce<sup>1</sup>.

Good hygiene practices on and between farms can reduce the risk of PCN cysts being transferred in soil on tyres, harvesting equipment and footwear. Soil should be washed off in the field where the crop was harvested to avoid transferring cysts between fields. Such practices could be linked to farm support payments which could be withheld if farmers or contractors erred from best practice. Similarly potato washings should be deposited on the field of origin of the crop.

Long rotations are the key to controlling PCN. The use of PCN repellent GM potatoes may well tempt farmers into shorter rotations. This runs the risk of resistance to the repellent cystatins developing and may lead to a build up of other pests and disease to which the potato is susceptible. Thus the introduction of GM potatoes which repel PCN could work against the principles of sustainable crop management by:

- Increasing the risk of soil erosion (the bare soil in potato crops is prone to water and wind erosion)
- Increasing the risks of other potato pests and diseases (which number 600 in the UK) with a possible increases in pesticide use
- Reducing soil nutrients leading to increased use of artificial fertilizers.

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<sup>1</sup> Kerry B et al, 2003, *Investigations into Potato Cyst nematode Control*, Rothamsted Research, Defra Contract HH3111TPO available at [http://www2.defra.gov.uk/research/Project\\_data/More.asp?I=HH3111TPO&M=CFO&V=IACR](http://www2.defra.gov.uk/research/Project_data/More.asp?I=HH3111TPO&M=CFO&V=IACR)

The applicant will use this trial to assess the impact of the cystatins produced by the GM potatoes on other beneficial soil nematodes. GM Freeze believes that this research can be carried out in controlled conditions in greenhouses without the risk of GM pollen passing to surrounding crops and with a greater chance of controlling groundkeepers left in the soil.

The applicants appear to have assumed that the UK PCN species will remain susceptible to the repelling effect of cystatins in perpetuity. GM Freeze is concerned that the continuous presence of cystatins in potato root zones would lead to resistance in PCN developing over time. This would be a particular concern if PCN repellent potatoes were grown whether or not the pest was at dangerous levels and without a long rotation between crops.

Previous trials of the GM potatoes did not produce complete protection opening the way to resistance build up in the survivors<sup>2</sup>:

*In a field test, the best lines of potato cvs Désirée and Sante transformed to express the cystatin provided > 70% and 85% resistance respectively, relative to the untransformed cultivars. However, when transformed Sante was exposed to a virulent G. pallida population, the level of control declined to 51%. In more recent tests, transformed lines of Sante had improved resistance to G. pallida and the best line prevented populations of the nematode increasing [16]. In a similar approach, a cystatin gene from the tubers of potato cv. Jersey Royal has provided significant control (60%) of G. pallida populations when expressed in the roots of the same cultivar).*

GM Freeze therefore urges ACRE to reject this application to allow for the many management options available<sup>3</sup> to be fully researched and transmitted to potato farmers.

### **on point 3. Gene transfer**

GM Freeze is concerned that GM traits may escape from the test site via insect pollinators - in particular the pollen beetle (*Meligethes aeneus*), which is capable of carrying pollen over considerable distances. The formation of GM seeds in neighbouring, non-GM commercial and domestic potatoes could result in contamination of future crops destined for the market if seed derived from groundkeepers emerge in following years. Any presence of GM in a potato crop would make it illegal for it to be placed on the market.

According to the Leeds University application the GM modification has been engineered into Desiree – a variety known to flower and fruit profusely. No information on the viability or longevity of seeds in the soil is provided.

In view of the evidence on long distance pollen<sup>4</sup> movement and cross pollination in potatoes, GM Freeze requests that the application be refused on the grounds that Leeds University have failed to provide a proper assessment of the risks of cross pollination and the measure needed to prevent gene transfer.

There is no evidence to suggest that the applicants have assessed how many crops of potatoes are likely to be grown within the possible pollination zone for pollen beetles at the Tadcaster site. GM Freeze believe that this should have been carried out to allow local people to have their concerns properly heard.

<sup>2</sup> Kerry B et al, 2003, *ibid*

<sup>3</sup> Kerry B et al, 2003, *Investigations into Potato Cyst nematode Control*, Rothamsted Research, Defra Contract HH3111TPO available at [http://www2.defra.gov.uk/research/Project\\_data/More.asp?l=HH3111TPO&M=CFO&V=IACR](http://www2.defra.gov.uk/research/Project_data/More.asp?l=HH3111TPO&M=CFO&V=IACR)

<sup>4</sup> Emberlin J and Treu R, 2000. *Pollen dispersal in the crops Maize (Zea mays), Oil seed rape (Brassica napus ssp oleifera), Potatoes (Solanum tuberosum), Sugar beet (Beta vulgaris ssp. vulgaris) and Wheat (Triticum aestivum)*. Soil Association, Bristol.

**on point 4. Groundkeeper Control**

GM Freeze is concerned that recent winters in England would not produce the conditions to kill off tubers left in the soil post-harvest. Prevention of groundkeepers may well have to rely more on mechanical or chemical controls. Groundkeepers arising from seeds produced by the potatoes may not appear immediately, lulling the applicants into thinking that no more volunteers were present in the soil.

**on point 5. Movement of tubers**

Tubers (especially small ones) can be removed from site by wild animals and in machinery and on wheels. Measures to prevent this from occurring have not been set out by the applicants.

**Food safety**

There are a number of food safety issues that the applicants have not dealt with to the level we believe is required by a proper risk assessment. Consequently we do not think the trial should proceed until these points have been sufficiently addressed. We see no point in proceeding with research on certain aspects of how the GM potatoes interact with the environment if they have characteristics that may render them unsafe for human consumption.

**on point 6. Unexpected changes**

The applicants have failed to address other possible food safety aspects of the genetically modified potatoes (aside from the apparent lack of mammalian toxicity of cystatins) arising from other unexpected outcome of the genetic engineering events.

There are at least two examples where experimental GM potatoes produced entirely unpredicted outcomes in the parent. The first was a potato modified to have low levels of the NAD-malic enzyme. This modification had the surprising effect of increasing the potatoes starch content - an outcome the research team was unable to explain<sup>5</sup>. The second example comes from Germany when an attempt to introduce a yeast gene to increase starch content had the opposite effect and several unexpected compounds were formed by the disruption caused to the metabolism<sup>6</sup>. Research on GM potatoes<sup>7</sup> modified to produce an insect toxin was published in 1999. This research suggested a link between feeding GM potatoes and damage to the immune system and growth rates of rats. This research provoked much scientific controversy<sup>8</sup> at the time, but no follow up research has ever been carried out.

The applicants do not provide any evidence to show they have looked for such unexpected events in their GM potatoes or produced safety data.

GM Freeze believes that if the potatoes are to be marketed as food and feed there is little point in testing them unless they have been showed not to present a risk to health. In view of the lack of data on food safety submitted, GM Freeze request that the application be refused until such time as safety data becomes available.

**on point 7. Safety of synthetic repellent genes**

The applicant refer to "synthetic" repellent genes in Table 1 of Part A of the application. No data on the safety or stability of these genes is provided. GM Freeze believes it would be foolish to proceed any further with the development of these GM potatoes without the safety of thee genes being fully examined. ACRE should request further information from the applicants.

<sup>5</sup> BBSRC Business, Jan 1998. "Making crops make more starch" p6-7.

<sup>6</sup> Gura, T, 2000. "Reaping the plant gene harvest", *Science* 287, p412-414

<sup>7</sup> Ewan, SWB. & Pusztai, A, 1999. "Effect of diets containing genetically modified potatoes expressing *Galanthus nivalis* lectin on rat small intestine", *The Lancet* 354, p1353-1354.

<sup>8</sup> *Review of data on possible toxicity of GM potatoes*, 17th May 1999. The Royal Society, London.

**on point 8. Antibiotic resistant gene**

The presence of the antibiotic resistant gene (resistant to neomycin) is a major worry. GM Freeze believes that the gene is unnecessary for the purposes of the trial and should be removed. Although this group of antibiotic resistant genes used is approved by the European Food Safety Authority (EFSA) for use as markers in GM crops, the European Medicines Agency has challenged EFSA's opinion based on the potential importance of this group of antibiotics in medicine<sup>9</sup>. For instance, neomycin sulphate-containing Betnesol-N is currently used post cataract operations in the UK.

**on point 9. Lack of Allergenicity Testing**

The GM potatoes to be used in the trials contain altered genes from rice and "synthetic" repellent genes. ACRE will be aware of the research in Australia that found altered allergenicity in a protein when genetically engineered from its parent bean into peas<sup>10</sup>. GM Freeze believes that before development of these GM potatoes progresses any further, well designed allergenicity tests should be carried out as, firstly, cystatins have been found to be allergens (eg kiwi and cat), and, secondly, the lack of allergenicity of a compound produced in one organism does not guarantee the absence of allergenicity of this compound when produced in another organism.

**Conditions on consent for Leeds University**

If Defra mistakenly decide to grant a consent for the site at Tadcaster, it is essential that the trials are conducted in such a way as to minimise the potential impact on neighbouring farmers and growers and the environment. GM Freeze therefore recommends the following conditions be placed on any consent given:

- No other potatoes should be grown on the farm for the duration of the experiment.
- All potatoes in the trial should be destroyed on-site regardless of whether they are GM or not.
- A prohibition on future potato crops on the same land for 10 years.
- A requirement to monitor and control groundkeepers for 8 years or until none have appeared for two years.
- A requirement to remove flowers prior to pollination.
- A separation distance of 1.5 km between the trial and the nearest non-GM potato crop including allotments or gardens.
- All potato growers within 1.5 km should be informed in writing of the intention to grow GM potatoes and the impact should be independently assessed before approval is granted.
- A similar process should be carried out for beekeepers and crops requiring pollination in a 6 mile radius of the trial site.
- Fencing to prevent wild mammals entering the site.
- Leeds University should make a written undertaking to compensate any one for loss of income or reputation as a result of the trail and to make good any harm arising from it (eg the control and removal of GM groundkeepers from the land of neighbours).
- Monitoring of the site should be by an independent public body funded by the University of Leeds.

Yours sincerely,

Pete Riley  
Campaign Director GM Freeze

<sup>9</sup> <http://www.emea.europa.eu/pdfs/human/opiniongen/5693707en.pdf>

<sup>10</sup> [http://www.pi.csiro.au/GMpeas/PI\\_info\\_GMpeas.pdf](http://www.pi.csiro.au/GMpeas/PI_info_GMpeas.pdf)