



ADVISORY COMMITTEE ON RELEASES TO THE ENVIRONMENT

Advice on an application for deliberate release of a GMO for research and development purposes

Applicant: BASF Plant Science GmbH

Application: For a five year programme of work to release potato lines genetically modified for resistance to *Phytophthora infestans*

Ref: ¹06/R42/01

Date: 13th November 2006

Advice of the Advisory Committee on Releases to the Environment to the Secretary of State under section 124 of the Environmental Protection Act 1990

ACRE is satisfied that all appropriate measures have been taken to avoid adverse effects on human health and the environment from the proposed release and sees no reason for the release not to proceed on the following conditions. The holder of the consent shall:

1. in the two years following harvest of the GM potato tubers leave the area of release fallow and not plough but use only shallow tillage as required.
2. treat volunteers growing from true seed and groundkeepers in the fallow years with an application of glyphosate herbicide or hand pull potato plants prior to flowering. In subsequent years the appropriate herbicides should be used to control potato plants growing from true seed and from groundkeepers prior to flowering. Alternatively, plants growing from groundkeepers may be hand pulled.
3. notify the following information at the times shown:

the effects of the release as authorised by the consent, for the assessment of any risks there are of damage to human health and the environment from the genetically modified organisms concerned. This should be in the form of reports submitted:

- either one month after the date of termination² of each release in the programme of work or by 30 November in the year each trial was terminated whichever is the sooner;

¹Application reference 06/R42/1 dated 21 August 2006 taking into account all information and amendments in the applicant's communications received 31 August and 8 September 2006.

² For the purposes of this consent 'termination' occurs when the tubers resulting from the seed potatoes are harvested or otherwise removed from the environment. The latter may include, but is not limited to, the removal of plant material following vandalism.

- annually on the anniversary of the date of the termination of the release or by 30 November, whichever is the sooner to cover post-trial monitoring for;
 - assessment of the effectiveness of measures to control groundkeepers and volunteers, and
 - the re-evaluation of the post trial monitoring requirements
- 4. report and control all groundkeepers and volunteers until a period of two years when no groundkeepers or volunteers are observed has elapsed.
- 5. ensure that during any post-trial monitoring period remaining after the fallow period that a crop in which groundkeepers and volunteers may be easily identified and controlled is cultivated on the release site.
- 6. ensure that any potato crop harvested from the release site in subsequent years must comply with the current legislation regarding traceability and labelling of GM products and measures must be taken to ensure that unauthorised GM potatoes are not placed on the market as a result of Part B releases under this consent.

Comment

ACRE considered the risks to human health and the environment posed by the proposed release of potatoes genetically modified for resistance to *Phytophthora infestans*. The Committee has addressed a number of points in its safety assessment including scientific issues raised in public representations.

Key characteristics of this release for risk assessment are that :-

- i) The trial will be on a relatively small scale. This application is to release a total of 450,000 GM potatoes over a 5 year period. The applicant has proposed that the release will take place at two sites, at each site the GM potato plants will occupy no more than 1 hectare in an experimental plot of less than 2 hectares in each year of the trial.
- ii) The GM potatoes produced as a result of this release will not be put into the human food chain or fed to livestock.

In reaching its view on the current application ACRE considered the results of post-market monitoring provided by consent holders from previous trials where GM potatoes were released.

The molecular characterisation of the GM potato lines to be released in this trial confirmed that a gene conferring resistance to the antibiotic spectinomycin (*c-aadA*) was not present in the GM lines to be released. ACRE notes that the copy number of the inserts in the GM lines to be released is not known and that the presence of sequences from the plasmid vectors cannot be ruled out. However the Committee concludes that none of the inserted genes (*Rpi-blb1*, *Rpi-blb2* and *ahas*) or backbone sequences are likely to pose a risk to human health or the environment in the context of the proposed release.

Cultivated potatoes are a low-risk crop for pollen-mediated gene flow because they are highly self-compatible and cannot cross with other UK wild species to produce viable offspring. A chain of events would be necessary in order for a potato containing a GM event to enter the human food chain. Firstly pollen containing a GM event would have to be produced, this occurs to a variable degree in potato plants since some cultivars produce few flowers, BASF has indicated that some of the cultivars proposed for use in this trial frequently produce

flowers and set seed and therefore this can be regarded as likely. The second stage is the successful transfer of the pollen to a non-GM potato growing in a commercial crop. This relies on pollen being transported by the wind or by insects, pollen dispersal typically tails off with distance from the pollen source. ACRE recognises that rare long-distance cross-pollination events are possible, especially where pollen beetles are common in the release area. However, cross-pollination frequencies reduce dramatically over distance and pollen competition from within a non-GM crop reduces the likelihood of successful hybridisation further. If pollen containing a GM successfully hybridised resulting in a GM seed, the chances of the seed successfully germinating and surviving until harvest as a tuber in a non-GM potato crop are low because potatoes are usually grown in rotations and the volunteers resulting from true seed are very vulnerable to herbicide applications and crop competition.

The applicant has proposed a separation distance of 20 metres to non-GM potato plants growing around the trial and ACRE therefore considers that the probability of cross-pollination occurring is minimal.

ACRE notes that the information provided on the layout of the release site is not comprehensive, however the Committee recognises that these details are required primarily for enforcement and do not affect the risk assessment of this release. The Committee also notes that the release will be overseen by the GM inspectorate and that it is appropriate given the experimental nature of the programme of work for details of plot designs to be provided at the time of the release.

BASF has indicated that the trial will be fenced to prevent entry of wild animals. Potatoes are not generally eaten by wild animals due to the natural presence of toxic chemicals in plant foliage. ACRE sees no reason to fence the trial since this is likely to have a minimal impact in reducing the transfer of tubers away from the trial site by involuntary means.

ACRE considered the post harvest monitoring plans proposed by the applicant. Monitoring of previous releases of potatoes has revealed that groundkeepers may persist for many years after the initial release, in addition to this potato plants in this trial will be allowed to set true seed. ACRE advises that the area on which potatoes have been released should remain fallow for two years following the release to allow tubers and true seed to remain near the soil surface. Additionally ACRE recommends that in the two years following harvest of the potato tubers shallow tillage should be the only form of cultivation used on the release area. Furthermore the Committee considers that BASF should monitor the trial area until it has been clear of potato groundkeepers and volunteers for a period of two years and that crops which facilitate the removal of potato groundkeepers and volunteers are grown throughout the remaining post-trial monitoring period.

Items arising from public representations

ACRE considered sixteen representations received from members of the public on this application with respect to the scientific issues. The Committee considered the comments relating to separation distances, survival of potato tubers and cross pollination.

One study referred to in public representations (Skogsmyr et al., 1994³) indicated that cross-pollination events occur at distances of up to one kilometre. ACRE commented that the Skogsmyr study had no controls for the PCR on which this conclusion was based and therefore that the information provided was not reliable. A later comprehensive review of studies relating to gene flow in potatoes indicated that “a distance of 20 metres is generally

³ Skogsmyr, I. (1994) Theoretical and Applied Genetics 88:770-774

adequate to prevent cross-pollination with non-GM crops” (Conner & Dale, 1996⁴). However, as explained in detail in the text above, cross pollination is just one event in a chain of unlikely events that would be needed to contaminate potato crops outside the trial area.

The Committee considers that other issues raised in these representations did not affect the risk assessment given the scale of the release and the fact that tubers from this release were not destined for the food chain of humans or livestock.

ACRE was content that all issues raised had been considered thoroughly during the Committee’s assessment of the dossier. ACRE was satisfied that no new issues had been raised from the public with respect to this application.

⁴ Conner, A.J. and Dale, P.J. (1996) Reconsideration of pollen dispersal data from field trials of transgenic potatoes. *Theoretical and Applied Genetics*, 92, 505-508.