



## ADVISORY COMMITTEE ON RELEASES TO THE ENVIRONMENT

### *Advice on a notification for marketing of insect resistant and herbicide tolerant GM maize*

<b>Notifier:</b>	Syngenta seeds SAS
<b>Notification reference:</b>	C/F/96/05/10
<b>Product:</b>	Maize genetically modified for insect resistance and herbicide tolerance, transformation event Bt11.
<b>Scope:</b>	For the import and use of grain varieties derived from maize transformation event Bt11, and conventional hybrids, as for any other maize including cultivation.
<b>Date:</b>	11 September 2003

**Advice of the Advisory Committee on Releases to the Environment (ACRE) under S.124 of the Environmental Protection Act 1990 (Part VI) to the Secretary of State for Environment, Food and Rural Affairs, Scottish Ministers, Ministers of the Welsh Assembly Government and the Department of Environment (Northern Ireland).**

**Primary advice:** ACRE has considered this notification for the import, cultivation and use of insect resistant and herbicide tolerant maize based on transformation event Bt11. The Committee does not consider that sufficient information has been provided by the notifier to allow a full assessment of potential risks to human health and the environment. In coming to this conclusion ACRE have taken account of the advice of the Advisory Committee on Animal Feedstuffs Genetic Modification (ACAF GM) Sub-group who have recommended that further data be sought on the composition and nutritional value of vegetative parts of the maize in the assessment of this line. Before ACRE can complete its assessment the following information is required.

1. Further details of the data provided supporting the absence of the antibiotic resistance marker gene (*amp*) from line Bt11.
2. The sequences of the DNA flanking the single insertion site of the expression cassette should be provided together with bioinformatic analysis aimed at investigating the disruption of endogenous, or creation of novel, open reading frames.
3. Data demonstrating that vegetative parts of maize containing Bt11 (as fresh green material and silage) is safe and nutritionally equivalent as other maize lines and Bt11- grain animal feed.

4. An environmental risk assessment of the impacts of altered management practices associated with the cultivation of Bt11 maize, including consideration of the impact of the insect resistance trait, altered herbicide regime and any potential cumulative effects of the two traits and associated changes in management.
5. An improved post-market monitoring plan that takes into account any risks identified in the environmental risk assessment, and tests any assumptions made in the environmental risk assessment.
6. A detection protocol that will detect event Bt11 and no other transformation events.

### **Comment**

Consent to import, store and process grain derived from maize containing transformation event Bt11 has previously been granted under Directive 90/220 (Ref: C/GB/96/M4/1). This consent was issued, in line with ACRE's advice, by the UK on 9 June 1998 in accordance with Commission Decision 98/292. This consent remains in effect, and the present application is concerned with extending consent to encompass cultivation.

### **Molecular characterisation**

Molecular characterisation of Bt11 has been provided and ACRE remain content that the data provided support the conclusion that the inserted DNA sequences are present as a single copy and have not been subject to significant rearrangements. The Committee considered that two further points need to be addressed to complete the characterisation of the inserted DNA:

- The experiment designed to confirm that the antibiotic resistance marker (*amp*) is absent from Bt 11 (Appendix 3) uses DNA from line Bt10 as a positive control, demonstrating the ability to detect the *amp* sequence under the conditions of the experiment. However, the copy number of the *amp* gene in line Bt10 is not determined, so the value of this positive control is limited. The Committee requests further data supporting the use of DNA from line Bt10 as a positive control.
- The sequences of the DNA flanking the single insertion site of the expression cassette is not provided. These data are important because they allow examination of the sequence for the presence of disrupted endogenous open reading frames, or the presence of novel open reading frames generated by the insertion. The Committee requests that this sequence information is provided, together with a suitable bioinformatic analysis.

ACRE did not consider that the PCR detection protocol provided was truly event specific. The method is based on amplification of a sequence within the inserted DNA, so that any transformation event containing this insert would produce a positive result. The Committee consider that event specific detection methods should ideally involve amplification of sequences spanning the junction between the inserted DNA and endogenous plant DNA.

## Animal feed safety

The safety and nutritional equivalence of grain derived from maize containing transformation event Bt11 was assessed as part of the application to import grain (C/GB/96/M4/1) and neither ACRE nor ACAF are aware of any new information which changes previous assessment. However, cultivation of Bt11 maize in the EU will allow the use of vegetative parts of maize (as fresh green material and/or silage) derived from this line in animal feed. While the safety of the expressed novel proteins in Bt11 maize have been demonstrated, compositional analysis and feeding studies have only been carried out with grain. Data demonstrating that silage and fresh maize containing Bt11 is safe and nutritionally equivalent as grain animal feed should be provided.

## Environmental risk assessment

ACRE considered carefully the environmental risk assessment (ERA) for Bt11 maize provided by the notifier. The Committee did not consider that this assessment had been carried out in full. In particular, the ERA does not consider the possible indirect effects due to changes in management associated with the use of Bt11 maize. There are a number of areas that need to be addressed before the ERA is complete:

- Impact of altered weed management. The notifier states that the glufosinate tolerance trait is used only as a selectable marker. However, the presence of this trait in Bt11 maize would allow the use of an altered weed management approach based on this broad spectrum herbicide. This may have an impact on the biodiversity of organisms dependent on weeds for food, which, in turn, may impact on higher trophic levels. The results of the Farm Scale Evaluations of herbicide tolerant crops in the UK, which will be published shortly, will inform this part of the risk assessment.
- Impact of insect resistance trait on non-target insects. The notifier provides considerable evidence that the CRY1A toxin present in Bt11 maize has limited effect on organisms other than Lepidoptera, although the Committee notes that this is largely based on laboratory studies or data from North America rather than Europe. A number of European studies are cited but these are difficult to obtain – the Committee requests that the notifier provide copies of ABSTC (2002), Candolfi et al. (2002), Lozzia et al. (1999) and Lozzia and Rigamonti (1998) with translations into English as appropriate. A consideration of the wider biodiversity impacts of any effects on non-target insects should be included.
- Impact of insect resistance trait on target insects. The ERA does not consider fully the potential wider biodiversity impact of the insect resistance trait resulting from the effect on target insects. This consideration should not only include consideration of the primary targets *Ostrinia nubilalis* and *Sesamia nonagrioides* but also consider whether there are potential maize or grass feeding Lepidoptera in the UK that might be affected.
- Cumulative effect of changing management practices. As well as the assessment of the wider biodiversity impacts of the individual traits in Bt11 maize, and their associated management practices, the ERA should also consider the potential cumulative impact of the traits. For example, is the impact of the insect resistance trait on non-target Lepidoptera likely to be exacerbated by altered floristic balance within fields caused by changes in herbicide use?

## **Post market monitoring**

The aim of the case-specific part of the post market monitoring plan is to investigate risks identified in the ERA, and also to test any assumptions included in the ERA. The current plan for case-specific monitoring is focussed on monitoring to test the effectiveness of the Insect Resistance Management (IRM) strategy. While the Committee consider the IRM and monitoring of resistance to be adequate, the notifier will need to modify considerably the case-specific monitoring plan to take into account the additional requirements for the ERA outlined above. For example, depending on the outcome of the revised ERA, it may be appropriate to monitor changes in populations of target and non-target insects. In drawing up a revised case-specific monitoring plan the notifier should also consider the appropriate timeframe for reporting the outcome of monitoring to the regulatory authorities – this should be as frequent as is compatible with the type of monitoring study being carried out.