
Public information sheet

AVENTIS CROPSCIENCE N.V.

Field evaluation of hybrid and parental *Brassica juncea* lines

European Notification number

B/BE/01/V3

Upon advice of the Biosafety Council and the Service of Biosafety and Biotechnology of the Scientific Institute of Public Health – Louis Pasteur, the Belgian Ministry of Agriculture has granted consent to Aventis CropScience N.V. to perform experiments in the year 2001 in accordance with their application B/BE/01/V3.

This program will be executed in Flanders on the territory of the village of Dikkele (Zwalm) and will follow the normal growing period of Indian mustard (*Brassica juncea*) that runs from May till October 2001.

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2. Description of the genetically modified plants

Brassica juncea is principally grown as a source of condiment for the spice trade. It is known as 'brown' or 'Oriental' mustard, having two forms with dark brown (formerly 'Sarepta') and golden-yellow seed coats, respectively. Apart from being used as a spice, mustards are widely used as leaf and stem vegetables and as a salad crop in the Far East and Southeast Asia, and for green manuring or as a fodder crop mainly in Western Europe. *Brassica juncea* is also an important oilseed crop, particularly in the Indian subcontinent, China and the south-western areas of Ukraine. It is grown to some extent in Canada and the United States.

The new characteristics to be evaluated in these plants are the following:

Male sterility/Restorer of fertility

These two characteristics are the basic elements for obtaining hybrid plants.

Hybrid plants are the result of a cross between two parental lines.

Herbicide tolerance

The plants are tolerant for agricultural applications of the herbicide glufosinate ammonium (Liberty™). As a result these plants can be identified and selected in a efficient manner.

3. Purpose of the experiment

The aim of the field trials is to increase plant material.

4. Advantages for the environment, the farmer and the consumer

With the new hybridisation technique of Aventis CropScience the breeder can have access to an efficient system which will enable him to produce hybrids in crops that were not fit for that in the past.

Hybrid plants are the result of a cross between two parental lines. The interesting characteristics of both parents are combined in the new plant. Hybrid varieties grow better, bring more stable yield and are better protected against diseases and plant pests. Since the beginning of this century breeders have been working with hybrid seeds. In corn and most of the vegetable crops, commercial hybrids have been grown successfully for decades now.

For the farmer, growing better and stronger crops results in higher profits (by reducing the general costs) and in addition, a strong crop can lead to a lower input of crop protection products and a more effective use of fertilisers in the plant.

The environment – and as a consequence the consumer as well – will profit from this.

5. Biology and life cycle of the plant

5.1. Weediness of the plant

Brassica juncea does not appear as a weed in the trial area or its immediate surroundings. Volunteer plants can be found in subsequent cropping. In all cases suitable methods for managing are available. Based on the introduced functions and the unchanged behaviour of the transformed lines, no shift in niche or habitat is anticipated.

5.2. Survival and dissemination of seeds

Survival of *Brassica juncea* is limited to the seed phase. Seeds can remain dormant for several years under optimal conditions. However, oilseed rape seeds also tend to be readily germinating when conditions are favourable, e.g. shallow cultivation, irrigation or rain fall, etc.. Seeds will come into the environment at two stages of the proposed trial: at the onset seeding of the trial and at harvest, when a minor quantity of seeds can be anticipated to escape from the harvesting machines. Leakage or shedding from overripe varieties is not anticipated, since it is crucial for the value of the trials to harvest at the right point in time.

Dissemination can occur at the seed stage. Oilseed rapeseeds are small and round, and although they have no special adaptations such as hairs for passive transport, losses may be anticipated when handling the material. Such handling is limited to the packaging of seeds, the seeding of the trial, harvesting and further handling of the seed. No important losses or dissemination are anticipated.

6. Potential environmental impact

6.1. Outcrossing capability and establishment in natural ecosystems

6.1.1. TRANSGENIC POLLEN DISPERSAL

Pollination in *Brassica juncea* essentially occurs through wind and by insects. Although pollen can disperse over larger distances, the majority of successful pollination will occur at short distance.

Furthermore, the chances for a successful exchange of genetic material are in practice restricted to the closest relatives (*Brassica rapa* en *Brassica napus*).

6.1.2. SEED DISPERSAL

The staff in charge of the execution of the trial will make sure that all the seeds are harvested. The procedures for transport and seed treatment aim at reducing the seed loss to an absolute minimum.

6.1.3. SELECTIVE ADVANTAGE

The transformed plants will only get a selective advantage when standing in a field treated with a herbicide containing glufosinate ammonium as active ingredient. Various field trials with glufosinate ammonium tolerant varieties and post-commercial monitoring in Canada (since 1995) have demonstrated that the LibertyLink™ characteristic does not cause a selective advantage.

6.2. Interaction with target organisms

There are no target organisms.

6.3. Interaction with non-target organisms

There are no non-target organisms.

6.4. Impact of large scale and long term use

The development of new products follows a carefully described procedure that is followed by a step by step introduction of the product.

Aventis CropScience has a large experience with the introduction of genetically improved crops. Aventis CropScience' hybridisation technique has been tested in several crop for years (since 1989) on different locations world-wide and under diverse climate conditions.

All the observations done since the first introduction have demonstrated that the introduction of this genetically modified crop causes no damage to the environment or leads to the disturbance of natural balances.

7. Measures taken for the management of risks

7.1. Control of pollen dispersal

Maintaining an isolation distance from commercial *Brassica juncea* fields (at least 1000 m) will control pollen dispersal. The trial location will be checked on the presence of wild *Brassica* species, which will be destroyed.

7.2. Control of seed dispersal

The drill used to sow the experiment involving transformed rapeseed will be clean of seeds when it goes to the trial area. Seed of the transformed rape will be put into the drill within the planting area.

7.3. Post-harvest treatment

After termination of the trial, the trial area will be checked on a regular basis. Volunteers and wild relatives will be eliminated using an appropriate treatment.

8. Follow-up

In subsequent years the field will be brought back into normal cultivation but will be monitored for the emergence of volunteer rape plants, which will be destroyed by cultivation or herbicide treatment as appropriate. Control of volunteers is part of normal farm practice anyway.

9. Destruction method

After termination of the trial the remaining vegetative plants parts will be destroyed. It is foreseeable that a small quantity of seeds is released and will fall in the field at harvest time. These seeds will be left on the field for a couple of weeks to encourage germination. The germinated plants will be destroyed by a herbicide treatment or light soil cultivation.

10. Emergency response

As soon as any contra-indication on the level of health and/or environment occurs - and this will in the first instance be observed by the people involved in the trial design and execution - the trial will be stopped. The proper authorities will be informed in order to carry out additional inspections.

11. Inspections

The Inspectorate General of Raw Materials and Processed Products of the Belgian Ministry of Agriculture is in charge of the supervision of field trials involving transgenic material. In order to plan their inspections, the notifier has to inform the competent body about the sowing and harvest dates. Inspectors will watch over the execution of sowing and harvesting activities in the field, being in accordance with the ministerial approval in the protocols. In addition the inspector will sample plant material for analysis in an official laboratory.

12. Socio-economic aspects

This project fits in with a more general concern for a highly performing and sustainable agriculture and the continuous breeding and selection activities involved. Improving crop performance and yield can meet the growing demand for food and restrict a further extension of agriculture acreage or possibly make it unnecessary.

Growing these genetically improved plants does not require any specific knowledge or qualifications of the farmer. It does not involve any specific infrastructure and does not lead to additional costs in respect of the conventional culture.
