

Report on BUS-ticket C2<sup>1</sup>

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## Developments in genetically modified oilseed rape

### 1. Introduction

Oilseed rape (*Brassica napus*) is cultivated on a large scale as an oil plant from which oil can be pressed for numerous food and non-food applications including biodiesel. Biofuels are irrefutably the way forward. However, oilseed rape is also one of the four crops subject to the most genetic modification worldwide. Globally, oilseed rape is one of the most important crops for which genetic modification (GM) is applied in practice on a large scale. However, GM is not always acceptable as far as sustainability is concerned. There is therefore a real risk that a certain proportion of liquid biofuels consists of genetically modified oil. This paper deals with the issue of GM oilseed rape.

### Questions

First question is the amount of GM oilseed rape and the possibility to distinguish it. Second issue is the opinions of non-governmental organisations about GM oilseed rape.

## 2. Genetically modified oilseed rape: how much and where?

### *GM-crops worldwide*

Worldwide, GM crops are already being cultivated on 48 million hectares of land, according to estimates by the FAO (2000). The growth in the number of hectares of GM crops is enormous: 15% in 2003 and 20% in 2004 (ISAAA, 2004) and ISAAA (2004) mentions 81 million hectares of GM crops in 2004. Other information sources estimate the area used for GM crops as being 58 million hectares in 2002, 3 million hectares of which were used for GM oilseed rape.<sup>2</sup> Greenpeace (also) assumes an area of approximately 80 million hectares of GM crops in 2004.

Of the 48 million hectares of GM-crops in 1999 99% are in the USA (29 million hectares), Argentina (13.5 million hectares), Canada (3.5 million hectares) and China (2.1 million hectares).

Approximately 16% of the global acreage of soya, maize, cotton and oilseed rape already consists of GM crops. These four crops are the most relevant concerning GM-variants. Three-quarters of the genetic modifications of agricultural crops relate to herbicide resistance (glyphosphate) and almost 20% relate to the addition of the *Bacillus thuringiensis* bacteria, whereby the plant produces its own insecticide. Approximately 5% is a combination of both types of modification.

### *Oilseed rape and GM-oilseed rape*

In 2003, a total of 23 million hectares of oilseed rape were cultivated worldwide (source: FAO), of which 3.6 million hectares (16%) were GM oilseed rape (Clive, 2003).

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<sup>2</sup> [http://www.australianoilseeds.com/\\_data/page/237/Fast\\_Facts\\_2\\_-\\_Trade\\_Implications\\_GM\\_Canola.pdf](http://www.australianoilseeds.com/_data/page/237/Fast_Facts_2_-_Trade_Implications_GM_Canola.pdf)

In 2004, 4.3 million hectares were being used for GM oilseed rape (ISAAA,<sup>3</sup> 2004). Opponents of GM refer to a different figure for 2004, namely 3.7 million hectares. For 2003, they also state the number of hectares as being 3.6 million (Network of concerned farmers, 2004).

GM oilseed rape is cultivated mainly in Canada and the USA where it is usually referred to by the brand name Canola.<sup>4</sup> In 2003, 3.19 million hectares of GM Canola were cultivated in Canada and 0.41 million hectares in the USA (Brookes, 2004; Network of concerned farmers, 2004). A projection of this ratio for 2004 gives us 3.75 million hectares in Canada and 0.55 million hectares in the USA. Half of the acreage of oilseed rape in Canada now consists of genetically modified oilseed rape (canola), corresponding with 2.4 million hectares out of a total of 5 million hectares (1998 figures).<sup>5</sup> More recent figures indicate that two-thirds of the Canadian oilseed rape acreage already consisted of GM canola in 2002.<sup>6</sup>

Rapeseed oil from GM Canola contains no GM material and is therefore identical to rapeseed oil produced from non-GM Canola (Canola Council of Canada). Another source speaks of “no major difference” between GM Canola oil and non-GM Canola oil. However, this source does not state what that minor difference is (Donaldson, B. 2004).

### *GM-oilseed crops in EU*

The EU will be investing heavily in increasing the market share of liquid biofuels over the coming years. Part of this will come from oleaginous crops, the most important of which is oilseed rape. The annual production of oilseed rape worldwide is 40 million tonnes, from which approximately 10 million tonnes of oil can be made. Production mainly takes place in the EU, Canada, India and China. Within the EU, oilseed rape is most common in France, Germany and the UK.<sup>7</sup>

The development in the market introduction of GM crops makes oilseed rape a questionable raw material for biodiesel (and, or course, for many other food and non-food applications). The cultivation of GM crops is currently still prohibited within the EU, but the Commission is becoming increasingly lenient in allowing GM products onto the European market. Field tests are actually already permitted. The EU has permitted imports of genetically modified oilseed rape since 1997<sup>8</sup>, with all the risks of unintentional dissemination, as demonstrated by a recent Greenpeace report on Japan.<sup>9</sup> It is therefore certainly not unthinkable that there could soon be large quantities of genetically modified rapeseed oil on the European market (see box 1). Genetically modified products are generally not routinely kept separate from conventional product and can therefore form a considerable proportion of the imports.<sup>10</sup>

<sup>3</sup> ISAAA (The International Service for the Acquisition of Agri-biotech Applications) is a not-for-profit organisation that delivers the benefits of new agricultural biotechnologies to the poor in developing countries.

<sup>4</sup> Canola (**Can**adian **oil** **low** **acid**) is a variety of oilseed rape with less than 2% erucic acid and less than 30 micromol/g of glucosinolate (Canola Council of Canada).

The old varieties up until about 1978 contained both erucic acid and glucosinolate. There was a switch from the normal varieties to single zero varieties (1979) and double zero varieties (1990). Varieties with low levels of erucic acid in the seed were called single zero varieties. Varieties that were both low in erucic acid and glucosinolate were called double zero varieties. (Bernelot Moens H.L. and Wolfert J.E., 2003).

<sup>5</sup> <http://stockholm.usembassy.gov/biotech/oilseedrape.html#transgenic>

<sup>6</sup> [http://www.australianoilseeds.com/\\_data/page/237/Fast\\_Facts\\_2\\_-\\_Trade\\_Implications\\_GM\\_Canola.pdf](http://www.australianoilseeds.com/_data/page/237/Fast_Facts_2_-_Trade_Implications_GM_Canola.pdf)

<sup>7</sup> <http://www.eufic.org/gb/tech/tech02b.htm>

<sup>8</sup> On Friday 24 June 2005, the European Commission pronounced its approval of the import of Monsanto's transgenic oilseed rape variety GT73. GT73 is the third genetically modified product to be approved since the EU put an end to the non-acceptance of this type of crop last year. Monsanto has requested approval for the use of this oilseed rape in animal feed and in industrial applications (AgriHolland 28/06/05).

<sup>9</sup> <http://www.greenpeace.org/raw/content/international/press/reports/canola-report.pdf>

<sup>10</sup> [http://www.australianoilseeds.com/\\_data/page/237/Fast\\_Facts\\_2\\_-\\_Trade\\_Implications\\_GM\\_Canola.pdf](http://www.australianoilseeds.com/_data/page/237/Fast_Facts_2_-_Trade_Implications_GM_Canola.pdf)

### Box 1: An example of the European decision-making process<sup>11</sup>

On 11 February 2004, the European Food Safety Authority (EFSA) Scientific Panel on Genetically Modified Organisms concluded that "... GT73 oilseed rape is as safe as conventional oilseed rape and therefore the placing on the market of GT73 oilseed rape for processing and feed use is unlikely to have an adverse effect on human or animal health or, in the context of its proposed use, on the environment.' Once a GMO application has received a positive safety assessment from the EFSA, a 'Draft Decision' is sent for approval to the appropriate Regulatory Committee (in this case under the Committee covered by Directive 2001/18/EC). The Committee comprises representatives of the member state concerned. A qualified majority of votes (88 out of 124) in favour of the application is needed to approve an application. Member states' votes are weighted on the basis of their population and corrected in favour of less-populated countries. Following a vote in the Regulatory Committee on 16 June 2004 on the release of genetically modified organisms into the environment, the decision to authorise the imports and processing of the genetically modified oilseed rape known as GT73 will pass on to the Council of Ministers. The Committee, which was set up under Directive 2001/18 and represents the member states, did not reach the qualified majority necessary to support the Commission proposal to authorise the oilseed rape. Over the coming weeks, the European Commission will now formally adopt the proposal to be sent to the Council of Ministers. The Council can either adopt or reject the proposal with a qualified majority. If no decision is taken after three months, the file returns to the Commission, which can then adopt it. If authorised, the oilseed rape, which has been modified for increased tolerance to the herbicide glyphosphate, would be clearly labelled as containing GM oilseed rape, in accordance with the new legislation in force since 18 April 2004.

### 3. Risks of NGOs about GM-oilseed rape, according to non-governmental organisations

One of the main objections to genetically modified crops is the risk of the spread of extraneous genes to the surrounding area. Transgenic contamination has already been detected for oilseed rape and maize.<sup>12,13</sup>

"Over 60 incidences of illegal or unlabelled GE contamination have been documented in 27 countries on five continents. Genetic contamination may occur as a result of a GE plant cross-breeding with conventional varieties of the same species, or with other related species. It may occur as a result of human handling, storage or transport errors, or of wind, pollination, water or movement by animals," according to the Worldwide GE Contamination Register compiled by Greenpeace and Genewatch UK, June 2005<sup>14</sup>

Most conservation and environmental organisations consider genetic modification undesirable as well as unacceptable from the perspective of sustainability and the certification of sustainability. However, it is not only NGOs that are hesitant with regard to GM crops. For example, the majority of Australian farmers (who planted 2 million hectares of oilseed rape in 2002) are against the introduction of GM oilseed rape.<sup>15</sup> "An Australian study found that

<sup>11</sup> <http://www.foodstandards.gov.au/mediareleasespublications/factsheets/factsheets2004/gmcanolasafetyassess2498.cfm>

<sup>12</sup> [http://www.foe.co.uk/resource/media\\_briefing/government\\_to\\_publish\\_the.pdf](http://www.foe.co.uk/resource/media_briefing/government_to_publish_the.pdf)

<sup>13</sup> <http://www.cbc.ca/stories/2002/06/27/gncanola020627>

<sup>14</sup> <http://www.greenpeace.org.au/truefood/news2.html?mode=intl&newsid=239>

<sup>15</sup> [http://www.control.com.au/bi2003/articles246/feat\\_246.shtml](http://www.control.com.au/bi2003/articles246/feat_246.shtml)

*gene-carrying pollen from GM canola can travel up to three kilometres on the wind or insects, whereas the present isolation distance between GM and non-GM canola is usually only 100m wide.*<sup>16</sup> In Canada there are major objections to GM oilseed rape within the National Farmers Union. They are even supporting a lawsuit against it: “*Mass contamination following the introduction of GM canola means that organic farmers now find it virtually impossible to grow organic, GM-free canola.*”<sup>17</sup>

A few non-governmental organisations have been asked for their opinions about GM-oilseed rape: HIVOS, Greenpeace, IUCN and the World Wildlife Fund. It seems that those organisations are aware of the risks of GM-oilseed crops. Within this paper their opinions are given.

*The opinion of HIVOS (development organisation)*<sup>18</sup>

In the case of oilseed rape, HIVOS is very concerned that the GE (genetically engineered) versions will rapidly cross-breed and mix with non-GE varieties. This is almost inevitable, according to HIVOS. No safe distances can be determined at which the risk of the crop cross-breeding is zero. The Terlouw committee concluded that the Netherlands is too small to prevent the cross-breeding of GE oilseed rape.

HIVOS: “GE-free oilseed rape will therefore soon be a thing of the past. Oilseed rape also has related wild plants, which are also likely to become “contaminated” rapidly. The environmental damage will be irreparable. The consequences for human consumption are unclear. Great prudence is therefore called for. This means that the large-scale introduction of GE oilseed rape in Europe and, in particular, its cultivation must be prevented as far as possible.”

According to HIVOS the large-scale cultivation of the herbicide-resistant variety would bring with it the risk of an ecological disaster due to the rapid increase in the amount of herbicide used. There are now also doubts about the potential health hazards posed by “Roundup Ready” (to which the herbicide-resistant GE oilseed rape is resistant), as it could be an “endocrine disruptor.” (A French research institute published the first suspicions in February 2005.) In short: according to HIVOS, it is undesirable and a major hazard for humans and the environment. In any event, “we should work to prevent the increase in the cultivation of GE oilseed rape and its spread across the world”.

*Greenpeace*<sup>19</sup> (campaigner against genetic manipulation)

Greenpeace is an opponent of the use of genetically manipulated crops in the open natural environment. The technology is still in its infancy and the environmental consequences of the cultivation of this crop are therefore unpredictable. Such consequences are also uncontrollable and irreversible since genetic manipulation relates to living organisms that reproduce.

Furthermore, one cannot see from a plant’s appearance whether it has been genetically manipulated or not. It is therefore impossible to return to the original situation.

For every solution to a problem, one needs to make sure that the solution is not ultimately worse than the problem. In the case of genetic manipulation, this is a very real risk. The environmental consequences could be so serious that we are ultimately confronted with a bigger problem than the one we were trying to resolve. Mother nature has already shown us that huge problems can be caused by introducing extraneous plants or animals in a new

<sup>16</sup> <http://www.percyschmeiser.com/Gene%20Flow.htm>

<sup>17</sup> <http://www.nfu.ca/canola.htm>

<sup>18</sup> Harrie Oppenoorth

<sup>19</sup> Sandra Schalk

environment. Examples include the rabbits in Australia, African killer bees in South America, which are now advancing towards North America, and the Nile perch in Lake Victoria.

For a genuinely sustainable solution to problems, one must therefore look at all aspects of the three Ps from a long-term perspective. A serious consideration of the P of Planet and the P of People is therefore required. Genetic manipulation is not viewed very positively where the P of People is concerned (as small-scale farmers are pushed out, and also with regard to the whole problem surrounding patents).

The same therefore applies to the production of biomass: the solution must not be worse than the problem. In our opinion, if the solution is sought in genetically manipulated crops grown in the open natural environment, then that solution is automatically no longer a sustainable one. Some of the consequences are uncertain, but a number of consequences for Planet and People can be seen straight away: increased use of herbicides, large-scale land use at the expense of natural areas (e.g. the rainforests of South America) and small-scale farmers, restrictive contracts for farmers, etc.

In short, Greenpeace sees no solution for the biomass problem in the form of genetically manipulated oilseed rape.

#### *IUCN<sup>20</sup>*

The viewpoint of IUCN is clear: no GM technology, on the basis of the precautionary principle, with a small possibility if adequate precautions are taken. The IUCN website ([http://www.iucn.org/congress/members/WCC\\_Res\\_Recs\\_ENGLISH.pdf](http://www.iucn.org/congress/members/WCC_Res_Recs_ENGLISH.pdf)) presents the resolution (resolution 3.007 and 3.008) that was accepted in Bangkok following lengthy discussions, as some were of the opinion that this is an outdated viewpoint, in view of the rapid developments in this field, and that it is better to make concrete recommendations. However, no such recommendations have yet been made.

A manual for policymakers on genetically modified organisms was compiled by the IUCN on 13 August 2004 regarding the possible ecological impact of GMOs on the environment and specifically on biodiversity, socio-economic matters and food security ([http://www.nciucn.nl/nederlands/actueel/nieuws/archief/2004/augustus/13\\_.htm](http://www.nciucn.nl/nederlands/actueel/nieuws/archief/2004/augustus/13_.htm)). The Netherlands has ratified the Cartagena Protocol, which entered into effect in September 2003. This biodiversity treaty looks explicitly at the dangers and consequences of introducing genetically modified organisms into the natural environment and farmland. In May 2003, the IUCN published a book on "biosafety." This publication, entitled "Explanatory Guide to [the Cartagena Protocol on Biosafety](#)" looks at how we should deal with genetically modified organisms and safety issues (<http://www.iucn.org/themes/law/pdfdocuments/Biosafety-guide.pdf>).

#### *World Wildlife Fund*

The WWF objects to the introduction of GMOs into the natural environment, because they can trigger changes in the adaptability and interactions of organisms. This may alter the natural balance and affects established ecosystem processes, which are essential for maintaining environmental integrity. The release or escape of GMOs into the environment further threatens the declining biodiversity and natural resources. The WWF calls for a total

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<sup>20</sup> Henk Hartogh

ban (moratorium) on the use of GM crops and urges the agro-industry to avoid food and feed resources containing GM substances. (WWF 1999. WWF position statement on GMOs ([www.wwf.no/english/aquaculture/wwf\\_gmostatement.doc](http://www.wwf.no/english/aquaculture/wwf_gmostatement.doc))).

The WWF has set up best practice guidelines on GMOs for several industries, which should support the moratorium on the use or release of GMOs into the general environment until ecological interactions have been fully researched and safeguards are put in place. These guidelines stress the importance of carrying out transparent, comprehensive environmental impact assessments of planned releases into the environment, to include considerations of the impacts of changing crop management practices, as well as the invasion of natural and semi-natural habitats or the competitive displacement of native species by transgenic plants and animals. The guidelines also insist on the avoidance of additional impacts through genetic modifications which:

- facilitate or stimulate greater use of chemicals;
- harm pest-controlling and other locally beneficial insects associated with crops;
- lack safeguards against gene flow into native organisms; and
- use artificially constructed genes (the effects of which are more difficult to predict and control)

According to the WWF, effective monitoring of the use and spread of GMOs is urgently needed, including effects on different habitats and species. (WWF 2000. Background paper on transgenic cotton: are there benefits for conservation? A case study on GMOs in agriculture with special emphasis on fresh water ([http://www.panda.org/downloads/freshwater/ct\\_long.pdf](http://www.panda.org/downloads/freshwater/ct_long.pdf))).

## Literature

- FAO <http://faostat.fao.org/>
- Clives, James, *Global Status of GM Crops in 2003*, International Service for the Acquisition of Agri-Biotech Applications (ISAAA), 2003  
<http://www.ogm.ch/infos/2003%20GMO%20status.pdf>
- ISAAA by Clive James, *Global Status of Commercialized Biotech/GM Crops: 2004*, ISAAA, 2004  
[http://www.isaaa.org/kc/CBTNews/press\\_release/briefs32/ESummary/Executive%20Summary%20\(English\).pdf](http://www.isaaa.org/kc/CBTNews/press_release/briefs32/ESummary/Executive%20Summary%20(English).pdf)
- Network of concerned farmers, *How much GM canola is grown in Canada?* December 2004 [http://www.non-gm-farmers.com/news\\_details.asp?ID=1833](http://www.non-gm-farmers.com/news_details.asp?ID=1833)
- Bernelot Moens H.L. & Wolfert J.E., *Teelthandleiding koolzaad - Zaad en zaaien*, May 2003, PPO  
[http://dlg2.vertis.nl/pls/dlg/docs/FOLDER/KENNISAKKER\\_NEW/KENNISCENTRUM/HANDLEIDINGEN/TEELTHANDLEIDING\\_KOOLZAAD\\_3ZAADENZAAIEN.HTM](http://dlg2.vertis.nl/pls/dlg/docs/FOLDER/KENNISAKKER_NEW/KENNISCENTRUM/HANDLEIDINGEN/TEELTHANDLEIDING_KOOLZAAD_3ZAADENZAAIEN.HTM)
- Brookes, G & Barfoot, P, *Co-existence in North American agriculture: can GM crops be grown with conventional and organic crops?* June 2004, Dorchester, UK  
<http://www.pgeconomics.co.uk/pdf/CoexistencereportNAmericafinalJune2004.pdf>

- Canola Council of Canada <http://www.canola-council.org/portal.html>
- Donaldson, B. *Genetically modified crops free areas bill 2003*, 2003  
[http://www.parliament.wa.gov.au/hansard/hans35.nsf/\(ATT\)/DE87EF30DD51587448256DF700241322/\\$file/C36+S2+20031204+p14159b-14170a.pdf](http://www.parliament.wa.gov.au/hansard/hans35.nsf/(ATT)/DE87EF30DD51587448256DF700241322/$file/C36+S2+20031204+p14159b-14170a.pdf)
- AgriHolland <http://www.agriholland.nl/nieuws/>