



# Genetically Modified Canola

## A Resource Guide

The following is a reference guide, providing information about the commercial release of genetically modified (GM) canola in Australia. The guide provides a brief summary of the information available on the GM canola varieties available in Australia, including the history of their development, industry guidelines for managing GM canola in the supply chain, agronomic and market issues, the science behind the canola and the overseas experience.

### 1. CURRENT STATUS

In 2008 genetically modified (GM) herbicide tolerant canola is being grown commercially in Australia for the first time on a small scale in New South Wales (NSW) and Victoria. The latest progress reports for the new crop are available at:

[www.afaa.com.au/n\\_gmcanola2008\\_progress.asp](http://www.afaa.com.au/n_gmcanola2008_progress.asp).

Approximately 110 growers across 35 local government areas are growing GM Roundup Ready® canola in 2008. The average amount of GM canola planted per farm is 88 hectares. Bayer CropScience has indicated that they do not have commercial quantities of seed of the InVigor Hybrid variety available for 2008, but they will continue with their breeding program which includes field trials.

### 2. REGULATION

After six years of field trials, two companies, Bayer CropScience and Monsanto Australia, applied to Australia's Gene Technology Regulator for the commercial release of GM canola for use in the Australian cropping system. The applications were lodged at the Office of the Gene Technology Regulator (OGTR) in June and July 2002.

In late July 2003 following an extensive evaluation and public consultation, the Regulator announced the commercial release of Bayer CropScience's InVigor® hybrid canola, a variety tolerant to the herbicide glufosinate-ammonium.

The Regulator concluded during the assessment period that the Bayer CropScience variety of GM canola is as safe to human health, safety and the environment as non-GM canola. The Regulator's full determination on the Bayer licence can be found on the OGTR website [www.ogtr.gov.au/ir/dir021.htm](http://www.ogtr.gov.au/ir/dir021.htm).

In December 2003, the Regulator also approved Monsanto's Roundup Ready® GM canola variety for commercial release, concluding that Monsanto's GM canola was as safe to human health, safety and the environment as non-GM canola. The variety can tolerate applications of the glyphosate herbicide.

The documentation relating to the Regulator's decision about the Monsanto licence can be found on the OGTR website [www.ogtr.gov.au/ir/dir020.htm](http://www.ogtr.gov.au/ir/dir020.htm).

Other agencies involved in the regulation of GM products include Food Standards Australia New Zealand (FSANZ), which is responsible for the safety of GM foods and ingredients derived from such foods.

The issue of food safety is often raised as one of the major concerns people have about GM foods. Follow this link to the FSANZ brochure, **Safety Assessment process for genetically modified food**. The booklet explains FSANZ's role in assessing the safety of GM foods – an assessment all GM foods must undergo before they are allowed to be sold in Australia and New Zealand. [http://www.foodstandards.gov.au/srcfiles/GM%20Foods\\_text\\_pp\\_final.pdf](http://www.foodstandards.gov.au/srcfiles/GM%20Foods_text_pp_final.pdf).

In December 2001 Australia adopted **new labelling laws for food produced using gene technology**. Standard 5.1.2 (food produced using gene technology) ensures that all GM crops, animals and microorganisms are assessed and approved by FSANZ as safe before they can be used for food or in food processing.

Food or ingredients labelled 'genetically modified' either contain new genetic material or protein as a result of genetic modification or have altered characteristics – for example, changed nutritive values compared to conventional food. Under these labelling laws, oil from GM canola is not required to

be labelled as the genetic material/DNA is removed in the refining process and the oil from a GM crop cannot be differentiated from conventional (non-GM derived) crops.

Food products from six GM commodities may be in Australian supermarkets. These are soybean, canola, corn, potato, sugar beet and cotton. Of these, only GM cotton and canola is grown domestically in Australia.

For more information:

[www.foodstandards.gov.au/thecode/assistanceforindustry/userguides/labellinggeneticallymodifiedfooduserguide/index.cfm](http://www.foodstandards.gov.au/thecode/assistanceforindustry/userguides/labellinggeneticallymodifiedfooduserguide/index.cfm)

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### 3. STATE GOVERNMENT DECISION-MAKING

Under Australian gene technology legislation the OGTR regulates for human health, safety and the environment, but not for marketing issues. There is, however, provision within Australia's Federal gene technology legislation to create zones free of GM crops. Under the Commonwealth *Gene Technology Act 2000*, the Ministerial Council, comprising of federal, state and territory ministers, has the opportunity to issue a policy principle, "Recognising areas, if any, designated under state law for the purpose of preserving the identity of one or both of GM or non-GM crops for marketing purposes."

The Ministerial Council agreed in 2003 to issue a policy principle to recognise the rights of state and territory governments to designate zones for GM or non-GM crops for marketing purposes.

Following this, all canola growing states in Australia (NSW, Victoria, South Australia, Western Australia and Tasmania) imposed bans on the commercial production of GM canola for marketing purposes. These bans were lifted in NSW and Victoria in 2008 following government reviews, however they remain in place in the other canola producing states.

In NSW, the GM canola ban was lifted after a review undertaken by the NSW Government in 2007. The review is available at: [www.dpi.nsw.gov.au/agriculture/field/field-crops/oilseeds/canola/gm](http://www.dpi.nsw.gov.au/agriculture/field/field-crops/oilseeds/canola/gm). The Government announcement following the review can be found at: [www.dpi.nsw.gov.au/aboutus/news/recent-news/agriculture-news-releases/gm-canola-gets-go-ahead-macdonald](http://www.dpi.nsw.gov.au/aboutus/news/recent-news/agriculture-news-releases/gm-canola-gets-go-ahead-macdonald).

The Victorian Government also conducted a review of its GM canola legislation, available at [www.dpi.vic.gov.au/DPI/nrenfa.nsf/childdocs/-66DC26DFE9F443F9CA256FB7000037B3-](http://www.dpi.vic.gov.au/DPI/nrenfa.nsf/childdocs/-66DC26DFE9F443F9CA256FB7000037B3-)

[89E6C67B468BD2A7CA256FB70001BAB8?open](http://89E6C67B468BD2A7CA256FB70001BAB8?open)

and announced that the bans in place would be allowed to lapse in February 2008 [www.dpc.vic.gov.au/domino/Web\\_Notes/newmedia.nsf/955cbeae7df9460dca256c8c00152d2b/29067fb82f32a2a2ca2573a000819938!OpenDocument](http://www.dpc.vic.gov.au/domino/Web_Notes/newmedia.nsf/955cbeae7df9460dca256c8c00152d2b/29067fb82f32a2a2ca2573a000819938!OpenDocument).

The South Australian Government also conducted a review of its GM Crop Management Act legislation in 2007, but decided to maintain the ban on GM food crops and introduced new legislation available at: [www.legislation.sa.gov.au/LZ/C/R/GENETICALLY%20MODIFIED%20CROPS%20MANAGEMENT%20REGULATIONS%202008.aspx](http://www.legislation.sa.gov.au/LZ/C/R/GENETICALLY%20MODIFIED%20CROPS%20MANAGEMENT%20REGULATIONS%202008.aspx). GM canola trials continue in the state.

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### 4. MANAGING CANOLA IN THE SUPPLY CHAIN

As mentioned above, the OGTR does not consider marketing issues in the regulatory process. As a result a number of industry and government industry organisations have sought to address this issue.

Since 2002, the grains industry has been considering the introduction of GM grain into Australian farming systems. In 2007, the industry's commitment to managing GM canola in the grain supply chain was released. **Delivering Market Choice with GM Canola** outlines the grains industry's ability and commitment to incorporate GM canola into the supply chain with a certainty and confidence that it can be managed to meet market and customer requirements - [www.afaa.com.au/pdf/Delivering\\_Market\\_Choice\\_with\\_GM\\_canola.pdf](http://www.afaa.com.au/pdf/Delivering_Market_Choice_with_GM_canola.pdf).

This industry approach to the introduction of GM canola in Australia was endorsed by 29 organisations representing the entire grain supply chain.

The above document is supported by **Principles for Process Management of Grain within the Australian Supply Chain** which details all the principles and protocols available to the industry to deliver products which meet market requirements. This 102 page report covers all phases of the cropping process from research, breeding, on-farm, storage, transport, marketing and exporting to manufacturing and the consumer, and the management practices required to meet market specifications for both GM and non-GM crops [www.afaa.com.au/pdf/Principles\\_for\\_PM\\_Australian\\_supply\\_chain.pdf](http://www.afaa.com.au/pdf/Principles_for_PM_Australian_supply_chain.pdf).

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## 5. THE MARKETPLACE

There have been various reports released on the market issues surrounding GM canola. Following is a brief summary of the reports, including links for further information.

### Report A

A CSIRO report looking at the **segregation of GM and non-GM grain in the Australian grain storage system**, particularly sampling and testing regimes, was released in 2005 ([www.daff.gov.au/data/assets/pdf\\_file/0003/182829/Final\\_GM\\_Report\\_July\\_04.pdf](http://www.daff.gov.au/data/assets/pdf_file/0003/182829/Final_GM_Report_July_04.pdf)). It concluded that the sampling and testing systems proposed are likely to perform well as far as evenly distributed GM grain is concerned, however, more research is required to establish models for predicting the dispersion of unevenly distributed GM material during normal grain handling operations under different circumstances.

### Report B

In South Australia, the Eyre Regional Development Board undertook the **development of a protocol for accreditation of non GM grain within a designated non GM region**, to substantiate the process required should Eyre Peninsula grain growers seek to establish a GM free zone. The development of such a protocol, as a case study, was seen as an important step for the regions growers to understand the requirements should the region establish a designated GM free area for broad acre grain crop production. As South Australia has a GM crop ban in place, the protocol has not been tested -  
[www.daff.gov.au/data/assets/pdf\\_file/0003/182838/eyre\\_peninsula.pdf](http://www.daff.gov.au/data/assets/pdf_file/0003/182838/eyre_peninsula.pdf).

### Report C

A report titled, **Gap Analysis in relation to Quality Management for the Supply Chain Management of Genetically Modified (GM) products**, was undertaken by Tasmanian Quality Assured (TQA) to provide an analysis of existing quality management systems with respect to their ability to address supply chain management of GM and non-GM products, particularly in relation to segregation and identity preservation. The report used canola, cotton, pasture and poppies as case studies.

### Report D

The Productivity Commission, the Australian Government's principal review and advisory body on microeconomic policy and regulation, released their report, **Modelling Possible Impacts on GM Crops on Australian Trade** in November 2002.

The Report provides an analysis of the economic and trade implications of the introduction of GM technology in the grains sectors, excluding wheat and oilseeds. It contains a detailed review of the evidence of the on-farm benefits achieved from the main GM crops commercialised to date. It assesses the consumer and regulatory environments in which GM crops are being introduced, including any associated costs. For further information:

[www.pc.gov.au/research/staffresearch/gmcrops](http://www.pc.gov.au/research/staffresearch/gmcrops).

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## 6. ECONOMIC IMPACTS

Through the years, the Australian Bureau of Agricultural and Resource Economics (ABARE) has released a number of reports regarding the marketing implications of adopting or not adopting GM canola. A brief summary of these reports is below.

### Report A

**Economic impacts of GM crops in Australia**, released in 2008 listed the potential benefits of GM crop adoption in Australia, and presented simulation scenarios examining the impact of adopting only GM canola crops. The most positive economic benefits are predicted for NSW (excluding the Murray Catchment Management Area which is considered separately), at \$273 million (in 2006-07 dollars) over 10 years to 2017-18. This is reduced to a benefit of \$121 million if adoption is delayed. Significant economic benefits of adopting GM canola are also projected for other states, including Western Australia (\$180 million) and South Australia (\$115 million). See the full scenarios at: [www.abareconomics.com/publications\\_html/news/news/news.html](http://www.abareconomics.com/publications_html/news/news/news.html).

### Report B

Also released in 2008, **GM crops in emerging economies**, claims "that Australia will potentially have to forgo significant economic gains by delaying the introduction of GM oilseeds and wheat in an environment where these emerging economies are increasing their GM uptake. If these crops are increasingly adopted by emerging economies but not Australia, Australia's export competitiveness will be adversely affected. For more detail: [www.abareconomics.com/publications\\_html/crops/crops\\_08/gmcrops.pdf](http://www.abareconomics.com/publications_html/crops/crops_08/gmcrops.pdf).

### Report C

A report titled, **Potential impacts from the introduction of GM canola on organic farming in Australia**, released in 2007, concluded that if GM canola were commercialised in Australia, the direct impacts on organic canola production in Australia are likely to be negligible; the introduction of GM

canola would have minimal impact on the organic livestock industry; and the impact on organic honey production is expected to be minimal. For more information see:

[www.abareconomics.com/publications\\_html/crops/crops\\_07/organic\\_farm.pdf](http://www.abareconomics.com/publications_html/crops/crops_07/organic_farm.pdf).

#### Report D

**Market acceptance of GM canola**, released in 2007, stated that "In summary, the marketers of GM canola and of products based on livestock fed on GM materials, including GM canola, do not appear to be disadvantaged in the Australian and world markets - GM canola seems to be finding ready markets throughout the world at prices very similar to those received for conventional canola. For more detail:

[www.abareconomics.com/publications\\_html/crops/crops\\_07/GM\\_Canola.pdf](http://www.abareconomics.com/publications_html/crops/crops_07/GM_Canola.pdf).

#### Report E

In 2006, **GM grains in Australia: identity preservation** was released. This report stated that the additional costs of grain segregation varied according factors such as the mix of grains being produced; the cost of certified non-GM seed; truck sizes, and grain storage capacity. It also noted, "while it is evident that there are additional costs associated with the segregation of GM canola, in general terms it does not appear at this stage that there is a price premium in domestic and world markets for certified non-GM canola that is sufficient to offset the additional costs of segregation."

[www.abareconomics.com/publications\\_html/crops/crops\\_06/GM\\_grains.pdf](http://www.abareconomics.com/publications_html/crops/crops_06/GM_grains.pdf).

#### Report F

Released in 2003, **Market access issues for GM products: implications for Australia**, outlines key market access conditions or restrictions that are affecting international trade in GM grains and assesses their impact on trade patterns, such as regulatory arrangements and labelling requirements. Copies of the report can be downloaded at:

<http://abareonlineshop.com/product.asp?prodid=12559>.

#### Report G

In 2003, ABARE also released a report titled **GM canola - What are its economics under Australian conditions?** This report contained newly available data from field trials of GM canola in Australia, and used this data to analyse aspects of the economics of the commercial release of GM canola in Australia. The data can be downloaded at:

Such a detection rate would comply with the current regulation of GM crops around the world. For further information visit:

[www.abareonlineshop.com/product.asp?prodid=12526](http://www.abareonlineshop.com/product.asp?prodid=12526).

#### Report H

**Genetically Modified grains: market implications for Australian grain growers**, released in 2001 explored the pros and cons of adopting GM crops. It is available at:

[www.abareonlineshop.com/product.asp?prodid=12137](http://www.abareonlineshop.com/product.asp?prodid=12137).

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## 7. SCIENCE

A number of research projects were undertaken to provide further information for the regulatory progression of GM canola. The reports below complemented the information required by the Gene Technology Regulator during the field trial phase of the technology development.

### Pollination

The potential for canola to cross pollinate with other plants and create herbicide tolerant weeds or increase herbicide resistance is often raised as a concern. Comprehensive research has been carried out by various scientists Australia-wide on the gene flow of GM canola, and two reports are currently available.

The Bureau of Rural Sciences (BRS) has produced a report investigating Australian and international literature in relation to the unintentional gene flow via cross pollination from GM crops. The report entitled, **Gene flow study: Implications for the release of genetically modified crops in Australia** can be found at:

[http://affashop.gov.au/PdfFiles/12860\\_gene\\_flow\\_report.pdf](http://affashop.gov.au/PdfFiles/12860_gene_flow_report.pdf).

In 2000, a comprehensive study on the spread of canola pollen was undertaken by Dr Mary Rieger of the Cooperative Research Centre for Australian Weed Management and the University of Adelaide, to quantify at a landscape level the gene flow that occurs from herbicide-resistant canola crops to nearby crops not containing herbicide resistance genes.

The study found that canola pollen can travel considerable distances but that the amount of gene flow is minimal. The methods used were very sensitive, with the detection rate 100-fold lower than the proposed international standard of one per cent.

[www.weedscrc.org.au/documents/gmfree\\_unness.pdf](http://www.weedscrc.org.au/documents/gmfree_unness.pdf).

## Herbicide tolerance

A publication titled, **Agricultural Biotechnology: Herbicide Tolerant Crops in Australia** was released by the Department of Agriculture, Fisheries and Forestry (DAFF) in 2003.

The report examined herbicide tolerant crops, particularly GM herbicide tolerant crops, the reasons they are being developed and the rationale behind their use by farmers. The benefits and risks from growing these crops are investigated, along with the strategies used to manage the risks. The aim is to inform the public debate about the technology and its potential in Australian agriculture. To obtain a copy of the report visit: [www.affashop.gov.au/product.asp?prodid=12743](http://www.affashop.gov.au/product.asp?prodid=12743).

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## 8. THE AGRONOMICS OF GM CANOLA

### Field trial performance

According to a long-term trial, <http://news.csu.edu.au/search/result.cfm?itemID=363C755F0F03ED5034B67FEC742E1469&module=newsreleases&cat>, undertaken by Professor Jim Pratley at Charles Sturt University in NSW, which compared the yield and economic performance of a GM herbicide tolerant canola variety with conventional canola varieties over a typical five-year crop rotation system, the GM canola consistently delivered superior weed control, higher yields and oil quality and better profits when compared to current common canola varieties grown under conventional weed management systems.

### Weed control and environmental benefits

Canola is now the third most important winter grain crop grown in Australia, its beneficial effect on wheat yields as part of a rotation makes it critically important for the cropping belt. Weeds however are a significant issue for canola. The proposed introduction of two lines of GM canola with tolerance to either glyphosate or glufosinate-ammonium herbicides have the potential to provide farmers with other weed control options.

**Conservation Farming Systems and Canola**, a report by Dr Robert Norton in 2003 stated that the uptake of GM canola would result in an "increase in canola and wheat production worth \$135 million to the Australian grains industry," and that the "increased production could be achieved while making the canola industry more sustainable through better integrated weed management and soil conservation practices." For more information: [www.jcci.unimelb.edu.au/GMCanola2007/Conservation%20Farming%20R%20Norton%202003.pdf](http://www.jcci.unimelb.edu.au/GMCanola2007/Conservation%20Farming%20R%20Norton%202003.pdf).

The report above was updated in 2007, and according to the latest version, **Canola and Australian Farming Systems**, [www.jcci.unimelb.edu.au/Canola2007.pdf](http://www.jcci.unimelb.edu.au/Canola2007.pdf) if half of the Australian canola crop was sown to GM canolas, 640 tonnes less triazine herbicides would be used each year and an extra 225,000 hectares of canola would be grown by direct drilling or minimum tillage; average national canola yields would increase eight per cent; an additional 200,000 hectares of canola could be grown in low rainfall areas; and, wheat production (following canola) would increase by 80,000 tonnes on the additional canola production area.

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## 9. OVERSEAS EXPERIENCE

In Canada, GM canola has been grown commercially since 1996. In 2000 the Canola Council of Canada undertook a survey of 650 members to assess their experience with GM canola. The Canadian experience with similar canola varieties to the those approved for commercial release by the OGTR in Australia, shows benefits such as improved yields, better returns, easier and better weed control, cost reductions and easier clean-up of paddocks.

To access the grower responses go to: [www.canola-council.org/gmo\\_main.aspx](http://www.canola-council.org/gmo_main.aspx).

To read a publication titled **Why Growers Choose GM Canola**, view: [www.canola-council.org/facts\\_gmo.aspx](http://www.canola-council.org/facts_gmo.aspx).

For a general overview of canola in Canada go to: [www.canola-council.org/](http://www.canola-council.org/).

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## 10. FEED

With GM crop adoption growing around the world, numerous scientific studies and reports have been completed to explore the topic of animal feed.

A report titled **GM Inputs to Feedlot Beef - A Scoping Study** has also been compiled by DAFF which provides a supply chain map of stockfeed produced for feedlot beef and quantifies the current volumes of major crop products in stockfeed. [www.affashop.gov.au/PdfFiles/scoping\\_study\\_gm\\_feedstuffs.pdf](http://www.affashop.gov.au/PdfFiles/scoping_study_gm_feedstuffs.pdf).

According to the ABARE report previously mentioned, **market acceptance of GM canola**, "marketers of GM canola and of products based on livestock fed on GM materials, including GM canola, are unlikely to be disadvantaged in the Australian and world markets."

Further, the report states, “the preference for products from livestock not fed on GM materials seems to be very much a niche market and is largely confined to dairy products. With meat products, for example, Canada’s export trade has grown strongly since the introduction of GM grains and oilseeds in the United States and Canada in 1996, despite a dependence on the use of GM feedstuffs, particularly GM canola meal. Even in the European Union, a major exporter of meat and dairy products, livestock production is heavily dependent on the use of GM feedstuffs, particularly soybean meal and corn gluten feed.”

[www.abareconomics.com/publications\\_html/crops/crops\\_07/GM\\_Canola.pdf](http://www.abareconomics.com/publications_html/crops/crops_07/GM_Canola.pdf).

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## 11. LIABILITY

One area which has received much attention in the GM canola debate is that of liability relating to presence of GM content in non-GM crops. A report titled, **Managing GM crops in Australia** concluded that “The use of legal remedies by farmers or the grains industry has been rare...The ability of farmers to manage spillovers, and the ability of those damaged to seek redress through the courts if necessary, strongly suggests that special legal regimes, and strict liability in particular, are not warranted for GM crops in Australia. This is also the view of legislators in the United States, United Kingdom, Canada and New Zealand.” [www.croplifeaustralia.org.au/default.asp?V\\_DOC\\_ID=1609](http://www.croplifeaustralia.org.au/default.asp?V_DOC_ID=1609).

A report has also been produced by DAFF on this topic, titled **Liability Issues Associated with GM Crops in Australia**, the report outlines the arguments for and against a liability regime specific to GM crops and products.

The Australian government has chosen not to implement a special liability regime for damage caused by GMOs. Recourse for those affected by the unintended presence of GMOs in Australia is to the common law and existing statute. This approach is consistent with the approaches adopted in a majority of countries, including the United Kingdom, Canada and the United States. The report can be downloaded from [www.daff.gov.au/\\_data/assets/word\\_doc/0007/182842/liability\\_issues\\_paper\\_final.doc](http://www.daff.gov.au/_data/assets/word_doc/0007/182842/liability_issues_paper_final.doc).

**Farmer’s liability and GM crops** is a fact sheet produced by the Australian Centre for Intellectual Property in Agriculture, it provides a brief overview of the issues that may affect both those wishing to grow GM and those who want to remain GM free. See: [www.daff.gov.au/\\_data/assets/pdf\\_file/0008/197081/factsheetliabilityandgmcropsweb.pdf](http://www.daff.gov.au/_data/assets/pdf_file/0008/197081/factsheetliabilityandgmcropsweb.pdf).

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## 12. GENERAL AND OTHER REFERENCES

**GM Canola 2008** is web portal developed and maintained by Agrifood Awareness Australia Limited. GM canola is being grown commercially in Australia for the first time in 2008 on a small scale. For background information relating to the regulatory approvals, stewardship processes and potential benefits as experienced overseas and in Australian field trials, as well as the latest progress reports for the new crop, please visit: [www.afa.com.au/n\\_gmcanola2008\\_landing.asp](http://www.afa.com.au/n_gmcanola2008_landing.asp).

A report looking at all aspects of canola production in Australia and overseas, GM canola, and the regulation, market acceptance, liability, grain handling, research and development of GM canola, was recently released by DAFF. Titled **GM Canola: An Information Package**, it provides a strong summary of many of the issues considered over the past years regarding the place of GM canola in the Australian and global grain supply chain [www.daff.gov.au/\\_data/assets/pdf\\_file/0010/539443/gm-canola-info-package.pdf](http://www.daff.gov.au/_data/assets/pdf_file/0010/539443/gm-canola-info-package.pdf).

Agrifood Awareness Australia Limited: A daily updated website which includes an easy to read booklet providing an overview of gene technology in Australia. [www.afa.com.au](http://www.afa.com.au).