Market Choice in the Canola Industry

2008/9 Final Stakeholders Report

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Introduction

The Australian canola industry has adopted a position of market choice which frames the development of coexistence arrangements across the range of consumer and industrial products it produces. The "Delivering Market Choice with GM Canola" document was prepared by the grains industry under the auspices of Single Vision Grains Australia in 2007 and outlines the protocols, processes and capabilities the grains industry supply chain has to facilitate trade and deliver market choice with the commercialisation of GM canola. It also provides detailed information as to how the industry can meet marketplace, trade and regulatory requirements through the "Market Choice" criteria.

Grain Trade Australia (GTA (formerly the National Agricultural Commodities Marketing Association)) has over 300 member organisations involved in the Australian grain industry. It was formed to standardise grain standards and trade rules. Over 95% of the Australian grain crop is handled by GTA members and 90% of grain contracts are based on GTA trade rules and contracts, including oilseeds. GTA acts as a key representative body of the industry and plays a crucial role in developing and managing processes that facilitate trade, thus making it the most appropriate body to coordinate the market choice framework.

The Australian Oilseeds Federation (AOF) is the peak industry body representing the Australian oilseeds industry, including food, feed and industrial products. AOF members include technology developers, breeding companies, growers and advisors, grain accumulators and marketers, exporters, oilseed and oil processors, consumer marketing companies, stockfeed processors and end users.

Both GTA and AOF recognise the potential benefits of GM technology and have endorsed its commercial use under a framework that provides for market choice. The Market Choice criteria and framework were developed to recognise that all participants along the supply chain should have the ability to exercise choice for appropriately approved technology i.e. approved by the Office of the Gene Technology Regulator (OGTR) and Food Standards Australia & New Zealand (FSANZ).

The elements identified to deliver market choice for approved GM products are:

- Market segments and customer requirements identified
- Approval in place for food and feed importation and consumption in customer countries
- Adventitious Presence (AP) thresholds established for the unintended presence of GM product, in Australia and in importing countries
- Supply chain ability to provide traceability, verification and contingency plans demonstrated

Following the approval for commercial production of GM canola in New South Wales and Victoria in 2008, the industry implemented processes to enable market choice. The industry also undertook to provide a Stakeholder Report in regard to the effectiveness of the industry's market choice framework. GTA and AOF have jointly undertaken the responsibility to provide this report, on behalf of industry stakeholders.

Purpose, scope and timing

This2008/9 Final Stakeholder Report builds on the interim Stakeholder Report report issued in March 2009, and its purpose is to report and demonstrate how the market choice framework performed for the 2008 GM canola crop in New South Wales and Victoria.

This Stakeholder Report provides:

- A summary of GM canola growing, harvesting and storage in 2008 and subsequent handling, storage and processing in 2009.

- An overview of how the market choice framework performed
- Any actions/revisions of the protocols required

This GTA/AOF Market Choice Stakeholders Report encompasses the effectiveness and facilitation of the GM canola supply chain against the principles and protocols of "Market Choice" from the growing through to supply of consumer products. This report does not cover the breeding and technology development sectors, the effectiveness of the technology or the financial impacts of the technology.

This significant difference between this Final Market Choice Stakeholder Report and the Interim Report of March 2009 is that the Interim Report covered only movement of the grain from harvest to bulk storage. This Final Report now includes details of the subsequent handling, and processing that has been undertaken since March 2009..

Where there is demand, the GTA/AOF Market Choice Stakeholders Report will be published each year in November, with an Interim report published in March.

Market Choice Framework

AOF and GTA are signatories to the Australian grains industry market choice policy. The document "Principles for process management of grain within the Australian supply chain" has provided the basis for development of the guidelines and processes reported in this document.

The Australian canola industry has adopted a position of market choice which frames the development of coexistence arrangements across the range of products that the industry produces.

There are three key elements in delivering market choice:

- The ability of any supply chain participant to access product that meets a pre-determined set of specifications
- The ability of any supply chain participant to supply a product that meets a pre-determined set of specifications
- The ability of any supply chain participant to manage their area of production, manufacturing and delivery of product to a pre-determined set of specifications

The market choice criteria have been assessed for GM canola in the industry's "Delivering Market Choice with GM Canola" document and the industry has supported the commercial production of GM canola on this basis.

Delivering Market Choice with GM Canola

The Australian canola industry has historically been based on one grade of canola (CSO1). In recent years, the industry has seen a range of new products introduced. This includes the introduction of speciality canola which has modified fatty acid profiles and specific end product applications; new types of canola such as canola quality mustards; and new technologies such as GM canola. In addition, there is research and development occurring on industrial mustards for applications such as biodiesel and there is ongoing development of condiment mustards. Refer Appendix I for details of the canola industry value chains.

The management of the grain supply chain to meet end user specifications, manage product quality and ensure that the product is not compromised by the unintended presence of impurities, is built on a platform of product integrity. This is maintained through implementation of tools such as standards, identity preservation processes, segregation and traceability.

In response to the approval for commercial production of GM canola in NSW and Victoria, AOF introduced an additional trading standard for Non GM canola to accommodate market requirements.

Further the AOF has developed protocols based on the "Principles for process management of grain within the Australian supply chain" for GM canola. These protocols are summarised in the flowchart on pages 5 & 6. The supply chain has subsequently implemented appropriate processes and systems to meet the industry's market choice criteria and customer requirements as defined by the industry standards and protocols.

Measuring Market Choice has been delivered

Criteria for assessing delivery of market choice and the relevant performance measures are outlined below.

Outcome	Performance Measures
Identity preservation	▪ Protocols adhered to ▪ Customer specifications met
Trade facilitation	▪ Industry agreed standards and supporting methodologies ▪ Through chain commodity/product declarations ▪ Effective dispute resolution process ▪ International harmonisation of trade processes
Regulatory	▪ Regulatory requirements met

compliance	

The 2008 GM canola supply chain

Summary of the 2008 GM canola season

Commercial production of GM canola commenced in NSW and Victoria in 2008. This saw a limited area of Roundup Ready® canola grown, harvested and marketed in southern NSW and Victoria through a segregated system.

Two genetically-modified (GM) herbicide tolerant types – glyphosate tolerant Roundup Ready® and glufosinate-ammonium tolerant InVigor® varieties– have been approved for commercial production by the OGTR. Three Roundup Ready hybrids and one open pollinated variety were available from three seed companies. The InVigor® hybrids are not commercially available in Australia at this stage.[1]

The 2008 GM canola crop was conducted under the Roundup Ready canola framework as stipulated in the OGTR License for Intentional Release to Monsanto Australia. In addition, the industry initiated further steps in the value chain to meet the requirements of market choice.

The industry adopted a segregated strategy for GM canola in 2008, which saw the crop grown by a small number of accredited farmers, delivered to dedicated delivery sites and sold only to domestic processors.

In summary, 108 growers planted approximately 9,600 hectares of GM canola. Despite a severe growing season, approximately 9,336 tonnes of grain was harvested. Due to the hot and dry weather experienced at the end of the growing season, a small number of the GM canola crops were cut for hay.

The harvested grain was delivered to, and stored at the nominated receival sites. The grain was then delivered to nominated crushing companies for processing in accordance with their production schedules, such that the GM canola seed, and resulting oil and meal could remain segregated within and throughout their production processes. By November 2009, all GM seed had beem crushed and the resultant oil sold into the domestic market..

Figure 1 illustrates the players for 2008 and further details provided in Appendix II.Where crops were cut for hay, Monsanto worked with the dairy, fodder and stockfeed industry to develop and agree a process for growers who, as a result of season conditions, intended to cut their Roundup Ready canola for hay.

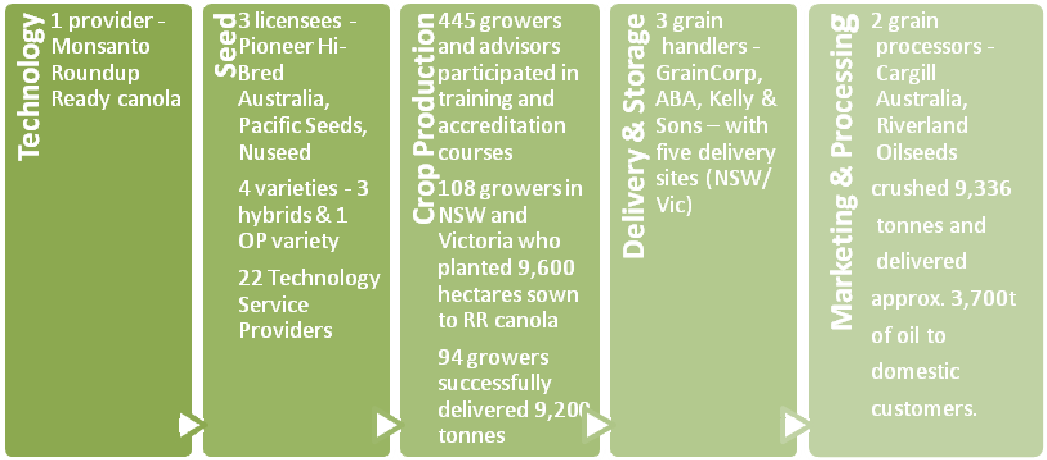

Figure 1: GM canola process in 2008

- [1] ® Roundup Ready is a registered Trademark of Monsanto Technology LLC used under licence by Monsanto Australia Ltd
- ® PRAMOG is a registered Trademark of Monsanto Technology LLC used under licence by Monsanto Australia Ltd
- ® Roundup Ready herbicide is a registered trademark of Monsanto Technology LLC distributed under licence by Nufarm Australia Ltd.
- ® Invigor is a registered trademark of Bayer CropScience

Delivering market choice – Identity preservation

The 2008 canola crop has been harvested, sold, processed and the resultant oil and meal sold into the domestic market. . This report provides assessment against each of the steps in the table below.

2008 GM Canola Protocols

	Action	Objective	Control Points	Records
Pre farm				
Step 1 Accessing the technology	Farmers must undertake Roundup Ready® canola accreditation course and sign license documentation in order to access the technology and complete a paddock risk assessment & management option guide (PRAMOG®).	Comply with Monsanto stewardship framework	Successful completion of accreditation courses	Course certificate PRAMOG® result
	Technology Service Providers must be trained and accredited	Comply with Monsanto stewardship framework	Successful completion of accreditation courses	TSP Agreement
On-farm to delivery				
Step 2 Crop Management	Growers must sign a Technology Use Agreement and purchase seed for sowing each season	Comply with the Roundup Ready Canola Crop Management Plan (incorporating the Resistance management plan)	On farm management of GM canola in accordance with CMP GM seed purchased is accounted for	Grower licensing records Seed purchasing records Hay records in the event the crop is not harvested
Step 3 Harvesting	Growers/contractors to follow clean down procedures	Comply with AOF guidelines or equivalent for equipment cleaning as per the Roundup Ready Canola Crop Management Plan	Harvester cleaned down post harvest	Grower/contractor records
Step 4 Delivery to Grain Depot[2]	GM grain to be delivered to nominated grain depots Trucks are inspected prior to transport of GM grain Trucks are cleaned following transport of GM grain	Ensure that GM grain is kept separate	GM grain handled and stored separately Grain truck cleaned down post unloading	Roundup Ready canola delivery notification card Grower/contractor records

[2] No on farm storage was allowed

	Action		Objective	Control Points	Records
Storage, handing and outturn					
Step 5 Storage & Handling at Bulk Commodity Depot	Receival	Sampling and assessment of grain quality and status on delivery to depots	Ensure that GM grain is kept separate	GM grain handled separately. GM grain sample retained GM grain deliveries accounted for	Depot receival docket Grower Declarations Commodity Vendor Declaration
	Storage	Segregation and maintenance of GM grain			Internal stock-take and accounting system
	Outload	Sampling and assessment of grain quality and status on despatch from depots			Depot despatch docket. Internal cleaning checklists
Step 6 Delivery to Crush Plants	GM grain to be delivered directly to nominated crush plants		Ensure that GM grain is kept separate	Grain truck cleaned down post unloading	Delivery docket AOF Certificate of Cleanliness
Processing					
Step 7 Storage & Handling at Crush Plant	Segregation and maintenance of GM grain		Ensure that GM grain is kept separate	GM grain handled separately AP tolerance level maintained for non GM canola GM grain accounted for	Internal stock-take and accounting system
Step 8 Processing	Handled as distinct separate grain with appropriate segregation and flushing to minimise blending				Daily Production reports Internal stock-take and accounting system
Step 9 Storage – Finished Oil & Meal	Oil to be identified and handled as a separate oil type and stored in separate, identified tanks		Oil derived from GM grain is identified and handled as a distinct product		Internal stock-take and accounting system
	Meal to be identified and handled as a separate meal type and stored in separate, identified store		Meal derived from GM grain is identified and handled as a distinct product		Internal stock-take and accounting system
Consumer markets					
Step 10 Delivery to Customers	Delivery to customer as per customer requirements and AOF Code of Practice		FSANZ FSC for oil derived from GM canola		Despatch dockets Customer invoice
Note: Testing may occur as required by the customer or as determined by the facility operator to ensure compliance with internal processes and product/customer specifications					

On farm – the crop

Stewardship Framework

The Roundup Ready Canola Stewardship Program is a requirement of Monsanto Australia's licence with the APVMA[3] and a framework has been established to ensure that the technology is managed in a responsible manner. The primary aims of the Stewardship Framework are to:

- Ensure compliance with regulatory requirements
- Allow for the coexistence of different canola production systems
- Achieve the sustainability of the technology
- Maximise the benefits of the technology

Access to Roundup Ready Canola

All growers intending to access the Roundup Ready canola technology in 2008 were required to complete and satisfy the following steps:

- Step 1 - Attend and complete the Roundup Ready canola accreditation course provided by Monsanto Australia
- Step 2 – Review and sign the License & Stewardship Agreement (LSA). The LSA stipulates the regulatory and stewardship requirements governing the use of the technology. Growers signed to confirm they had read and understood the stewardship and commercial obligations of Roundup Ready canola for 2008
- Step 3 - Complete a paddock risk assessment & management option guide (PRAMOG). Required for access to the technology. The PRAMOG is used by growers to assess and understand the weed and herbicide histories of paddocks. This then provides a solid basis for the development of Integrated Weed Management plans and the Resistance Management plan
- Step 4 – Sign and Review a Technology Use Agreement (TUA). The TUA includes specific obligations relating to planting the crop, which growers signed to confirm they had read and understood the stewardship and commercial obligations of Roundup Ready canola

  The TUA records the proposed paddocks and resistance management assessments along with the proposed planting area and seed varieties and quantities to be used. The 2008 TUA also obligated the grower to only deliver Roundup Ready canola to one of the nominated delivery points.

- Step 5. - Upon completion of the four steps above growers were provided with a TUA number. Growers were only able to access seed once they had a TUA number.

Technology Service Providers

For the limited release of Roundup Ready canola in 2008, 22 Technology Service Providers were nominated and approved (refer Appendix II). The TSPs were the only seed outlets RR canola growers could purchase RR canola seed from. The TSPs were located in the areas designated to grow the 2008 Roundup Ready canola crop. The growers were required to provide proof of their LSA and TUA prior to purchasing and taking delivery of Roundup Ready canola seed for planting.

Documentation
Roundup Ready Canola Technical Manual PRAMOG® License & Stewardship Agreement Technology User Agreement

[3] Australian Pesticides and Veterinary Medicine Authority

On Farm – Crop Management

The on farm production and agronomic support of the 2008 Roundup Ready canola crop required was documented in the Roundup Ready Canola Crop Management Plan incorporating the Resistance Management Plan. The Roundup Ready Canola Crop Management Plan encompasses:

- Seed and grain management pre-planting
- Weed management
- Resistance management strategies
- Volunteer management
- Pollen movement
- Machinery hygiene and harvest management
- Post-harvest management
- Re-cropping

Documentation
Roundup Ready Canola Crop Management Plan incorporating the Resistance Management Plan (Appendix III)

1. *Harvesting*

During the training process, growers and advisors were provided with guidelines and recommendations to ensure that no Roundup Ready canola would be inadvertently mixed with non-GM canola during the harvesting process. Best practice processes for pre and post harvest cleaning of all associated equipment were provided for in the Monsanto Australia Roundup Ready canola technical manual and the AOF Harvester Clean-down Guidelines. Growers and contractors were required to abide by best practice principles.

Documentation
Roundup Ready Canola Crop Management Plan AOF Harvester Clean Down Guidelines (Appendix IV)

2. On farm storage

For the supply chain arrangements in 2008, there was no GM canola stored on farm.

3. Delivery to Grain Receival Sites

All of the 2008 GM canola was delivered to one of five authorised delivery sites (refer Appendix II).

Under the license, growers were required to deliver all Roundup Ready grain to a nominated site. No Roundup Ready canola was to be retained on-farm. A delivery notification card accompanied all loads.

In addition, all loads delivered to each receival point required a declaration of its GM status as well as further details including grower name, NGR #, TUA #, paddock identification, grower contact details, variety name and nominated delivery location, as additional product identification and traceability.

Documentation
Roundup Ready canola delivery notification card AOF Code of Practice for the Bulk Transport of Oilseeds AOF Roundup Ready Canola Lateral Flow Test Strip Method (Appendix V)

4. Storage & Handling (Bulk Handling Companies)

The canola industry has seen a range of specialty canola varieties released in recent years that have specific end product uses. The industry has developed a robust set of management plans to ensure that these specialty canola types are delivered according to customer specifications. In addition, the grain accumulation industry has also a long history and reputation for handling and delivering specialty grain varieties for flour milling and brewing customers.

Based on these, each site has further developed identity preservation protocols and procedures to ensure that all GM canola deliveries were accounted for, to handle the GM canola through dedicated pathways, and to store the GM canola under segregation protocols to preserve its identity.

Appropriate levels of stack monitoring using the Roundup Ready Canola lateral flow test strips were implemented to maintain any non-GM canola stored on location at below industry standard AP thresholds.

Each receival site was required to maintain adequate records of all deliveries and monitoring results.

Documentation
Roundup Ready canola delivery notification card Grain handler declaration forms (Appendix VI) AOF Roundup Ready Canola Lateral Flow Test Strip Method

5. Delivery to Process Plants

To ensure that all GM canola deliveries are kept separate, the delivery and transport of the Roundup Ready canola will be under a set of protocols based on the AOF Code of Practice for Bulk Transport of Oilseeds by Road and Rail. A delivery notification card will accompany all loads.

Crushers and marketers require confirmation of the quality and status at their processing receival point. All loads are required to be tested for quality parameters and in addition Roundup Ready canola deliveries may be tested with lateral flow test strips to verify the GM status. A GM Declaration will be required.

Documentation
GM Canola Declaration form AOF Code of Practice for the Bulk Transport of Oilseeds AOF Roundup Ready Canola Lateral Flow Test Strip Method

6. Storage & Handling (Crush Plants)

To ensure that the identity of GM canola is preserved, processors have modified existing internal quality and accounting/stock-keeping procedures to ensure the integrity of all grain stored on site.

7. Processing

To ensure that the identity of GM canola is persevered, processors have modified existing quality procedures to ensure the integrity and quality of all grain processed.

8. Storage & Handling (Finished Oil & Meal)

To ensure the integrity of all finished oil and meal products, processors have modified existing quality and accounting/stock-keeping procedures. All finished oil and meal is as clearly identified, stored and handled as separate products to ensure compliance to customer specification and respective legislation.

Oil processed from GM canola grain is handled separately and is identified as GM derived oil. Meal processed from GM canola grain is handled separately and indentified as GM derived meal.

9. Delivery to Customers

To ensure the integrity of all finished oil and meal products, processors have modified existing quality procedures, based on the AOF Code of Practice for the Bulk Transport of Vegetable Oils by Road and Rail, for oil and meal derived from GM canola grain. All GM derived canola oil is clearly identified on delivery documentation. In the case of Roundup Ready canola derived oil this declaration is "Oil derived from glyphosate-tolerant canola" as per Food Standard 1.5.2. Meal processed from GM canola grain is clearly identified on delivery documentation as GM canola meal.

Identity preservation performance

The table below provides a performance checklist and the evidence used to demonstrate that the market choice framework has operated effectively and in accordance with the protocols.

Identity preservation protocol performance checklist throughout the value chain

Flow chain step	Compliance measure	Achieved	Evidence
Access to technology	All farmers growing Roundup Ready canola accredited	✓	Monsanto records of attendance and successful completion of exit quiz
	All TSP's accredited	✓	Monsanto records of attendance and successful completion of exit quiz
On farm production	All farmers growing Roundup Ready canola signed license agreement to adhere to CMP	✓	Monsanto records of signed grower agreements
	Adherence to CMP	✓	Monsanto (including TSPs) in crop checks. Growers delivered all tonnes against contract/s
	Grower declaration at delivery	✓	GrainCorp, Kelly & Sons and ABA records of grower delivery cards
Storage and handling-Grain Handlers	Receival documentation	✓	GrainCorp, Kelly & Sons and ABA records of grower receival documentation
	All tonnes delivered as per specifications	✓	GrainCorp, Kelly & Sons and ABA records of grower receival samples
Storage and handling-Crush Plants	Unique stock codes for GM grain	✓	Cargill and Riverland accounting systems and associated documentation Cargill and Riverland SOPs (Standard Operating Procedures) for handling of GM and conventional canola.
Processing	Isolated production run for GM grain	✓	Cargill and Riverland production records Cargill and Riverland SOPs for processing of GM and conventional canola.
Storage and handling-Meal and Oil	Unique stock code and/or internal documentation for oils and meal from GM grain	✓	Cargill and Riverland accounting systems and associated documentation Cargill and Riverland SOPs (Standard Operating Procedures) for handling of GM and conventional canola oil and meal
Delivery to Customers	Unique stock code for and/or internal documentation oils and meal from GM grain Delivery in accordance with customer's requirements	✓	Cargill and Riverland accounting systems and associated documentation Customer receipt of goods confirmation Payment in full by customer as ultimate acceptance of delivery according to specifications.

	C of A, if required by customers for oil		

Delivering market choice – trade facilitation

Industry agreed standards and supporting methodologies

The industry has developed a range of standards and supporting documents to ensure that trade continues without disruption.

Non GM canola standards

The Australian canola industry has historically been based on one grade of canola (CSO1). In response to the approval for commercial production of GM canola in NSW and Victoria, AOF introduced an additional trading standard in 2008 for Non GM canola (CSO1-A) to accommodate market requirements.

The CSO1 trading standard applies to all canola seed irrespective of its GM status and adventitious presence of OGTR approved gene events.

The CSO1-A canola trading standard is applicable for all declared non-GM canola. All quality and trade parameters for CSO1-A are as per CS01 with an additional requirement for an adventitious presence of OGTR approved events at 0.9%.

Details of the trading standards can be accessed via the Grain Trade Australia website www. Graintrade.org or for AOF members via the AOF website www.australianoilseeds.com

AOF also established new standards for meal. This includes a new non-GM canola meal standard for both solvent and expeller meal. All quality and trade parameters for non GM meal standards are as for canola meal, but with an additional requirement for an adventitious presence of OGTR approved events at 5% and that it is processed from CSO1-A canola seed. It was agreed with the Stockfeed Manufacturers Council of Australia that the standard would be reviewed for the 2009/10 season.

Supporting documents

AOF developed two supporting documents throughout the course of the AOF season to provide an industry standard for key elements in the delivery of identity preservation for GM canola.

This included:

- AOF Code of Practice and Guidelines for Harvesting Equipment Clean Down (Appendix V)
- Roundup Ready® Canola Lateral Flow Test Strip Kit Method (Appendix VII)

Through chain commodity/product declarations

GTA and AOF updated their common declarations around GM prior to the 2008 season to reflect the commercial production of GM canola.

Commodity vendor declaration forms are routinely used in the grain and oilseed supply chain on receipt of grain from a grower or during transfer of ownership within the trade. These commodity vendor declaration forms can include details such as chemical residue status, variety and quality status of the grain. This information is used by the buyer or handler of the grain to verify the grain meets regulations and/or market requirements.

There are various formats of these commodity vendor declaration forms used in the industry, depending on the company receiving the grain.

There can also be a requirement for a separate declaration to be made on the GM status of the grain. Industry participants may require this to be separate to the declaration on the commodity vendor declaration form. Specific wording has been developed by the industry to provide consistency and transparency in the marketing process.

Different declarations may be used depending on the point of transfer of grain in the supply chain and these can be found at the AOF website www.australianoilseeds.com and the Grain Trade Australia website www. Graintrade.org

Effective dispute resolution process

GTA has in place a well established and recognised dispute resolution process. This system has been tested and refined over its many years of operation in the grains industry and is a rigorous process with strong legal integrity. This can be applied to contracts relating to GM grain.

There were no disputes regarding GM canola in 2008.

International harmonisation of trade processes

GTA and AOF play an active role with their international counterparts and government processes to ensure that Australia's systems and processes are aligned with international trade standards.

GTA is an active member of the International Grain Trade Coalition which is the group leading discussions globally on liability and redress issues relating to GM grains and oilseeds; promoting global standards on AP and working with international initiatives such as the BioSecurity Protocol.

GTA and AOF actively participate in processes such as Codex to seek harmonisation of standards globally and work with the Australian regulatory authorities such as AQIS, FSANZ, OGTR, APVMA, NRS and others.

Delivering market choice – regulatory compliance

All regulatory requirements were met.

Monsanto reports to the OGTR[4] and APVMA, also undertaking frequent communication with the Victorian and NSW state governments to ensure they were kept informed on progress throughout the season.

Monsanto, under OGTR license number DIR 020/2002, submitted the 2008 Annual Report for the Commercial Release of Roundup Ready Canola (Brassica napus) in Australia. The reporting period was 19 December 2007 through 19 December 2008. The report was submitted on 19th December 2008.

DIR 020/2002 was issued in December 2002 permitting dealings with the GMO to be undertaken.

Monsanto, under their registration with the APVMA, submitted the annual compliance report for 2008 on 27th November 2008.

Monsanto Australia Limited informed all canola growers covered by the DIR 020/2002 license, and APVMA registration, of the obligations imposed on them as a result of the conditions of this license. This was primarily achieved through the Monsanto Accreditation Program and information course which includes information on regulatory obligations, as well as management of the crop.

[4] Office of the Gene Technology Regulator

Accreditation programs require all persons having management responsibility for Roundup Ready canola crops, to undergo training, and to pass a test on the content of the training.

During the reporting period, Monsanto did not become aware of additional information as to any risks to the health and safety of people, or to the environment, associated with the dealings authorised by the License; or of any unintended effects of the dealings authorised by the License.

Corrective actions and revisions to the Market Choice Protocols

A post season review of the market choice protocols has been undertaken and a planning meeting regarding 2009 has been held with canola supply chain participants.

The protocols were effective in delivering the market choice outcome and no revision to the protocols is required.

For 2009 and beyond, the two canola standards (CSO1 and CSO1-A) will operate and that the protocols will applied to enable market choice against these two segregations

Market Choice in the Canola Industry

Stakeholders Report Appendices

Appendix I – Canola Value Chains

Canola Value Chain

Delivering market choice

Introduction

The Australian canola industry has adopted a position of market choice which frames the development of coexistence arrangements across the range of products that the industry produces.

To date, the Australian canola industry has been based on one grade of canola (CSO1).

In recent years, the industry has seen a range of new products introduced. This includes introduction of speciality canola which has modified fatty acid profiles and specific end product applications; new types of canola such as canola quality mustards; and new technologies such as GM canola.

In addition, there is R&D occurring on industrial mustards for applications such as biodiesel and there is ongoing development of condiment mustards.

Management of the grain supply chain to meet end user specifications, for product quality and ensuring that the product is not compromised by the unintended presence of impurities, is built on a platform of maintaining product integrity.

This platform is built on utilising tools such as standards, identity preservation processes, segregation and traceability.

In response to the approval for commercial production of GM canola in NSW and Victoria, AOF has adjusted the trading standards for canola to accommodate market requirements. This has not previously been required in relation to specialty canola as these crops have been grown under a 'closed loop' arrangement.

This document outlines how the canola supply chain operates for commodity and identity preserved products and illustrates the arrangements in place for GM canola in 2008, as well as demonstrating how it may be dealt with in the future.

Canola value chain

Commodity canola value chain

Bulk handling process for canola

The flow chart opposite outlines the processes in place for production, handling, transport and marketing of canola (CSO1).
CSO1 can include conventional and/or GM canola.

GM Canola in 2008

A Segregated Closed Loop Chain

(NSW and Victoria)

Step 1:
Production

Growers select and sow the most appropriate canola variety to match agronomic and market requirements.

Growers must attend an accreditation course and sign a Technology Users Agreement that requires them to comply with the Crop Management Plan and Resistance Management Plan.

Technology provider – Monsanto Australia
Seed providers – Pioneer Hi-Bred Australia, Pacific Seeds, NuSeed

Step 2:
Harvest, on farm storage and delivery

Growers use their own equipment or contractors to harvest their crop at the most appropriate time. Many farmers deliver direct to country bulk grain depots from the harvest. Truckloads are sampled and tested and, if acceptable, unloaded into the bulk handling facility.

Contractors follow clean down procedures as specified in the Crop Management Plan/ AOF guidelines. GM varieties will be kept separate and delivered directly to nominated delivery sites with appropriate segregation.

Receival sites – GrainCorp, ABA

Step 3:
Delivery to End-Users and Export Terminals

All canola is delivered to domestic end-users or export terminals in dedicated, cleaned trucks or railcars as per the AOF Code of Practice for Bulk Transport of Oilseeds.

GM canola is transported directly from the GM sites to end users as identity preserved product.

Domestic processors – Cargill Australia, Riverland Oilseeds

Step 4a:
Domestic Processors

Canola is stored and crushed to produce canola oil and meal.

Step 4b:
Export Markets

Australian canola seed is regarded as a high quality commodity, it is exported to international customers, in accordance with customer specifications.

GM canola is crushed separately and oil and meal products stored separately and delivered to customers in accordance with their requirements.

Step 5:
End products: Oil and Meal

Canola products are delivered to customer specification.
Canola oil is used in a range of cooking oils, spreads and other food products. Canola meal is valuable feed ingredient for a range of livestock.

GM canola is crushed separately and oil and meal products stored separately and delivered to customers in accordance with their requirements.

Identity managed canola value chain

Bulk Handling Process for Specialty, non-GM, Juncea canola, High Oleic varieties

There are several variants of 'identity managed' canola in Australia. However, they all have some common principles in terms of providing traceability through the chain and confidence to customers that products delivered are to specification.

In the case of specialty canola – high oleic, low linolenic canola – and juncea canola, these products are managed through closed loop identity preservation systems. This means that growers are contracted to produce specific varieties and grain produced is contracted to a specific end user against specific quality specifications.

In the case of non GM canola, this product is handled as a commodity product and growers are free to market their grain to any buyer offering contracts against the industry based trading standard CSO1-A. In this scenario, growers follow a similar production system to commodity canola (CSO1), although care needs to be taken in ensuring planting seed is non GM and that appropriate crop management practices are undertaken to ensure that the grain meets the CSO1-A standard. There are similar processes in place post farm gate to ensure traceability through the value chain and that customers purchasing non GM canola can be assured that this is what they receive.

Step 1:

Production

Growers and buyers contract for specific IP varieties that may incur a premium.
Specified varieties are grown under contract, harvested under IP procedures and stored in separate silos or bins.

Growers provide IP crops on an individual basis to meet specific market requirements. For non GM canola this is AOF CS01A Standard.

Step 2:

Harvest, on farm storage and delivery

Growers use their own equipment or contractors to harvest their crop at the most appropriate time. IP varieties are delivered, graded and handled using specific IP procedures and stored in separate bins or silos. Specific sampling and testing, such as test strips, is performed as required to verify the IP variety and type.

Step 3:

Delivery to End-Users and Export Terminals

IP grain is delivered to domestic end-users or export terminals in dedicated, cleaned trucks or railcars as per the AOF Code of Practice for Bulk Transport of Oilseeds.

Step 4a:

Domestic Processors

IP canola is handled as a distinct seed type, with its own individual product code. IP canola seed is handled and stored in infrastructure that meets customer requirements for segregation. IP canola seed is crushed in a dedicated production run.
Process lines are flushed pre and post IP to eliminate cross contamination.

Step 4b:

Export Markets

IP canola is handled, stored and shipped in infrastructure that meets customer requirements for segregation. All infrastructure is cleaned and inspected and records kept as per the providers IP manual.

The IP price pays for growers, accumulators, processors and others to handle the crop separately

Step 5:

End products: Oil and Meal

Both IP canola oil and meal are identified with unique product codes. Both IP oil and meal is stored, handled and distributed as a separate product which may incur a premium.

Canola stakeholder report

AOF/NACMA will provide stakeholders with a report in regard to GM canola. This will demonstrate how GM canola has been managed against the industry's market choice policy. The report will be published in March each year, with an interim update provided in September/October each year.

The report will provide stakeholders with an overview of how GM canola has performed in relation to the market choice protocols that have been developed by the industry.

The market choice protocols can be accessed from the AOF website.

The report will provide:

- An overview of the area and volume of GM canola
- A report on how the market choice protocols have performed
- Identify any actions/revisions of the protocols that have been undertaken in response to the value chain performance

For further information:

Australian Oilseeds Federation
PO Box R1826
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Appendix II – 2008 data

Seed varieties:

Seed Company	Varieties	Maturity
Nuseed	GT 61	Early -Mid
Pacific Seeds	M8032RR	Early -Mid
	M8265RR	Mid
Pioneer Hi-Bred Australia	46Y20 (RR)	Mid - Late

Branch locations of the 22 Technology Service providers

NSW	VIC
AgnVet Wagga (IHD)	Elders Ballarat
Delta Ag Young	Gorst Rural - Lake Bolac
Elders Albury	Harbergers Donald
Elders Cowra	IK Caldwells Shepparton
Elders Finley	Landmark Bannockburn
Lachlan Fert Cowra	Landmark Bendigo
Landmark Forbes	Landmark Kaniva
Landmark Henty	Landmark Rupanyup
Lockhart Rural	Northwest Ag Beulah
Riverina Co-op Wagga	Western Ag
	Driscoll Seeds Maryborough
	AgriTech Rural Horsham

2008 Roundup Ready canola planting details

Available in hard copy.

2008 Roundup Ready canola delivery information

	Total estimated tonnes
Graincorp sites	
- Lockhart	2532
- Lubeck	1693
- Grenfell	1535
ABA Tatyoon	2693
Kelly at Finley *	884
Total Deliveries	**9336.92**

Process for 2008 Roundup Ready canola crops cut for hay

Where crops were cut for hay, Monsanto worked with the dairy, fodder and stockfeed industry to develop and agree a process for growers who, as a result of season conditions, intended to cut their Roundup Ready canola for hay. Each grower was instructed to undertake the following steps:

- Notify Monsanto of their intent to cut for hay; and confirm the area cut to ensure accurate record is kept
- Inform the buyer of the GM status of the hay e.g. using appropriate vendor declaration
- Advise the buyer that, as with other hay, the Roundup Ready canola hay could contain viable seed and needs to be treated accordingly
- Keep appropriate record of the buyer's details – name, address & contact details and provide to Monsanto for traceability

Appendix III – Roundup Ready Canola Crop Management Plan

Roundup Ready® canola

2009 Crop Management Plan

Monsanto Australia Limited

Disclaimer

Always read and follow the directions and precautions on the label for Roundup Ready® Herbicide and Roundup Ready® canola, and any other special conditions that may accompany the Technology User Agreement.

All the information provided in this technical manual is provided for general information only and no reader should act upon any material contained in this manual without considering his or her individual situations. Roundup Ready crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup Ready Herbicide. Roundup Ready Herbicide will kill plants that are not tolerant to glyphosate.

Roundup Ready canola® Crop Management Plan (CMP)

Objective

The purpose of the Roundup Ready canola Crop Management Plan is to implement **on-farm** strategies to manage risks to the integrity of grain crop supply-chains and the sustainability of agricultural production. These strategies will:

1. Contribute to the long-term economic and environmental sustainability of agricultural production systems,

2. Maximise the life of the Roundup Ready canola technology, while allowing farmers and the community at large to realise fully the economic, agronomic and environmental benefits offered by the technology, and

3. Enable different production/market systems to concurrently operate in a profitable and sustainable way, in response to changing market and non-market requirements.

Specifically, growers of Roundup Ready canola are required to implement on-farm management practices that aim to:

- Prevent the evolution of herbicide resistant weeds,
- Control Roundup Ready canola volunteers,
- Minimise risks to the integrity of grain supply-chains,
- Ensure good crop agronomy in a sustainable manner, and
- Meet all other regulatory requirements.

Training and Accreditation

Growers and/or agronomists are required to attend a Roundup Ready canola Accreditation Programme as part of the Roundup Ready canola stewardship strategy. The participants must attend training and exhibit competency before they will be accredited to service or use the technology. Upon completion the participants will become accredited to use or service Roundup Ready canola.

It should be noted that any accredited agronomists have a duty of care to ensure that all recommendations made are in accordance with the Crop Management Plan, Resistance Management Plan, Technical Manual, Roundup Ready Herbicide label, seed label, Stewardship & Licence Agreement and Technology User Agreement.

Communication

The CMP forms part of the conditions of the Licence and Stewardship Agreement, which a grower is required to sign before growing Roundup Ready canola. Details of the CMP will also be included as part of the accreditation course and the Technical Manual for Roundup Ready canola.

Resistance Management Plan

The sustainable use of glyphosate based herbicides (e.g. Roundup® Ready Herbicide) is critical for Australian farming systems. Furthermore, longevity of Roundup Ready technology in Australia can only be ensured by minimizing the development of weed resistance to glyphosate based herbicides. Hence, the Resistance Management Plan (RMP) is a critical component of the CMP.

The RMP has been developed by Monsanto in consultation with leading Australian weed researchers.

The RMP aims to ensure the sustainable use of glyphosate herbicide in Australia, through growers implementing management practices, within a crop rotation incorporating Roundup Ready canola, to minimize the risk of weeds (particularly annual ryegrass) developing resistance to the herbicide.

PRAMOG

Growers must complete the Paddock Risk Assessment Management Option Guide (PRAMOG®) as a condition of the TUA. PRAMOG is a tool that identifies existing risk potential for glyphosate resistance development and suggests additional management options to minimize this risk in the years after growing Roundup Ready canola. This recognizes that each paddock has a unique Glyphosate Resistance Risk Profile, and allows growers to choose management options that are complementary to their individual farm planning requirements.

As part of completion of the PRAMOG, the grower must provide details of the outcomes of PRAMOG for each paddock to be planted to Roundup Ready canola.

Records

All Roundup Ready canola growers must maintain a set of paddock management records, for all paddocks in which they grow, or intend to grow Roundup Ready canola. Ideally, these records should commence prior to growing Roundup Ready canola, however they must be maintained and updated during the growth of the crop, and for **three years** after harvest. These records are to be made available to Monsanto or regulatory authority nominated auditors when requested. As a minimum records should include:

- History of crop and weed management practices on the paddock (e.g. non-herbicide weed control, sowing dates, sowing rates, etc).
- Names, rates, application methods, application dates, and effectiveness of herbicides applied.
- Weed type, numbers and herbicide resistance status present in the paddock, and
- Soil types.

Inspections

Growers or their nominated agronomist must inspect paddocks between 14 and 28 days after spraying Roundup Ready Herbicide to monitor the effectiveness of the herbicide application. During these inspections, any surviving weeds that are normally sensitive to glyphosate application, should be identified and reported to their TSP. The inspections must be recorded as part of the Roundup Ready canola audit.

Audits and Compliance

Monsanto or the growers TSP will undertake random audits of Roundup Ready canola paddocks and records maintained by the farmer to ensure the Resistance Management Plan has been implemented and that the paddock is in “Compliance” with the Technology User Agreement Terms and Conditions.

If through the random audit by Monsanto of a Roundup Ready canola paddock it is found to be “Non-Compliant”, Monsanto will work with the farmer and the Technology Service Provider to implement appropriate practices to ensure the paddock comes back into “Compliance”.

A compliance levy may be charged to allow additional audits to be conducted, to confirm that the paddock is back in “Compliance”. This would normally be done by inspecting the paddock and the farmer records.

If a dispute occurs between the farmer, the Technology Service Provider and Monsanto regarding implementation of the Resistance Management Plan, the dispute will be referred to independent arbitration for resolution.

Crop agronomy

Good crop agronomy is essential to maximising the value of this technology to the grower. Sustainable production is a primary aim of good crop agronomy, and includes many factors that are not unique to the production of Roundup Ready canola.

The Crop Agronomy aspects are addressed in the Roundup Ready canola Technical Manual and include, but are not limited to, the obligations and recommendations applicable to:

- maintaining adequate records,
- paddock mapping and identification,
- selecting appropriate varieties,
- purchasing seed
- taking receipt of seed,
- planting,
- seed,
- applying insecticide,
- applying herbicide,
- flowering,
- windrowing, and
- harvesting.

Increased focus with respect to genetically modified (GM) crop production will be placed on: pre-sowing and post-sowing machinery cleanliness, paddock identification, identification of neighbouring crops, pre-swathing and post-swathing machinery hygiene, pre-harvest and post-harvest machinery hygiene, and any regulatory requirements as they relate to crop husbandry. If growers are wishing to further pursue Good Agricultural Practices, it is recommended that more information be sought regarding Quality Assurance principles (as outlined by Grain Care and Great Grain).

Management of Open Pollinated Canola

Co-existence

A key objective of the stewardship management practices for Roundup Ready canola is to maintain product integrity within the Roundup Ready canola crop and that of surrounding crops. The Roundup Ready canola Technical Manual provides details of the supporting research and literature from which these guidelines were developed.

Table 1. Requirements for growing Roundup Ready canola near other canola in Australia, to minimise the occurrence of off-types.

MINIMUM DISTANCES FOR MANAGING ADVENTITIOUS PRESENCE OF GM GRAIN TO BE LESS THAN 0.9%, BETWEEN GM CANOLA AND:	**Grain Production** **Non-GM canola & all other canola**	**Seed Production** **Foundation Seed canola**
	5 metres	400 metres

Where an alternate standard (i.e. lower threshold for non- Roundup Ready canola) is required in response to market requirements and product specifications, or there is a plan to grow a specialty canola crop that requires specific management to maintain product integrity (e.g. High Oleic, High Erucic, GM Free or Organic Canola), appropriate management strategies applicable to the growing and processing of the crop should be incorporated as deemed and communicated by the supply chain for the specified product.

If non- Roundup Ready and Roundup Ready canola crops are to be grown in adjacent paddocks (within 5m of each other), and there is a supply chain requirement to deliver and declare the grain separately, the following management practices must be adopted:

- A narrow band (at least 5m) of the Roundup Ready crop should be slashed and/or cultivated prior to the onset of flowering, or
- If the crops are grown within the same farming operation, a narrow band (at least 5m) of the non-Roundup Ready crop can be harvested and processed as part of the Roundup Ready crop and subsequently managed as per the Roundup Ready paddock for volunteer control.

Where a farmer grows a Roundup Ready canola crop along a boundary fence line that is adjacent to a neighbouring canola crop (or within 400m of a seed production crop), the farmer should notify the neighbour and discuss any relevant matters.

The area immediately adjacent (at least 5m) to the Genetically Modified crop should be treated as per the Roundup Ready paddock for subsequent volunteer control.

Movement of pollen can occur beyond 5m, with isolated low frequency events occurring over greater distances. The level of pollen movement declines rapidly with increasing distance. Growers should ensure provisions for this are included in their weed management plans.

Potential for multiple herbicide tolerance developing in canola volunteers

Pollen movement between open pollinated canola crops will always occur. Although the risk is very low, the development of plants tolerant to more than one herbicide could occur through cross-pollination between crop varieties. The above separation distances are recommended to minimize this potential.

Potential for outcrossing between canola and weeds

Weed species that are closely related to canola occur throughout many canola growing regions in Australia. Studies have shown that there is the potential for naturally occurring hybrids to form between canola and wild radish, buchan weed or charlock. These events are extremely rare and often result in infertile hybrids. Attempts to transfer Herbicide Tolerance (HT) genes from canola into wild radish, buchan weed or charlock populations by backcrossing the hybrids to the weedy parent species have failed (ie. no introgression of HT traits has been possible). Good agricultural practice will ensure these weeds are controlled in crop and non-crop situations, thus, there will be minimal opportunity for Roundup Ready canola to form hybrids with them.

To date, in the small number of interspecific hybridization events that have been closely studied, the direction of pollen transfer is primarily from the weed species to canola. This means that the resulting seed is likely to be harvested with the rest of the crop and, if not, should be treated similarly to volunteer canola.

B. rapa and *B. juncea* are crops/weeds that are very closely related to canola, and have the potential to hybridize with canola. Introgression of HT traits is possible but unlikely to occur naturally, and would not confer increased fitness or spread as a weed, relative to conventional *B. rapa* and *B. juncea*. In areas where *B. rapa* or *B. juncea* occur within or adjacent to Roundup Ready canola paddocks, they should be managed similarly to volunteer Roundup Ready canola (i.e. they should be controlled with other herbicides or cultural techniques).

Management of outcrossing events

Multiple herbicide tolerant canola volunteers and herbicide tolerant weed hybrids could occur at very low to extremely low levels, respectively. These plants can be controlled by an integrated weed management program, including the use of other herbicides and cultural methods. Multiple herbicide tolerant canola should be anticipated by farmers in order to effectively control canola volunteers.

The following measures are required to reduce potential impact of gene movement:

- talk with neighbours
- respect separation distances
- scout paddocks to identify herbicide tolerant canola in succeeding crops
- keep paddock records
- clean machinery and trucks
- use appropraite rotations

Identification and Control of Volunteer Canola

It is essential to monitor and manage the appearance of volunteer canola in both crop and non-crop situations. The primary aim of volunteer management should be to limit the spatial and temporal distribution of Roundup Ready canola by preventing pollen movement and seed set in years subsequent to growing of the crop.

Volunteers are likely to be found for three years after growing the crop and should be controlled prior to flowering. Burial of canola seed to a depth greater than 5cm is not recommended as this can substantially delay the emergence of volunteers (secondary dormancy can be induced). Inspection regimes for identifying volunteers should take tillage practices into consideration.

The following situations must be assessed for the presence of volunteers:

- In a paddock, where Roundup Ready canola has been grown,
- In a paddock immediately adjacent to where Roundup Ready canola has been grown,
- In areas where seed or grain spillage has resulted during transport (eg. roadsides),
- In any area where ineffective machinery clean down may deposit viable seed,
- In areas where grazing animals excrete for 7 to 10 days after digesting seed, and
- Any areas where physical movement of seed may result in volunteers.

Any plants present in a paddock that may be suspected to be Roundup Ready canola should be controlled as outlined below:

- **Prior to crop establishment:**
  Through the use of a knockdown herbicide (with an appropriate tank-mix partner if using glyphosate based products) and/or cultivation.

- **In-crop:**
  Through the use of an appropriate registered herbicide for the crop being grown.

- **In non crop situations:**
  Through the use of grazing, mowing, grading or herbicide application as appropriate for the situation to prevent the canola reaching maturity. Refer to the Monsanto Tech Topic (Integrated Weed and Vegetation Management in Non-Crop Situations) for further information about control strategies.

When making spray decisions to control volunteer canola, growers should be aware of previous herbicide tolerant canola cropping both on their farm and that of their neighbours and modify herbicide choice appropriately.

Refer to the Roundup Ready canola Technical Manual for a complete list of herbicidal and cultural options.

Farmer Saved Seed

Under the Licence and Stewardship Agreement, farmers are not permitted to save seed for replanting in subsequent years. Under no circumstances may Roundup Ready canola farmer saved seed be supplied to another party for replanting.

MONSANTO DOES NOT WARRANT THE SAFETY OR PERFORMANCE OF THE ROUNDUP READY TECHNOLOGY OR ROUNDUP READY HERBICIDE WHEN SAVED SEED FROM ROUNDUP READY CANOLA IS USED FOR PLANTING.

Seed Hygiene, Planting, Storage and Transport at Harvest

Attention to seed hygiene, storage and transport when planting and harvesting Roundup Ready canola assists in effective weed management and volunteer control.

Consistent with conventional crop hygiene techniques, an effective equipment clean-down procedure is important in preventing the dispersal of Roundup Ready canola seed. This includes equipment such as seed drills and harvesters, and is important for both contractor equipment and machinery kept and used on farm. The farmer should notify any equipment contractor of the relevant crop's GM status.

On and off the farm, appropriate measures must be taken to avoid spillage during transport and intermediate storage of the harvested crop.

The seed of Roundup Ready canola varieties must be stored separately from other canola seed upon receipt and the label information must be retained with the seed. Keep the seed in a leak proof storage

area and maintain the seed in its original packaging to ensure seed quality. For storage, the surplus of seed must not be mixed with other seeds and must remain identifiable.

Where Roundup Ready canola and other canola varieties are mixed together, the grain must be treated as GM. Every seed transportation unit containing Roundup Ready canola grain (bags, containers, bulks) must be labeled. Where harvested grain is being delivered to a grain handler or processor, the shipment must be declared as containing GM grain to avoid unintended mixing with non-GM grain.

Situations where Roundup Ready canola should not be grown

Roundup Ready canola should not be grown in the following situations:

i.) Where the risk of developing glyphosate resistance in growing Roundup Ready canola is high in (as indicated by PRAMOG); or

ii.) In vineyards for biofumigation purposes, or

iii.) Within 5m of non-Roundup Ready canola crops when supply chain requirements require separate delivery and declaration of non-GM canola crops, unless management practices outlined in the above “Management of Open Pollinated Canola” section are adopted, or

iv.) Within 400m of Foundation Seed canola crops.

Adverse Event Reporting

Growers are required to report any adverse event to Monsanto as soon as it is identified. Monsanto will investigate the incident and produce a report and recommendations as required.

Who to contact for assistance

If any grower encounters problems in complying with the Australian Roundup Ready canola Crop Management Plan, or would like any other information, please contact your Roundup Ready canola Technology Service Provider or Monsanto (phone (03) 9522 7122 or www.monsanto.com.au).

ROUNDUP READY CANOLA RESISTANCE MANAGEMENT PLAN (RMP)

Resistance Management Principles for Roundup Ready canola

1) Aim to enter the Roundup Ready canola phase of the rotation with a low weed burden.
2) Integrate as many different weed control options (chemical and cultural) as possible through all phases of the crop rotation.
3) Make every herbicide application count - use registered rates - and assess effectiveness.
4) Rotate herbicides with different modes of action throughout the crop rotation.
5) Rotate herbicide tolerant crops with tolerance to different modes of action herbicides throughout the crop rotation.
6) Regularly monitor the effectiveness of resistance management practices.
7) Test weed populations for herbicide resistance status as part of ongoing integrated weed management.

Goal:
Through the implementation of management practices, within a crop rotation including Roundup Ready canola, manage the weed population to ensure the long-term sustainable use of glyphosate herbicide in Australian farming systems, by minimizing the risk of weeds (particularly annual ryegrass) developing resistance to glyphosate based herbicides.

Strategy:
To incorporate a range of cultural and herbicide management practices that maximize control of weeds which may be resistant to glyphosate. The implementation of these practices should result in a reduction in the weed population entering the subsequent phase of crop rotation.

Tactics:
Selection and adoption of specific management practices will require consideration of the impact of the following:

- The presence or absence of weeds with established resistance to the management practice (i.e. herbicide resistance).
- The effectiveness of weed control following the application of the management practice.
- The rotation phase within which the management practice is selected for inclusion.
- The inclusion or exclusion of glyphosate as a knockdown herbicide within the rotation.
- The complementary and/or synergistic impact of two or more management practices.
- The sustainable use of the management practice within the crop rotation.
- The ability to assess glyphosate resistance risk potential on a paddock by paddock basis.

PRAMOG®: The Paddock Risk Assessment / Management Tool

Incorporating weed control management practices that rotate away from glyphosate herbicide in the year immediately following Roundup Ready canola is the simplest and most effective way of minimizing the risk of weeds developing glyphosate resistance.

However, rotating away from glyphosate herbicide in the year following Roundup Ready canola is not always practical or feasible so farmers require options that may allow the continued use of glyphosate. Farmers are requested to complete the model below, regardless of their choice to use or not use glyphosate in the year after Roundup Ready canola, on the basis that doing so highlights the glyphosate resistance risk potential.

The Paddock Risk Assessment and Management Option Guide (PRAMOG®) provides farmers planning to grow Roundup Ready canola with an individual paddock risk assessment management tool, that when completed will:

1) Provide a "Risk Assessment" in relation to the potential risk (i.e. increasing or decreasing) of developing herbicide resistance to glyphosate within the current ryegrass population and

2) Provide a decision making process that allows a farmer flexibility to continue to utilise glyphosate as a knockdown herbicide in the year following Roundup Ready canola by outlining a number of alternate management practices that a farmer can select and implement in order to manage the ryegrass population present.

Each paddock nominated for planting to Roundup Ready canola will exhibit a unique Glyphosate Resistance Risk Profile. This is based on the implementation of various management strategies throughout the previous crop rotation within the paddock.

The two key management strategies that will determine the Glyphosate Resistance Risk Profile of the annual ryegrass population within a paddock are:

a) **Glyphosate Application Index:** The number of applications of glyphosate to a population of ryegrass within a paddock will determine the selection pressure applied to that ryegrass population for glyphosate resistance. Further, the intensity of selection pressure depends on the type of application (e.g. a glyphosate application followed by full-cut cultivation provides less intensive selection pressure than a no-till glyphosate application). The index combines the elements of selection frequency and intensity to produce a risk index rating.

b) **Herbicide Mode Resistance Status:** This is the number of herbicide modes of action to which ryegrass in the paddock are resistant. The herbicide resistance status of a paddock reflects the outcomes of previous management practices for the control of ryegrass. It is an indicator of the resistance pressure that has already been placed on glyphosate.

PRAMOG® Directions for Use:

1) All farmers should complete a PRAMOG assessment, regardless of whether or not they intend to use glyphosate herbicide in the year following Roundup Ready canola.

2) Glyphosate herbicide should not be applied in the year following Roundup Ready canola unless this is not feasible or practical. Where it is not feasible or practical to avoid the application of glyphosate in the year following Roundup Ready canola, PRAMOG® provides an indicator of risk, and a means of identifying additional management practices to reduce this risk of glyphosate resistance developing.

3) Calculate the the Glyphosate Resistance Index, using figure 1 shown below. Mark the number of each type of glyphosate application (over the last 20 years) that was applied to the paddock intended for planting Roundup Ready canola. Multiply this by its weighting, and record this in the far right column. Tally the numbers in the far right column to give the Glyphosate Resistance Index.

Figure 1: Glyphosate Resistance Index

Type of glyphosate Application	Number of Applications	Weighting	Multiplied
Winter Fallow (with no grazing), Roundup Ready canola.		4	
Knockdown with minimal soil disturbance (e.g. No – Till or Zero – Till), Pasture Topping, Crop Topping, Fallow (with grazing)		3	
Knockdown with minimal or no soil disturbance followed by Paraquat and/or a seed set control practice.		2	
Knockdown followed by full soil disturbance (i.e. full – cut cultivation)		1	
No Roundup (or glyphosate)		0	
		INDEX = Sum	

4) Refer to Figure 2 for the Glyphosate Herbicide Resistance Risk Profile. Find the the Glyphosate Resistance Index category in the left column. **If the glyphosate herbicide application history of the paddock is not known, select the middle category on the left hand axis.**

5) The top row of the matrix in figure 2 shows the number of herbicide groups for which herbicide resistance has been confirmed for ryegrass within the paddock intended for planting Roundup Ready canola. For example, if resistance has been confirmed to Group A herbicides (Fops and/or Dims), the Herbicide Mode Resistance Status would one, if resistance has been confirmed to Group A and B herbicides (Fops and/or Dims plus sulfonylureas and/or IMI's) the Herbicide Mode Resistance Status would be two, etc. **If the Herbicide Mode Resistance Status is not known, choose either the number TWO for a paddock in Western Australia or ONE for a paddock in Eastern Australia**.

6) Draw a line across from the Glyphosate resistance index category and down from the Herbicide mode resistance status

7) The box where the two lines meet shows the level of risk for glyphosate resistance developing in ryegrass populations in this paddock. This rating determines the number of mandatory management practices that a farmer should implement as part of the Resistance Management

Plan for Roundup Ready canola where the farmer wishes to continue to utilize glyphosate as a knockdown herbicide for weed control in the following year. Alternatively the point of contact may determine that the resistance related risk of using glyphosate in the year following Roundup Ready canola is too high.

Figure 2: Glyphosate Herbicide Resistance Risk Profile

Glyphosate Resistance Index	Herbicide Mode Resistance Status			
	0	1	2	3
>=40	2	NG	NG	NG
30-39	2	2	2	NG
20-29	2	2	2	2
10-19	1	1	2	2
<10	1	1	1	1

It is recommended that farmers seek advice from their Technology Service Provider or other expert sources to ensure an integrated weed management plan is established for all paddocks.

1 = A minimum of one additional management practice must be nominated and implemented.

2 = A minimum of two additional management practices must be nominated and implemented*.

No Glyphosate (NG) = A minimum of two additional management practices must be nominated and implemented, and Monsanto recommends that farmers do not use glyphosate in the year following Roundup Ready canola.

* It is recommended that farmers seek to voluntarily leave glyphosate out of their herbicide program for at least one year in the next three years following Roundup Ready canola.

8) Refer to Figure 3 for Glyphosate Resistance Management Plan Option Selector and choose the appropriate number of nominated management practices (determined in Step 7).

Figure 3: Glyphosate Resistance Management Plan Option Selector

Resistance Management Plan Practices

Year Following Roundup Ready Canola	Control of Emerged Weeds Prior to Planting		In – Crop Weed Control
	Herbicide	Cultivation	Herbicide
Options	Paraquat/Diquat	Full Soil Disturbance	Pre-Emergent or Post-Emergent Herbicide

NOTE: Additional non-herbicidal practices are also highly recommended. These are listed below.

9) Farmers are recommended to incorporate additional resistance management strategies during different phases of the crop rotation. (i.e. cereal, legume, fallow, pasture) as this minimizes the on set of herbicide resistance. Additional suggested options are outlined in Figure 4.

Figure 4: Additional management practices that farmers should aim to include where possible and appropriate, as part of an integrated weed management plan.

Weed Management Strategies for other phases of the crop rotation.

Tactic	Ryegrass control level (%) Likely (range)
Mowing	95 (90-98)
Hay, silage, green manure	90 (80-98)
Long fallows	75 (50-90)
Pasture or crop topping/weed wiping	70 (50-95)
Strategic grazing	70 (30-95)
Pasture manipulation to reduce grasses	70 (50-90)
Weed seed collection at harvest	60 (45-75)
Pre-sowing cultivation	50 (35-70)
High seeding rates	40 (25-50)
Strategic burning	40 (10-90)
Minimise burial of seed	40 (20-50)
Autumn tickle followed by control	35 (15-55)
Swathing/Windrowing	35 (10-80)
Good crop agronomy	30 (25-50)
Sound crop rotations	Allows IWM practices to be employed
Herbicide group rotation	Minimises resistance and large weed populations
Farm hygiene	Minimises unnecessary weed seed

Resistance Management Plan Reporting, Monitoring, and Non-Compliance

Reporting:
As part of completion of the Technology User Agreement (TUA), the Technology Service Provider will record the completion and profile of PRAMOG Steps 1 to 7. Additionally, the TUA will also be used to record **either** the omission of glyphosate in the following year **or** the completion of Step 8 and the subsequent actions selected for implementation in the year following Roundup Ready canola.

Monitoring:
Growers should inspect paddocks between 14 and 28 days after spraying Roundup Ready Herbicide (or other registered glyphosate) to monitor the effectiveness of the herbicide application. During these surveys, any surviving weeds that are normally sensitive to glyphosate application, should be identified. The inspections should be recorded as part of the Roundup Ready canola Crop Management Plan checklist.

Monsanto, or the grower's TSP, will undertake random audits of Roundup Ready canola paddocks and records maintained by the grower to ensure the implementation of the Resistance Management Plan has been undertaken and that the paddock is in "Compliance" with the Technology User Agreement Terms and Conditions.

If a farmer chooses to change either the selected components or the time of implementation of components within the Resistance Management Plan, the farmer should notify the Technology Service Provider[1].

If through the random audit by Monsanto or the TSP, of a Roundup Ready canola paddock it is found to be "Non-Compliant", Monsanto will request the farmer to implement appropriate practices to ensure the paddock comes back into "Compliance" (refer below).

Non-Compliance:
Where a farmer is found not to have completed or implemented management practices nominated within the Resistance Management Plan and has not notified the Technology Service Provider, the Roundup Ready canola paddock will be deemed to be "Non-Compliant".

The Technology Service Provider should notify Monsanto where a paddock becomes “Non-Compliant” and detail the remedial management practices that will bring the paddock back into “Compliance”.

It is the responsibility of the farmer and the Technology Service Provider to undertake and implement appropriate management practices that will bring the paddock back into “Compliance”.

If a remedial management practice cannot be implemented in the year following Roundup Ready canola, then the farmer, under the direction of the Technology Service Provider, will be required in the second year following the Roundup Ready canola crop to either:

1) Not apply glyphosate as a knockdown herbicide for control of emerged weeds prior to planting, or
2) If intending to apply glyphosate, undertake to practice a weed management plan as agreed to by Monsanto, the Technology Service Provider and the farmer.

A Resistance Management Plan compliance levy may be charged to allow additional audits to be conducted, to confirm that the paddock is back in “Compliance”. This would normally be done by inspecting the paddock and the farmer records.

Dispute Resolution & Arbitration:
If a dispute occurs between the farmer, the Technology Service Provider and Monsanto regarding implementation of the Resistance Management Plan, the dispute will be referred to independent arbitration for resolution. Arbitration of the dispute will be based on an objective assessment of the individual risk of glyphosate resistance for each paddock.

NATURALLY OCCURRING RESISTANCE TO GLYPHOSATE: Naturally occurring populations of ryegrass may possess biotypes with resistance to glyphosate. Farmers should be aware of this prior to using the glyphosate based herbicides and should aim to decrease the development and growth of resistant populations. If you suspect resistant biotypes are present, these should be sampled and tested.

Importation of weed seeds from external sources may corrupt the outcomes of this model. If ryegrass seed has been imported into a paddock, the history of the previous paddock should also be investigated for herbicide applications and resistance status.

This Resistance Management Plan aims to reduce the likelihood of glyphosate resistance developing by providing guidance on the level of risk associated with specific practices. It does not provide a guarantee that there will be no resistance to glyphosate. Please notify your Technology Service Provider and Monsanto if any weeds survive an application of glyphosate.

Appendix IV – AOF Harvest Equipment Clean Down Guidelines

Harvesting Equipment Clean Down Guidelines – Canola

Insect infestations and grain intermingling starts in the paddock with the harvester. Combine harvester sanitation therefore takes on significance when grain infestation, contamination and cross-blending risks are considered.

The following procedure and checklist has been designed to act as a guide to assist in the cleaning of harvesters and associated equipment between canola crops where cross contamination or blending may cause non compliance to AOF Trade Standards. In the case of GM canola in particular these guidelines are strongly recommended.

Anytime during harvest, the machines will contain soil, seeds and plant material. These can be transported together with the harvester and may become dislodged when the machine is next used. In addition, retained seed can blend with the subsequent seed to be harvested and result in non-compliance to trade specifications, for example the adventitious presence of GM seed. In addition, working harvesters can also transfer diseases and weeds between farms. It is important that all plant material and soil is removed prior to relocating or transporting harvesters. Combine harvester sanitation can take several hours per machine but the effort is essential for the benefit of the canola industry.

Equipment:

The following equipment should be available:

- Tools to dismantle the machine
- Portable lighting
- Brooms and brushes
- Scraper
- Wire probe
- Vacuum cleaner
- Industrial grade air compressor
- Air lance
- High pressure water blaster.

Order of Cleaning:

Harvesters should be cleaned from the top down to avoid contaminating areas already cleaned. If possible cleaning should take place in a well-lit area and on a hard clean surface, such as concrete or bitumen.

1. Before cleaning, open all access doors or covers and run the harvester so as to remove or dislodge as much material as possible from the internal workings
2. Then shut the machine down and remove the starter key
3. Loosen all dirt, trash and plant material with scraper and probe
4. Remove as much as possible by brushing and blowing the surfaces. An air lance – a length of small-diameter pipe with nozzle to use with the air compressor - is ideal for harvester cleanout
5. Vacuum material lodged in pockets or other enclosed spaces
6. Leave all inspection covers open after cleaning so to facilitate inspection

7. Inspect all areas and, if required, re-clean
8. Only use high pressure water as last resort, to avoid damaging bearing seals, **or** clumping and sticking of plant material and soil

Cleaning is not limited to the following areas but should include:

For all harvesters, rotary or straw walker type:

- Start at the top with the grain bin and associated augers
- Engine compartment, radiator core and covers
- Driver's cabin (particularly floor area)
- The comb, cutterbar, platform and skid plates
- Skid plates, including below and underneath
- The throat, and threshing mechanism and associated areas
- All header knives and fingers
- The horizontal auger running across top of header (be sure to inspect inside auger pickup finger plates)
- All areas behind belt covers
- All areas inside belts and draper fronts (if fitted)
- Tailings auger and returns conveyor
- Cleaning shoe sieves and grain pan
- Grain elevator, including any cups or rubber flighting and the boot
- Straw spreaders
- Feeder housing and stone trap
- Cleaning fan, fan housing and shielding
- Chassis including axles, chassis rails and undercarriage areas
- Tyres and rims
- Any residues of seed left on the rig from overflows, stubble retention, etc.

Walker-type harvesters:

- Threshing or separating area, including drum, concaves and concave wiring
- Beater drum, including area between drum and walker
- Straw walkers, including the beater and chaff pans

Rotary harvesters:

- External top and sides along the full length of rotor cover
- External top and sides of the conical entry section of rotor cover
- Clean out threshing and separating concaves

If the harvester is to be stored for a lengthy period it is advisable to treat with Dryacide as per the label directions.

Other associated equipment should also be inspected and cleaned prior to relocation and transport.

Windrowers:

- Use air compressor to remove any residual seed

Bins: (Chaser bins, field bins, or any bin used to transfer or store seed)

- Open cleaning latches located at the base of the bin
- Use air compressor to remove residual seed

Enclosed Augers:

- Run without the hopper for around 15-20 seconds or until any visible seed expulsion ceases.
- Use the steepest setting to ensure any seed flows back down to the base of the auger once the auger stops rotating

- Tap along the length of the auger with a rubber mallet from top to bottom to remove any seed caught at the weld seams

Belt Augers:

- Use air compressor to remove residual seed
- Clean out the joints in the belt as seed may become lodged there
- Where possible, all augers should be run in reverse to facilitate cleaning

Transport Machinery:

- Empty grain bin, use air compressor to dislodge seed and soil
- Ensure adequate inspection of any ledges, joins and weld lines, cleats, around the top of the bin, under the tarp, and any other seed collection point

Appendix V – Roundup Ready® Canola Lateral Flow Test Strip Kits

AOF 4-1.6
Roundup Ready® Canola Lateral Flow Test Strip Kits

1.0 DEFINITION

Roundup Ready® canola has been developed to express the novel protein, CP4 EPSPS, which provides tolerance to glyphosphate, the active ingredient in the Roundup family of herbicides. The lateral flow test strips available are intended for the qualitative (yes/no) determination of the CP4 EPSPS protein expressed in Roundup Ready® canola. These qualitative tests can be used to test canola bulk seed samples to detect the presence of this novel protein at levels typically expressed in Roundup Ready® canola. The sensitivity or detection limit of these test kit strips is typically at 0.1% or 1 Roundup Ready ®canola seed in a sample of 1000 conventional canola seeds. This procedure is to be used in conjunction with the current AOF Canola Seed standard.

2.0 SCOPE

Applicable to detection of the CP4 EPSPS protein when present in bulk non Roundup Ready canola samples only. The test kits are designed to screen for presence or absence only and are not meant to be quantitative. The method described below determines the probability that a bulk canola sample contains greater or less than a specified threshold concentration at a pre-determined level of confidence

3.0 APPARATUS AND REAGENTS

3.1 APPARATUS

Appropriate Standard Lateral flow test strips and user guide* Sample tubes (1.5ml) Transfer pipettes Laboratory grade blender (Waring model 31BL91 or Oster Sunbeam 400 series) Blender jars Blender blades Graduated cylinder Sample tube rack

3.2 REAGENTS

Water

4.0 PROCEDURE (observe all safety requirements)

4.1. A representative sample of the bulk canola seed should be extracted as per AOF 4-1.1

4.2. Determine Number and size of sample – to select the appropriate sample size, first determine the purity level and the degree of confidence required, (The statistical probability that the % of RUR in the sample is below the selected purity level). The following table provides a guideline for determining the number of seeds required to meet the level of confidence required.

Table 1: Number of Canola Seeds Required to Test that One Sub-sample being Negative

Confidence Level for 0.9% AP threshold	Number of Canola Seeds Required for testing at 0.9% AP threshold
95%	332
99%	510

If the lateral flow test shows a positive result at either of the above confidence levels, then a two stage testing approach should be implemented to avoid possibility of a false positive result.

Confidence Level for 0.9% AP threshold	Number of Canola Seeds Required for testing at 0.9% AP threshold	Additional number of tests that must show negative
95%	332	3
99%	510	2

4.3. The statistical sampling plan is based on the number of seeds to be used. In practice it is more routine to weigh the sample rather than count individual seeds. The average weight of canola seed depends on variety and environmental conditions. It is recommended that the weight-to-canola seed ratio for each variety be determined by:

- Count 100 seeds of variety to be tested
- Weigh the hundred seed to nearest 0.01 gram
- Divide the result by 100
- Multiply the average seed weight by the number of seeds in the determined sub-sample from Table 1

4.4. Sample Preparation:

4.4.1. Weigh sample into clean, dry blender jar

4.4.2. Grind sub-sample as per blender instructions, on high for 15-30 seconds.

4.4.3. Visually inspect to ensure every seed has been broken.

4.4.4. Add volume of water according to following formula: – 5 times weight (grams) of seed = volume (ml) water to be added.

4.4.5. Shake the jar for 15-20 seconds and at least 30 times to ensure all ground sample is fully wetted.

4.4.6. Allow ground sample too settle for 30 seconds.

4.4.7. Using clean pipette transfer 0.5ml of the liquid from blender jar into clean sample tube.

4.5. Test Strip Procedure

4.5.1. Place a Test strip into the sample tube and return tube to sample rack

4.5.2. Allow test strip to stand upright for 5 minutes

4.6. Interpretation

4.6.1. The appearance of one control line indicates a negative result at the pre-determined level of testing and confidence.

4.6.2. The appearance of two lines (control and test) indicates a positive result at the pre-determined level of testing and confidence.

4.6.3. If no control line appears, the test is invalid and needs to be re-conducted. Similarly if a test line appears with no control line, the test is invalid and needs to be re-conducted.

5.0 REFERENCES.

Envirologix “QuickStix Kit for Roundup Ready canola Bulk Grain (07-15-08)
Strategic Diagnostics Inc. “Trait NK603 √ Test Kit (02/27/04)

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Appendix VI – Declaration card

GrainCorp Canola Declaration

GrainCorp is seeking from you, as a participant in the limited commercial release of GM canola, a declaration as to the status of all canola produced by you in 2008.

By declaring the GM or Non GM status of all deliveries of canola into the GrainCorp storage and handling network, you will be contributing to the successful stewardship of the introduction of GM canola and you will be helping GrainCorp adhere to the canola industry standards developed in 2007.

Delivery Advice

Please complete the following delivery details for every load of canola delivered into all GrainCorp sites

Grower name: _____

Trading name: _____

NGR # _____

Truck Reg. #: _____

1. Grower Registration #	2. Type of sale	3. Buyer	4. Contract #	5. Percentage split of load

1. Payment will be directed to this registration number.
2. Type of sale includes warehouse, cash, pool or contract.
3. Buyer is the name of the grain buyer of your choice. E.g. GrainCorp, Cargill, Riverland.
4. The contract number is only required if you have contracted your canola to the buyer prior to delivery to a GrainCorp site.
5. If you wish to split your load to more than one grower registration number please nominate individual registration numbers and the percentage to be allocated to each number.

Paddock ID _____

Has the grain been treated? *Circle whichever is applicable* **Yes** **No**

If **Yes**, specify treatment _____

I may be contacted on the following telephone number _____

Is this load of canola *Please tick the appropriate box*

A GM variety? ☐

A Non GM variety? ☐

Signature of grower _____