



Biotech Bulletin 10

Coexistence

Welcome to this edition of Agrifood Awareness Australia Limited's (AFAA) Biotech Bulletin. This edition of the Biotech Bulletin, entitled "Coexistence" provides information on the various coexistence practices in place around the world in response to the introduction of genetically modified (GM) crops.

INTRODUCTION

The recent release of an international report on the success of GM and conventional crop coexistence presents a timely opportunity to examine world experiences with coexistence management practices.

The report by PG Economics Ltd released on 16 October 2004 entitled, "Coexistence of GM and non-GM crops: current experience and key principles" examines in detail the successful coexistence of GM, organic and conventional crops. It outlines real world experiences and puts forward five key principles for delivering workable coexistence management practices. The five key principles are based on, and drawn from four papers, covering coexistence in North America, Europe, the United Kingdom (UK) and Spain.

According to the report, "successful coexistence has occurred between GM, organic and conventional crops since the time GM crops were first planted some nine to 10 years ago."

COEXISTENCE

In the context of GM crops, coexistence is the ability of farmers to provide customers with a choice between GM, conventional, and organic crops and products. Farm practices (such as separating crops by space and time, communicating with neighbours, use of good husbandry, planting, harvest and storage practices) to enable successful coexistence have been practiced by many farmers (including seed producers and growers of specialist crops) for many years.

AROUND THE WORLD

In Australia the coexistence of GM, conventional and organic crops has occurred since GM cotton varieties were commercially grown in 1996. In 2001, in recognition of the need to manage issues relating to the coexistence of grain crops, in particular GM canola, the Australian grains industry established the Gene Technology Grains Committee (GTGC) to develop and recommend to industry and government stakeholders, plans based on a strategic framework, for enabling the coexistence of different production systems and supply chains. The committee was comprised of representatives from across the grains industry, including seed producers, growers, bulk handlers, marketers and food producers.

The framework entitled, "A strategic framework for maintaining coexistence of supply chains" was released in December 2002, providing a basis for growers to deliver GM or non-GM grain crops into the marketplace.

The Framework aimed to meet the following objectives:

- to enable each grain supply chain participant to competitively meet the requirement of their chosen market, recognising that these requirements will ultimately be determined by consumer preference and regulatory requirements.
- to enable the release of GM crops into the environment in a manner that maintains or enhances the natural resource base and minimises the offsite impacts of agricultural and related activities;
- to enable producers to utilise technologies most appropriate to their chosen farming system; and
- to enable the incorporation of GM crops into individual farming systems using crop management techniques that maximise the effective life of the technology.

The framework was based on the following principles:

- Transparency and consultation;
- Freedom of choice;
- Reasonable measures;
- Responsibility to act;
- Monitoring and review; and
- Case-by-case planning.

Following the feedback received on the Strategic Framework, the GTGC then developed a specific canola management plan in preparation for the commercial release of GM canola.

Canola Industry Stewardship Principles

The Canola Industry Stewardship Principles were released in July 2003. They provide a set of practical stewardship principles that define different canola production processes and ensure they coexist with different supply chains. The Principles focus on canola but can be applied to other crops and speciality products requiring identity preservation and traceability.

The Principles were designed for use as a reference at appropriate points along the supply chain, from the supply of seed to the end use of the resulting grain products in food and feed. The principles set out the steps, procedures and standards by which the canola industry can meet specifications put in place by numerous customers within farming system and industry risk framework.

The Principles are presented separately for each major sector in the supply chain including:

- pre-farm - breeding, processing and marketing of quality sowing seed;
- on-farm - adopting and implementing crop management plans and good agricultural practice; and
- post-farm - receipt, storage, handling and transport of grain for domestic and export use by customers.

Within each sector the main process risks are identified that require management for effective coexistence.

The Principles define:

- the outcome required - that is, from one step of the supply chain to the next step;
- the responsibility to act - who is responsible for the management practices;
- reference – an established reference or standard for management practices;
- documentation – if required, to track the process of the end product through the supply chain; and
- what to manage – defining the process elements, when managed, which will produce the end product that meets pre-determined market specifications.

To date, Australia has not had the opportunity to assess these Principles due to every state and territory government (apart from the Northern Territory and Queensland) implementing bans on the commercial production of GM (food) crops.

European Union

The European Commission released guidelines for the development of strategies and best practices to ensure the coexistence of GM crops with conventional and organic farming in July 2003. The guidelines, to be implemented by each Member State, are intended to assist in developing workable measures based on the vast climatic and agronomic differences between the Member States.

According to the European Commission, the coexistence guidelines complement the comprehensive regulatory framework that the European Union (EU) has set up for dealing with GMOs and resulting food and feed.

The Commission suggests as a general rule, that during the introduction phase of a new production type in a region, farmers who introduce the new production type should bear the responsibility of implementing the actions necessary to limit admixture. Continuous monitoring and evaluation and the timely sharing of best practices are also indicated as imperatives for improving measures over time.

A non-exhaustive list included in the guidelines indicates measures that Member States could adapt or use in various combinations and these become part of national coexistence strategies and best practice. The list includes:

- on-farm measures (such as isolation distances, buffer zones, pollen barriers such as hedgerows);
- cooperation between neighbouring farms (such as information about sowing plans, use of crop varieties with differing flower time);
- monitoring and notification schemes;
- training for farmers;
- exchange of information; and
- advisory services.

In relation to the traceability of GMOs in the EU, under Directive 2001/18/EC, Member States must ensure traceability at all stages when a GMO becomes commercially available. Businesses in the production and distribution chains that handle products containing GMOs will have to provide information to their customers to allow traceability. They will have to list in accompanying documentation, the codes for the individual GMOs used to constitute the original raw material for products intended for food, feed and processing.

A report published in May 2004 by PG Economics Ltd, entitled "Co-existence of GM and non-GM arable crops: the non-GM and organic context in the EU", found that:

1. GM crops can coexist with conventional and organic crops in the EU without causing any economic or marketing problems;
2. Claims by anti-GM groups that GM and conventional crops cannot coexist are exaggerated; and
3. Attaching onerous coexistence and liability conditions to GM crop plantings would be inequitable and disproportionate.

According to the report, the conclusions were based on GM crops under development in the EU, the level of demand for conventional crops and the experiences of European specialist farmers. In addition, conclusions were based on the commercial experience of growing GM crops in North America.

The report concludes that, "for the future, the likelihood of economic and commercial problems of coexistence arising remains very limited (in the EU and North America) even if a significant development of commercial GM crops and increased plantings of organic crops were to occur."

Spain

Since 1998, the only EU country where a GM crop has been grown commercially, insect resistant Bt maize, is Spain. In 2003, after six years of commercial production, PG Economics Ltd conducted a case-study examining coexistence in Spain.

The report entitled, "Coexistence of GM and non-GM crops: case study of maize grown in Spain", considered the current coexistence strategies in place. Out of the area planted to maize in 2003, (about 460,000 hectares), approximately 32,000 hectares (seven per cent) were GM insect resistant (Bt) varieties, less than 1,000 hectares (0.2 per cent) organic and the vast majority conventional.

According to the above report, farmers planting over five hectares of GM maize are advised to plant some of their crops to conventional varieties to act as a refuge for the target species (corn borer) and to minimise the possibilities of corn borer developing resistance to the Bt trait. Farmers are also advised of the possibilities of adventitious presence from their GM crops being found in conventional crops and how best to minimise possibilities of cross pollination occurring.

Genetically modified maize farmers must ensure they take into consideration wind direction, flowering dates and planting of refuges in bands between GM and conventional crops. At least four rows of conventional maize planted between GM crops and 'vulnerable' conventional crops are recommended.

To date, GM maize has been largely planted in regions of Spain where it is primarily used for feed purposes, which does not specify conventional status. In addition, farmers have not had to store GM and conventional crops separately.

Farmers planting conventional crops are not generally given advice about the siting of their maize crops relative to GM or organic crops. However, where maize is produced for the human food sector (such as starch manufacturers), which account for about 20 per cent of the total maize used, these buyers usually require supplies to be certified as non-GM. The buyers mainly purchase conventional maize from regions where GM maize is either not grown or where there are very low levels of plantings including regions with low levels of corn borer problems.

Organic certification in Spain is currently based on adherence to farming principles such as only using selected pesticides. Baseline requirements are set at an EU level although each organic certification body may set its own principles and conditions that may be stricter than the legal baseline. The EU regulation (2092/91) covering organic status in relation to adventitious presence of GMOs states, "there is no place for GMOs in organic agriculture" and that "(organic) products are produced without the use of GMOs and/or any products derived from such organisms."

According to the report, to date, the incidence of adventitious presence of GMOs in organic maize has been very low and of negligible economic consequence, taking into consideration that a low area of organic maize is grown in Spain.

In the next five to ten years the report suggests the possible wider adoption of GM maize in Spain may lead to coexistence issues becoming more important, however as GM maize is only concentrated in some regions, the extent of coexistence will remain minimal. The adoption of GM maize will depend on the level of demand, the price of the technology and its benefits, and will most likely be concentrated in regions that suffer the greatest infestations of corn borer.

According to the report, it is unlikely that cases of adventitious presence of GM maize will be found in conventional maize to levels that cause economic disadvantage to conventional crop growers, provided that maize crop barriers and separation distances are adhered to.

The report concludes that, "the evidence to date shows that GM, conventional and organic maize crops in Spain have coexisted without economic or commercial problems."

North America

In June 2004, PG Economics Ltd released a research paper on GM and conventional crop coexistence entitled, "Coexistence in North America agriculture: can GM crops be grown with conventional and organic crops?" which examines the coexistence issues from an economic perspective in North America.

Genetically modified crops have been widely grown in North America since 1996, with the total GM area planted to soybeans, corn, cotton and canola rising to over 42 million hectares in 2003. Over the same period, the area dedicated to organic crops has also increased.

According to the report, in North America there are two main forms of crop stewardship of relevance to farmers growing GM crops - insect resistance management (IRM) plans and GM crop stewardship.

Insect Resistance Management

Farmers planting GM (Bt) corn, are required to implement Insect Resistance Management (IRM) plans to minimise the possibilities of target insects developing resistance to the GM trait. The IRM program includes guidelines on separation distances and insecticide usage including:

- At least 20 per cent of total corn plantings must be of a conventional variety;
- A non Bt refuge must be planted within approximately one kilometre of each Bt corn field,
- Refuges can be in the form of strips, within or around the Bt crop, or as blocks between Bt crops;
- Non Bt corn refuges can only be treated with conventional insecticides if target pest pressure reaches economic thresholds; and
- Bt-based foliar insecticides are not allowed to be used on the refuge areas.

GM Crop Stewardship

Suppliers of GM seed are required to provide farmers with "Technology Use Guides" or "Crop Stewardship Guides". These provide recommendations for use of the GM products and some advice on coexistence issues that aim to maintain the purity of conventional crops growing on GM crop planting farms, or nearby farms, in storage or when supplied to buyers.

The recommendations include rotating crops, herbicides, herbicide tolerant traits, the timing of herbicide applications, as well as the use of certified seed.

According to the paper, "the practical relevance of GM crop stewardship conditions to the coexistence of GM and non-GM crops in North America has been limited. This largely reflects the limited nature of markets for conventional and organic produce from these crops in the USA and Canada and the very small scale of organic production. GM crops have been and are usually sold through normal marketing channels, without any requirement for on-farm or post-farm segregation from conventional crops."

According to the research paper the key findings include:

1. GM crops have been, and continue to coexist with conventional and organic crops in North America (where GM crops account for the majority of plantings of important arable crops like soybeans, oilseed rape and maize), without causing any economic or marketing problems to conventional or organic growers;
2. claims by anti-GM groups that GM and conventional crops cannot coexist in North America are greatly exaggerated, given the on-farm experiences since 1995; and
3. the market has developed practical, proportionate and workable coexistence measures without government intervention. These have been delivering effective coexistence for nearly nine years.

United Kingdom

The Agriculture and Environment Biotechnology Commission (AEBC) was established in July 2000, to provide Government with independent strategic advice on developments in biotechnology and their implications for agriculture and the environment. The AEBC comprises members from diverse backgrounds, from organic farmers, environmentalists, academics, researchers, farmers, lawyers and industry.

The AEBC released a report in November 2003, on the issues of coexistence and liability should GM crops be grown commercially in the UK. The report entitled, "GM Crops? Liability and Coexistence" makes several recommendations, as follows:

- facilitating consumer choice while allowing UK farmers to respond to present and future market demands;
- the establishment of legally enforceable protocols designed to achieve at least the 0.9 per cent threshold. This threshold has been set to allow for the accidental presence of GM content in a conventional product;
- an initial introductory period where intensive monitoring and auditing of coexistence arrangements takes place to ensure coexistence is being achieved;
- powers to amend coexistence protocols or suspend the production of GM crops should data show that coexistence was not being achieved until solutions were implemented to overcome such issues;
- special compensation arrangements for farmers suffering financial loss as a result of their products not meeting relevant thresholds through no fault of their own; and
- the development of the UK's ability regime for any damage caused by the release of GMOs in the environment.

COEXISTENCE – A CHECKLIST

A publication released in January 2004, by the Endowed Chair in Agricultural Systems at the University of Minnesota, outlines some of the best management practices or a quick check list for GMO and conventional farmers to guide them in minimising genetic drift, commingling, and other contamination. The brochure entitled, "A Plan for Coexistence – Best Management Practices for Producers of GMO and non-GMO Crops" suggests that before farmers grow crops they should know their:

- crop;
- regulations;
- farm;
- neighbours;
- neighbouring crops;
- equipment;
- transport;
- crop storage;
- harvest;
- records;
- buyers; and
- risk.

REPORTS

All the reports mentioned in this edition of the Biotech Bulletin can be found at the following sites:

- Coexistence of GM and non-GM crops: current experience and key principles report: www.pgeconomics.co.uk/pdf/Coexistencekeyprinciplesdocument.pdf
- A Strategic Framework for Maintaining Coexistence of Supply Chains: www.affa.gov.au/corporate_docs/publications/pdf/innovation/strategic_framework.pdf
- Canola Industry Stewardship Protocols: www.avcare.org.au/files/biotechnology/gtgc/Canola%20Industry%20Stewardship%20Principles.pdf
- European Union: www.pgeconomics.co.uk/pdf/Co-existencestudyEU_PG_Economicmay2004.pdf
- European Union (Directive 2001/18/EC): http://europa.eu.int/comm/food/fs/gmo/biotech09_en.pdf

- Spain: www.bioportfolio.com/pdf/Co-existencecasestudyspain.01.pdf
- North America: www.pgeconomics.co.uk/pdf/CoexistencereportNAmericafinalJune2004.pdf
- United Kingdom: www.aebc.gov.uk/aebc/reports/co-existence_liability.shtml
- Coexistence – A checklist:
www.wkkf.org/Pubs/FoodRur/BiotechBMPs03.final_00253_03862.pdf

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