



State Agricultural  
Biotechnology Centre  
WESTERN AUSTRALIA



To: Ms Lauren Mesiti  
Committee Clerk  
Standing Committee on Environment and Public Affairs  
Parliament House, 4 Harvest Terrace  
West Perth WA 6005

16 February 2018

**Response to Inquiry into mechanisms for compensation for economic loss to farmers in Western Australia caused by contamination by genetically modified (GM) material**

This submission is made jointly on behalf of WA State Agricultural Biotechnology Centre, Murdoch University and AusBiotech Ltd.

AusBiotech is a well-connected network of over 3,000 members in the life sciences industry, which includes bio-therapeutics, medical technology (devices and diagnostics), food technology, industrial and agricultural biotechnology sectors.

The WA State Agricultural Biotechnology Centre (SABC) at Murdoch University is the major centre for R&D in agricultural biotechnology in Western Australia. Murdoch University is the only university in Australia with the top score (5) for Agricultural Biotechnology in the Excellence in Research Australia (ERA) for ERA 2012 and 2015.

Both organisations have many years' experience in all issues that relate to growth and handling of GM crops in Australia, including crop genomics, developing new traits, GM diagnostics, segregation, gene technology regulations and their practical application to the Australian agricultural industry.

**Summary**

- There is no scientific or legal case for the establishment of a separate compensation mechanism for economic loss to farmers in Western Australia caused by contamination by approved genetically modified material, and such legislation should not be enacted.
- Sensible decisions must be made based on genuine scientific understanding of what constitutes a GMO.
- There is now a history of 20 year's safe use of GM crops, with all scientific evidence showing that they are safe for humans and benefit the environment.
- GM crops contribute substantially to the Australian and WA economies.
- Co-existence of all forms of cropping should be encouraged in WA, without discrimination against any one farming system.
- WA has an effective system for segregating commodities that works.

- Inflexibility in recognising that a low level of unintended presence is normal in agricultural and food products is unhelpful. A desire for 100% purity is wholly impractical, and would increase the cost of food production and distribution for all agricultural producers and consumers.
- A Compensatory Scheme, if implemented, must also recognise that organic farms can be reservoirs for pests, diseases and weeds that can adversely affect the livelihood of their neighbours. Compensation for losses must be two-way and organic farmers should be equally liable for damage caused by harbouring higher levels of pests and diseases.
- A Compensatory Scheme would not be compatible with national legislation: current law is already in place to deal with compensation.
- A Compensatory Scheme targeting GM technologies would inhibit agricultural innovation in WA.
- A Compensation Scheme would be divisive and would adversely affect trust in farming communities.
- Compromise is needed to acknowledge the major benefits of GM crops, and that a minority of farmers may wish to farm in alternative ways. With common-sense and good will, co-existence of all forms of farming can readily be achieved without additional confrontational legislation.

## Background

The sustainable production of food crops is a vital part of WA and the world's economy.

There will be 9.5 billion people in the world who need to be fed in a sustainable manner from 2050 and beyond, against a background of water, heat and frost stresses, climate change, and incursions of new pests and diseases. It is vital that the best science and technology be applied to ensure future food security and that decisions on their use are evidence-based, and not based on ideology, misinformation or simply for political gain.

Agriculture in WA is an important part of the State's economy – second only to the mining, minerals and natural gas industry. Agriculture contributes strongly to WA's export income, with broadacre crops (wheat, barley, canola, lupins) contributing about \$8 billion per annum. Agriculture provides the fabric of WA's agricultural regions, but the environment and production costs mean that WA agriculture is facing increasing competition in the world's markets. WA can only compete effectively by applying cutting-edge science and technology to all aspects of crop and food production, including applying genetic improvements, better agronomic practices, desalination technology, precision and digital farming. Rapid advances are being made in all these areas, and especially in the fields of genetics, genomic sequencing technologies and their application to new breeding technologies.

The WA Government has a target of doubling food production by 2025. This is an ambitious target and there is little chance that this will be met unless the best science and technology is applied. This includes transgenic and genome edited crops. All the many scientific studies which have been undertaken worldwide, from the National Academies of Science, food health and safety organisations (e.g. FSANZ), the EU, and government regulators (e.g. OGTR) show that GM food is safe – indeed safer than conventionally produced foods, with organic marginally the least safe.

GM crops now provide more than 10% of the world's food - most foods derived from maize and soybean sold in Australia and consumed here are derived from GM crops, and the rapid uptake of GM canola in WA is testament to the fact that most farmers want the choice whether or not to grow GM crops as part of their farming systems. It should be noted that the growth of GM crops in Australia and WA has not prevented the

expansion of growth of organic crops, although organic production continues to be a very small part of the overall crop production.

### **What are GM crops?**

The Gene Technology Act 2000 defines all forms of crop improvement in which there are new combinations of genetic material as Genetically Modified Organisms (GMOs). This definition includes all forms of conventional plant breeding – crossing, transfer of chromosome segments between species, double haploids, mutagenesis, cell fusion and genetic changes using recombinant DNA technology. It then excludes the technologies that do not involve recombinant DNA from the legislation. Thus forms of breeding that can transfer very large blocks of genes, such as cytogenetics are excluded – for example, all wheat grown in Australia has about 125 million bases of DNA transferred from the rye genome, but since this did not use precise recombinant DNA technology, it is excluded from legislation. Similarly, triticale is a completely artificial hybrid of wheat and rye, obtained using colchicine to double up chromosome numbers, and mutants generated by harsh chemical or irradiation treatments which are not regulated.

Expanding this aspect, wheat containing 125 million bases of DNA from rye is not regulated, but if one single base is added using recombinant DNA technology to the 15 billion bases that constitute the wheat genome, it is regulated as GM. Such issues highlight the scientific paradox, that if we know little about what genetic changes have occurred in developing a new variety by conventional means it is not regulated as a GMO, but if we use the best science and technology to make small, precise, knowledge-based changes the product is highly regulated. Logic would tell us it should be the other way round.

Such issues, as highlighted above, show the need to make decisions based on understanding the science.

### **History of safe use of GM crops**

There is more than 20 years' history of safe use of GM crops and foods worldwide and there is no evidence for initial cautions, which the current Gene Technology Regulations address. The current review of the Gene Technology Act 2000 recognises that the regulations are now nearly 20 years' old, have become out-of-date and in urgent need of revision. New breeding technologies, such as genome editing, have since been developed. The latter include specific, targeted mutations (SDN1 –Site-Directed Nuclease 1, which results in precise minor changes without introduced DNA). Targeted mutagenesis is a knowledge-based technology, and crop plants improved using SDN1 should be much more acceptable than mutants derived from treatment with chemical mutagens or irradiation (in which many changes at unknown sites are induced in the genome). Yet chemical or irradiation-induced mutants are legislated as non-GM and advertised in organic shops as non-GM. Such inconsistencies testify to the absurdity of the current legislation.

### **Co-existence of cropping systems**

For Australian farmers to be competitive in the international markets and to meet their own personal needs and circumstances, they must have the freedom to grow whatever crops they chose in a way that generates the most benefit to them, whilst complying with relevant legislation. This includes being able to make their own choices free of the ideological views of their neighbours. WA has an excellent system of segregation of commodities, and for example, has an excellent record of maintaining GM and non-GM categories of canola both in transport, storage, and delivery to end users locally or overseas. Different classification of wheat and barley have long been segregated in a similar manner. In the USA individual farmers can grow GM, conventional and organic produce on the same farm if they so wish, and then change the mix as best suits their business model.

There is every reason that co-existence of all forms of cropping should be allowed in WA, without any one form being discriminated against.

### **Unintended presence**

Anyone who deals with agricultural produce knows that it is impossible to have a commodity or produce that is 100% pure. The nature of agriculture, the weather, wind, floods, soil, dust and even crevices in machinery mean that there is always some minor contamination, whether it be weed seeds, insects, soil particles or surface contamination with plant pathogens (e.g. fungi, bacteria).

This fact is recognised in the Gene Technology Regulations and by food standards authorities, with the limits for admixture for canola set at 0.9% for OGTR-approved GM canola crops, and 0.5% for seed crops. For derived food, FSANZ stipulates a limit of 1% GM presence before labelling is required.

Similar standards exist in other advanced countries, including the USA, Canada and most EU countries.

All other food codes also recognise the fact that no food is 100% pure – for example:

- FDA/ORA Filth Standard CPG 7104.02, Sec 578.200: 50 g cornmeal can contain up to: 1 whole insect, or 50 insect fragments, or 2 rodent hairs, or 1 rodent excreta fragment.
- CPG 7114.29, Sec 585.890: 100 g tomato paste can contain up to 29 fly eggs, or 14 fly eggs + 1 maggot, or < 2 maggots.
- White rice- *Codex Alimentarius* (3.2.2.1) can contain up to: Impurities of animal origin (including dead insects) of 0.1% m/m max.

These examples show that inflexibility in recognising that a low level of unintended presence is normal in agricultural and food products, and a desire for 100% purity is wholly impractical and would increase the cost of food production and distribution for all agricultural producers and consumers.

### **The unscientific and one-sided nature of a Compensatory Scheme**

It seems implicit in the Inquiry that there is only one-way movement between conventional or GM crops and organic crops. This is certainly not the case.

Any compensation, if legislated, should apply equally to contamination of the crops of farmers growing conventional or GM crops. This is because, in general, organic growers do not control the presence of pests, diseases or weeds in their crops as well as non-organic farmers. Consequently organic farms can be reservoirs for pests, diseases and weeds that can adversely affect the livelihood of their neighbours. This is a serious problem, but more difficult to prove.

A classic example from France involved a winegrower (Emmanuel Giboulot) who cultivated his vineyard according to 'biodynamic' methods, which supposedly blends organic farming with the spiritual forces of the cosmos. He was required by authorities to spray his vineyard with insecticide to control a bacterial disease (*Candidatus Phytoplasma vitis*), which is transmitted by the leafhopper, *Scaphoideus titanus*. The phytoplasma disease was lethal to vines and was a serious threat to the production of many vineyards of the Côte-d'Or region. He was fined for non-compliance and putting the Region's wine production at risk.

(As an aside, a detailed study of pesticide residues in prestigious Burgundy wines showed that 100% of conventionally grown *and* organic wines contained substantial pesticide residues, perhaps not surprisingly since the French wine industry, with 3% of the farmland, uses 20% of the national fungicides and insecticides. [Saporta, I, 2014, *Vino Business, the cloudy world of French wine*, ISBN 978 1 61185 963 8]. Such information supports the view that genetic resistance to pests and diseases, as can be provided using

GM technology, is preferable to chemical forms of control used in conventional or approved for use in organic agriculture.

### **A Compensation Scheme would not be compatible with national legislation**

Growing of approved GM crops is legal in WA and any issue of compensation for supposed contamination is already covered adequately in common law. Accidental presence of low levels of contamination is already dealt with adequately.

In the case of Marsh vs Baxter, in which Marsh sued Baxter for adventitious presence of a few GM canola plants blown onto his organic wheat and sheep property, this aspect was studied in great detail, first in the Supreme Court, in the Appeals Court of WA and then in the High Court of Australia. According to Justice Martin, the organic decertification of part of Marsh's farm was a failure of the organic certification body (NASAAA) in a number of areas. Marsh's losses were not caused by Baxter's growth of a legal canola crop, but rather resulted from NASAAA not applying its own rules.

There is no other situation in which growing a legal crop requires an additional compensatory mechanism, unless a crop is destroyed under biosecurity legislation, and a Compensation Scheme in WA targeting GM crops and growers alone would be incompatible with national legislation.

### **A Compensation Scheme would inhibit innovation in WA**

It is now a time of great scientific advances in agriculture – genetic, agronomic and technical. The threat of a compensation scheme will inhibit the investment and innovation that is needed to keep WA farming viable and competitive in the international marketplace. With 50% of agricultural advances stemming from the application of genetic knowledge, and the advent of new breeding technologies like genome editing, now is not the time to impose new threats of compensation, since this will create additional uncertainty and inhibit investment in entrepreneurs and innovators who are needed to lead agriculture into the next era.

For example, lost innovation will delay generation of frost, drought and heat tolerant wheat, possibly to a level where WA wheat is no longer competitive in the world markets. This would be a disaster for WA agriculture, and for the State's economy.

### **Mechanism of compensation and the need for equal protection from losses caused by organic farming methods**

An approved GM crop that has been deemed safe for humans and the environment by the OGTR and FSANZ, and which can legally be grown in WA as tested by the Supreme Court of WA and the High Court of Australia, does not need a method of compensation in addition to that provided by common law.

There is therefore no scientifically or legally supportable case for enacting the provision of a compensation fund to protect farmers from possible 'contamination' from GM crops.

However, the tenor of the Inquiry is that movement of 'contaminants' is only towards organic or conventional farms – as indicated above, nothing could be further from the truth.

Pests, diseases and weeds present on organic farms tend to be much less well controlled than on conventional or GM farms. As a result, the same forces which might lead to minor contamination of organic farms with GM materials can result in the transfer of pests, disease spores and weed seeds to neighbouring farms from organic producers. Although more difficult to prove, equity demands that any Compensatory Scheme should also address this issue, and that conventional and GM farmers who lose yield and profit as a

result of poor control of pests, diseases and weeds on a neighbouring organic farm should also be compensated.

### The myths and misinformation surrounding food safety

All the detailed scientific studies undertaken by learned societies, government and university researchers in developed countries on the safety of GM crops, all point to the fact that GM foods are safe. In fact, because of the required testing, GM foods are the safest foods, followed by conventional, with organic the least safe.

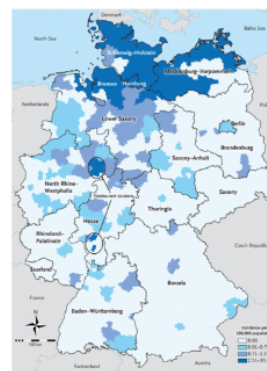
In Australia the vast majority of maize and soybean products in supermarkets are derived from GM plants, which now provide more than 10% of the world's food.

Provided below is but one example of a problem with organic food, commonly known as 'Sproutbreak'. In this case, organically produced bean sprouts infected with a bacterial strain commonly present in animal manure, caused the death of 54 people, with many more requiring kidney dialysis or kidney transplants. In contrast, there have been no validated cases of any health issues caused by eating food derived from GM crops.

## 'Sproutbreak' – Germany, May-June 2011

- Outbreak of gastroenteritis and the haemolytic–uremic syndrome caused by Shiga-toxin–producing *Escherichia coli* serotype O157:H7
- Usual origin: faecal matter from cattle
- Source: organic bean sprouts
- 3,816 cases recorded, acute renal failure, kidney dialysis and transplants needed for some
- 54 deaths

Source: New England Journal of Medicine (2011), 365,1771-1780



Have you heard about this?

**In contrast: not one authenticated case of any ill effects from eating GM foods**

The list of food recalls for health reasons in Australia and overseas often features organic produce.

It therefore seems strange that a Compensatory Scheme should be proposed to 'protect' organic producers from 'contamination' with plant materials which are, if anything, safer than the organic produce that is to be 'protected'.

### Organic producers actually grow genetically modified crops now

The section above 'What are GM Crops?' recounts that the Gene Technology Act 2000 includes all forms of conventional plant breeding under genetic manipulation – sexual crossing, crosses with wild species, transfer of chromosome segments between species, double haploids, mutagenesis and products of cell fusion as

genetic manipulation: products derived from these methods are therefore scientifically GMOs. However, they are then excluded from regulation.

Thus organic wheat farmers grow wheat plants which contain ~125,000 bases of DNA transferred from the rye genome by the crude method of cytogenetic transfer of parts of chromosome arms, yet are concerned when one base of DNA is introduced into the 15 billion base genome of wheat using precise recombinant DNA technology. This type of concern makes absolutely no scientific sense.

Similarly, there are more than 3,000 varieties generated by mutagenesis using the sledgehammer of  $\gamma$ -irradiation or treatment with toxic mutagenic chemicals, which generate many breaks in DNA at unknown sites, but with selection may yield a few useful products.

Thus seedless oranges and ruby-red fleshed grapefruit were generated using this type of genetic mutation, and these can be found for sale in organic shops complete with non-GM stickers.



*Ruby red grapefruit genetically manipulated using  $\gamma$ -irradiation.*



*Orange with seeds and seedless orange before and after mutagenic treatment*

### **The tail wagging the dog – what is needed is some common sense**

The WA farming industry does not need nor appreciate a minority of farmers dictating how the majority must act. Indeed, an aim of the proposal seems to be to scare or prevent farmers from growing legally approved GM crops.

Organic produce only constitutes a small part of the value of agricultural production in WA, but it seems that all producers will be required to meet their wishes if a Compensatory Scheme is established. Although a small minority, anti-GM groups make much noise and attract unquestioning media attention. Their protests have little to do with an understanding of the underlying science and more to do with belief systems, politics, misinformation or self-interest.

If enacted, a Compensation Scheme would be highly divisive. It would create enmity in the agricultural community and be open to false claims and accusations. It is likely to pit farmer against farmer.

There can be little doubt that a Compensation Scheme targeting new genetic technologies would also inhibit agricultural investment and innovation in WA, at least in seeking better genetic solutions to the State's agriculture challenges.

What is needed is some compromise on all sides to acknowledge the major benefits that GM crops have already brought and will bring in the future to WA farming, and that a minority of farmers may wish to farm in alternative ways. With common-sense and good will, co-existence of all forms of farming can readily be achieved without additional confrontational legislation.