Australian Biotechnology Association

Submission to

The House of Representatives Standing Committee on Primary Industries and Regional Services

Inquiry into Primary Producer Access to Gene Technology

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Inquiry into Primary Producer Access to Gene Technology

1. Introduction:

The Australian Biotechnology Association (ABA) welcomes the opportunity to provide a submission to the Committee which has been asked to inquire into and report on the following areas, with particular emphasis on the capacity of small and medium sized enterprises to access the benefits of gene technology:

- The future value and importance of genetically modified varieties; and
- The ability for producers to compete using traditionally available varieties.

Abbreviations used include: GMF for genetically modified foods (where foods are prepared from or using ingredients that have been genetically modified); GMO for genetically modified organisms (which include plants, animals and bacteria which contain extra genetic material inserted via ìgene technologyî).

1.1 Australian Biotechnology Association

The Australian Biotechnology Association was established in 1985, as a public company limited by guarantee, when the potential for the application of gene technology was starting to be realized. It is a national body of over 500 individuals from research, legal, regulatory and company backgrounds; there are also about 40 corporate company members; students also form a proportion of the membership. The ABA is dedicated to the development and prosperity of Australia through the safe use of biotechnology as well as better communications between all sectors of biotechnology. A particular objective is to contribute to improving the understanding of all Australians about biotechnology. One of the ways this has been done has been to produce 12 leaflets that explain about the technology and its application and regulation. A copy of these is appended.

2. The future value and importance of genetically modified varieties

2.1 Overview

Growing and processing food through fermentation were two of the earliest uses for biotechnology. It is now apparent that there are many opportunities for modern biotechnology to speed traditional plant and animal improvement (through tissue culture, genomic technologies, gene marker and mapping techniques, artificial insemination , and production of transgenic organisms) and can also enable traits from unrelated species to be combined (Parker and Zilberman 1995; Kleiner 1997).

Food is sold to a marketplace that is perhaps more complex than many other biotechnology markets, where consumer perception can very easily be adversely affected by emotionally slanted or misleading information (e.g. food scares based on careless public statements- see for example New Scientist 22 May 1999, and 31st October 1998; Wahlquist 1999). Initial offerings of GMF to the market may not be well accepted if consumers are not led to understand how they will benefit indirectly by productivity increases on the farm (e.g. by reduced costs, better export sales and their flow on effects), improved food quality, better environmental management from technological improvements currently on offer and security of future food supply from breeding of more resilient disease resistance into crops.

2.2 Plant Biotechnology

Genetic modification can lead to development of:

- more productive crops,
- crops with improved resistance to pests and diseases, resulting in lower use of pesticides;
- crops with modified fats, oils or improved nutritional value to make them more healthy for human consumption;
- crops which produce novel industrial or therapeutic enzymes; these new crops are processed for industrial or health, rather than food uses.

These developments are poised to have a major impact on commercial production. In the viticulture industry, for example, biotechnology is developing improved grapes which, at the same time, are resistant to important pests and diseases (Robinson 1998). Transgenic rice is resistant to the yellow stem borer, which is important in the Asian market (Quiddington 1995). Cotton resistant to the bollworm caterpillars allows reduction in pesticide sprays, which through spray drift have caused problems in beef-producing properties.

Biotechnology can enable growers to modify the chemical and physical characteristics of plant products so that they meet consumer demands for low fats, better flavour, improved shelf life and other desirable traits (Biotechnology News 1995; OECD 1996; Hedley et al. 1996; Shimamoto 1998). Crops such as canola can be engineered with changed oil quality and content. Australia is second only to Canada as an exporter of canola; these exports earned Australia about $500 million in 1998. Last year 40% of the Canadian area sown to canola was of genetically modified varieties and this proportion is expected to increase. The benefits of improved food quality for consumers (eg adjustment of amino acid or other content, removal of deleterious plant metabolites, to suit human metabolism) are incontrovertible.

Globally, over 1800 field trials of transgenic plants were conducted between 1987 and 1995 (OECD 1996), but the first marketing approvals for genetically-modified crops were not granted until 1994 (Thayer 1995). By 1997 the products of 10 such crops (e.g. tobacco, tomato, rapeseed, soybean, chicory and maize) had been approved for sale in the European Union (EU) (Muller et al. 1997). A further 38 species are currently being tested (Malik 1998). Substantial numbers of hectacres of plantings have occurred in China with a less stringent regulatory system. It is expected that agricultural/food products based on biotechnology will comprise only 4% of the total agriculture market , and 20% of the food market by Yr 2000 (Jones 1998) (OECD 1996).

In Australia as yet there are no commercial crops for use as GMFs but Ingard® cotton, genetically-modified to contain insecticidal proteins active against the cotton boll worm, was introduced in 1996. Other products are being trialed in the field and transgenic canola crops are expected in two to three years.
Successful use of biotechnology in plant and animal agriculture requires an understanding of the genetics of many plant and animal (pest and product) species. Major areas of R&D cover plant genome research, metabolic studies, development of novel plant products, pest management and diagnostic tools (National Science and

Technology Council 1995). The average R&D investment by ag-biotech firms is 17% of sales/turnover, but this ranges widely depending on the actual target market (Kidd 1995).

2.3 Animal Biotechnology

For animal products biotechnology enables development of animals with modified growth rates, thus bringing them to market earlier at a lower cost. It also enables the development of animals that are resistant to pests and diseases (thus lessening the need for treatment with chemicals such as pesticides) and production of, for example, polyunsaturated “meat on-the-hoof”, low fat milk and stronger wool. It potentially provides sources of useful "biochemicals" for human use, such as pharmaceuticals from milk ("pharming"). Like plant agriculture, animal biotechnology research is focused on animal genetics, metabolic studies, development of novel products and diagnostic tools (National Science and Technology Council 1995).

3. The ability for producers to compete using traditionally available varieties

If Australian primary producers are to remain competitive in national and international markets, the future value and importance of genetically modified varieties should not be under-estimated. Cost of goods sold has been driven down relentlessly since about 1980 in response to international and domestic pressures. In the long term it is projected that Australian producers will grow genetically modified varieties rather than traditionally available varieties, as it is expected that the profit margin will be higher. These new varieties especially would have to deliver tangible benefits in terms of profitability and quality to the producer and the consumer.

The traditional important role for breeders is breeding for traits such as disease and pest resistance as well as food quality; for long term food security we need to make sure that the development of new and better methods which gene technology allows to underpin plant breeding are encouraged for all crops. On a small scale, some producers might be able to establish niche markets for premium-priced organic/non-genetically modified foods, but this is likely to be a minor component of the national agri-business industry. Indeed, it is recognized that with the furore in Europe over GMF, Australia has a current advantage in being able to assure readily that the primary produce exported in GMO free.

4. The commercialisation and marketing of agricultural and livestock production varieties

Australia needs to embrace gene technology to stay competitive with other food exporting countries. Thanks to researchers in Universities, State and Commonwealth Scientific Institutions, Australia is at the forefront of genetic manipulation leading to improved breeds of cattle and sheep and crop varieties, and must ensure that it capitalises on this. Good Public Policy formulation in this area demands a sophisticated understanding of technology trends, and of consumer attitudes in a variety of markets. Market forces will largely determine adoption of new GMFs, provided the Government establishes and maintains a regulatory system satisfactory for both producers and consumers.

Clear, transparent regulatory regimes must be in place as soon as possible so that the progress for clearance of products from gene technology can be tracked through the various regulatory agencies (e.g. National Registration Authority, Therapeutic Goods Administration, Australia New Zealand Food Authority, National Industrial Chemicals Notification and Assessment Scheme). The establishment of the Office of the Gene Technology Regulator must improve rather than further obfuscate the existing regulatory processes. In addition, it would be worthwhile ensuring that the general public is aware of the current of regulatory processes which have been used to date and how the Office of the Gene Technology Regulator will build on what is already in place. One of the reasons given for the acceptance to date of GMF in the USA has been the great consumer confidence placed in their regulatory system.

Another area that has the potential to impact trade between countries is the International Biosafety Protocol for the safe transboundary movements of living (genetically) modified organisms that may have an adverse effect on the conservation and sustainable use of biological diversity. An Open-ended Ad Hoc Working Group on Biosafety has been established under the Convention on Biological Diversity. The Protocol is still under negotiation. The most recent meeting at Cartegena de Indias in February 1999 failed to reach agreement on a range of issues.

Many of GMFs in the first round of offering are directly benefiting the producers rather than consumers. The final consumers need to have explained from many sources how, in a competitive economy, this really does benefit all of society by indirect flow on effects. The report from the 14 Lay panel members who participated in the recent first Australian Consensus Conference on "Gene Technology in the Food Chain" highlighted the need to involve the public more - they noted eg that "Currently the public does not have enough information about GMO food to make informed purchasing decisions. To allow real choice, information must be more readily available. Awareness allow the opportunity for wide public discussion and debate" (First Australian Consensus Conference 1999)

5. The cost to producers of new varieties

A major problem with developing genetically engineered crop varieties in Australia is that almost all of the genes and the processes used to transfer them are patented by multinational seed companies. Many of these companies are large vertically-integrated companies which have the potential to create monopolies in world markets. By contrast, much of the germplasm used in Australia comes from publicly funded (government/farmer) plant breeding programs. The existence of a strong intellectual property system which includes Plant Breeders Rights is an important factor in allowing local organisations to negotiate effectively with integrated transnational companies, as commercial arrangements have to be made with the owners of the genes and transfer processes to put these genes into Australian elite germplasm. CSIRO, for example, is working with Cottonseed Distributors and with Monsanto to release Ingard®cotton to Australian growers. Its rate of distribution is limited by the number of hectares approved for planting by the regulatory agency GMAC. It is crucial that there be significant Australian equity in these ventures in the best interests of local grain growers and of taxpayers generally.

Costs must be such that it is worthwhile for farmers to grow these varieties. Many farmers are aware of the case where a very high licence fee was imposed by the seed company Monsanto on Australian farmers who grew genetically engineered insect resistant cotton, such that it was barely profitable. However, it did result in lower use of pesticide.

6. Other impediments to the utilisation of new varieties by small producers

New varieties that have altered product quality traits (e.g. changed oil quality and content) will often be grown on a contract basis and will require segregated handling from other crops. This will be imperative much later on when crops are grown for non-food uses such as for the provision of vaccines, pharmaceutical peptides and industrial enzymes.

If consumers and the Australian New Zealand Food Authority require labelling of food products that are "substantially equivalent", then much more segregation will be needed. This may be difficult for small producers.

In addition, the market is often split, in that the requirements of the domestic market may be different from that of the international market. In brewing, for example, individual brewers are generally locked in by plant and process to malt specification and the domestic requirements are different from those of the international market where the use of adjuncts such as rice and maize require higher enzyme levels in the malt.

The strong anti-GMF sentiment in Europe is leading some customers of Australian food manufacturers to demand they certify their product as GMO-free. At present Australia does not have a process for ensuring segregation of GMO crops from regular ones particularly of imported varieties, so in the case of imported soybeans, all could have been derived from GMO crops. Thus, firms cannot guarantee the soy oil they use is not derived from GMO crops. This is coming to a head in the EC now with the debate on the Novel Foods Act, mainly targeted at regulating GMFs.

The USA has been tolerant of GMFs so far, but U.S. farmers are now starting to realize that their crops, which are aimed at world markets, may be more difficult to sell in Europe. Big Asian markets do not seem to be affected by these anti-GMF sentiments, as yet, where realistic economic appraisal of new technologies is more obviously influenced by awareness of food shortages in relation to demand, and large numbers of hectares are planted with these crop (eg in China). Australia will be governed by what is decided in these major markets.

7. Assistance to small producers to develop new varieties and the protection of the rights of independent breeders in relation to genetically modified organisms

The need for traditional breeding programs will continue, with the transgenes simply providing new valuable markers to be incorporated into the equally valuable elite germplasm. Thus assistance to develop new varieties and protect breeders' right should continue. Indeed, for farmers to be able to access the benefits of gene technology, the Plant Breeders Rights Act (1994) for varietal protection and the Australian Patent Act (1990) must be retained and preferably strengthened.

The Rural Research & Development Corporations, such as the Grains Research & Development Corporation, play a key role in the support of public breeding programs. Access to germplasm for plant breeding is important; as much of this comes from overseas, it is important that Australiaís interests are well represented during the negotiations on the revision of the International Undertaking on Plant Genetic Resources at meetings of the Commission on Genetic Resource for Food and Agriculture.

8. The appropriateness of current variety protection rights, administrative arrangements and legislation, in relation to genetically modified organisms.

The use of genetic manipulations of raw materials and products derived from them, in the food chain, has important safety implications for human health. This means that the regulatory body involved in the approval for the use of gene technology in agriculture needs to have strong representation from the Department of Health. The establishment of the new Gene Technology Office in the Health Ministry is a step forward, but the processes for co-ordination must be transparent and consistent. There are concerns about how easy this will be.

9. Opportunities to educate the community of the benefits of gene technology.

The ABA has long supported the need to inform the community regarding the applications of gene technology to many sectors, including agriculture and food production. The ABA has generated a series of 12 leaflets that explain what biotechnology is and how it is used; these were of particular benefit to high school students in the earlier years when less printed material was available. The ABA is currently seeking funding from Government sources to support extension of this work for dissemination to a wider audience

Consumers need to be confident about gene technology and its applications. They need information at a range of levels, from a range of different sources, and the public needs to be consulted regarding regulation of the technology. If there is no consumer acceptance then there is no market for the product, as was seen in the past with irradiated foods.

All people participating in this technology must take every opportunity to talk about the technology with a range of people who may use it such as opinion leaders, community groups, farmers, school students. A better informed community is better able to make more informed decisions on the benefits and risks associated with the application of biotechnology and less likely to be influenced by scaremongers.

Labelling may also play an important role in generating consumer confidence, but if it imposes a requirement to be able to separate GMFs from non GMFs all along the food chain, it will cause significant cost increases (possibly as much as 30%, The Economist 1999), with commodities being especially sensitive to price factors. Thus poor labelling policies could cancel out the benefits that genetic improvements offer to the overall Australian community.

Christine Deane (1999) notes saliently that:
ìThe future of biotechnology will be dictated by market reaction rather than technical feasibility. Consumer reaction to the products of biotechnology is the critical factor determining the ultimate success or failure of this technology in the marketplaceî. ìRisk is a central issue influencing public opinion on biotechnology. The public perception of risk and the scientific evaluation of risk are very different.î

Risk comprises two components viz a ***hazard*** component which can ìhurtî and an ***outrage*** component which covers everything else about risk except how it is likely to hurt and includes emotional, social, ethical aspects. A scientific assessment of risk focuses on the ìhazardî component while peopleís concerns about risk have more to do with outrage than hazard. This is why scientists think that ìpeople worry about the wrong riskî. Thus in formulating a communication program about a new technology such as biotechnology, its essence is risk communication and so it is important to understand how people perceive and respond to risks and the factors that contribute to outrage. (Sandman 1987).

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