SUBMISSION:

House of Representatives Inquiry into Primary Producer Access to Gene Technology

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Scope of the Inquiry

The Australian Democrats have sought on a number of occasions to have the issues of genetic technology and agriculture debated. So far every attempt in the Senate has been rejected by the old parties voting together and against any proposal.

By failing to involve the Senate in this inquiry, either through a Joint Parliamentary Committee or a Senate Committee, the Parliament has avoided Parliamentarians who do not share the uncritical acceptance of gene technology which is pro-development and short term. This is unfortunate and can only result in further skepticism and doubt about what has the potential to be a significant and beneficial technology.

The Australian Democrats are sceptical of the promises of biotechnology and the speed with which this technology has been imposed on the Australian community, and mostly without our knowledge. There are clearly benefits to the technology in amazing medical treatments and the potential solutions to some of the world's most pressing problems. However, we know from our past experiences of 'a solution for everything' technology, the promises fail the expectations and the significant damage can not always be reversed.

Although the Australian Democrats do not oppose every aspect of gene technology, we need to be convinced about the overall benefits of the technology. As a minimum we would support the British Medical Association Board of Science & Education recommendations:

(i) the application of the precautionary principle in developing GM crops or foodstuffs, including comprehensive cost-benefit, health and environmental impact assessments;

(ii) the segregation at source of GM foodstuffs to enable identification and traceability of GM products;

(iii) further research on the possible health risks of GM foods consumption particularly on the mechanisms of allergenic reaction to GM products and the health risks of antibiotic resistance;

(iv) long-term research into the environmental effects of GMOs, particularly the fate of metabolic transgenic DNA in animals and human beings;

(v) the application of comprehensive health and environmental impact assessments to all GM crops site applications which are open to public scrutiny and evidence of safety should be openly presented and subject to critical scientific peer review rather than being held under commercial-in-confidence clauses; and that,

(vi) breaches of crop site regulations be met with appropriate fiscal measures and that fines should be a sufficient amount as to act as effective deterrent to biotechnology operators.[1]

The scope of this inquiry appears also to be directed towards a rubber stamp approval of gene technology. As with every new technology we need to examine it carefully and

[1] British Medical Association Board of Science & Education, *The Impact of Genetic Modification Agriculture, Foods and Health – An Interim Statement*, May 1999.

choose only those parts which will bring us benefit. This is a political decision based on value judgements which can only be successfully determined through broad understanding and participation in the decision making processes outside the realm of 'the experts'. Although I welcome any discussion of gene technology in the Parliament, I do not consider the scope of this inquiry is either broad enough or inclusive of all sections of the Australian family involved in this new technology and responsible for dealing with outcomes of this technology.

I have set out below a number of my concerns addressed broadly at the access issues for primary producers to gene technology. I have considered this issue broadly recognising access includes not only access to the technology, but also access to the benefits of the technology.

Trade related concerns

The Trade Related Intellectual Property Agreement (TRIPs) which formed part of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) set minimum standards for intellectual property protections. I am concerned this Agreement will disadvantage the Australian primary producer's access to gene technology by driving up prices for the technology, limiting the potential to develop new technologies which supersede present technology and promote gene technology outcomes which are designed for another hemisphere, another environment and different agricultural practices.

I am particularly sceptical of claims that monopolies (or whatever term presently describes exclusive rights to technology in the form of products and processes) over technologies are beneficial and encourage further investment in research and development. There is no data to support these contentions and I suspect any data would show a disproportionate amount of the funds for developing these new technologies are public funds spent in public universities and research institutions. If this is true, then it is inequitable for the public to be funding the research and then paying high prices for the use its benefits.

Australia has an opportunity to circumvent the worst aspects of this Agreement through our competition laws. This may ameliorate aspects of un-level competition and restricted access to the best technologies. However, I would welcome the opportunity to examine the effectiveness of these laws and promote the collection of data so we can make a proper assessment of the restrictions imposed on the access to gene technology (and other technologies).

A 'precise' technology

Genetic engineering is not at present a precise technology and the long-term consequences of the technology are poorly understood. Current manipulation techniques involve the insertion of genetic material randomly and do not provide a precise or chosen location for insertion. Further, the levels of expression depends to a large extent on the location of insertion and genes may move outside their intended spaces.

It is reasonable to expect that pleiotropy (the affect of a single gene product on more than one trait) and epistasis (the capacity for one gene to modify the expression of another

gene which is not an allele[2] of the first) will also occur in trangenic crops, as they do in their traditional counterparts. These effects increase the complexity and difficulty of assessing the risks that transgenic crops may have on the environment, nutrition, consumer health, etc. This aspect of gene technology is presently poorly understood, poorly researched and does not appear to have been adequately assessed in proposed regulatory schemes. For example, the proposed substantial equivalence for gene food labeling would be unlikely to detect a predisposition in a food crop to accumulate heavy metals with its downstream health effects.

Two examples illustrate this concern:

(a) The production or conferral of weediness to agricultural and non-agricultural species is one aspect of agricultural gene technology which holds the potential to cause significant cost to primary producers in Australia. Scientists have suggested that some transgenes may confer or enhance the ability of a crop species to become a weed[3]. The risk of transgenic crop weediness is similar to that presented by the introduction of non-indigenous plant species into an environment, but the relatively few that do can cause significant ecological disruption and a significant cost to agriculture, for example, through increased herbicide use and environmental degradation.

(b) Another concerning aspect of first generation agricultural gene technology is the insertion of virus genes into crop plants to protect them against disease. Experiments have shown migrating viruses can acquire the inserted genes and produce novel viruses with new properties. Work on inserting virus genes for resistance is advancing in many countries, including Australia, and is well funded compared to the research attempting to understand the potential dangers. Significantly, field tests of transgenic plants are presently not even independently monitored. This is a major concern to Australian agriculture and means that we must be concerned about the genes we are incorporating in the populations of cells and organisms and their relations.

These are valid concerns - gene flow to wild relatives has been recorded in quinona, squash, carrot, maize, sorghum, sunflower, strawberries and sugar beet[4] and there have been 16 reported international cases of genetic exchange between crops resistant to herbicides, insects and viruses and wild relatives.[5] Such genetic pollution is now receiving recognition and serious consideration by international governmental regulatory agencies. It was concluded by the United Kingdom's Advisory Committee on Releases to the Environment (ACRE), Department of the Environment, Transport and the Regions that cross-pollination between adjacent crops of fodder maize and sweet corn can occur.[6]

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[2] Alleles are different types of a gene for a particular trait which produce differing outcomes. To use the Mendelian example, one allele of a gene will produce a wrinkled seed whereas another allele of the same gene will produce round smooth seeds.

[3] Rissler J & Mellon M, *Perils Amidst the Promise: Ecological Risks of Trangenic Crops in a Global Market*, Union of Concerned Scientists, Cambridge MA, 1993 at page 4 of 8. http://binas.unido.or.at/binas/Library/ucs/section5.2.html accessed 1 June 1999.

[4] Gray AJ & Raybould A F, 'Reducing transgene escape routes', *Nature* Vol 392 16 April 1998 at page 654.

[5] Brookes M, 'Running Wild', *New Scientist*, 31 October 1998 at page 41.

[6] Department of the Environment, Transport and the Regions *Advisory Committee on Releases to the Environment*, Advice for the Secretary of State, 23 June 1998: Genetically Modified Maize in National List Trials Adjacent to an Organic Farm in Devon. http://www.environment.detr.gov.uk/acre/advice01.htm, accessed 8 March 1999.

This is also a concern in Australia. The Genetic Manipulation Advisory Committee (GMAC) 1997-98 Annual report documents an incident where transgenic lupins modified for herbicide resistance were inadvertently released. In Australia no crossing occurs with other species in this genus and the possibility of genes entering the naturalised races of lupin are very low. However, similar release of a transformed subterranean clover is very likely and under selective pressures and over a period of time as short as several years the likelihood of an outcross is very likely (it is a matter of numbers…). This may have significant implications for Australian primary producers and the wider Australian community.

The consequences of this 'imprecise' technology are likely to significantly affect primary producer access to the benefits of the technology. An assessment of the exact impact is difficult because the mechanisms are poorly understood and they are not being investigated. I am particularly concerned about the long term consequences to the environment and its ability to sustain viable and productive agriculture.

Biodiversity

The possibility that there could be hundreds of thousands of genetically modified organisms in the environment will threaten the naturally evolved life forms in their natural environments. I believe we have a responsibility to ensure that the cohort of presently existing organisms are maintained into the future, expressing their diversity and unique solutions to biology's challenges. This is essential for the future of primary production, and especially food production.

Australia is one of twelve mega-diverse nations. The Commonwealth Report, *The State of the Environment: Australia 1996* estimated some 1 million species of animals, plants and microbes exist in Australia with some 15% formerly described. We therefore have unique biological solutions suited to Australian conditions and we should not ignore the potential benefits of this diversity in agriculture. This report highlighted the threat that the decline of biodiveristy is to industries including fisheries, agriculture and water supplies. The potential economic value of biodiversity is indisputable. What remains to be determined however, is the way in which it is harnessed. Second generation biotechnology has the potential to support sustainable development principles, to provide intelligent systems to aid the environmental combat of industrial pollution and to aid environmental repair.

Ecosystems with high biodiversity also support higher productivity, and provide some protection against drought and other environmental stresses. First generation agricultural biotechnology applications however act to undermine such diversity and instead promote mass production of monoculture species. First generation genetic technologies focus primarily on the development of insect resistance, herbicide resistance and herbicide tolerance and have been monopolised by transnational companies including Monsanto, Norvartis and Dupont.[7] As the United States dominates the agricultural biotechnology industry (accounting for greater than 70% of the total field trials in the world, approximately 67% of the commercially released plants and the majority of commercial plantings[8]) the majority of GM crops are developed and tested in North America, and we

[7] 'Australia losing the race to own biotechnology', *Reform* Issue 7 Autumn 1999 at page 7.
[8] Forster M, 'Plant Gene Technology: Australia's competitiveness and the role for government' *OUTLOOK 99* at page 229.

need to be sure our primary producers are not sacrificed to first generation biotechnology and North American practices which do not work in Australia.

Health Concerns

Primary producers need to recognise the broader perspective in areas such as food production, materials (including fibers) production, etc. Public perceptions about the desirability or otherwise of a technology will have a significant impact on the livelihood of primary producers.

Safety and environmental concerns have reached such prevalence internationally that Canada's National Farmers Union (NFU) is lobbying the Canadian government to make agricultural biotechnology companies financially responsible for genetic pollution of organic and traditional crops which has "…infringed on the livelihoods of farmers or the general public".[9]

The British Medical Association's report *The Impact of Genetic Modification on Agriculture, Food and Health*, warns that any adverse effects from GMOs are likely to be irreversible and that the precautionary principle should be implemented. The report focusses on the use of GMO's in foodstuffs and the evidence based research surrounding the environmental and health impacts of GMO's. The BMA believes that any conclusions regarding the safety of introducing GM material into the UK is premature as there is insufficient evidence at present to make an informed decision.

Biosafety Procedures in Australia

Australia's current voluntary system of biosafety regulation is not of an acceptable standard and the public can not be confident it is a reliable scheme or that it will deal with their concerns.

At present voluntary regulation of small and large scale genetic manipulation work in containment facilities and the release of genetically modified organisms into the environment under GMAC are inadequate. GMAC regulates such activities by the issue of non-statutory guidelines which specify the procedures to be followed by institutions and researchers intending to undertake genetic manipulation work and detail requirement for containment facilities. Proposals for genetic manipulation work are assessed on a case-by-case basis giving varied conditions under which organisms are to be modified and released.

The inadequacies of this system can be illustrated by the determination of buffer zone specifications under GMAC. Currently in Australia, 'refuge'[10] and 'buffer' zones[11] are not defined in GMAC's guidelines. Instead conditions are established on a case by case basis. The effectiveness of this practice is at the very least questionable as presently the production of transgenic Bt Cotton[12] requires a 'refuge' of 10% traditional crop to prevent

[9] Paulson J, *The Saskatoon StarPhoenix*, May 12 1999 at page 5.
[10] Refuge zones are expanses of farm land of traditional crops designed to prevent the development of pesticide resistant organisms.
[11] Buffer zones are expanses of land designed to prevent cross pollination of genetically modified crops.
[12] Bt Cotton is a genetically modified cotton species produced by Monsanto which carries a gene (including Bt – Cry1Ac or Bt – Cry2A) derived from a baterium, *Bacillus thuringiensis*, that produces a Bt toxin killing pests of the crop.

the development of pesticide resistant organisms. This requirement means that such zones are of highly variable distances depending on the size of the field which the cotton is grown in. It does not take into account generally accepted international set distances or findings such as those in the UK which have established that bees can carry pollen four kilometres from test sites[13] by failing specifying a minimum distance for such zones.

The current regulatory arrangements not only fail to provide sufficient protection to consumer health and the environment but also fail to provide standard enforceable regulations which clearly specify to researchers, industry and primary producers the boundaries in which genetic technology applications may be used. The present practices do not insure industry or consumer confidence. Furthermore, case-by-case assessment of genetic manipulation applications will become more and more unsustainable as the 'biotechnology revolution' evolves in Australia and the frequency of such activities increases exponentially.

Institutional Biosafety Committees (IBCs) are internal committees which oversee the implementation of GMAC Guidelines in individual institutions and companies which use genetic manipulation techniques. These committees rely solely on the full and voluntary cooperation of research institutions and companies to report all manipulation activities for compliance with the guidelines which is clearly inadequate in light of the possible risks associated with this technology. Furthermore, IBCs under GMAC are granted commercial-in-confidence rights. This practice is inappropriate and inadequate to ensure accountability, consumer and environmental safety and additionally acts to undermine consumer confidence. I have called for a statutory, publicly accountable, transparent regulatory and independent testing system to be implemented which ensures the safety of the public interest.

Limits of Biotechnology

Genetic technology has the scope for revolutionary and beneficial applications. However, I am concerned that the rush for the increased output and revenue that agricultural biotechnology applications promise is ill-considered and fails to recognise the unique factors and variables that Australia possesses. This debate has heard only the side of pro-development and those who intend to reap the rewards of the technology in the short term.

For example, Australia's geographical advantage of being an isolated land mass and the non-modified status of Australian canola crops, means we hold a natural advantage in the canola market. In January 1999 Australia secured its largest export shipment of canola on the basis that it could be guaranteed to be GMO free. The shipment to European oilseed crushing plants, recording 57 000 tonnes and $A26 million (US$16.53 million), is expected to lead to a record shipping program for 1999. GMO-free canola exports are estimated to total approximately 350 0000 to 400 000 tonnes in the coming year.[14]

If we do not regulate agricultural gene technology applications comprehensively we will lose significant trade opportunities. According to a 1997 poll, 70-90% of Japanese consumers surveyed indicated that they favoured comprehensive labelling of GM

[13]Nuttal N, 'Bees spread genes from GM crops', *The Times*, 15 April 1999.
[14] 'Australia to Ship Largest Cargo of Canola to Europe' OTC 1.27 SYDNEY, Jan 8 1999 (Asia Pulse via COMTEX)

products.[15] Australia should introduce comprehensive segregation, auditing and labelling procedures to ensure that we do not loose valuable export markets. We need a multidimensional approach which does not sabotage lucrative primary industries and instead ensures that we exploit niches retaining a 'clean and green' agricultural image for the long term.

Research budget

Despite the specific prominence that biotechnology received in the 1999-2000 Federal Budget, funding for the Department of Industry, Science and Resources was cut by 6% overall. The general operating grants for universities were reduced (by 1%), as was 'targeted university research' (by 5.5%), other university research (by 2.3%), the Australian Research Council (ARC) (by 3.9%), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (by 0.5%) and the Cooperative Research Centres (by 5.5%).

The National Health and Medical Research Council (NHMRC) received a rise in revenue which included $17.6 million directed to biotechnology over the next two years for the establishment of Biotechnology Australia, an office of biotechnology in the Department of Industry, Science and Resources to coordinate activities and the Office of Gene Technology Regulator (OGTR) to regulate gene technology and its applications. This increase unfortunately has been suggested to have been indirectly at the expense of the ARC.[16]

Despite this Budget attention to biotechnology, none of the initiatives were targeted towards risk assessment research. Though regulatory reform of genetic manipulation applications is overdue, funding for such reforms should not be at the expense of research, particularly research into the possible risks and negative of agricultural gene technology.

The future

Gene technology has great potential to remove human suffering and address some of our most pressing environmental problems, but it must be done through satisfactory debate in the broader community and decisions which have a very long term perspective.

We must, as a nation, invest in our future, not only our industrial future but equally in our health and environmental future – a future which relies on intelligent and sustainable technologies. Second generation agricultural biotechnology holds the potential to provide great benefits for agricultural, environmental and health supportive technologies. I look forward to a sustainable future. This means making sure we protect the natural environment from what we know or suspect might be damaging technologies, until we can have absolute confidence that we have only the good bits of technology and it is sustainable.

[15] *Yomiuri Newspaper* Public Opinion Poll 1997 provided by Consumers Union of Japan.
[16] Nolch Guy, 'Budget boost for science is fiction', *The Age,* 31 May 1999.

The UK's ACRE advised that the standard separation distance of 200 metres between organic sweet corn and genetically modified maize would result in the likely cross-pollination frequency of no greater than 1 sweet corn kernal in every 40 000 being a genetically modified hybrid[17].

on of genetically modified crops.

In 1997/1998 Agricultural exports[18] totalled $24.45 billion dollars, 4.3% of GDP[19]. At the same time agricultural research received …..
%GDP of agriculture and needs special attention

The Ecologically Sustainable Development (ESD) Steering Committee (1992) emphasised the need for both nature conservation and environmental protection to ensure biodiversity preservation. However this report and the preceding Working Group on Sustainable Development (1991) disregarded to a large extent the multifarious issue of biotechnology and its relation to biodiversity.

[17] Department of the Environment, Transport and the Regions *Advisory Committee on Releases to the Environment,* Advice for the Secretary of State, 23 June 1998: Genetically Modified maize in National List Trials Adjacent to an Organic Farm in Devon.
http://www.environment.detr.gov.uk/acre/advice01.htm, accessed 8 March 1999
[18] Agricultural exports are defined as: food and live animals; beverages and tobacco; crude materials, inedible except fuels (excluding crude fertilisers and crude materials and metalliferous ores and metal scrap); and, animal and vegetable oils, fats and waxes.
[19] Australian Bureau of Statistics, *International Merchandise Trade, Australia,* (Catalogue number 5422.0);