



appendix 2

Outcomes of Consultation: Submissions
from Interested Persons

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3.17 Areas of public interest: environmental matters

Introduction

Warrant item (j) placed the environment (including biodiversity, biosecurity issues and the health of ecosystems) as the second main area of public interest. The environment was a significant issue throughout many of the submissions with 35 submitters making substantial comment on environmental matters.

Submitters' views on the environment were fairly evenly distributed between those supporting and those opposing the use of genetic modification technology. Views expressed across all of submissions showed a fairly even distribution of opinion: 16 of the submitters making substantial comment on environmental issues supported and six generally opposed the use of genetic modification technology. More specifically, 11 submitters had concerns about genetic modification in relation to New Zealand's flora and fauna.

Supporters of genetic modification generally felt that any environmental risks posed by genetic modification could be managed. They also noted positive environmental benefits in using genetic modification to protect New Zealand's biodiversity.

Major concerns of those submitters who had reservations about the environmental impact of genetic modification were:

- “unknown” and “unpredictable” impacts on the ecosystem
- gene transfer.

Other specific concerns of submitters included:

- development of unexpected characteristics in genetically modified organisms
- development of new pathogenic viruses
- genetic erosion (ie, the loss in genetic diversity through the planting of crops of the same hybrids)
- development of genetically modified, herbicide-resistant weeds (“super-weeds”)
- unintentional spread of genetically modified organisms throughout an environment

- potential degradation of air, water and soil quality
- reduction in the variety of food available to animals.

Effects on the ecosystem

Among those submitters generally opposing the use of genetic modification technology, the most frequently mentioned issue was concern about the unpredictable impacts of genetically modified organisms on the ecosystem as a whole. Many submitters noted that the interdependence of the components of an ecosystem was such that a small change could have far-reaching and irreversible deleterious effects.

Representative of these concerns were comments from Safe Food Campaign [IP86], which talked of the “unbalancing effects” that genetically modified organisms might have on an ecosystem. Canterbury Commercial Organics Group [IP65] expressed concern at the “downstream effect on the wider environment”. Pacific Institute of Resource Management [IP84] said information was lacking on how genetically modified organisms would behave “in context” (“genomic, cellular, ecological and evolutionary”). Several submitters noted the need to recognise that the environment was a “complex system” with each element interdependent.

Environment and Conservation Organisations of New Zealand (ECO) [IP102] effectively summarised opinion on the issue in its comment that:

Every part of an ecosystem interacts with other parts and even seemingly tiny changes can have huge effects on our biodiversity and health of our ecosystems. ECO is concerned that the use of genetically altered organisms could cause irreversible and damaging contamination of our environment with consequent loss of biodiversity.

Bio Dynamic Farming and Gardening Association in New Zealand [IP61] noted that New Zealand had the opportunity to wait until the outcomes were clear of what happened elsewhere as other countries released genetically modified organisms into their environments.

Interchurch Commission on Genetic Engineering [IP49] expressed concern about “the unintentional spread of GM plants or other organisms throughout the environment” and noted that this could affect the “credibility” of organic farmers. Interchurch Commission also raised concerns about “respect for God’s creation” and the importance of “retaining integrity and biodiversity of species” in the environment.

Royal Forest and Bird Protection Society of New Zealand [IP79] noted the “responsibility of people to other living things” as expressed in the concept of

kaitiakitanga (guardianship). The Society said that “biodiversity is New Zealand’s biological wealth” and that “the uniqueness of much of New Zealand’s indigenous biodiversity means that responsibility for its continued existence is entirely ours”.

Gene transfer

Gene transfer was the next most frequently mentioned cause of concern. This included both gene transfer by pollination (the natural spread of pollen via the wind, bees and birds) and horizontal gene transfer (the transfer of genes between organisms by means other than sexual reproduction).

Submitters expressed concerns about the potential impact on organic production, the transfer of engineered genes to related ‘wild’ species, the spread of viral pathogens, as well as development of genetically modified, herbicide-resistant crops, leading to the development of “super-weeds” and “super-bugs”.

Gene transfer was raised as a potential issue of public interest in submissions from a number of sources including those of submitters who were generally regarded as supporters of genetic modification. Submitters who mentioned gene transfer (either by pollination or horizontal gene transfer) included: AgResearch [IP13], New Zealand Game Industry Board [IP33], Interchurch Commission on Genetic Engineering [IP49], Canterbury Commercial Organics Group [IP65] Environmental Risk Management Authority (ERMA) [IP76], Royal Society of New Zealand [IP77a (biological sciences)], Pacific Institute of Resource Management [IP84], Safe Food Campaign [IP86], New Zealand Cooperative Dairy Company [IP88], New Zealand Association of Scientists (NZAS) [IP92], Nelson GE Free Awareness Group [IP100], New Zealand Vegetable and Potato Growers’ Federation/New Zealand Fruitgrowers’ Federation/New Zealand Berryfruit Growers’ Federation [IP75], Royal Forest and Bird Protection Society of New Zealand [IP79], Green Party of Aotearoa/New Zealand [IP83] and ECO [IP102].

Specific public interest issues raised by submitters about gene transfer are outlined below.

Pollen drift

NZAS [IP92] noted that “the main area of environmental concern appears to be one of pollen drift from GM plants and the associated problem of horizontal gene transfer”. The Association argued that “the main issue is one of management”. It further suggested that the “terminator” genetic modification technology “could be productively applied in areas where there may be a threat to native flora or where weedy characteristics pertain”.

New bacteria and viruses

Noting that horizontal gene transfer was now recognised as a “phenomenon” that was “far from rare”, Canterbury Commercial Organics Group [IP65] said that this suggested “that transfer of transformed genes to new host plants, bacteria or viruses” might produce “unplanned events ... an unpredictable, potentially disastrous and irreversible phenomenon”. Pesticide Action Network New Zealand [IP87] suggested that soil bacteria could take up genetic material from genetically modified organisms and that the use of virus-resistant genetically modified crops could result in “the appearance of new disease-causing viruses”.

“Super-weeds”

The issue of transfer of engineered genes to related “wild” species, which could allow the plant or weed a competitive advantage through enhanced fitness or greater reproductive capacity (thereby creating “super-weeds”), was a significant concern of several submitters. Safe Food Campaign [IP86] registered particular concern about the creation of new weeds. It commented that the creation of new weeds by horizontal gene transfer was viewed as “genetic pollution”. Noting that “techniques being utilised to reduce the possibility of genetic pollution are ‘crippled’ GM bacteria and viruses” (ie, “‘crippled’ laboratory strains of bacteria and viruses ... that have been engineered not to survive release into the environment”), it warned that “if this technology fails, many critics [believe] that ‘super weeds’ will develop”. Canterbury Commercial Organics Group [IP65] noted that such plants would have “the capacity to overwhelm a given ecosystem”.

Transfer from plant material to animals

Game Industry Board [IP33] considered that “the evidence to date” indicated that “the risks of instability in new organisms, the risks of horizontal gene transfer from say plant material in the digestive tract of an animal to animal cellular DNA or the risks of pollen contamination from transgenic plants are both minimal and manageable”.

Unpredictability

Pacific Institute of Resource Management [IP84] noted that “new evidence suggests that current knowledge of evolutionary theory is inadequate to predict the fate of recombinant organisms or recombinant genes”. It further commented that “there is no way to extrapolate from one region or environment to another, differing environment ... especially true when GMOs are transferred to ecosystems and climates which differ from those where they were first developed and used”. As a consequence, the Institute recommended: “Unless there is sufficient scientific evidence that a GMO or its recombinant genes will not pose any environmental stress or health impact we should abide by the precautionary approach.”

Irreversibility

ECO [IP102] raised concerns about “the possibility of new and virulent diseases through the use of the antibiotic marker genes and viruses used in the process of gene transfer and identification and from the actual organisms created through horizontal gene transfer”. It argued that “once released these organisms cannot be recalled”.

Cultural implications

Royal Society of New Zealand [IP77b (social sciences)] noted that “genetic manipulation may be seen to interfere with the integrity of species” and that “the mixing of genes between species is an affront to the mauri inherent in whakapapa”. And Nga Wahine Tiaki o te Ao [IP64] stated:

It is within the main principles of mauri, mana and wākapapa that Maori raise their absolute disagreement regarding genetic engineering and modification. If these principles are damaged or tampered with in any way, thus upsetting the holistic world balance, so too will be the mauri, mana and wākapapa of Maori and following generations.

Management of risks

Supporters of genetic modification also commented on environmental issues. Submitters frequently refuted claims of risks to the ecosystem from genetically modified organisms, arguing that the risks could be assessed, managed and therefore minimised. University of Otago [IP19] claimed that there was “no evidence of risk to the environment, biodiversity, or ecosystems, despite 25 years of laboratory based GM research”. Crop and Food Research [IP4] maintained that “potential environmental risks posed by genetically modified crops are very similar to those posed by crops that are not genetically modified”. HortResearch [IP5] commented that New Zealand had “thorough, robust, and systematic risk management systems in place”. Monsanto New Zealand [IP6] concurred, arguing that in New Zealand environmental effects were “thoroughly evaluated”.

Several submitters noted that effective management could reduce risk. New Zealand Biotechnology Association [IP47] saw the potential risks to the environment from genetically modified crops as “not due to the nature of the technology that derived the product” but, rather, “due to the way in which that product is used”. NZAS [IP92] argued that the risks of both pollination from genetically modified plants and horizontal gene transfer could be managed effectively. NZAS noted that many plants used for food production did not have weedy characteristics and had no wild relatives in New Zealand; ie, selective breeding for food purposes had essentially “ring-fenced” most crop plants.

New Zealand Transgenic Animal Users [IP45] said that the “biosecurity risks of GM animals are very low, and little different to those from non-GM animals” and added that “regulatory systems in place are adequate to manage these risks”.

Environmental benefits

Some 33 submitters felt that genetic modification could provide opportunities for environmental benefits: 16 submitters felt that genetic modification was acceptable if used for environmental protection. Several submitters noted substantial benefits to be gained from the use of genetic modification in environmental management, including preservation of biodiversity and improving biosecurity, as well as bioremediation. The benefit for pest control, particularly control of possums, was frequently mentioned. Supporters of genetic modification not only saw the risks to the ecosystem as “low” and “manageable” but also believed that genetic modification offered ecological advantages.

Introduction of genetic modification meant that “agriculture will be revolutionised”, according to New Zealand Life Sciences Network [IP24], with benefits of reduced use of harmful chemicals.

AgResearch [IP13] saw environmental benefits in greenhouse gas reductions (by reducing methane production from ruminant animals through modification of rumen microorganisms) and reduced nitrate pollution of groundwater (by using improved legumes to supply nitrogen rather than inorganic fertilisers). Genetic modification technology was also of similar benefit to the environment by restoring the “nitrogen balance in the soil” and the ability to “bioremediate harmful pollutants in the environment” (Life Sciences Network [IP24]). It offered “tools for control and eradication of diseases of special concern to our biosecurity”. (New Zealand Veterinary Association [IP28]).

Several submitters argued that conservation of indigenous flora and fauna would be enhanced. University of Canterbury [IP7] advanced the benefits of genetic modification to biodiversity arguing that: “Routine GE is an essential tool in analysing and monitoring biodiversity and ecology. Conservation of indigenous flora and fauna depends on this fundamental research.” University of Otago [IP19] noted that much of the research aimed at protecting the diversity and health of ecosystems was based on the use of genetic information, including fingerprinting of endangered species. “Terminator” genetic modification technology could also be productively applied where there might be a threat to native flora (NZAS [IP92]).