FOREST & WOOD PRODUCTS

Research & Development Corporation

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2 September, 1999

Committee Secretary
Standing Committee on Primary Industries and Regional Services
House of Representatives
Parliament House
Canberra, ACT, 2600

Re: Inquiry into primary producer access to gene technology

Dear Sir/Madam,

I welcome the opportunity to participate in your inquiry into primary producer access to gene technology. A submission to this inquiry is attached.

If you require any clarification please do not hesitate to contact me.

Yours sincerely

Silvia Pongracic
Resource R&D Manager
for
Kwame Asumadu
Executive Director

Submission to the Inquiry into primary producer access to gene technology

Summary:

- Timber plantations have the potential to achieve major value gains through access to gene technology.
- There is no threat (perceived or real) to human health in genetically modified trees.
- Genetic improvement must be described in a useful manner which reflects the level of improvement achieved, and should be priced to reflect this.
- Due to the long time frames involved with timber rotations it is unlikely that small producers will have the capacity to develop individual genetic improvements.
- Genetic improvement of eucalypt and other native species should only be undertaken once sterility of the improved strain has been assured.

Background to the Forest and Wood Products RDC

The Forest and Wood Products Research and Development Corporation (FWPRDC) was established on 1 January 1994 under the *Primary Industries and Energy Research and Development Act 1989.*

FWPRDC's Legislative Objectives are to invest in effective, co-ordinated research which has potential to:

- develop and enhance resource sustainability;
- maintain and promote environmental responsibility throughout the industry;
- stimulate profitable value adding;
- enhance market opportunities and product marketability for wood products;
- stimulate effective and profitable utilisation of by-products and residues;
- promote international best practice throughout the industry; and
- improve processing technology to reduce production costs and enhance product quality.

The FWPRDC represents the interests of the softwood and hardwood industries throughout Australia. Both the softwood and hardwood industries rely on wood as their primary input and this wood may be derived from sustainably managed native forests, or from plantations. This submission covers only plantation grown timber species.

Background to the timber industry

The forest and wood products industry differs from many other primary industries in that the end product does not enter the food chain. The application of gene technology to improve plantation timber species does not present a threat, real or perceived, to human health as does genetic manipulation of other agricultural crops cultivated for human consumption.

The tree plantation industry is a long rotation industry compared with other primary production industries, with rotation lengths of between 8 years for pulp wood and up to 35 years for sawlogs. Plantation productivity is dependent upon the quality of the site (soil fertility) and rainfall. Traditionally timber plantations have been established on marginal or "failed" agricultural land with sub optimal site conditions. Judicious application of fertiliser, weed control and other improved silvicultural (site preparation, thinning) practices can assist in achieving maximum growth rates.

As the tree plantation industry has very limited capacity to increase productivity, harnessing the existing genetic variation within the plantation species has the greatest potential to provide productivity gains. This variation not only relates to volume productivity but also to value improvement through focussing on wood quality traits related to pulp fibre properties or structural timber properties.

The importance of genetic improvement to the plantation industry is evidenced by the existence and survival of the Southern Tree Breeding Association (STBA). The tree plantation industry has embraced this co-operative and is working actively through the STBA to improve the quality and quantity of available stock through traditional breeding methods. Genetic improvement is extremely expensive and is unlikely to be pursued unless by a co operative arrangement.

Most tree breeding programs are only in their first or second generation of improvement. In contrast the breeding of agricultural crops, such as wheat, has occurred over several centuries, and the level of improvement is in the 100s of generations.

The long time period to harvest for timber species means that tree selection (generational interval) may be between 8 – 35 years, when the true value of the grown wood can be assessed at final harvest. In contrast a wheat crop has a generational interval of a season or a year at final harvest. To overcome the extreme time delay, tree selections are undertaken at between 4-8 years of age with the expectation of a high level of age-age correlation with final crop trees. This means that the trees selected as superior at age 4 will be expected to exhibit their superiority through until final harvest. High age-age correlations have not yet been confirmed in many species.

Traditional tree breeding can be fast tracked using modern molecular techniques to make early selections. This allows trees to be selected at a very early age if they exhibit the genetic markers for traits of interest. The

potential to alter timber characteristics by genetic modification also provides an opportunity to fast track traditional breeding methods. This new technology can allow timber species to bypass the traditional slow breeding method and make greater value gains sooner.

Common plantation trees belong to the hardwood genus (*Eucalyptus*), a native species. Concern exists that genetically altered strains could cross back into the native forest and alter the natural genetic diversity. This could be overcome by ensuring that any modified strains were also sterile, so that contamination of the native forest resource could not occur.

Concerns also exist that exotic tree species could invade our native forest and compete with the natural vegetation. This could again be controlled by vegetation management techniques or by ensuring sterility of the planted stock.

Terms of Reference

The future value and importance of genetically modified varieties:

Due to the low level of genetic improvement in tree breeding in Australia access to gene technology is vital to maintain and enhance a viable and sustainable plantation timber industry.

We cannot have an internationally competitive tree plantation industry without techniques that offer productivity improvements. These productivity increases lead to improved raw materials and hence:

- ease of processing as well as reduced cost of processing; and
- better quality product to compete with similar off shore material.

Gene technology can allow the industry to produce timber with properties and qualities similar to timber substitutes such as steel, aluminium, concrete and plastic, all of which require more energy to produce than timber and are less environmentally friendly.

Access to gene technology will also allow the development of a domestic technical/scientific capable of supporting the industry.

Breeding of *Eucalyptus* species is highly advanced in South America, South Africa and parts of Europe. These countries are direct competitors with domestic producers of timber. Similarly breeding of *Pinus* species is advanced in New Zealand and parts of South America, who are again direct competitors to our domestic producers. As the Australian people continue to demand wood for construction and aesthetic purposes, domestic producers should be enabled to compete fairly in the world market, by having access to gene technology to improve the quality and cost effectiveness of timber produced.

The future value of genetic improvement is difficult to predict. Recent work undertaken by the University of Tasmania indicated that improving traits

directly related to the quality of paper making could improve profitability for a typical breeding program by $97M. Similar studies investigating the economic value of sawn timber properties currently being undertaken at Queensland Dept. of Primary Industries – Forestry are expected to show similar outcomes.

The ability for producers to compete using traditionally available varieties:

Australian tree plantation growers would not be able to compete effectively using available genetic stock. Timber production is becoming a world market due to the limitations of land available for establishment of large scale plantations and the locking up of native forest internationally, reducing the available harvestable timber. With international competitors already deploying improved stock, Australia's development and deployment of genetically improved material is imperative to maintain competitiveness.

The productivity of traditional varieties of plantation trees is extremely variable and therefore quite low. Poor quality and quantity of wood increases the cost of processing and reduces the recovery rates of timber harvested. Access to gene technology allows the tailoring of properties to modern processing techniques.

Australian timber producers will not be able to compete effectively with overseas industries in terms of cost structure, unless we can improve our cost effectiveness with respect to quality of product and reduced costs of production. Both of these can be achieved with the aid of gene technology.

Commericialisation and Marketing of production varieties & Cost to producers of new varieties

The STBA has a system of named "Breeding Values" for the three species in it's breeding program. This system is directly related to the calculation for the level of improvement rather than an arbitrary numbering system.

A system similar to the STBA would be the most appropriate and transparent form of marketing the new strains. Price of deployment stock would vary according to the level of improvement achieved. Various traits can have different breeding values/economic weights and customers would be able to mix and match their desired traits.

This system would have to administered through a single body, so that all improved genetic material would be comparable.

The affordability of improved genetic material is an issue. The level of genetic improvement should be reflected in the cost of the material. This cost of improved stock should be offset by a reduced rotation length and less variable plantation trees of higher value.

The level of uptake of improved varieties of trees has been large both within Australia and internationally. The tree plantation industry in Australia has worked together through the STBA to access the new genetic material as

early as possible. Internationally much of the genetic improvement is done within individual companies where access by outsiders to the genetically improved stock is limited.

Impediments to the utilisation of new varieties by small producers & Assistance to small producers to develop new varieties and protection of independent breeding rights

Impediments to the utilisation of new genetic stock include:

- public concerns regarding back crossing into the native forest with eucalypt species;
- the complexity and cost of protecting breeding rights;
- the specialised nature of the technology and its cost; and
- the lack of commercial technology to disseminate the improved genetic stock.

An innovative assistance program could address the impediments to accessing improved genetic material by small producers.

Opportunities to educate the public on the benefits of gene technology.

There is public anxiety about genetically modified organisms which may be caused more by ignorance rather than based on scientific facts. There is a need for a comprehensive, well co-ordinated educational program to educate the public about:

- the need for genetically modified organism technology;
- the benefits to the industry and Australia's economy and therefore our standard of living; and
- technologies for ensuring that back crossing into the native forest do not occur.

The public also needs assurance that genetically modified tree plantations will not harm human health as wood products are not part of the food chain.

The improved productivity of tree plantations will produce more of the higher quality timber from smaller areas of plantations, thereby reducing the need for extensive areas to provide timber for Australia.