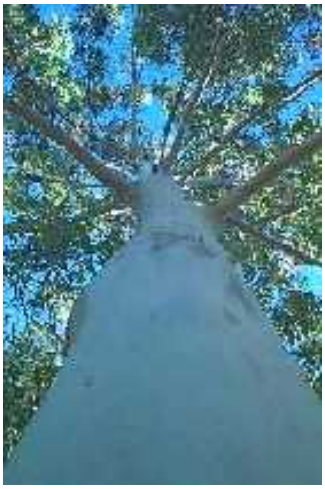
NEW ZEALAND FARM FORESTRY ASSOCIATION

The Proceedings of a Farm Forestry Seminar on Special Purpose Tree Plantings (Telford Polytechnic – 07 July 2004)



Sustainable Farming Fund
www.maf.govt.nz/sff

LIST OF PRESENTATIONS

PROFILE OF SPEAKERS

Patrick Milne is a registered forest consultant and a specialist in cypress management. He is based at Rangiora in Canterbury. He has an extensive background in forestry, having worked for the New Zealand Forest Service and Forest Research, before establishing his own business. At Forest Research he was a scientist with the Alternative Species research programme, specializing in the growing and managing of cypresses. He is the author of many reports and popular articles on cypress species. In addition to this, he has wide experience in the growing and managing of Eucalypts and Douglas Fir on South Island sites. He is a member of the executive council of the NZ Farm Forestry Association, and is its representative on the Forest Owners Research Committee.

Ian Nicholas [B.For.Sc. M.Phil.] has been associated with the Forest Research Institute since 1975. His focus has primarily been on species identification and the evaluation of timber, for specialist uses. He has managed the Special Purpose Species Research Programme, which has focused on: eucalypts, acacias, walnuts, cypresses, and Paulownia. His work has included all facets of the management of these species – establishment, genetics, silviculture, and health. Ian currently works in the Alternate Species Programme with responsibility for silvicultural research.

Phil De La Mare is the Southern Regional Manager for Ernslaw One Limited. Phil graduated from the University of Canterbury in 1982 with a Bachelor of Forestry Science degree. Following this he worked for the Forest Research Institute and then for PF Olsen Ltd, based in Rotorua. In 1987 he took on a planning role with New Zealand Timberlands Ltd in Gisborne and then joined Ernslaw One Ltd in Tapanui as a Harvest Supervisor/Planner in 1990. As Ernslaw One Ltd grew in size Phil progressed to the position of Senior Forester and was then appointed Regional Manager in 1998. He is currently responsible for the overall management, and administration, of the Company's South Island forests. Phil is also the chairman of the Douglas-fir Research Co-operative.

Graham Milligan is a nursery manager and farmer, based at Dipton in Southland. He has extensive experience in the growing and management of eucalypt species. He advises on farm plantings and he speaks regularly at field days and discussion groups. He is a past president of the Southland Farm Forestry Association, and he has a keen interest in the development of alternative plantings, both natives and exotics.

Parnell Trost [MSc, PhD] is a senior policy analyst with the Ministry of Agriculture and Forestry. He is based in Dunedin and works on forestry, biosecurity and transportation issues. His background is in geographical analysis and resource management.

Paul Millen is a director of Vineyard Timbers Ltd, based in Marlborough. He also operates a consultancy company, Millen & Associates Ltd, which specializes in landscape and forestry planning. Paul, in association with his brother, manages a 25 hectare forest in the Marlborough Sounds. Regular plantings since 1984 have produced a mixed age forest of small woodlots of cypress, eucalypt, Blackwood and a variety of other species. Trial sawmilling has been successful with thinned trees from all these species. Small scale commercial production thinning is now underway. Paul's recent interest in durable eucalypts has resulted in the establishment of Vineyard Timbers Ltd, so as to spearhead the establishment of a local plantation resource to produce naturally ground durable vineyard posts.

Nick Ledgard [BSc, Auckland; MSc, Bangor, Wales] has worked as a scientist with the Forest Research Institute since 1971. He is based at the Institute's South Island office, in Christchurch. Nick trained as a forester, and describes himself as a generalist rather than as a specialist researcher. The areas in which he concentrates is efforts in are: montane (high altitude) forestry for production and protection purposes, the environmental impacts of forestry, natural regeneration (wilding spread), and farm forestry (School of Forestry lecturer).

THE CYPRESSES: AN OPPORTUNITY FOR THE OTAGO – SOUTHLAND REGION

(Patrick Milne – Southern Cypresses)

INTRODUCTION

> "To date, debate about cypresses is characterised by the fact that everyone has a point of view and often there is not a lot of consensus."

There is still considerable debate amongst growers and research scientists as to the appropriate management systems for cypresses. Different approaches have been attempted across New Zealand. This mirrors the historical experience with radiata pine. Before Forest Research commenced modelling radiata pine, there were 69 different regimes for management, essentially one for each district. Now there are only half a dozen and they are supported by long-term science and practical experience. A similar pattern is occurring with cypresses. Growers and scientists recognise hat there is a steep learning curve in determining the optimal management regimes.

WHAT ARE GROWERS LOOKING FOR IN ALTERNATIVE TIMBER SPECIES

Before commenting on the features of the cypresses grown in New Zealand, Patrick outlined what attributes growers (and investors) are seeking in a timber species. The critical ones are:

- The production of timber that has a ready market (there is little use in growing high quality timber if there is no domestic or overseas market for it);
- Investors need to know that they are likely to make a profit from the species;
- The species needs to be predictable and offer a high degree of certainty (plantation development is a longterm investment and growers need to have certainty about the growth characteristics / profile, of a species); and
- The species must be easy to establish and manage.

High quality timber species such as Teak would fulfil the first three criteria but not the fourth.

Other favourable qualities investors look for are:

- Relatively short rotations (i.e. in the region of 30 years);
- Potential for an intermediate crop, which will help with cash flow (i.e. production thinning); and
- Some degree of natural durability above the ground (this is becoming more important due to consumer resistance to the use of chemicals).

Jolyon Manning commented that some growers are looking to longer rotations, as it produces a more valuable product (in terms of additional heartwood and stronger structural timber). Patrick agreed that there are benefits in a longer rotation, but investors will generally go for the shorter rotation if they can maintain most of the attributes of the timber.

THE ATTRIBUTES OF CYPRESSES

Patrick began this section by posing the question – what is a cypress? He explained that the term is used to refer to the 25 species from the genera Cupressus and Chamaecyparis.

In New Zealand, growers utilise only a selection of these species.

- *Cupressus macrocarpa* (Monterey cypress): Plantings of this species are now restricted to the cooler areas of the South Island, due to cypress canker. Previously it was widely planted;
- *Cupressus lusitanica* (Mexican cypress): This species is planted widely in the North Island, and on warmer, moister, sites in the South Island;
- X *Cupressocyparis leylandii* (Leyland cypress): This cross between *Chamaecyparis nootkatensis* and *Cupressus macrocarpa* has produced a range of hybrids (i.e. Ferndown, Leighton Green and Naylors Blue). They are more vigorous growers than their parents and they generally tolerate a range of sites.

Cypresses have traditionally been planted for shelterbelts and for small farm woodlots. The planting rate has been upto 1,000 hectares per annum, and MAF estimates that there is a national estimate of approximately 20,000 hectares.

Patrick then identified the positive attributes of the cypresses grown in New Zealand:

- The timber has a very good reputation – medium density, good colouring, lustre, machines and finishes well, dimensionally stable and the heartwood is durable above the ground;
- No problems associated with the juvenile wood (i.e. 14 year old Leyland cypress panelling has been produced and is being accepted by the timber industry); and
- Relatively easy to establish and manage (a straightforward process).

At the end of this discussion Patrick commented that cypresses **are not suitable** for pulp and paper production. He saw this as a positive feature, as it encourages the processing industry to see cypress timber as a high value item rather than as fibre.

Cypresses have a distinct role to play in the future development of New Zealand's exotic plantation estate but they should not be seen as a blanket crop. Cypresses will survive on a range of sites but their growth rates vary significantly depending upon soil and climatic conditions. Cypresses need naturally fertile soils and prefer sheltered locations at low to medium altitudes. Consistent soil moisture will also encourage optimal growth.

Another limitation is the occurrence of cypress canker in a number of the species grown in New Zealand. *Cupressus macrocarpa* is particularly prone to this biological threat. It causes branch dieback, stem defects and tree death, particularly when sites are under environmental stress (i.e. during droughts). *Cupressus lusitanica* is generally more resistant to cypress canker but individual trees maybe affected when under stress or after heavy pruning.

THE COST OF PLANTING AND SILVICULTURE

Traditionally the stocking rates have been reasonably high (in a woodlot / plantation situation). This has been to ensure that there are a sufficient number of high quality trees for the final crop. With improved planting stock however (Leyland cypress and the hybrids), the stocking rates, and establishment costs, can be reduced.

Cypresses are a bushy tree, with a large number of branches. This makes them useful for hedges but adds additional costs in a plantation situation. The cost of undertaking intensive silviculture on a cypress block is relatively expensive, compared to plantations of radiata pine. The cost of pruning one metre of stem ranges from $0.80 to $1.20 (the lower figure is for an early pruning regime). This translates into a per hectare cost of approximately $2,400.

The rotation length, on fertile and moist farm sites, has normally been in the 35 to 45 year range. There is scope within the rotation to production thin. Previously production thinning was recommended after year 20. The recent work on younger timber shows that production thinning can take place at a younger age. The determining factor is therefore the diameter of the log.

CYPRESS PLANTINGS IN OTAGO – SOUTHLAND

The region is becoming the final bastion for *Cupressus macrocarpa*, due to the spread of cypress canker throughout the country. Only a few years ago, Canterbury and Marlborough were considered to be the cut off line, but not now. The increasing risks associated with this species are making its future use, in commercial situations, uncertain. The disease is also behaving unexpectedly. The common wisdom was that as trees matured they gained more resistance. This is not necessarily the case. Growers should therefore consider the other cypress species that are available.

Growers in this part of New Zealand have a major advantage, in the fact that City Forests Limited has developed a sizeable cypress resource, and has been undertaking a range of planting trials. The Company will have the necessary volume of timber to establish long-term markets for cypress. Smaller growers will be able to piggy-back upon their marketing efforts. The Company has also shown a willingness to discuss their experiences with current and potential growers.

Patrick suggested that growers in the south should look again at *Cupressus lusitanica*. Historically it has not been seen as a suitable species but the local trials are proving successful. Careful attention needs to be paid to site selection. Patrick also discussed the potential of Leyland cypress (and the hybrids) as a plantation / woodlot option. Until recently they have not been regarded as a plantation species, but the wood property trials being undertaken by Forest Research, show that they can produce very good timber. The timber has the same traits as macrocarpa, except in its colouring. Leyland cypress produces a number of false growth rings, which gives it a distinct character.

Patrick's preference in the south would be Leyland cypress, as long as it can be sourced at a reasonable price. The availability of Leyland stock is increasing, and prices are becoming more competitive. The price issue is why Leyland stock has been used principally in shelterbelts to date (a good, predictable tree, and their stability is similar to other cypresses). The preferred hybrid has been Ferndown.

Nick Ledgard commented on the difference in price between Macrocarpa and Leyland stock. While one thousand Macrocarpa can be purchased for $400.00, the comparable price for Leyland would be in the order of $1,900.00, almost a five fold difference. (Note: *Cupressus lusitanica* – Lismore 1/0 - $500 per thousand and Gwavas 1/0 - $565 per thousand). This cost differential needs to be borne in mind when considering which cypress to plant. Nick noted that the physical establishment costs for Macrocarpa and Leyland are similar.

EUCALYPTS – THE OPPORTUNITIES AND HURDLES

(Ian Nicholas – Forest Research)

INTRODUCTION

There are over 600 species of eucalypts world-wide, of which 160 have been recorded as growing in New Zealand. The species recommended by nurseries, and industry groups, have changed over recent decades, so it is important not to get hung up on the idea that there is a 'species of choice'. Growers should draw on local experience to determine what is appropriate for their locality and climatic conditions.

The eucalypt estate in New Zealand is estimated to be in the vicinity of 40,000 hectares. A substantial proportion of this area is in short rotation fibre crops. The short rotation plantations are located primarily in Southland and the Central North Island.

CURRENT RESEARCH

Forest Research has a number of scientists actively studying the characteristics of eucalypts and investigating their timber properties. They include:

- Errol Hay looking at growth, site, and silviculture conditions;
- Ruth McConnochie examining genetics and tree improvement;
- Russell McKinley researching wood properties; and
- Toni Withers addressing forest health issues.

The funding for this on-going research has come from a variety of sources (Foundation for Research, Science and Technology, NZ Farm Forestry Association, Lotteries Board, AGMARDT etc).

The Institute's eucalypt programme has the objectives of providing growers with appropriate technical support, and encouraging the establishment of a sustainable hardwood industry. The work areas covered by the current research programme are summarised below:

- An inventory of the species grown around New Zealand, and the identification of seed sources;
- Breeding programmes to address the needs of the industry for improved growth, wood quality and health in *Eucalyptus nitens* and *E. fastigata;*
- The development of improved techniques for plantation management. An evaluation of the site and growth conditions of eucalypts in the Stringybark group (*E. muelleriana, E. globoidea*) has been undertaken (along with other selected species, such as *E. pilularis*);
- Research is being undertaken on ways to improve sawing and drying techniques for eucalypt timber, particularly younger timber (i.e. *E. nitens* and *E. fastigata*). The properties of eucalypt sawn timber are also being research;
- The appropriateness of eucalypts for veneers, Laminated Veneer Lumber (LVL) and paper production are being investigated; and
- Work is being undertaken on growth stress and internal checking within eucalypts.

RESEARCH FINDINGS

Eucalyptus nitens

Ian outlined that positive results have been achieved from research into the use of *E. nitens* for veneers and LVL. Forest Research found that veneers of an acceptable quality could be obtained from nitens harvested on relatively short rotations (i.e. rotations less than those of radiata pine). There were no significant problems in slicing the veneer or in the production of LVL. The structural tests on the LVL were encouraging. This means growers could carry out a production thinning, which would be used for veneers. The better trees could then be left to maturity, for sawn timber.

Forest Research has also undertaken wood density trials on *E. nitens*. Sites from Dargaville to Millers Flat were included in the examination. The trials looked at both the affect of latitude and altitude. Overall, the trials found that there is little variation in the density of *E. nitens*, across New Zealand, and at different altitudes. An interesting finding from the study was that fast growth does not necessarily lead to lower density. Another conclusion from the study was that there is generally less checking on cooler sites.

A pruning trial at Avenel Station (Millers Flat) found that the radical pruning of *E. nitens* (at age 3, using a 6 cm gauge) slowed diameter and height growth. The radical treatment lost the trees approximately one year of growth compared to a more conservative pruning regime.

Bio-energy

Forest Research has a research programme covering the full bio-energy value chain from tree planting, and fuel collection through to energy conversion. As part of this programme, trials are underway with different tree species (and locations). The trials are looking at the Mean Annual Increment, per hectare for species upto the age of six years. In Northland, rates of 25 to 40 cubic metres are being achieved, depending upon the quality of the site, while the better sites in Otago and Southland could achieve 20 to 25 cubic metres. Otago and Southland has the advantage of better forest health.

FOREST HEALTH

Eucalypts in New Zealand face a number of biological threats (mainly from insects which have found their way across the Tasman). The rate of new incursions has unfortunately been growing, due to increased trade and passenger flows. On average, we are getting one new incursion every eighteen months. The insects can quickly spread in New Zealand, if their natural predators are absent. One of the early incursions was the Eucalyptus tortoise beetle (*Paropsis charybdis*) which can severely defoliate *E. nitens* and other eucalypt species. More recent incursions include the leaf mining sawfly (*Phylacteophaga froggatti*) which attacks *E. nitens, E. saligna* and *E. botryoides* and the Eucalyptus gall wasp (*Ophelimus* species) which has targeted *E. saligna* and *E. botryoides*. Forest Research has brought in biological control agents, such as *Enoggera nassaui* (a tiny wasp) and *Cleobora mellyi* (a ladybird) which feed on *Paropsis charybdis*.

Forest Research closely monitors the spread of these incursions and the effectiveness of introduced biological control agents. For example, *Enoggera nassaui* has been a successful control agent to date. It is however coming under attack, which is reducing its numbers and ability to control *Paropsis charybdis*.

The stringybarks are considered to be less susceptible to fungal and insect attack. In the trials undertaken by Forest Research they show few signs of major leaf spot disease or significant insect attack. Even with the stringybarks however, growers should expect a degree of pest damage.

SELECTION ISSUES

The preferred planting species have changed over time.

E. saligna and *E. botryoides* were widely planted in the upper North Island during the 1970s, but their susceptibility to biological attack has encouraged growers to look elsewhere for their next generation of plantings. A similar experience occurred with *E. regnans* and *E. delegatensis.* They were planted for pulp and timber production during the 1970s and 80s, but health issues, and the identification of species with better timber properties, has seen growers move into other species.

With the control of *Paropsis charybdis*, large-scale plantings of *E. nitens* were undertaken during the 1990s and into this century. The plantings (estimated at 20,000 hectares) are for short rotation pulp production. Nitens also have potential for veneers and timber production, although there are issues with drying.

E. fastigata and the stringybarks (*E. youmanii, E. blaxandii, E. muelleriana, E. globoidea*) are the current species favoured for planting. Although they are generally considered to suit warmer sites, a number of them can cope with frosts. There are fewer problems in sawing and drying these species and they are relatively healthy. The stringybarks are not as vigorous in their growth as the nitens but their wood quality is better.

Ian was asked why growers in New Zealand should be looking at eucalypts when there is a huge resource in Australia and other countries. The eucalypt species offer growers an economic alternative when they are considering planting options. The logs produced from eucalypt plantings are used in a range of timber products, including high value items. Paul Millen commented that Australia is a net importer of eucalypt hardwoods.

EUCALYPT ACTION GROUP – NATIONAL EVALUATION PROJECT

The Eucalypt Action Group has secured funding from the Sustainable Farming Fund, to evaluate a range of eucalypt species, and their ability to cope with the climatic variations across New Zealand. 100 sites will be planted, and the Action Group is looking for landowners, who would be willing to participate in the project. The trial blocks will have 150 trees, made up of 10 eucalypt species (mainly stringybarks). The landowners will be required to undertake the site preparation, and cover the cost of the seedlings. Interested landowners can contact Angus Gordon (Main Road South, RD 3, Taihape, (06) 388-1571, angusg@xtra.co.nz).

SEQUOIADENDRON GIGANTEUM (GIANT REDWOOD)

(Phil De La Mare – Ernslaw One Limited)

INTRODUCTION

In this presentation, Phil De La Mare, examined the properties of *Sequoiadendron giganteum*, how it should be managed (in a plantation setting) and what opportunities there are for this species to become a significant component of New Zealand's forestry estate.

A DESCRIPTION OF THE SPECIES

The species has a limited natural estate. It is found only in isolated groves along the western foothills of the Sierra Nevada range in California. The total natural area is approximately 14,000 hectares (distributed across 75 groves). The species has been grown in Europe since 1853, and is popular as an ornamental tree. In New Zealand, it has been used as a specimen tree and in small shelter belts. There are very few examples of this species grown in a plantation or woodlot setting.

The Giant Redwood has a thick bark, heavy taper and cords of foliage similar to rimu. In contrast, Coast Redwood (*Sequoia sempervirens*) has a less tapered stem and foliage more like miro. The Giant Redwood grows in areas with precipitation of 900 to 1,400 mm, of which half is winter snow. It copes with an extreme of temperatures, from 24 to 29 degrees Celsius in summer to minus 24 degrees in winter.

The species prefers sandy loam soils, and performs poorly in heavy, wet soils. The Giant Redwood is normally found with other timber species (i.e. it grows with ponderosa and sugar pine at all elevations). The major groves in the United States are found at elevations between 850 and 2,700 metres (8,860 feet). In the New Zealand environment, its upper limit will be determined by the degree of exposure, rather than elevation.

The species experiences rapid juvenile growth and will grow to a great age, of upto 2,000 years. Stump counts on some of the trees harvested in the nineteenth and twentieth century show that specimens have attained an age of 3,000 to 3,200 years. Trees can grow upto 90 metres in height and have a trunk of 10 metres. Mature specimens can contain upto 1,000 cubic metres of timber. The species does not produce stump sprouts as readily as Coast Redwood, and it develops a resistance to fire, due to its thick, non-resinous fibrous bark, and elevated crowns.

SILVICULTURE

The silviculture regime for *Sequoiadendron giganteum* is not fully known.

The Beaumont trial was planted at 333 stems per hectare (5 * 6 metres), and was inter-planted with larch. The pre-plant line was sprayed. This was followed by spot spraying and hand releasing in subsequent years. This produced a 100% survival rate at year two. Three years after planting, fertiliser was applied to the trial block. Form pruning of double leaders was undertaken at year seven. Nine years after planting, 30% of the Larch were thinned to waste, to favour the Redwoods. Sixteen years after planting, the remaining Larch fillers were thinned to waste, and the Redwoods were pruned to two metres. The block was production thinned in 2003, when the stand was aged 23 years. Phil recommended that all lower branches be pruned if clear wood is the objective.

CLEAR WOOD AND FLUTTING

The trial results showed that pruned stubs will occlude in most cases. Where the occlusion is incomplete, there does not appear to be any risk of infection via the pruning wound. Fluting is a genetic characteristic of the species, and shows up particularly in the first metre of the butt log. The depth of fluting is related to the diameter of the log (i.e. the larger the log, the deeper the fluting). Some trees in the trial had bad heart rot, which was related to the deep fluting. The deep flutes allow water and infection to penetrate the heartwood and facilitate rotting. In the worst cases, one metre of the butt log had to be removed.

TIMBER UTILISATION

In the United States there is little history of utilising the Giant Redwood. There is a common misconception that the wood is too weak and brittle for commercial utilisation. Recent testing in the US and Germany shows that young growth (<60 years) is superior to young Coast Redwood in most ways, but as the trees grow older, the quality of the Coast Redwood exceeds the Giant Redwood. The early superiority is in static bending.

In New Zealand, the timber industry has little experience in using the Giant Redwood. This is due to the limited resource within the country. Phil showed an example of a Wanaka house that was clad in locally grown Giant Redwood. This demonstrates that the heartwood can be used for rusticated weatherboard. Both sap and heartwood can be used for interior T&G work. The timber does not require chemical treatment. The absence of chemical treatment would open a number of export markets, particularly to the United States (i.e. the ‘green housing’ movement).

The timber cut to date (from the Beaumont trail) has been used in panelling. The timber is not particularly strong, and the industry would need to work with councils, and building inspectors, to determine where it could be used. The issue of using non-treated timber would also have to be addressed with councils, and the building industry.

TIMBER PROPERTIES

The heartwood is clear on first exposure to the air. It then deepens through pink to red. It accepts oil readily, which enhances the colour (going red-brown). The heart-sap boundary is distinguished by a spotty brown line. The colouring is not as deep as Coast Redwood.

A production thinning was undertaken at the Beaumont trial in 2003. The timber from the harvest was only 23 years old but it appears to be very stable, once it has been through the drying process. The manager of the mill which processed the timber cautioned that extreme care needs to be taken with drying timber of this age. Unless it is stacked correctly, it can warp and twist. The timber is low strength, but very suitable for appearance grade uses. It is also easy to use and non-resinous.

THE BEAUMONT PROVENANCE TRIAL

Phil explained that the Forest Service (and the Forest Research Institute) established five trail sites in 1977 (Hanmer, Craigieburn, Geraldine, Rai and Beaumont). The trials were established to test the performance of *Sequoiadendron giganteum* in a plantation situation.

The Beaumont trial block covers 1.19 hectares and is located at an elevation of 46 metres. The site was planted in September 1977. Eight US provenances were used (Black Mountain, Giant Forest, McKinley, Mountain Home, Wheel Meadow, Whitaker / Redwood Mountain, Nelder and North Calaveras), plus one New Zealand source (Raincliff). The management regime for the trial was described previously, in the silviculture section.

At age 26, the DBH of the provenances ranged between 40 and 60 cm, with the Raincliff trees being the least successful, at 42.5 cm. The Raincliff trees also had the lowest average height at 12.7 metres, while the US provenances ranged between 14.0 and 17.3 metres. The Nelder and North Calaveras provenances were the best performers.

HEARTWOOD FORMATION

The heart / sapwood percentage varies with the provenance. The US provenances have approximately 7 to 9 rings of sapwood. The Nelder provenance had the lowest number of sapwood rings, and consequently the highest proportion of heartwood. The heartwood is naturally durable. Durability appears to be related to age and maybe compromised in rapidly grown trees.

SEED SOURCE

Ernslaw One collected four kilograms of seed from the Beaumont stand in the past year, of which two kilograms has been exported to California.

FUTURE OF THE SPECIES IN NEW ZEALAND

Interest has been generated in the species by Professor Bill Libby, of Berkeley University (California). He has been encouraging investors to look at the species as a plantation option. The

Giant Redwood has the advantage that it can tolerate harsh sites (with climatic extremes). This ability to cope with frosting, and even extended periods of snow, gives it a distinct advantage over the Coast Redwood for inland South Island sites. The Coast Redwood planted at Beaumont was badly frosted. Coast Redwood is more suited to the North Island and the upper South Island.

THE MARKETING PROSPECTS FOR SPECIAL PURPOSE SPECIES

(Paul Millen – Millen & Associates Ltd)

INTRODUCTION

Growers of special purpose species have focused on the production of high quality timber, and have neglected the issue of market development, and the building of consumer demand. Unless there is consumer demand for these species, the returns are likely to be disappointing. The markets for these species need to be identified, and growers need to brand their production (i.e. promote its unique characteristics). Only in this way will growers receive an adequate return for their production. With increasing consumer demand there will also be encouragement for additional planting.

MARKET OPPOTUNITIES

Paul examined the level of sawn timber imports, and the opportunities to replace overseas sourced timber, with local production. In the year ending December 2003, $24.4 million of softwoods, and $20.98 million of hardwoods, were imported into New Zealand (preliminary figures).

Western red cedar has been the principal softwood species imported over recent decades ($23.2 million in the December 2003 year). Small quantities of Redwood and Oregon pine are also imported (normally less than $1 million per annum). On the hardwood side, New Zealand imports small, but significant quantities of eucalypt ($3.4 million in the December 2003 year) and Oak ($3.1 million). Imports of tropical hardwoods currently stand at $5.4 million (December 2003). The level of tropical hardwood imports has fallen since the 1980s.

This demand for special purpose timbers can not be met by New Zealand's indigenous timbers. The production of indigenous sawn timber has been falling for a number of decades, and is now a relatively small industry. This means growers of exotic softwoods and hardwoods have a significant market opportunity. They can target their production at the manufacturers and processors who are currently utilising overseas sources of timber.

Paul commented briefly on overseas market opportunities. There has been limited research on the opportunities for exporting special purpose species. This has been due to the lack of supply, and the requirements of overseas markets (i.e. assurances on supplying set quantities and grades each quarter).

THE TIMBER PRODUCT

Growers should be looking at the characteristics of each species, and determining which have the solid wood properties that will produce high quality timber. Paul outlined what are the wood properties growers should be focusing upon:

- Natural durability to weathering and decay;
- Density and hardness;
- The potential for using preservative treatments;
- Moisture content; and
- Shrinkage.

Paul went on to explain that the management system you adopt for your plantation will be reflected in the grades of timber that are produced, at the time of harvesting. A more highly managed block will produce a greater volume of clear wood, which can be used in flooring, panelling and visual timber products. In contrast, blocks with less intensive management systems will produce more wood in the structural framing grades. The difference in volume may not be significant, but the price differential certainly is. Paul posed the question:

> "Where does your timber fit in these classifications?"

As part of this discussion, Paul emphasised the issue of timber sustainability. Increasingly consumers are focusing upon the source of their timber products. Customers (in developed nations) are expecting their timber products to be sourced from renewable plantations.

PROMOTION AND BRANDING

Branding is required to encourage consumers to utilise the higher quality timbers grown in New Zealand.

> "Brands add value through providing consumer recognition of a particular product."

The published research indicates that consumers will normally go to the branded product first, even if it is more expensive. The industry should therefore consider brand names for the species which we are growing. The names would reflect specific attributes of the timber, and may have a link to other timber products.

APPROPRIATE SITING OF BLOCKS

With small volumes of timber, handling and transportation costs take on a high priority. Growers need to recognise this, and locate their blocks accordingly. The optimal forest location is one with productive land, good access to transportation links, and which is close to processing facilities. This will minimise the burden of transport costs.

VINEYARD TIMBERS LIMITED

Paul established Vineyard Timbers Ltd in response to concerns over CCA treated radiata pine and the low strength of this product. Breakage rates of 5 to 10% were being recorded annually. There were also issues concerning the disposal of treated posts.

The options were alternative wood treatments, non-timber posts or naturally durable posts. Vineyard Timbers Ltd has gone for naturally durable posts. Eucalypts are at the top of their list of preferred species. Paul considers that there is significant potential for posts from the horticultural and viticultural sectors.

NOTHOFAGUS AS A PLANTATION SPECIES

(Graham Milligan – Milligan Nurseries and
Parnell Trost – Ministry of Agriculture and Forestry)

INTRODUCTION

This presentation examined why landowners should look seriously at New Zealand beech as a planting option, particularly silver beech (*Nothofagus menziesii*) and red beech *(Nothofagus fusca*). The discussion emphasised the properties of the timber; how the beech species are responsive to intensive management and the fact that they can tolerate a range of climatic and soil conditions.

THE TIMBER PROPERTIES OF THE MAJOR BEECH SPECIES

Silver Beech (*Nothofagus menziesii)*
Silver beech has a fine, even texture, and the timber seasons evenly. It is excellent for machining and turning. Cabinet makers appreciate the fact that it stains and glues well. It has natural toughness and good bending properties. On the downside, it has a wide variation in colour and low ground durability.

The timber is used for flooring, furniture, interior finishing and food contact items.

Red Beech (*Nothofagus fusca*)
Red beech produces a strong, even textured timber. It has good machining, finishing and turning properties. The timber takes stains and paints well. It is also ground durable. The timber is difficult to dry, but once it is dry, it is one of the most stable timbers in New Zealand.

To date, the timber has been used for flooring, furniture and panelling.

Black Beech (*Nothofagus solandri*)
Black beech has a fine even texture, and is valued for its good sanding and finishing properties. Once dry, it is reasonably stable. The sapwood has good turning and bending qualities. The Heartwood is moderately durable.

The timber is normally used in furniture and flooring. The sapwood is used for dowels and brush backs.

A VERSATILE TIMBER USED IN HIGH VALUE END PRODUCTS

Parnell provided a brief overview of the products produced from New Zealand beech and their principal markets.

With the decline in the availability of rimu, there has been a greater focus upon beech for furniture production. The timber is gaining a strong reputation in the New Zealand market, with a number of firms specialising in beech products. There is also a growing international market for beech furniture, particularly in North America and Europe.

The inherent qualities of beech have encouraged architects and builders to use it for stained flooring and panelling. It is sold both domestically and on the Australian market.

The bending qualities, and toughness, of Silver beech have made it the preferred timber for items such as spinning wheels and weaving looms. The timber is used by Ashford Handicrafts, which has been producing spinning wheels for 70 years, and has a world-wide export market.

Silver beech is also used extensively in food contact products, such as skewers, coffee stirrers and ice cream sticks. In addition to this, it used for a number of medical items (i.e. tongue depressors). The advantage of silver beech, over other timbers, is the fact that it does not transfer a residue taste to food items, or patients.

Finally, the New Zealand beech species are used for the production of veneers, mouldings, and laminated boards.

RESPONSIVE TO INTENSIVE MANAGEMENT

Parnell outlined that with intensive management, and appropriate site selection, rotations of between 50 and 80 years are attainable. On reasonably good sites, black and mountain beech can reach stem diameters of 50 cm within 50 years. For red beech an average stem diameter of 50 cm can be reached in a 60 year rotation, while for silver beech, the timeframe would be closer to 80 years.

With intensive management the health of beech blocks will be significantly improved (i.e. a lower incidence of insect damage) and there will be a higher proportion of defect-free logs. Early thinning regimes are likely to promote stability against wind and snow damage.

Potential Management Regime

First Thinning:	When self-pruning starts. The trees are usually four to six metres. The thinning rate will depend upon site conditions and the management regime.
Pruning:	Pruning is normally undertaken a year after thinning. Care needs to be taken not to damage the bark of the tree due to potential for disease or insect attack.
Later Thinnings:	The timing will be based on spacing and form. To achieve maximum growth, thinnings should be sufficiently heavy and frequent so the crowns of adjacent trees just touch each other.

TOLERATES A RANGE OF SOIL & CLIMATIC CONDITIONS

Parnell briefly reviewed the site and climatic requirements for growing native beech.

Red Beech
The most site demanding of the New Zealand beech species. It grows on lower and mid altitude slopes, rarely reaching the timberline. It is generally restricted to relatively deep and fertile soils, which are well drained.

Mountain Beech
Generally found at higher altitudes and in the drier (eastern) regions. Tolerates poorly drained and infertile soils.

Silver Beech
Normally grows at higher altitudes, but descends to almost sea-level in the far south. It is usually a component of the wetter beech forests. It has some tolerance for poorly drained and infertile soils.

Hard Beech
Restricted to lower-altitude sites. Will grow on poorer and more drought-prone soils. It has limited tolerance to low temperatures.

Black Beech
Also restricted to lower altitudes. Likely to form pure stands on ridges and spurs, especially in drier, eastern areas.

Silver and mountain beech handle difficult sites more effectively than the other beech species but they are prone to competition on more fertile sites. Red, hard and black beech are better competitors but they are less tolerant of difficult environments.

ALTERNATIVE SPECIES – A PRAGMATIC VIEWPOINT

(Nick Ledgard – Forest Research)

USING TREES ON FARMS

When landowners consider commercial tree planting, they are often surprised to find that we actually have a wide range of choices in New Zealand. Radiata pine is only one of a number of options, and not necessarily the most productive. From the discussion today, we have identified several timber species with high rates of growth and which yield timber worth significantly more than that of radiata.

When growers are considering new plantings, it is important to research what grows well in New Zealand, rather than simply relying upon species with solid overseas reputations. A number of off-shore species, with strong reputations, have not done well in New Zealand. Conversely, a number of poorly performing international species have thrived in the New Zealand environment.

High value species need good marketing arrangements to ensure that growers receive an adequate return. This is the biggest challenge, particularly as we are talking about developing interest in species that may not come onto the market for 3 or 4 decades.

A key element in developing market demand is being able to provide a reliable quantity, and quality, of timber. This can only be achieved if there is a sufficient supply of timber (i.e. a sufficient critical mass of plantings). Nick recalled that in 1981 the Forest Service held a seminar series which was aimed at determining what were the most likely alternative options to radiata pine. The Forest Service intended to develop viable estates of these alternative species. Ten to fifteen percent of their yearly planting would be in alternative species. This policy came to an end with corporatisation.

EUCALYPTS

Eucalypts are an exciting, fast growing species that offer significant potential. They do however have a number of problems, with health issues being at the top of the list. The current work being undertaken by Forest Research is identifying a number of new species for planting, and it is producing positive results on the use of nitens, particular the ability to use juvenile wood for veneers and LVL.

GIANT REDWOOD

The Giant Redwood has potential, particularly here in the south. The intensive management of the Beaumont trial (and the careful recording of the results) provides a valuable source of information

on how to handle this species. Nick supported the pruning experiments in the block, as this has provided valuable information on the behaviour of the species.

To encourage more planting of this species, it is important to get the information out to the growing public.

MARKETING

Nick agreed with the need to focus on marketing but had reservations about the co-operative approach. Very few of the co-operatives set up over recent decades are still in existence. They tend to struggle.

Nick supported Paul's comments on natural durability and stressed that it will become more of an issue overtime.

NATIVE BEECH

The majority of forest owners would like to grow more native trees. The problem is our investment and generational timeframes. Our current investment perspectives are relatively short term. They do not encompass a rotation of 50 to 80 years. There is also the critical issue of marketing the timber to obtain a sufficient return, for this extended investment term.

CYPRESSES

Nick disagreed with Patrick's opening statement. He considers that there is a consensus on the future role of cypresses. Out of the species examined during the workshop, the cypresses are probably the best bet, in terms of a comparatively quick growing species, that provides high value timber for a range of end uses. This is particularly true for Leyland cypress and the hybrids, due to their more vigorous growth and ability to tolerate a range of sites. Nick recalled a comment by Denis Hocking, that his only regret is not planting more cypresses in his youth, or encouraging his father to grow more.