

GUEST EDITORIAL

REFLECTIONS OF A FOREST GIANT

Lindsay Poole C.B.E. can quite rightly be referred to as "the grand old man" of New Zealand forestry. What's more, at the age of 94 his opinions are still as accurate and trenchant as ever. Born in 1908 on the East Coast of the North Island Lindsay obtained his forestry degree from the now defunct Auckland University School of Forestry. With the depression looming he spent the next 6 years as a "labourer" in the Forest Service which included having to manage a nursery in Kaingaroa and shooting deer in the Ureweras. Joining the Botany Division of DSIR in 1937 it was only a few years before he found himself overseas with the 15th Forestry Company. For most of the next 6 years he was Scientific Liaison Officer with the DSIR in London doing work relating to forestry and agriculture in Britain and Germany. Returning in 1946 he attended Victoria University where began his lifelong study of beech. By 1949 he was Director of the Botany Division of DSIR, moving back to the Forest Service as Assistant Director in 1951. From 1961 to 1971 he was Director General of the Forest Service and upon retirement, Chairman of the Soil Conservation and Rivers Control Council until his second retirement in 1978. Since then golf, gardening and writing have kept him occupied.

I write these notes with a pen, the body of which, is fashioned out of kauri wood. And I have just read "Sustainable management of New Zealand's indigenous forests: the sorry record of government mismanagement", by Ian Barton in the Proceedings of the Launch of Tane's Tree Trust –held at Waharau Regional Park on 8 September 2001.

In another paper in the Proceedings, Maggie Lawton spelt out clearly the "Vision and Objectives" of the Trust. Many important matters are dealt with. In my experience two stand out clearly. First, education of the wider community so that the place of indigenous forestry is better understood and, secondly, the pressing need to resolve the legal and political obstacles serving as disincentive to the planting of indigenous trees.

While attending the Probus Rendezvous 2002 in Auckland, Ian Barton took my wife and I to see kauri investigation work he is involved with in the Hunua Ranges, South Auckland. The day was of very great interest to me because of the investigations being carried out and because it was in this area 70 years ago, while studying for the forestry degree at Auckland University, we used to visit a kauri forest area owned by Rudolf Hohneck. He was busy converting cutover forest, still containing much kauri regeneration, occasional very old kauri trees, tanekaha and other species that could be used, into a sustainable forest. So here was the beginning of actual sustainable kauri management.

With this example and extensive cut-over areas of kauri forest throughout the north of the North Island it was inevitable that the newly formed Forest Service became engaged in the investigations that would lead to sustainable yield kauri management. Specialist officers were appointed to investigate the whole potential. Kauri tree seedlings were raised in quantity and cut-over forest was experimented with, in places on a large scale.

Then came the obliteration of the Forest Service, in the 1980's and 90's, and with it kauri investigations by the government ceased. Potential sustainable-yielding kauri forest can now only be seen in untouchable reserves. In fact the Government that sold the State Plantation cutting rights (Sale of the Century), specifically omitting management practices, completely undermined the matter of sustainable yields.

This has been a great long term loss to New Zealand as a whole. Unfortunately it has been repeated in the wonderful glacial-terrace uneven aged rimu forests of the West Coast. Several times schemes were submitted to Governments for the sustained yield, permanent management of these forests but there has never been permanent acceptance of them. The remains of what could have been continuing, sustainable wealth to the West Coast, and a continuing attraction to travellers are now bogs.

The same political manipulation of casting aside the potential for sustainable yield in Southern Beech (*Nothofagus*) forests is underway. The remaining beech forests are extensive-mainly in the South Island- and they are being little cut because the 'hardwood' they yield is not in demand like the 'softwood' yielded by conifers. However in time their wood will be sought in quantity, partly for power as populations expand and put increasing pressure on power sources.

Southern beeches, with three to four years between flowering –followed by tremendous seeding, are easy forests to manage for sustained yields but, as with kauri and rimu, they get nowhere with stop-go planning. What we must not have, under any circumstances, is clearfelling without regeneration and sustainability of production –and some governments could plan this given an urgent need for wood supplies. And this world-wide demand will come sooner or later.

New Zealand urgently needs the spread and basic thrust of the concepts of Tane's Tree Trust.

Lindsay Poole

BOOKS BY LINDSAY POOLE

- Tomorrows Trees L Poole & J Johns Caxton Press. 1992. *An illustrated history of New Zealand forestry*
- Trees, Timber & Tranquility L Poole. Monigatti Publishing. 1998 *An autobiography with comments on forestry*

TRUST ACTIVITIES June to November 2002.

Workshops and meetings:

The Trust was present at the Mystery Creek Field days and met many people who showed great interest in what we are trying to do. In October we were involved in a successful workshop at New Plymouth where the subject was how the Council should manage its planted kauri groves, some of which are now over 60 years old. We also took the opportunity to explain the Trust and encouraged people to join. In November a Whangarei workshop allowed David Bergin to speak about his totara research while others dealt with kauri and other native timber species.

Funding:

The Sustainable Farming Fund grant is being used for several purposes. Some has gone toward communicating information to interested people: - at the Trust launch in September 2001, at Mystery Creek and workshops in Tairua, New Plymouth and Whangarei. Another activity has been the rejuvenation of two trial areas in the Hunua Ranges. This work is well underway and is scheduled to be completed this summer. A preliminary report is included in this Newsletter on one of these projects - a trial of kauri and several potential nurse species which was established in the mid 1970's.

Submissions and Meetings:

Recently the Franklin District Council called for submissions on its proposed rural plan change. Because one of the ideas put forward was favourable to indigenous forestry, in one part of the District, we submitted that the Council should allow this clause over the whole District. The clause reads: - "Encourage indigenous forestry ventures and sustainable farm forestry in appropriate locations." The Trust believes that this is a very forward looking proposal and deserves support. When the opportunity

Subcommittees:

The trust has set up four subcommittees which, apart from the Science Committee, have not yet begun work. The committees are: -

Science:	B Burns (Convenor) D Bergin, W Silvester, M Dodd, G Steward
Publicity:	J Kneebone (Convenor), R MacGibbon, R McGowan
Funding:	P Berg (Convenor), I Barton, J Kneebone,
Policy/Advocacy:	M Lawton (Convenor), M Dean, M McAlonan

The Trust invites financial members of Tane's Tree Trust network to join any of these sub-committees. If you would like to play a greater role in Trust activities, and especially if you have skills in any of the above areas, we would welcome you. Please contact Ian Barton if you are interested.

Communications:

Work is well advanced in the setting up of the Tane's Tree Trust web-site. The site is being designed at present and if all goes according to plan it should be operating before the end of the year.

Greg Steward has started work to set up a data base on which to record data from the planting questionnaires that many of you have filled in.

Trust Chairman:

In July Ian Barton was elected as Trust Chairman. This is only intended to be for a short time as he would prefer that someone else took over so he can concentrate on the day to day running of the Trust.

Membership:

As at 15 November the membership of Tane's Tree Trust network is 74. Of these 9 are corporate members.

While in the South Island in September Ian Barton took advantage of the opportunity to speak about it at a lunchtime meeting at the School of Forestry. This meeting was attended by the Council of the Institute of Forestry as well as university staff and students and Farm foresters. Then In Nelson he spoke about the Trust and Kauri research at Tasman District Council in Richmond. This meeting was attended by Council staff, Farm Foresters and Tree Croppers.

The Trust will eventually publish data from both of these trials, We are currently seeking funding in order to cover the basic costs of running the Trust for the next two years. As you may know this is a difficult proposition because most funding agencies will not support wages and organisational running costs. If anyone can make suggestions in this area we would like to hear from you. Our Science subcommittee is working on the first establishment project that we hope to set up next year. When they have completed their proposal we will be approaching a major sponsor for funding.

arises, other Councils will be encouraged to follow suit.

In July Maggie Lawton and Ian Barton had a second meeting with the Hon Pete Hodgson. We talked at some length with him and Climate Change officials about the great potential of indigenous forestry to sequester carbon. Further meetings with this Minister and others are planned.

UPCOMING ACTIVITIES

Legal and Taxation Seminars Funding has been obtained to run three one day seminars on this very important topic. There will be a panel of expert speakers at each meeting to introduce the topics, and it is proposed to include plenty of time for all attendees to participate in discussion. The aim will be to devise the best way to ensure that people who plant indigenous trees for timber are treated in the same way as those who plant *P. radiata*. There will be a small charge –about \$15.00

Proposed dates are: Hamilton February 18th
 Christchurch February 20th
 Wellington February 26th

Would anyone who wishes to attend any of these please register their interest with Ian Barton. He will send out full details when they are finalised.

Trust A.G.M

This, the inaugural A.G.M, will be held in Hamilton on Saturday 7 June 2003 commencing at 1 pm. All members of the Trust Network are invited to attend and take part. Time will be allowed to discuss issues such as future research directions, funding, information transfer etc. A full agenda will be sent to all financial members of the Trust and representatives from allied organizations in May. It is possible that a native tree seminar or workshop will be held in conjunction with the A.G.M.

RESULTS FROM A KAURI NURSE EXPERIMENT. Ian Barton & Greg Steward (Scientist, Forest Research)

Part of Tane's Tree Trust's Sustainable Farming Fund grant from the Ministry of Agriculture and Forestry has been spent on re-instating a trial established on Auckland Regional Council (ARC) land in the Hunua Ranges from 1974. The intent of the trial was to plant a range of species which might give protection and nurture (nurse crop) to kauri seedlings through their first few years. Despite the trial receiving little maintenance during the mid 1980's, a great deal has been learnt and there is potential for much more information to be extracted.

The plots were 12 x 12 metres and 36 nurse plants were planted in each at 2 metre spacings. Two or three years after the nurse was planted 25 kauri

seedlings, also at 2 metre spacings, were planted between the nurse species. A total of 12 different nurse species were planted as well as some control plots with kauri only. The numbers of plots planted with each nurse ranged between 2 and 9. Some of the nurse plants failed and were not planted with kauri.

The plots have been re-pegged and the lines between them cut open with the assistance of ARC staff.. Measurements have now been taken of all remaining kauri and the surviving nurse plants. Results so far are mostly predictable with only one or two unexpected results. The survival and height growth of kauri under the different nurse plants is as follows: -

SURVIVAL AND GROWTH OF KAURI IN RELATION TO NURSE PLANTS

Best survival: -

Acacia melanoxylon / Pinus elliottii	71%
Alnus incana	64%
Pinus elliottii	58
Acacia melanoxylon	55%
Control	46%

Poorest survival: -

Pinus radiata	25%
Kanuka (<i>Kunzia ericoides</i>)	40%
Alnus glutinosa	42%

Best height growth: -

Control (open planting)	5.0 m.
Alnus incana	4.3 m.
Robinia pseudoacacia	4.2 m.
Alnus glutinosa	4.1 m.
Pinus elliottii	4.0 m.
Acacia melanoxylon	3.5 m.

Poorest height growth: -

Pinus radiata	1.7 m.
Kanuka	2.8 m.
Acacia melanoxylon / Pinus elliottii	2.9 m.

The best survival rates generally occurred in those treatments where nurse plants supplied nitrogen or mycorrhizal effect or both. Poorest survival is in the *P radiata* plots and, surprisingly, the kanuka plots. Overall survival was not as high as might be expected but this is probably due to the lack of care the trial received from 1986 onwards. The low survival under *P radiata* can be attributed to the very dense pine canopy in earlier years and, although light levels were

high enough over the past 10 to 15 years, low soil moisture levels probably caused some mortality. Similar reasons may apply to the unexpectedly poor survival of kauri under kanuka; ie, light levels too low and soil too dry.

There is a fairly high negative correlation between survival of the nurse plants and kauri height (**see figure**). It appears that the natural mortality of nurse plants increased light levels and improved kauri

growth rates. It is also noticeable that the best growth has usually occurred in those plots with N fixing nurse species. However the control plots (planted in the open without a nurse) have the tallest kauri. This seems to be attributable to the control plots being for the most part surrounded by plots with nurse plants.

REGENERATION

The trial was established in open pasture with some blackberry, more or less surrounded by dense, slender kanuka between 5 and 15 metres tall. *Cyathea dealbata* formed an understorey to the kanuka. A record of all invasive plants (plants that were not present when the experiment began and which have establish since –both exotic and indigenous) present on each plot, and their frequency was made. A total of 55 invasive species were recorded, 46 indigenous and 9 exotic. Of the 61 plots examined 22 (36%) had no exotic weeds. The most pervasive weed was blackberry which occurred on 41% of the plots, followed by *Acacia* suckers (25%) and *Robinia* suckers (16%). Other weeds were *Cotoneaster* spp (8%), Japanese honeysuckle (7%), Himalayan honeysuckle (5%), grass (3%) and pampas grass and foxglove both 2%. Forty six invasive native species were recorded. Of these only three –kanuka, *Cyathea dealbata* and kahikatea were recorded as being on or adjacent to the area in 1974.

In 2002 the commonest species recorded were: -

<i>Coprosma grandifolia</i>	(kanono)	92% of plots
<i>Geniostoma ligustrifolium</i>	(hangehange)	89
<i>Cyathea dealbata</i>	(silver ponga)	87
<i>Coprosma lucida</i>	(karamu)	61
<i>Schefflera digitata</i>	(patete)	56
<i>Meliccytus ramiflorus</i>	(mahoe)	49
<i>Myrsine australis</i>	(mapou)	46
<i>Blechnum capense</i>	(kiokio)	44
<i>Cyathea medullaris</i>	(mamaku)	43

There is a surprisingly high stocking of indigenous timber tree seedlings in the plots, with 9 species recorded. There are 91 stems per hectare present of which kahikatea make up 71 (78%). The *Acacia* plots

These would have provided important side shelter from wind while allowing the kauri to grow in full light. Another possible effect is the invasion of control plots by *Acacia* roots (and possibly other N fixing plants) which could have provided the kauri in these plots with nitrogen but not much competition.

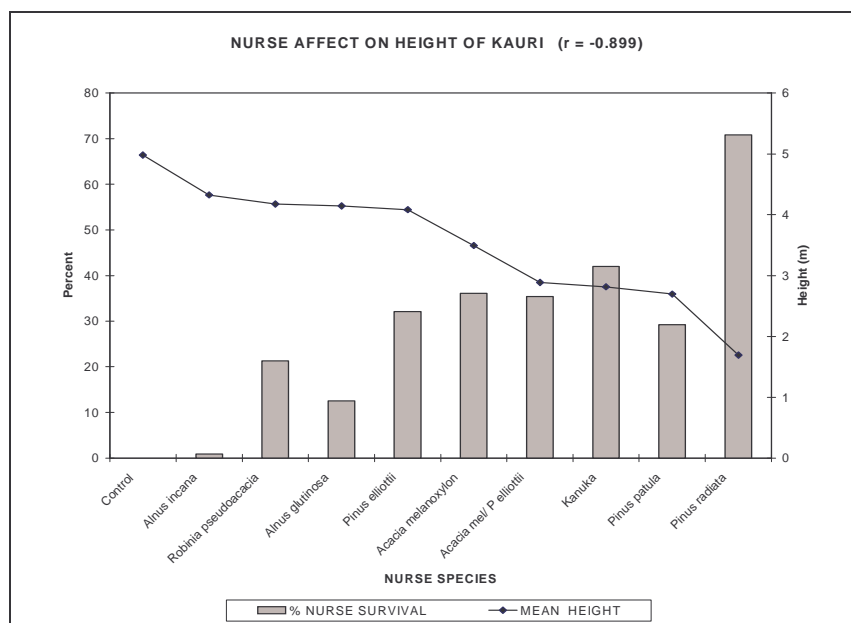
have the highest number of seedlings (43). Seedlings have established on all but one of the nine *Acacia* plots, but by comparison only one of the six *P radiata* plots was recorded containing a seedling. Kanuka, with only three seedlings does not appear to be as effective in allowing regeneration to become established as *Acacia*.

There are two possible reasons why *Acacia* provides a good regeneration site. First it might be preferred as a bird roosting tree and secondly the ground conditions, being relatively moist with open litter, may be the most conducive to germination and survival. In comparison *P. radiata* plots typically have a litter layer comprised almost exclusively of dry pine needles some 5 cm thick. For newly germinating native seedlings this pine litter is difficult to penetrate with fibrous root systems and during dry summer months seedlings become desiccated.

Most of the seedlings are in the 10 to 30 cm height range, but some kahikatea reach almost two metres.

That nine different species and a stocking of almost 100 seedlings per hectare has taken only 28 years to establish is encouraging. It indicates that, providing seed sources are available, some nurse species are conducive to natural regeneration becoming established quite early.

The future management of this trial, including the options for removal of the now large *P. radiata* nurse is currently being discussed with the Auckland Regional Council.



TIMBER TREES OF THE FUTURE

This will be a regular section in the newsletter, in which we will examine the [timber] potential of some of our lesser known native timber trees.

POHUTUKAWA (*Metrosideros excelsa*)

HISTORY

To the Maori pohutukawa is a sacred tree, for it is from the ancient trees on the cliffs at Te Reinga that the spirits of the dead left this land. Legend tells us that the red of the flowers comes from the blood of the mythical hero Tawhaki, who fell to his death from the sky. The Maori made some use of the wood of pohutukawa; mainly for small implements, paddles and mauls.

When Europeans first arrived in New Zealand they found pohutukawa reaching from Cape Reinga south to Poverty Bay and Urenui and on the shores of the Rotorua lakes. It has now been planted over most of New Zealand, mainly in areas close to the sea, with the oldest planted trees being at least 150 years old. (Burstall & Sale)

Early Europeans used pohutukawa extensively for the curved members of boat frames and its numbers were greatly reduced in areas adjacent to boat building yards. Because it was so hard it was usually worked green which often led to problems later on (Clifton). When straight lengths could be obtained it was used for piles, stringers, bridge & wharf planking and mining timbers.

It is probably in areas of tradition and nostalgia that pohutukawa plays the greatest role in our lives today for images of the tree appear in photographs, paintings and Christmas cards. It is found in plays, poems and literature and even the titles of Mills & Boon novels (Project Crimson).

TREE SIZE

Burstall and Sale (1984) contains records of many large pohutukawa. Some of these are listed below (all measurements in metres): -

	Trunk diameter	Height	Crown diameter
Mangonui	3.24	18	36.5
Tiritiri Matangi	3.20	25	52
Mayor Island	3.22	17.4	36.5
Te Araroa	6.46	20.3	40.3
Lower Hutt	2.40	14.6	15 [planted ca. 1860]
New Plymouth	2.27	20.2	19.1 [planted 1874]

TIMBER

The wood is a rich reddish brown in colour, heavy, compact and of great strength. It is reputed to be durable and resistant to the marine worm, teredo. As already indicated it is easier to work when green but often shrinks later. (Clifton)

The major problem with the timber is that the growth habit of the tree makes it almost impossible to obtain long, straight pieces.

While there appears to be no published data on the timber properties of pohutukawa, details for northern rata do exist. Pohutukawa's timber is expected to be similar –see table below. (As a comparison, figures in brackets are for *P. radiata*)

Density:	880 kg/m	(500 kg/m ³)
Moisture content:	70%	(130%)
Tangential shrinkage -green to 12% m.	6.9%	(4.7%)
Radial shrinkage	3.8%	(2.2%)
Modulus of rupture	114 Mpa	(90 Mpa)
Modulus of elasticity	21.2 Gpa	(9 Gpa)

POTENTIAL

Because of its strength properties, density and presumed durability, there is good reason to consider growing pohutukawa as a timber tree. The drawback is of course its apparent inability to grow as a straight, single trunked tree. Anecdotal evidence suggests that straight, single stemmed pohutukawa do exist although they may be hybrids with northern rata. Indications are that it may be possible to select seed trees with the required characteristics of straightness and upright growth and grow seedlings from these at spacings close enough to encourage erect growth.

The growth rate is reasonably fast. Diameter M.A.I of the two planted trees recorded above indicates that an annual diameter growth of about 2 cm is possible. More accurate data from measurements of trial plantings (Pardy et al, 1992) gives pohutukawa an MAI of 35 cm for height growth and 0.95 cm for diameter for trees in the 51 – 60 age class.

RESEARCH REQUIREMENTS

First we need to determine the basic site requirements of the species by field evaluation. At the same time locate straight growing pohutukawa (or pohutukawa x northern rata) and propagate plants for a trial. This would probably involve spacing and site preparation considerations and the possible use of nurse species for nitrogen production and an intermediate crop. If, on reasonable sites, pohutukawa will grow at about 1 to 1.5 cm diameter annually, it should be possible to grow millable trees in 50 to 60 years –or less. - *Ian Barton*

REFERENCES:

Burstal S W & Sale E V 1984. Great Trees of New Zealand
Clifton N C 1990. New Zealand timbers
Pardy G F, Bergin D O & Kimberley M O 1992. Survey of Native tree plantations. FRI Bulletin 175
Project Crimson 1999. The living library. http://www.projectcrimson.org.nz/living_library.html

Readers are invited to write in with comments about the potential of pohutukawa as a timber species. If you have information on where straight trees may be found please get in touch.

If you would like to request a discussion on the potential of other native trees for timber please let the editor know.

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