

6. *PINUS RADIATA*—THE BASIS OF FARM WOODLOTS

The changes in growing and marketing forest trees since 1950 have been brought about by the combined input of the NZ Forest Service, particularly the Forest Research Institute (FRI), large companies, and farm foresters.

Until the Forest Service was abolished, and research was changed to a “user pays” basis, a very free exchange of ideas took place between all groups, largely through FRI leadership in bringing people together in symposia, and publishing the findings.

This period of rapid development is over, with everyone now looking after themselves, but fortunately in the case of *Pinus radiata* high levels of expertise had been reached in most sections of the industry.

One cannot but be concerned that slowly in the future, small growers may be left behind as the corporates keep new developments to themselves. It is thus most important that the Association remain in touch with research by retaining membership of the key FRI/Industry Research Co-operatives.

Farm foresters have experimented with a wide range of tree species for timber, shelter, shade, and landscape values, but *P. radiata* is by far the most commonly planted tree from North Cape to Bluff. In percentage terms the farm forestry total would be well behind the proportion planted by the State or large companies, but *P. radiata* has still dominated field day discussions and meetings where all aspects from nursery production to marketing have been considered. This section thus refers almost exclusively to this one species.

Nursery Production

The years 1950–2000 during which the Association has developed have seen rapid improvement in the production of nursery stock. In the 1950s nurseries were sowing seed collected from (mostly) better trees during felling operations, but with little knowledge of genetics.

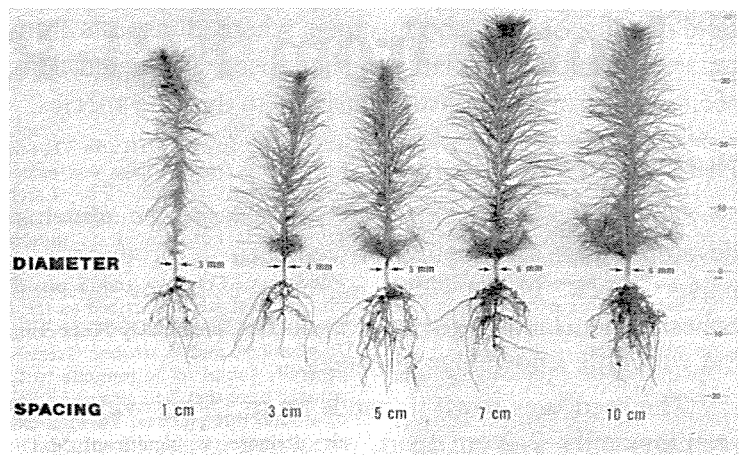
The seed was sown in bands up to 15 cm wide, with seedlings only 2–3 cm apart, wrenched by spade once or

twice in the autumn, and often “puddled” on lifting; this involved tying the trees in bundles of up to 25, and dipping the roots in a liquid mud, before heeling in a trench to await dispatch. For transport the trees were wrapped in damp straw and hessian.

An individual seedling would be perhaps 20–30 cm high, with a root collar diameter of 2–3 mm, and with long straggly roots, sometimes lightly trimmed.

Rapid changes took place in the 1960s with FRI leading the way by its own nursery techniques and by holding Symposium No.9 in 1967, followed by Symposium No.22 in 1981, at which private nurserymen mixed with those from State and company nurseries to compare notes. The influence of these symposia, with the work of scientists put into practice by FRI nurserymen Jaap van Dorsser and Trevor Faulds for all visitors to see, cannot be over-emphasised.

The development of tractor-mounted reciprocating wrenching (undercutting) machines, seed sowing machines, and lateral pruning machines using discs to cut lateral roots between the rows gave consistency to results and took the drudgery out of the job. Single-line sowing, where seedlings were 5–8 cm apart, led to the production of much sturdier trees with a collar diameter of over 5 mm (which often became the lower limit in contract orders), shorter root systems with more laterals, and sometimes the topping of trees at about 30 cm.



The effect of seedling spacing on diameter growth.

There was a very free exchange of ideas between all sections of the industry in those days, a friendly rapport between nurserymen, and a rapid improvement in the quality of stock throughout the country.

Farm foresters in Otago, mainly David Alderton and Jack Mackay, had been very critical of the quality of seedlings which they claimed resulted in windthrow and death. Jack Mackay in his own nursery at Moa Flat, mostly producing trees for his own use, showed how good trees survived better and grew more rapidly. There was at times fierce debate with commercial nurserymen who claimed poor planting or other factors to be responsible, but the discussions all led to better production of good seedlings.

FRI had clearly shown that survival and fast early growth were related to collar diameter and woodiness of seedlings, and so this became the aim of all nurserymen.

The method of packing and transporting trees to the planting site, and minimising delay, were all shown to contribute to successful establishment and early growth. Packing in hessian gave way to plastic bags, then to cardboard cartons in which trees were laid horizontally to save bending of roots.

At the same time, seed collection had been changing rapidly, with the development of seed orchards grown from superior genetic stock. "Seed Orchard" seed became the requirement of most foresters in the 1970s. Then followed controlled pollination, where male and female trees of desired characteristics were crossed, protected from outside pollen. Seed from these crosses was expensive, and so techniques of multiplying this superior GF (Growth and Form) material by cuttings were developed, and have become common in recent years. Cuttings have also been taken from 2- to 3-year-old trees in the field, physiologically aged cuttings, which give more benefits in their branching habit, and in producing very sturdy trees resistant to windthrow.

Establishment

As the quality of nursery seedlings improved, so too did the realisation that the way they were handled, planted, and

cared for in the first year or two made a great deal of difference to survival and growth. The use of chemicals for grass and weed control before and after planting became recommended during the 1960s. The first advertisement for a chemical appeared in *FF* 5/4 1963, where Ivon Watkins Dow suggested the use of “Gesatop” for long-term weed control around conifers. “Asulox” from May and Baker was recommended for spraying over young *P. radiata* to control bracken fern in 1976, followed by Neill Cropper advertising “Velpar” broad-spectrum weedkiller safe over pines, and “Eliminex” plus “Weedazol” from IWD, both advertisements appearing in *FF* 20/3 August 1978.

Fred Faulkner, writing in *FF* 6/1, compared the results of spraying around newly planted *Cupressus macrocarpa* seedlings using an inverted plastic bucket to protect the tree, with a quick once-around pass from a knapsack sprayer using a chemical (not named) recommended by the Forest Service, with laborious hand clearing. He said the results in a drought year showed remarkable tree growth on the sprayed trees, and at 1 or 2 cents a tree, the cost was small compared to time saved and subsequent growth.

FF 8/4 in 1966 published a detailed article by John Rockell (NZFS), comparing costs of hand cutting, tractor crushing, and chemical application on scrub, either regrowth native or gorse and broom. While mostly written for large-scale operations, the article is interesting in showing the type of country then available to foresters—that is, generally unacceptable to farmers—and the range of desiccant sprays being trialled by air such as 2,4-D, 2,4,5-T, paraquat, diquat, sodium chlorate, and sodium arsenite. The main objective was to get a good “brown off” so that a clean fire would provide a good planting site.

Similar preparation was used by farmers for grassing scrub areas. The modern environmentalist concerned with air pollution and chemical drift would shudder if such practices were widespread today.

The cost of hand cutting lines, even at 1960 wage rates, was too expensive except on small areas, and so crushing, spraying, and burning was the normal method.

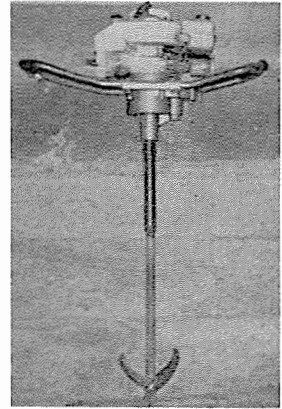
FF = the journal *Farm Forestry*, *TG* = *Tree Grower*

What's New in Forest Research No.11 was quoted in *FF 16/4* with perhaps the first recommendation for planting pines on pasture. FRI had found that pre-plant spraying of strips or spots with paraquat/simazine for fast knock-down and residual control of germination of weeds, gave pine seedlings a considerable growth advantage over unsprayed controls.

This opened the way to forest grazing or agroforestry, with early fast growth of pines allowing the earlier introduction of sheep to control pasture and give some return in the early years of the rotation.

Richard Davies-Colley wrote in *FF 18/3* of his experience in planting trees in holes prepared by using a special winged auger on a "Mate" petrol-driven post-hole borer. Richard found that in good conditions he could drill up to 4000 holes a day, leaving nice friable soil without the glazed walls of post hole augers. His willing(?) family coming behind found planting very easy in these prepared sites. The following dry summer showed some cracking around the perimeter of the hole, but not where the tree was planted which occurred with spade planting. There was a much higher survival (95%) than where a spade was used.

Mark Farnsworth, also writing in *FF 18/3*, explained the use of a tractor rotary hoe to prepare planting sites on exposed coastal sand country with dense kikuyu grass. The spinning hoe was lowered at each planting site leaving a curved depression completely free of grass and roots allowing a tree to be planted at the deepest point, free of grass competition for a while, and protected from salt winds. Mark, from Pouto Forest Farm Ltd, also wrote in *TG 1/2* of his experience using a modified drench gun for applying herbicides over young pines. Pouto had an aggressive kikuyu grass problem which could be controlled with the chemical hexazinone, or "Velpar". The drench gun was modified to apply a fixed dose (usually 20 ml) to a known area (usually 0.5 m²) by a single squeeze of the trigger with the wide-angle solid-cone nozzle held at a constant height above the ground. In spite of some problems of wear and replacement of parts being necessary, this method was much more accurate and



Power-driven auger with a winged head, used by Richard Davies-Colley for boring holes for tree planting.

easier for the operator than a knapsack sprayer where chemical distribution varied.

Jack Hawthorn worked for Ivon Watkins Dow as forestry chemical consultant, and acted as Field Organiser for the Association from 1978 to 1980. Jack was in touch with many large and small forestry operations around New Zealand, and wrote of the care needed, and the benefit obtained from the use of chemicals in both land clearing and tree releasing. His experience was outlined in *TG 2/1*, where he recommended the Agricultural Pesticides Course at the Technical Correspondence Institute.



Spot-spraying to control weeds after tree planting.

Tim Broad, a Farm Advisory Officer in Invercargill, wrote in *TG 6/1* about good herbicide spraying practices, particularly for Southland. He recommended a two-spray system, where pasture was sprayed in autumn or early winter with a knock-down spray plus residual, followed by a second pass of a residual spray around the tree after planting. He pointed out the importance of even spray coverage, suggesting a two-nozzle boom making a short pass to give a square or rectangle as being better than a circular movement with one nozzle, where the chemical could be concentrated in the centre and might damage the tree.

The FRI team led by Jeff Tombleson reported in *TG 7/3* on the establishment of *P. radiata* for agroforestry, using cutting-grown trees of high growth potential planted with the protection of electric fences. By planting trees in groups of three, each group at 10-m centres and protected by a

single-wire electric fence 25–30 cm above the ground, much of the area was still available for grazing by sheep. Each group would be finally reduced to one stem giving a stocking of 100 stems/ha. When experience showed it was safe to graze up to the tree, the fence could be removed and materials used again.



Group plantings of palatable cuttings protected by a single-wire electric fence, allowing 80% pasture utilisation.

The same type of fencing could be used for widely spaced rows of trees, where fencing costs were reduced yet a similar final crop achieved.

The difference in tree growth rates comparing weed-free growth spots with spots where grass, gorse, or pampas had been allowed to grow, was shown in an article by John Ray and Brian Richardson, FRI, in *TG 11/4*. Some evidence showed that early growth rates are maintained throughout the rotation so that even if a tree finally overcame the weeds, it would never catch up to one that was released.

Michael Coupe, an agricultural journalist writing in *TG 15/3*, described Carter Holt Harvey forest establishment in Hawke's Bay, where considerable benefits accrued from minimal soil disturbance when planting cutover forest blocks. Root raking encouraged a high rate of germination of gorse, blackberry, and other weed species, much more difficult to control than where a pre-planting spray of "Trounce" was used on undisturbed sites.

Weed control by chemicals was well summarised for Hawke's Bay in an article by Maurice Smith of Monsanto,

in *TG 16/4*. He recommended pre-plant spraying with “Trounce”, “Escort” and “Pulse” with a spot spray of “Roundup” if grasses were present in frost-prone areas, or where such species as *paspalum* were present.

Post-plant spraying with “Velpar” in spring when soil is warm, or with “Gardoprim 500W” if grasses predominate, was recommended.

What's New in Forest Research No. 11 was reprinted as an article in *TG 17/3*, this issue devoted to weed control for establishing *P. radiata* in pasture. A clear description of chemicals, their specific uses, and methods of application were covered, together with safety recommendations. This summary brought all necessary information to the modern farm forester likely to be planting trees on improved pasture.

Wind Problems in Establishment

When trees, particularly from improved fast-growing stock, came to be planted on high-fertility farm sites, windthrow, particularly at ages 2 to 4 years, became very common in some wet clay-based soils. A great deal of work has been done on this problem, mainly by reducing the “sail area” or volume of foliage of the young tree.

Neil Barr and Harry Bunn in their pruning “clinics” around the country showed how removing a number of branches, and cutting others to half their length, would take the wind leverage off the tree.

Peter Davies-Colley in Northland developed a straightforward recipe carried out on all trees in their second autumn. The prescription was to reduce all branches in the top half of the tree to half their length. This had the effect of reducing wind leverage in the top half of the tree—there is little in the bottom half—and also led the tree into a more conical wind-firm shape. Little if any growth was lost in the process.

There is evidence that trees grown from physiologically aged cuttings are naturally resistant to windthrow, partly because of their root structure, and partly because they do not grow with such a branchy juvenile habit.

Ingleby Coxe of Waiotira, as part of a degree from Massey University, is conducting trials and measuring a large number of young tree characteristics likely to lead to windthrow.

Spacing

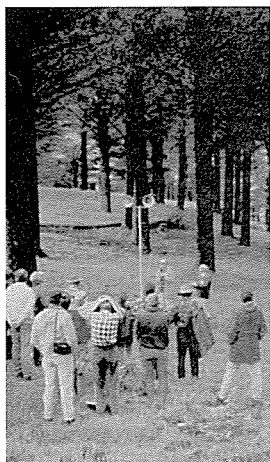
During the 50 years the Association has been in existence, recommendations about the initial and final-crop spacing of *P. radiata* have undergone major change. Probably no topic has excited more discussion at field days than what a final crop should be, how branch sizes can be controlled, and how the plantation should be managed during its life.

Following on from the success of early planting at large-scale forests such as Kaingaroa, farm foresters at the beginning were urged to plant closely, often on the poorest parts of the farm, in the expectation that the dense stand would restrict branch size and produce plenty of posts from thinnings.

The Wairarapa Association considered plantings at Ngaumu State Forest to work out the cost of producing posts. The area considered, Compartment 1, had been planted in 1947–48 at a spacing of 8 × 5 feet (2.4 × 1.5 m), or 1000 trees per acre (2470 stems/ha). This was thinned in 1957 down to 350 to 400 stems per acre (865–988 stems/ha), the thinning yielding 50 posts per acre (123 posts/ha), the job ideally suited to small chainsaws and a Ferguson tractor.

The above example, or the more common spacing at the time of 6 × 6 feet (1.83 × 1.83 m) or 1200 stems per acre (2985 stems/ha), represented a huge amount of work.

As it became apparent that clearwood could be obtained by pruning, the necessity for such close spacing to limit branch size was not necessary. Both FRI staff and early farm foresters began experimenting with lower stocking rates. It was soon apparent that the tree diameter grew much more rapidly without competition, risk of disease such as *Dothistroma pini* was much less where good air circulation could occur, and, most importantly from an economic point of view, the rotation length required to reach a diameter of 60–70 cm was reduced from about 40 years to 25–30 years.



Field trip to the Tikitere Agroforestry Trial area during the 1995 Conference.

The FRI research trials at Tikitere, where different tree spacings and grass growth were both measured to determine the economics of agroforestry, have quantified the growth rates and given farmers information on what to expect from trees planted on the generally better farm sites currently being used for forestry.

Neil Barr became an enthusiast for a final crop of only 100 stems/ha, where pruning was done on time, and very large trees could be grown in 25 years or less. A certain amount of friction developed between Neil and the Forest Extension Officers of NZFS who in handling loans and grants required a more conservative regime, largely because they could not guarantee that pruning and thinning would be done on time.

Much later, in articles in *TG* 9/2, 9/3, and 9/4, Owen Smith criticised the concept of agroforestry with wide spacing because of the winds experienced near Timaru, and the number of trees developing a lean causing off-centre pith and tension wood. Gavin McKenzie had a bob each way in the second article, describing how Extension Officers of NZFS had recommended conservative close spacing on many poorer farm sites, but made some allowance for agroforestry-type regimes on better farm sites only when pruning and thinning could be financed and done on time. Neil Barr in the third article defended the low stocking, saying that to thin 800 stems/ha down to 250 at age 5 or 6 was costly and inefficient in respect of good timber production and energy consumed.

Leith Knowles, in *TG* 13/2, considered spacing from results achieved at Tikitere and concluded a stocking of about 280 stems/ha on a fertile farm site would still allow plenty of grass to grow in the early years, but control branch size and give a high final-crop yield, while reducing wind damage.

Geoff Chavasse, FRI, in *TG* 14/2 wrote a very detailed explanation of stocking rates for areas of differing site indices, or better, of different basal area. He clearly showed that the number of trees that can be grown to any pre-determined diameter can be calculated if the carrying capacity by basal area is known.

Geoff Brann, who has been involved in agroforestry for a full rotation now, summed up the present thinking in *TG 13/3* where he explained that widely spaced trees have large branches above the pruned height with little value, and with a high risk of stem damage in wind, and that a final crop of 250–300 stems/ha is going to produce plenty of clearwood and also good framing timber above the butt log.

With the advent of quality seedlings or cuttings of high genetic potential, initial planting rates on good sites with good preparation are now down to about two to three times the final crop required, which means planting about 600 stems/ha—a far cry from the 3000 stems on poor country—and needing little fertiliser or releasing.

Pruning and Thinning

In 1960, NZ Forest Service District Ranger R. Packer gave members of the Taranaki Farm Shelter and Forestry Association a useful schedule for planting, pruning, and thinning. Abbreviated, this was as follows:

Prune—

To 7 ft (2.13 m) at age 5, 500 selected trees per acre (1235 stems/ha).

To 13 ft (3.96 m) at age 6, 250 trees from the above 500 (617 stems/ha).

To 18 ft (5.49 m) at age 8, 140 trees from the above 250 (345 stems/ha).

To 27 ft (8.23 m) at age 11, 70 trees from the above 140 (172 stems/ha).

To 36 ft (11 m) at age 14, all those pruned to previous height.

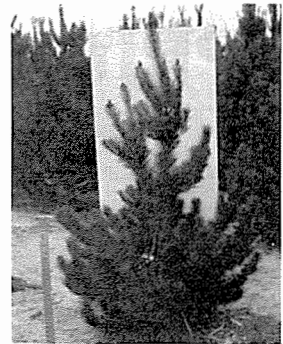
Thin—

At 8 years, thin to waste all but 250 pruned trees per acre (617 stems/ha).

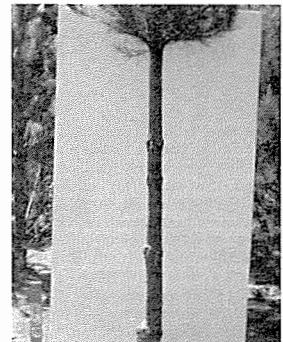
At 15–16 years, thin to leave the 140 trees pruned to 18 ft (5.49 m).

At 21 years, thin to leave only 70 trees pruned to 36 ft (11 m).

Leave to mature at 35–40 years.



A basket whorl pruned to a single leader (*above*); 2 years later the leader has straightened itself (*below*).





High pruning carried out with a curved saw on a long wooden handle.

At both second and third thinning, logs were to be taken as posts or sawlogs. Some modifications were suggested if there was a demand for posts, leaving more trees for early removal as posts at 9 years.

The amount of work involved in carrying out the schedule above would horrify a forester of the 1990s, but this was how a pruning and thinning regime developed from earlier close-spaced no-pruning forests.

Early pruning was done with a curved saw on a wooden handle, followed by a long aluminium pole for higher branches. Walking around in a forest with the gaze ever upward, balancing a 4- to 6-m pole was very hard on one's neck.

Porter pruners, and later similar Japanese HIT pruners were loppers that could cut branches up to 30 mm. Neil Barr favoured the Wilkinsons loppers. Gradually, ladders of a number of forms, with safety chains and easily added extensions have become the normal method of high pruning, using both loppers and the Bush Mate or similar pruning saw, a heavy quick-cutting saw with replaceable blades.

Neil Barr in *FF 3/3* described his own early efforts at pruning a mixed plantation somewhat damaged by stock, and how pruning was done with a sharp axe. Neil noted that if he was starting again, he would plant at 12×6 ft (3.6×1.8 m), pruning only selected trees early and more frequently, a regime which naturally led to wider agroforestry spacings in later years.

One of our most renowned farm foresters was the late W.B.Hull of Wairarapa. Mr Hull had planted a small stand of *P. radiata* in 1928, and perhaps was the first man in the country to meticulously prune these trees at regular intervals from ages 7 to 19, to an amazing pruned height of 45 to 50 feet (14–15 m).

Will Hull was made a Life Member of the Association in 1963, just before he died in 1964, but in 1963 he released a number of his trees to FRI for a milling study. The trees were then 35 years old with an average dbh of 24" (60 cm). They were sawn and measured for yield of varying timber

grades alongside similar trees from an unpruned stand nearby. Mr Hull's trees showed an increase of 28% of total sawn outturn in Clear, 2% increase in Clear-one-face, 6% increase in Finishing and Dressing, 3% increase in Merchantable, and a decrease of 30% of Box.

Attempts were made to put a value on this quality timber compared to costs of inputs, but as there was no real trade in clearwood at the time, this comparison was not reliable. However, in anticipation of such a market developing, the results of this trial excited the forestry industry and proved to be a great inspiration to farm foresters.

Neil Barr wrote in *FF 10/4* on the production of clearwood from *P. radiata* growing in shelterbelts. The idea was to plant pine with an alternate species such as *Cryptomeria japonica*, or *Thuja plicata*, shade tolerant and able to provide low shelter as the pines were pruned. Because of the open situation with no competition and fertile soils, growth was very fast. If pruning was done early when diameter over branch stubs was small, a large log yielding a high proportion of clearwood resulted even if higher logs were of inferior quality.

Gerald Hocking discussed woodlot management in *FF 16/1* where he asked "What will be the most satisfactory spacing to adopt?" He went on to say that the answer would usually be a compromise between the need to restrict the size of branches and the weak knotty early growth, and the need to avoid high establishment costs and unproductive early thinnings. He also spoke of the accelerated diameter growth following heavy thinning. There was a misconception that this wide-ringed growth was inferior, but Gerald Hocking stated that wood density (and hence strength) is influenced much less by the rate of growth than by the time in the life of the tree when the growth is made.

This subject of rapid growth, density, and wood properties became much more important in the 1990s, but the difference between corewood and latewood density was well described by G.S. Williams in *TG 5/3*, where he explained water loss in drying timber, and resulting warping and twisting. Williams explained that stresses set up between low-density corewood

and high-density outerwood cause the problem, and so the object of pruning must be to keep the former to a minimum and grow the latter to a maximum. He said clearwood did not make a good sawlog—age did.

The pruning of adventitious shoots from the stem of *P. radiata* was discussed in *TG 6/2* by Chris Inglis of FRI, where he described how Geoff and Gill Brann removed the stem needles with a piece of wire, normally used for dehorning cattle, attached to two pieces of broom handle about 12 cm long. This wire was pulled down the stem between internodes and removed those hairy needles very easily, a problem particularly noticeable on widely spaced trees where the sun can shine on to stems exposed by pruning.

The Advisory Services Division of the NZ Forest Service, together with the Association, sponsored travel and accommodation for Neil Barr and Harry Bunn from 1985 so that these two well-respected foresters could hold their “clinics” on pruning and thinning. The first was at the Taranaki branch in November 1985, where two well-attended field days involved demonstrations and debate. These Barr/Bunn clinics were held in many branches over the next few years, with Neil’s place eventually being taken by Geoff Brann. The banter and good humour that accompanied the demonstrations made the message easy to accept. A summary of the reasons for the techniques advocated was printed in “The Little Red Book”—a red-covered supplement by Neil, and printed by the NZ Farmer.

Neil Barr wrote a note in *TG 8/4* regarding the disappointment he, John Mortimer, and Jim Pottinger felt at the small volume of clearwood found after sawing their pruned trees. He advocated more careful pruning using callipers to ensure the knotty core was kept to a minimum, thinning to no more than 150 stems/ha, and a longer rotation to grow logs to about 80 cm dbh.

The final word on correct spacing and pruning will probably never be heard, and whether the best regime was followed will be apparent only after comparing the returns from clearfelling from different regimes. As the market is

always changing, farm foresters and researchers tend to advocate a regime that is producing high returns today, but it's not for 20 or more years after tending that one can be proved correct.

It certainly appears wise to take note of Piers Maclaren, *TG 9/2*, in aiming for maximum wood of high density by restricting the core to a minimum, followed by sufficient length of rotation to maximise high density clearwood that will dry with minimum distortion.

Denis Hocking, *TG 9/4*, added more possibilities to the equation by suggesting thinning slowly for sawlogs on perhaps three occasions after pruning 400 stems/ha, down to 300 stems/ha at age 15, 200 stems/ha at age 18, and 100 stems/ha at age 21, leaving the final 100 trees to grow to age 35.

The returns from these early sales can be a big help in keeping cashflow going, but they depend on prices available for the different log grades, and the costs of logging and transport from a particular site.

For many years now, farm foresters have been urged to prune and thin for quality, as this will always gain a reward in the market. Certainly the downturn in forestry of the last 2 years appears to justify this approach.

The Millennium forestry announced recently by Carter Holt Harvey, where 550 stems/ha are planted and left untouched to maturity in the expectation that improved fingerjointing techniques will provide clearwood, with all other wood processed into some sort of reconstituted fibreboard or paper, represents a further blow to an already emasculated forestry industry. Manpower requirements are further reduced, with skill levels not required. If this becomes widespread throughout the forestry companies, then lower numbers of graduates will be required from the School of Forestry, and less money will be available to maintain research.

In such a climate, farm foresters can only keep up the production of quality clearwood in the anticipation of a continuing margin at the end of the rotation.

Marketing and Stumpage, Selling the Final Product

Efforts of Association members during the early years were directed largely at planting and tree management. Many members planting for shelter or soil conservation considered those objects as the main role of trees, and if in the future some profit could be made from the sale of logs, then that would be a rather unexpected bonus.

However, as soon as the first few branches formed a National Association, the effect of death duties on forestry assets, and the low stumpage paid by sawmillers were recognised as impediments to future planting. (This is covered in some detail in the section “State Involvement with Farm Forestry”).

When these impediments had gone, and with the Government encouraging production forestry planting on farms by way of the Forestry Encouragement Act 1962, gradually more farmers began planting woodlots under the Loan Scheme (1962), and more particularly under the Grant Scheme (1970).

As the number of Association members with plantations increased, naturally enough more thought was given to the likely value of the trees and how best to market them.

Jack Stronge of Taranaki worked hard to give farmers good advice on how to sell their trees to maximise profit. In *FF 4/4* he described the measuring of logs, emphasising that before sale a farmer must know what he has to sell. This question came up many times throughout the country as stories of sales of woodlots to sawmillers or contractors without measurement or properly drawn-up sales agreements were shown to give very low returns, and often to leave an expensive clean-up behind the logging operation.

Jack Stronge produced a sample tender document in the same article which included conditions of sale covering such things as repairs to fences and waterways, a final removal date for timber, and any insurance cover deemed necessary.

The same problems were being faced in Canterbury where there was a surplus of timber, including cheap rimu,

competing with pine. Dick Beauchamp in *FF 6/1* wrote of farmers being advised to withhold logs from sale if prices were poor, the need to know volume and quality before negotiating a sale, and the need to use standard measurement. This was in the days of cubic feet, but measures such as Goss, Haakon Dahl, and Hoppus confused sellers. Dick Beauchamp thought that even some traditional Scottish measurement based on the length of a sporran could be used for all he knew!

Jack Stronge explained how stumpage was arrived at in *FF 6/3* where he showed how all charges involved in logging, transport, and milling were on a cost-plus-profit basis with only the remainder, if any, being available for stumpage. He suggested that even if price control was removed, stumpage would not improve until Forest Service sales were on a straight-out tender basis, and the private sector perfected some means of selling by co-operatives or commission or horse trading.

The Taranaki Association took this problem a step further in 1964 when it met with representatives of the Taranaki Pine Sawmillers' Association. It was shown that 95% of timber sawn in the province came from 160 Taranaki farms. The current flat rate paid for almost all trees was discussed, with the need being advocated for much higher prices for well-grown trees.

Neil Barr published some prices received for small blocks of pine in Lower Northland in 1966, explaining how two mills and the local Association used an ex-NZFS officer as a buying agent to help with the deal.

This idea of publication of prices as a guide to members throughout New Zealand was much discussed over following years. Jim Pottinger discussed the possible publication of Forest Service log prices in a 1975 editorial, but considered such information of little value to individual farmers because of so many variables such as log quality, ease of extraction, and distance from the mill.

Gavin McKenzie, writing in *FF 19/4*, produced the first schedule of contracts from NZ Forest Service for sales of

\$6000 or more. This was the first time the Minister of Forests had allowed such information to be released because of the variables mentioned by Jim Pottinger. The schedule covered sales in all Conservancies for different-quality logs.

Schedules were published from time to time in *Farm Forestry* and later *Tree Grower*, but were available from the Forest Service Extension Service.

John Edmonds, Ministry of Forestry in Dunedin, began a series of Market Reports in *TG 16/1* February 1995 which was a much more valuable guide to farm foresters. It described New Zealand's output of export logs through different ports, and domestic log prices. Export log prices were "at wharf" and domestic prices "at mill" which gave individuals a good idea of estimating their own log values depending on logging and transport costs. John Edmonds has kept this report coming, now (1999) in every issue of *Tree Grower*, improved with graphs, and different prices for differing grades of logs, so members now have a real guide to the value of their woodlots.

The advent of log sales to Japan and later Korea gave New Zealand forest growers a world market price to compare with local tenders. Jack Stronge in *FF 15/3* wrote of the stop-start nature of export log sales in the early 1970s, but was adamant that world wood prices, set by export log sales, must be the most important part of setting the price of New Zealand-grown exotic wood.

Alex Morison was one of the first farm foresters to benefit from this trade. Alex farmed a difficult steep property near Warkworth, and told the story that he gave up ploughing when the land became so steep that the top horse walked on the back of the lower horse! Alex began planting some 18 000 trees each year in 1947, in gorse-infested country, when tree stock was hard to get and advice almost non-existent. He did almost no pruning and little thinning. The *NZ Herald* in February 1980 reported how Alex supplied about a third of the logs for the "Sun Orion", perhaps the first log ship to leave Whangarei. The remainder of the load came from other farm foresters and included a few of Neil Barr's *Eucalyptus botryoides* logs.

The income from this shipment gave Alex and Margaret Morison their first break from a lifetime of hard work. The “Sun Orion” crew visited Morison’s farm and very much enjoyed a day of New Zealand rural hospitality with other farm foresters, and returned the favour on board their ship.

Fletchers had recently set up a marketing and advisory service, and they arranged the sale on a commission basis, in a similar way to J.E. Watson and Company in Southland. The effect on stumpage was immediate, doubling prices received locally.

Neil Barr, writing in the *NZ Farmer* in March 1980, said “As soon as the hot breath of log exports is felt on their necks, millers suddenly realise hidden reserves on prices they can give. And once any export trade has been built up, even if it ceases, prices seem to remain at the higher levels. Canterbury, Taranaki, Hawke’s Bay and Wellington Conservancy areas have experienced this.” Neil also referred to the State being the largest meat producer in the country, using the price-setting policies of the farmer-dominated Meat Board. He hoped it would not be long before a similar Forest Produce Board, with State and smaller owners represented, would have an overlooking role in getting fair stumpages.

As more Association members saw their trees nearing maturity, there was much discussion on the formation of marketing co-operatives. Jack Harper in *FF 16/2* wrote of many reservations he had about the likelihood of forestry co-operatives becoming established in New Zealand, not because they were not a good idea as practised in Sweden, but because New Zealand farmers were individuals who did not co-operate well. Jack wrote what many had talked about in the 1970s—of how wonderful forestry could be in New Zealand if State forests were settled in blocks by individual owners, selling their wood to a dairy industry type of co-operative processing and selling organisation.

Northern Southland set up a committee in 1973 to study the size of the private forestry estate in Southland, and whether a commercial organisation should be set up to service these forests. The initial thinking was that a private limited liability company of no more than 25 members could

be set up to act as an advisory service at all levels and stages of forestry, to organise labour and contractors, to arrange bulk buying of tree seedlings, and to act as an advisory service on marketing possibilities.

There is no record of this company being formed, but this was very likely because of the development at the time of J.E. Watson, a company providing a full range of forestry services for Southland.

Mike Malloy of Lower Northland, wrote a small booklet in 1978 of his musings on the future of forestry, and distributed it through his branch. Mike related products from the land to energy prices following recent oil shocks, and found forestry to be better placed than agriculture. He went on to discuss the successful Swedish co-operatives and thought it reasonable to conclude that a similar system would work well in New Zealand, but the country suffered from a lack of suitable legislation.

Mike combined his law and farm forestry skills to draft the Co-operative Forestry Companies Act 1978, with the help of Forest Service personnel, Ivan Frost and Ray Hannan. Mike was disappointed at the Wellington law draftsmen who followed the Dairy Company model too closely, and did not give him the opportunity of making necessary changes for forestry.

It was hoped there would soon be a number of co-operatives set up on this Act, but this did not happen. Neil Barr spoke against the co-operative direction at the 1979 South Auckland conference because of his personal experience with other agricultural co-operatives, and this may have dampened the idea.

The Western Farm Co-operative at Palmerston North was the only recorded body using the 1978 Act, but it has since re-registered under more suitable Acts.

A number of organisations have been established around the country, either companies or co-operatives set up independently, but with the good will of branches or with a shareholding by branches. The New Zealand Association has been careful to ensure that such companies are

independent of the Association which is in no way responsible for their performance. Examples of these organisations are:

- The Canterbury Forestry Foundation, formed in 1981, registered under the Industrial and Provident Societies Act 1907. The Foundation has had its ups and downs as markets have varied, and has streamlined its efforts since 1997 to give all trading activities to Aorangi Forestry Services while retaining an overseeing role and receiving an annual fee from Aorangi.
- The Taranaki Tree Growers' Marketing Society Ltd was established by local farm foresters, but will do work for anyone. The Society has agents in Coromandel and Waikato. Albie Mullins, a farm forester Director, feels that local mills have lifted their prices since the Society was formed, to get the log grades they require.
- Western Farm Co-operative Forestry Ltd based in Palmerston North was, as mentioned, originally registered under the Co-operative Forestry Companies Act 1978, but has since re-registered under the 1993 Companies Act and the 1996 Co-operative Companies Act. Hew McKellar is not sure of any price increases as a result of setting up the Co-operative, but is sure of better supervision of volumes sold, and better advice. He is disappointed that many local members do not use the Co-operative, and that existing co-operatives do not combine to form a national structure.
- Otago South Forestry Consultants is a company owned by the South Otago Farm Forestry Association, with Don Gordon acting as secretary to both bodies. They have managed to hold log prices in a time of falling demand, operating two or three logging crews, and sell to local sawmillers who also export.

Other branches have considered the formation of marketing arms, but the current low log-return situation, combined with a much-increased number of qualified forestry consultants available for advice since the end of the Forest Service, has meant that individual forest owners can get good advice, management of sales, and other forestry activities with confidence. Members of the Association with experience in such dealings are always available for guidance.

Joint Ventures

Perhaps the biggest advance in small-scale forestry in recent years has been the promotion of joint ventures, where landowners and investors can combine in almost any way to establish a forest and share the proceeds in proportion to their inputs.

This is covered in Chapter 2 “State Involvement with Farm Forestry”.

Conclusion

The last 50 years have seen tremendous improvements in all facets of the forestry industry, particularly in the growing and processing of *P. radiata*. New techniques in nursery and establishment practices, together with the ongoing debate on tending and spacing, made the period from 1970 to 1990 an exciting time for all involved, while rising log prices provided increasing rewards.

Dr Wink Sutton, of FRI and then Fletchers, kept enthusiasm high by his confidence in a growing world population needing an ever-increasing supply of plantation-grown timber, to make up for the dwindling indigenous supplies caused by overcutting or environmental constraints in different parts of the world.

There are increasing signs that plantation-grown timber such as *P. radiata* is being treated as just another commodity, where large corporations control the processing and retailing end of the market, with product prices controlled by competition, and the battle to maintain shareholder dividends resulting in a squeeze on the grower, forcing minimum labour input and the uninteresting, low-skill forestry promoted by Carter Holt Harvey.

For farm foresters to continue to get just reward for their years spent growing trees, they must continue to aim for quality, and be aware of niche marketing opportunities together with some identifiable brand that differentiates their product from that of the multi-national companies.