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# Update on Macrocarpa

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## History in New Zealand

*Cupressus macrocarpa* comes from a very small area of less than 100 ha on the shores of Carmel Bay on the Monterey Peninsula, where it was discovered less than 150 years ago. It was introduced into New Zealand in the 1860s and planted initially in private arboreta with other cypresses, but was soon used quite extensively for shelterbelts because of its fast growth, its resistance to wind and the density of its foliage, particularly when trimmed. When it was discovered that the heartwood is durable, it was often planted as small woodlots for the future production of posts, but not many forest stands were established before 1945. By 1980 there was just over 1000 ha in State forests and that area was more than doubled over the next six years as the Forest Service's special-purpose-species policy was implemented. In 1988, because the State was no longer planting macrocarpa, the NZ Farm Forestry Association formed an action group to promote the species, and by 1992 over a million seedlings were planted in the South Island alone.

## Why bother growing macrocarpa?

Besides being relatively easy to establish, fast growing, and easy to saw and season, macrocarpa has many of the properties desired in a special-purpose species, namely wood of medium density, good colour, figure and lustre, good machining properties and finish, dimensional stability and natural durability. Even for utility uses, its natural durability should ensure a premium over radiata as the world becomes more 'chemical-conscious'. Its wood properties are similar to those of kauri, making it suitable for boat-building, furniture and joinery, as well as the more traditional uses of exterior joinery, weatherboards, and farm utility timber. The timber has a good reputation, despite the fact that there has been a very limited supply of logs available, and most of those have been of poor quality because of heavy branching and deep fluting.

## Constraints to growing the species

Although macrocarpa will grow on most of the sites that will grow radiata, it only grows well on the better-quality sites, i.e. those with reasonable shelter and a good supply of moisture, and with soils of at

least reasonable depth and fertility. It is thus well suited to many farm sites but not to many of the poorer traditional forestry sites. Another constraint is that the species is affected by cypress canker, a disease that can cause severe dieback or death to susceptible trees. Some individuals are apparently particularly prone to the disease which can be aggravated if the trees are placed under stress or grown in a warm humid climate.

## Producing high-quality logs

Although scattered small green knots are currently acceptable in finishing grades of macrocarpa, in future a premium is likely to be paid for clear timber. Unfortunately, macrocarpa seedlings produce an abundance of branches, many of which are steep-angled and quickly become very heavy unless controlled by pruning. Close spacing does not help a great deal because coarsely-branched trees tend to become dominant in untended stands. Thus, to produce high-quality logs, timely thinning and pruning are essential and pruning normally involves at least twice as much effort as pruning radiata to the same height.

## Pruning

Because heavy early pruning can often lead to severe canker attack, and late pruning leads to a large and very knotty core, for many years we have been advocating that pruning should be a little and often, concentrating on removing the bigger branches several years in advance of clear pruning (pre-emptive pruning). To be most effective, pre-emptive pruning should start as early as possible (at age one or two) and be carried out at least annually. Where stands have not been pre-emptive pruned, limited trial experience suggests that a 12 cm gauge should be used for low pruning, and that the biggest six to ten branches in the remaining green crown should be removed at the same time.

## Breeding a better tree

In the early 1980s, John Miller of FRI started a breeding programme for macrocarpa by collecting seed off about 80 superior individuals in New Zealand and importing seed of about 150 trees growing in the natural stand in California. This seed was used for establishing trials in 1985. On the whole, the New Zealand seedlots have tended to be more vigorous

and of better form than the native populations, but much of this difference is due to the fact that many of the New Zealand seedlots show evidence of hybrid parentage, and these presumed hybrids are often of better form and vigour. In particular, there is a breed of macrocarpa widespread in Otago and Southland which has numerous small horizontal branches and which appears to have *C. sempervirens* in its parentage, and throughout New Zealand there are a number of macrocarpa of good form which produce seedlings which appear to have some *C. lusitanica* in their parentage.

From John Miller's trials, the top 50 families were selected in 1992 for use in a breeding programme, and material from the best seedling from each family has been used to establish an archive of grafted plants at Rangiora. In 1994, cuttings will be taken from these grafts and used both for the establishment of a seed orchard and for field testing. Patrick Milne has been investigating the use of hormones to stimulate flowering in macrocarpa, and has found that even young seedlings can be made to produce both male and female flowers. If they can also be made to produce viable seed, there is a possibility that controlled-pollinated seed could be produced in commercial quantities by the turn of the century.

## Clonal forestry

Over the last 12 years, FRI at Rangiora has been experimenting with producing rooted cuttings of macrocarpa, and we have found that provided the cuttings are set under conditions of very high humidity, there is no great difficulty in getting them to root. Furthermore, the more often a clone is propagated by cuttings, the higher the rooting percentage. There does not appear to be any ageing effect such as apparently occurs with radiata stoolbeds; work overseas indicates this is true of the cypresses generally.

Amongst large plantings of macrocarpa, there are occasional individuals of outstanding form and above average health and vigour. At FRI we have made a point of trying to identify a number of these superior individuals and multiplying them up by cuttings. To maximise the chances that the trees selected are genetically superior, selections are mostly made from young open-grown trees, but some

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\* NZFRI, Rangiora.

products, without any increase in production, could be worth up to \$4.5 million in increased export earnings when it comes into full force in 1999.

### Remanufactured Wood Products

Probably New Zealand's fastest growing area of forestry exports is in remanufactured wood products. These products include a diversity of goods including wooden furniture and furniture components, mouldings, beadings, and prefabricated housing. Exports of these products have increased from \$64 million in 1990 to \$107 million in 1993. With a number of new remanufacturing plants recently commissioned or on the drawing board strong export growth is anticipated to continue into the future. These value-added products are particularly susceptible to tariff escalation, a common phenomenon under which a country's tariff rates become progressively higher as a product is processed to a higher degree. However, in a number of key target markets, notably the United States and the European Union, the GATT Settlement has markedly improved access for remanufactures. For example, the US tariff on wooden furniture which is applied at 2.5 – 6.6 per cent will be eliminated. A similar result was achieved with Japan where the present base tariff on wooden furniture is 4.8 per cent and in the European Union countries where presently the base tariff is 5.6 per cent.

### Softwood Components

Softwood components such as mouldings, imported under code 4409.10, achieved similarly good results. In the United States and the European Union these tariffs have been eliminated (with the exception of finessed dowel rods in the US), while in Japan the tariffs in this class, currently applied at 4.8 – 8 per cent, reduce to 3.6 – 5 per cent.

The overall result on forestry sector tariffs, a sector where most of New Zealand's major markets apply moderate to low tariffs in any event, is sound if not spectacular. There now remain few tariffs that are insurmountable barriers for a determined exporter. The Japanese sawn timber tariff, which stands out firmly as the major source of trade distortion, will remain a focus for future unilateral negotiation. In the future decreased tariff escalation should provide additional incentive to substitute away from log exporting and into higher-valued processed products.

### Comprehensive Analysis

The Ministry of Forestry is in the process of preparing a comprehensive analysis of the GATT Settlement for forestry.

## LETTERS

### Dr Wilfred J.B. Crane

Sir,

Readers will be interested that CSIRO has named a circuit road around the oval in front of Forestry House as Wilf Crane Crescent. Wilf was well known in NZ forestry and scientific circles and in November 1991, shortly before his death, had hosted members of a NZFRI cooperative when they visited Canberra. He showed them over an impressive outdoor tree physiology experiment in which water and nutrients were strictly controlled to a stand of radiata pine.

The ceremony took place as scheduled and the main speaker was Hugh Wareing, a forester and scientist well known to New Zealanders who recounted a number of amusing anecdotes about Wilf – an eccentric but well respected character. The road named in honour of Wilf is in front of the old Australian Forestry School where many old-time NZ foresters like myself received our training, before the advent of the Canterbury School of Forestry.

Ryde James

### The highest GF rating

Sir,

I have recently been asked by a number of people involved in forestry as to what has been the highest GF rating allocated to any radiata pine seedlot so far.

Readers may like to know that, to date, the highest rating ever allocated to a seedlot involving more than two parents has been GF28. A few two-parent control-pollinated crosses (specific crosses) have been rated GF29\* and GF30\*. An asterisk indicates that less than normal confidence should be placed on that particular rating, because of the limited availability of the progeny performance data. It is unlikely that any increase in the top rating will occur over the next 12 months.

The availability of planting stock of the most genetically improved material is very limited. Regardless of the GF rating of the material being purchased, buyers should obtain a copy of the appropriate seed certificate from the seller and make sure that the packing note or invoice for the seed or plants being purchased contains the seedlot number and GF rating.

T.G. Vincent

Manager

NZFRI Seed Certification Service

### Update on macrocarpa (continued)

old trees from open stands have also been selected. Many of the trees selected to date appear to have more than just macrocarpa in their parentage.

Once clones have been multiplied up, they are then tested for two or three years in the field to ensure they are vigorous and of very superior form before stool beds are established for commercial production of planting stock. The first few thousand rooted cuttings were sold in 1992, and it is hoped to have at least 100,000 available by 1996. So far there has been a strong demand for these plants, with stocks sold out a year in advance of production, despite a price of \$2.50 each. With increased production, costs will drop below \$2 and could even drop to \$1 if production is on a big enough scale.

Although the long-term performance of these macrocarpa clones has yet to be proved, early indications are that on prime sites they are faster growing than Leylands and have lighter branching.

### Conclusions

The intrinsic wood properties of macrocarpa make it a very desirable species to grow a range of end uses, and the species enjoys a high reputation, despite the poor

quality of most logs currently available. It is relatively easy to grow but is not suitable for easy-care management. In young stands already established it is possible to produce high-quality logs with intensive pruning. In a few years time it is hoped to have high-quality seed available commercially, and this should greatly enhance growers' ability to produce high-quality logs. In the meantime, rooted cuttings of superior clones offer another avenue of quickly upgrading the quality of planting stock.

### NZ training for Indian forestry officials

Seventeen scientists and officials from the Indian Council for Forestry Research and Education are in New Zealand for three-month training fellowships. Hosted by the New Zealand Forest Research Institute, the high-ranking visitors from all over India are undertaking United Nations Development Project Training Fellowships through FAO prior to returning to India to take key roles in major afforestation projects.