forest research
creative wood-based solutions

Douglas-fir
RESEARCH CO-OPERATIVE
Newsletter

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Naseby meeting good value

Sixteen people attended the last meeting of the Douglas-fir Research Co-operative in Naseby on February 7/8, hosted by Ernslaw One Ltd. Two new members were welcomed – Wrightson Forestry Services (represented by Dennys Guild) and Mark Belton and Associates (Mark Belton).

Manager Leith Knowles reported good progress over the past year, particularly in the areas of genetic improvement (see page 2), malformation (page 3) and the silvicultural growth model (page 3). Leith also commented on the continuing good collaboration with fellow researchers in the Pacific Northwest (PNW), the Forestry Commission in the UK and INRA, the French government research station in Nancy. The meeting agreed to update the Co-op's agreement with American Douglas-fir researchers, and Leith signed this in Seattle on February 26. He was on his way to assist with Douglas-fir research in the UK (page 4), where he resided until late July.

A major talking point in Naseby was utilisation of the accumulating data on seed source/provenance testing. Reports were presented on the latest assessments of the trials resulting from major collections of seed in New Zealand and the PNW over the last 40 years, and a special subgroup was appointed to generate a "ready reckoner" to help members choose the right seedlots for different sites. This group met in Christchurch on May 2 (page 2).

The second day at Naseby was spent in the forest, a forest which is unique by New Zealand standards. For a start, virtually no radiata pine is planted, whilst innovative management and utilisation are allowing the major species, Corsican and ponderosa pine and Douglas-fir, to be sold profitably at a surprisingly young age. One stop was at a new sawmill being

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Douglas-fir Co-op Chairman, Phil De La Mare and Ernslaw One's logging boss on a Naseby skid site during the Co-op field-trip. The Hitachi machine with Valmet processing head behind them is essential for the efficient processing of small Douglas-fir

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constructed by Ernslaw One to take small logs up to 40 cm SED (minimum 12 cm). This will allow production thinnings of Douglas-fir to begin at around age 20-23, with further thinnings approximately every 10 years thereafter. These thinnings not only provide sawlogs for the mill, but also small poles, some of which were being exported to Australia as pony jump rails (photo, p 4). "Waste" wood not suitable for milling or poles was attracting ''better-than-pulp" prices for kindling and firewood. It was inspiring to see such efficient use of young trees (Corsican pine as well as Douglas-fir), aided considerably by a new Hitachi long-arm hydraulic yarder with a Velmet processing head (photo, page 1).

"Ready reckoner" for seed source choice

An obvious question for anyone intending to plant Douglas-fir is, what is the best origin or seed source to use? To answer this question, we now have the genetic material represented in good trials on a range of sites. Even though it is still early days, and it will be many years yet before we can give a definitive answer, we are in a position to give "best bet" advice, and a sub-group of the Douglas-fir Co-op recently met in Christchurch to assemble a "best bet" ready reckoner. Members of the group were Phil De La Mare (Ernslaw One and Co-op Chairman), Shaf van Ballekom and Nick King (Proseed), Mark Belton and Gordon Baker (Mark Belton and Assoc), and Nick Ledgard and Luis Gea (***Forest Research***).

First, we reviewed the results from the major seed source and provenance trials. There are strong leads in these results (see article below), but at this moment it is not possible to get seed from many of these origins, so the ready reckoner was based on seed sources available now, and most likely to be available in the near future.

We constructed a matrix, with seed sources down the left margin and performance along the top. The major performance considerations were vigour and form relative to exposure and soil moisture/fertility, and we gave a subjective score for each of these. The matrix has been released to Co-op members.

As indicated above, a major frustration is availability of seed. For most origins, there has not been a good cone set for a number of years, and therefore we included the likelihood of seed availability in the reckoner. Unlikely to be available for quite a while yet is CP seed from Proseed's seed orchards. This is a pity, as seedlings grown from crosses between clonal material selected in 1988 from the best performing provenances in early trials (mainly 1959) are now featuring right at the top (in growth and form) in results from the 1996 seed source trials.

Californian provenances show top growth rates

Earlier analyses of the effect of provenance on growth reported in previous Douglas-fir Co-op newsletters have been confirmed in more recent analyses by Leith Knowles and Mark Kimberley. Taking the latest measurements available from the 1959 provenance trials, and using covariance analysis to adjust for the uneven replication across the sites, they have shown quite conclusively that the "fog-belt" Californian provenances have come out tops. These data will be presented at the next Co-op meeting.

The data show that when averaged across the 5 sites (Tokoroa, Kaingaroa, Gwavas, Golden Downs, and Hanmer) these top provenances can produce around 20-25 m^3/ha/yr at a final crop stocking of 500-600 stems/ha (the regime applied to these trials). These are figures that rival radiata pine, and considering that the majority of the sawn timber grades out as No 1 framing or better, easily exceeds it in terms of structural quality. Another interesting trend in the results shows that whilst the Californian provenances outperform more northern provenances on all sites, they have done particularly well at Tokoroa, which has previously been considered as the northern limit for planting Douglas-fir in New Zealand. Some Californian provenances have produced MAIs of up to 37 m^3/ha/yr on that site. The role of Douglas-fir in the North Island may need reviewing in light of these results.

Previous research has shown that a key wood property is wood density. The higher the density, the stiffer and therefore more valuable the timber. The effect of provenance on wood density is relatively weak (+ or - 4% approximately), and there is much larger variation within the individuals of any provenance for improvement in wood density (+ or -15% approximately), with commensurate improvement in timber strength and value. By mating the best individuals within these preferred Californian provenances, the prospect of advancing both the growth and quality of this species looks excellent. More information on this specific strategy will be provided at the next Co-op meeting.

(A rather sad footnote is the news that the Hanmer provenance trial was clearfelled without notice in June, 2001. That meant that the most recent three years of growth on this site has gone unrecorded, so we are not able to confirm if the top Californian provenances continue to improve their advantage over the remainder on this representative South Island site. In addition, the opportunity to do some more in-depth wood quality sampling has been lost.)

Form improves with age

These two photos of the same tree were taken 6 months apart. The leader at left was produced on the 4-year-old tree during the 1999/2000 growing season. During the following 2000/2001 season significant straightening occurred (right).

The front page of the last Newsletter featured a photo of a 4-year-old Douglas-fir with its new leader bent at a 90° angle. The same photo appears above, but accompanying it is another taken of the same tree just 6 months later. During just one growing season, it is obvious that there has been considerable straightening of the leader. Other photos, together with data from 276 trees at this Lake Coleridge (Mt Barker) site show similar straightening (see Table below).

Improvements in leader form over 1 growing season. Mt Barker, Lake Coleridge

Distance of branch node from vertical * (mm)		Max distortion of leader from straight line ** (mm)		Form score of leader: from 1 (worst) to 9 (best)		% of trees with scores of <5 ***	
18/10/00	11/4/01	18/10/00	11/4/01	18/10/00	11/4/01	18/10/00	11/4/01
33	15	60	39	5.6	6.3	37%	23%

* distance of branch node at base of 2000 leader from straight line between nodes above and below

** maximum departure from a straight line drawn between top and bottom of 2000 leader

*** Scores of <5 were considered as 'undesirable'; those >5 as 'acceptable'

These measurements show that the leader deformation so obvious in many fast-growing young trees is correcting itself quite quickly. Further assessments will be done in 2002 to see how far this correction process continues.

New New Zealand National Douglas-fir Growth Model to be released soon

The new Douglas-fir growth model, on which progress reports have been provided in previous newsletters, has been completed. As a result of work in calibrating the model to British data during Leith Knowles's sabbatical earlier this year, some major changes have recently been made to the model by Leith and Mark Kimberley. The result has been the development of a suite of models which can be readily calibrated to regions (e.g., Westland, Tapanui) and if necessary to individual forests (Hanmer, Gwavas). In the case of Kaingaroa forest, because of the large quantity of data available, models have been calibrated to sub-regions within the forest. The suite of models will be released to members of the Douglas-fir Co-op automatically within their STANDPAK licence. One task left to complete over the next year is the production of a national suite of new height/age curves for Douglas-fir, to replace the rather dated and geographically incomplete set currently available.

Naseby Forest. Straight Douglas-fir thinnings down to 100 mm SED, for the Australian pony rail market — yet another profitable end-use for small, straight Douglas-fir stems.

British Douglas-fir growth models completed

As many readers will know, the manager of the Douglas-fir Research Cooperative, Leith Knowles, was awarded a four-month sabbatical by ***Forest Research*** to study Douglas-fir growth and yield in Britain between March and June, 2001.

During this time, spent at Alice Holt in Surrey, and at Roslin, near Edinburgh, he was able to put his previous New Zealand-gained knowledge and experience to good effect whilst evaluating Douglas-fir in Britain.

The end result has been the completion of a suite of growth models for use in England, Wales, and Scotland, or at a regional level within each of those countries if desired.

Leith reports that the method he and Mark Kimberley have developed for predicting growth of Douglas-fir in New Zealand seems reassuringly robust when checked against British data, and was readily able to be adapted to British conditions. His analysis showed that height growth, and therefore site index, in Britain is lower than in New Zealand (26 m average MTH at a base age of 40 years, compared to a 32 m average in New Zealand at the same age), and their stem diameter growth was somewhat slower to get into gear. Once these effects had been taken into account, the overall response of the species to site effects and silvicultural treatment was surprisingly similar.

Douglas-fir Co-op meeting and seminar, February, 2002

The next Douglas-fir Research Co-operative meeting will be held at the School of Forestry in Christchurch on Wednesday/Thursday, Feb 13-14, 2002. On the Wednesday morning, members of the Co-op will have their AGM and technical presentation session. During the afternoon, the Co-op will host a Douglas-fir seminar for invited participants, whilst Mark Belton and Associates propose to host a field-day on the Thursday to inspect Douglas-fir plantings up the Rangitata River.

Wednesday afternoon's seminar will feature summary presentations of the latest Douglas-fir research. Of particular interest should be the results of trials testing a wide range of imported and local seed sources on sites throughout the country.

New Zealand Douglas-fir Research Co-operative

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Annual base fee: $5000
Annual area levy: $1.20/ha of Douglas-fir estate