Douglas-fir RESEARCH CO-OPERATIVE Newsletter

No 6, July 2003

Unfair treatment of D-fir in leaky building 'solution'

Any Co-op member reading the Weekend edition of the NZ Herald on June 14th, would have read the 'Leak solution draws flak' article with some alarm. Especially the statement "The decision will be a blow … to … producers of Douglas-fir, which cannot be chemically treated and will therefore be banned from timber framing." The article was referring to the Building Industry Authority's (BIA) decision to require all house framing to be treated with preservative – and this, of course, includes Douglas-fir.

The Herald article is wrong in saying Douglas-fir cannot be treated. It can, and is for particular end uses in North America. Douglas-fir heartwood has adequate durability for internal use, and is also borer resistant. Freshly sawn sapwood can be treated with boron to a level proposed by the new standard. Mick Hedley, a senior researcher with Forest Research in Rotorua, says that protection against decay can also be conferred by light organic solvent preservative (LOSP), although further research is needed to determine whether Douglas-fir can be treated to the required standard. He went on to add that the BIA is proposing a regulation which would effectively ban Douglas-fir timber for structural use such as framing, joists, trusses, and purlins, where in many types of construction, decay of Douglas-fir has not been an issue.

Our Chairman, Phil De La Mare, states that the Douglas-fir industry is totally opposed to a unilateral requirement for treatment where it is not necessary. Douglas-fir's enhanced strength and natural durability (compared to radiata pine) is one of the main reasons why it has been the dominant species used for new plantations in southern New Zealand over the last 10 years. The requirement to use chemicals is unwarranted, and flies in the face of our ability to promote the species as part of a 'clean green' image. "More treatment plants will have to be built," says Phil. "Have we not had enough problems cleaning up the old plants – and just imagine the resource consent process for establishing a new one!"

The Co-op will be making submissions against the proposed NZ Standard 3602, and the proposed new BIA regulations. Needless to say, all support is warmly welcomed.

Freshly cut Douglas-fir timber ready for use in local buildings. Proposed new regulations mean that its position as a premium structural species is under threat.

forest research

Queenstown AGM, technical sessions and field-days

This get-together of Douglas-fir connoisseurs from February 10-12 was the best yet held by the Co-operative. A total of 45 people participated, comprising 18 Full members, 8 Associate members, 8 Forest Research staff and 11 visitors – mostly from the Pacific North-West (PNW) of the USA. The programme was divided into the AGM/Business session, a technical session and field-trips. All this in the attractive setting of Queenstown, with its backdrop of slopes clothed in Douglas-fir.

AGM/Business session

One of the most important outcomes was the passing of approval for a new membership category of Associate member – aimed specifically at small forestry consultants (with one or less full time equivalents), nurseries and supply companies, and individuals with a Douglas-fir estate of <500 ha. The offer of Associate membership also extends offshore, although the criteria are slightly different than those for New Zealanders.

Members discussed future research, which will concentrate on:

- Further assessment and analysis of the Co-op's seed source and progeny trials. These comprehensive trials, mostly established in 1996 and containing a wealth of NZ and overseas material, are at an age when meaningful results can be obtained.
- Rapid screening strategies for assessing D-fir wood quality. Research to date indicates significant wood quality differences within the preferred 'fog belt' provenances, and new technologies should allow these to be detected.
- Refining the influence of site factors on growth performance – see article on page 3.
- Further development of the Douglas-fir calculator. Linking it much more closely with the national DF NAT stand level growth model, thereby turning it into a more comprehensive and flexible silvicultural simulator.
- Improving strategies to control/ manage wilding spread.

Technical session

Fifteen papers were presented, ten dealing with findings from New Zealand-based research, while the others described results from the Pacific North-West.

Summarising just a few of the papers:

- Charlie Low described the establishment in 2002 of a trial to test 53 seedlots produced from controlled crosses within the top selected New Zealand genetic material. The few crosses produced previously have performed very well in earlier trials containing a wide range of material from New Zealand and off-shore. Further improvement is expected.
- Doug Graham described the development of new protocols for sampling D-fir foliage for nutrient testing. It is important that foliage is sampled from the correct parts of the green crown at the right time of the year. Members are expected to make immediate use of this vital information.
- Nick Ledgard's address on stem malformation supported the contention that site factors are likely to be important influences on stem form. To date there is no indication that imported seedlots have inherently better form on exposed sites.
- Leith Knowles described research to model within-tree and between-tree variation in wood and lumber properties, plus the construction of a new model which predicted 64% of whole tree timber Modulus of Elasticity (MoE) from breast height properties of outerwood density, and branch index. Other work on rapid screening methods to determine MoE, found the most efficient method could involve conventional density coring combined with improved use of sound velocity and SilviScan2 testing.

Field-trips

These covered 4 days in total, involving two half-days at Queenstown, plus pre-and post-conference tours. They presented a wide-ranging overview of Douglas-fir growth performance and environmental impacts in the South Island hill and high country.

Two aspects featured:

- The high growth potential for D-fir in parts of the South Island – both lowland and high country. This was evident by the large old trees we saw at Ross Creek (behind Dunedin), and also as younger 18-20 year-old trees in Coronet Forest (near Arrowtown) and at Forest Research's trial site on Ribbonwood station (near Omarama).
- The challenges facing forest managers in the high country, where management often extends far beyond the norm elsewhere – of just planting, thinning and clearfell harvesting. Multi-purpose forestry is increasingly the name of the game, involving the management of recreation, amenity and landscape values alongside production objectives.

The importance of site

Most Co-operative members can walk onto any property with varied soils and topography, and use their experience to determine reasonably accurately the sites most suitable for Douglas-fir. We know that the species is sensitive to moisture availability and exposure, and hence the site factors which influence these – particularly where summer moisture is limited.

Forest Research has access to growth performance from some 1600 permanent Douglas-fir sample plots (PSPs) and it is suspected that some of the variation in growth is a result of variable site factors. The main factors are rainfall, aspect, slope, exposure, and soil attributes such as effective rooting depth, ability to retain moisture, and drainage. In New Zealand, most D-fir sites appear not to be deficient when it comes to soil nutrients. The problem is that we do not have good data to quantify these site effects, and this is limiting our ability to predict performance, particularly on exposed sites. The current research by Dr Su Young Jung is a first step in trying to correct this anomaly.

When faced with obtaining site information, the immediate response of the modern-day, desk-top researcher is to reach for national datasets, digital terrain models or spatial imagery. Frequently used examples are the likes of the BIOCLIM, LENZ or the LCDB. These are powerful sources of information at the macro level – national, regional and sub-district. From them we can obtain good climate data, rainfall being particularly useful. In theory, once eastings and northings have been entered, digital terrain models should be able to supply aspect and slope, plus soil information. However, there is suspicion that the scale and accuracy of these models is not sufficient to detect all the finer details of topography and soil which affect Douglas-fir growth.

Chairman's comment by Phil De La Mare

The Queenstown meeting. Much discussion was generated during the annual meeting held in Queenstown from February 10-12. As a Co-op, we had been in grave danger of fading away after 5 years of falling membership. Therefore, it was heartening to welcome three new Full Members (two of whom had previously been members), as well as ten new Associate members. There is now a real sense of momentum, particularly as we start to reap the benefits of our early research. With this expanded membership, we are due for a strategic review as to where we are headed. Our last such review was 4 years ago.

The annual meeting field trips included visits to Douglas-fir sites with a wide range of altitudes and aspects, and hence - exposure. The effect of exposure on height growth and stem form was obvious, but we are only in the very early stages of quantification (see article on this page). Of particular interest were the opinions on seedlot selection for the various sites visited. A discussion document will be circulated shortly to keep this topic on seedlot choice going, so that we channel our energies appropriately.

Leaky buildings. This is well addressed on page 1. As growers of D-fir, an increasing part of our market appeal is due to the species not requiring preservation in protected above-ground situations.

It is for this reason, that Dr Jung has approached PSP owners for their input, gained from local knowledge of the location of each plot. He has formulated simple categories to make site factor selection as simple as possible. Depending on owner familiarity with the plots, these inputs can be done in the office. Results from data analyses should identify those site factors of greatest impact on D-fir growth performance.

Stem form

Although Dr Jung's study should illuminate the effect of site factors on D-fir growth rate, it will not throw much light on their effect on stem form and grade recovery. A research proposal to address this question has been put to members for consideration. Initially it will concentrate on looking at log-grade recovery from mature stands with uniform moisture availability and soil type, but varied topography and exposure. John Moore, Forest Research's wind specialist, will categorise sites according to altitude, aspect, slope and exposure, and try to relate these to the log-grades recovered. In future, this work will be extended to actual timber-grade effects. We hope that this will enable us to detect sites where malformation is most likely, and to calculate the cost of this malformation, so that exposed sites can either be matched with the appropriate genetics and silviculture, or avoided altogether.

Four-year-old Douglas-fir in Gowan Hills seed source trial. What causes this malformation? Proposed assessment of Co-op trials will determine the relationship of site and genetics relative to stem form.

Notes from the Pacific North-West

In September last year, 25 members of the Forest and Farm Plantation Management Cooperative spent 10 days observing forestry management in the Pacific North-West of the USA. Here are four extracts from notes made by one participant – our secretary, Nick Ledgard.

- Use of multiple species. Douglas-fir dominant, but at Starker Forests, four species were being planted as a mixture - Douglas-fir, 70%, with Western Red cedar (*Thuja plicata*), Grand fir (*Abies grandis*) and Western Hemlock (*Tsuga heterophylla*) at 10% each. The main reason was to spread risk of disease, and widen market options. In theory this appears fine, but potential problems arise at thinning (which to leave?), and harvesting (scattered resource of differing maturity).

Plum Creek containerised seedling nursery in Cottage Grove, Oregon. In the Pacific North West, the cost of containerised stock is coming down and could soon challenge that of bare-rooted seedlings.

- Dominance of container grown seedlings. (See photo.) Advantages are seen as the ability to site nurseries anywhere, grow seedlings to size in 1 year, add fertilisers, and plant for longer periods of the year - Starkers plant 50% of stock in the autumn. Use of soil-less mixes – peat moss with 10% perlite (sawdust and bark were not favoured). Major challenge is getting the correct fertilisers to slow-release over more than 1 year (up to 3). Cost of containerised stock coming down and could challenge that of bare-rooted soon. At Weyerhauser's main bare-rooted nursery (40 million seedlings) near Mima, Washington, a major anticipated future cost is that of hand weeding (use of herbicides not possible). 1/1 stock preferred over 2/0 at Mima, due to better root structure.
- Diminishing available resource of harvestable, large, old-growth timber. At Starfire Timber we saw very large logs (mainly obtained from Indian Reservations at mill-door price of NZ$1100/m^3) being sawn for the Asian market. Interestingly, D-fir logs over 300 years old were known as yellow fir, due to the yellow colour of the heartwood, whereas logs less than 300 years old, are known as red fir. Some logs had resin pockets, which were apparently of no concern to the buyers.
- Changing market demand towards smaller logs. Very few mills can handle large, old growth, logs (>90 cm SED). The most profitable log size in PNW was said to be 25-40 cm SED. At Starker Forests, we saw a 20-year-old D-fir stand which had been profitably production thinned down to 500 spha. SEDs were down to 8 cm, with thinnings returning NZ$1600/ha.

Full Members	Associate Members
Carter Holt Harvey Forest Resources	Avenal Farm
Ernslaw One Ltd	A W Gordon
JPS Ltd	Edendale Nursery
Mark Belton & Assoc.	Fords Nurseries
P.F. Olsen & Co Ltd	Leithfield Nursery
Proseed NZ Ltd	Piers Maclaren & Assoc.
Selwyn Plantation Board Ltd	Rangiora Nursery
Timber Management Co Ltd	Southern Forests NZ Ltd
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Wrightson Forestry Services Ltd	Wood'search Marketing Ltd

New Zealand Douglas-fir Research Co-operative

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Membership fees -
Annual base fee: $5000
Annual area levy: $1.20/ha of Douglas-fir estate
Associate membership: $650/year (see page 2)