Douglas-fir Research Cooperative

No. 8, September 2007 Newsletter

Excellent meeting in Gore

Thirty people were present at the New Zealand Douglas-fir Research Cooperative meeting in Gore on 19–21 February 2007. Members enjoyed one day inside (Technical and Business sessions) and two in the field. For many, the highlight of the first field-day was probably the last stop at the Blue Mountain Lumber Mill between Tapanui and Gore. Mills are common-place to most of us, but this visit was special, as it demonstrated a real turn-around in the Douglas-fir fortunes over the last year — at least in our southern regions (see story on p. 2). Earlier in the day, we walked around Ernslaw One's new seed orchard at Ettrick — an excellent example of a Coop member hosting a very important collection of genetic material for the long-term mutual benefit of all members.

The second field-day saw us visiting one of the Coop's 1996 seed source trials at Gowan Hills. Although the juvenile form of these trees is not the most impressive (probably because they are sited on a very fertile, but rather exposed site), they cover the range of genetics available to New Zealand, and having just been assessed for wood stiffness, will represent a most valuable source of material for future seed production. Earlier in the day we lunched on the White Hill, part of Ernslaw One's Barnhill Forest, where we were shown another use for such land — as the location of a wind farm for the generation of power. Above the forest of Douglas-fir, 29 wind turbines will generate 58 MW — sufficient to supply enough electricity for Invercargill.

Manager Leith Knowles and host Gordon Baker on the Douglas-fir Coop field trip in February within Cainard Forestry's extensive plantings close to Fairlight in northern Southland.

But the high-light of that day was probably the first stop at Cainard Forest close to Fairlight, not far south of Lake Wakatipu. At 2232 ha, this is the largest of the local Cainard Forestry LLC forests, which total 3633 ha. The trees were planted between 2001 and 2005, and the excellent survival and very even growth rate were ample validation of the rigorous nursery and establishment procedure outlined by manager, Gordon Baker. Sites such as Cainard obviously suit Douglas-fir well, but success is not all about fast growth. Gordon spent some time explaining the environmental practices also needed to meet "wise" land management criteria. Included were improved public access to the nearby Eyre Mountains (DOC land), around 100 bait stations checked monthly for possum control, and fringes of less spread-prone species (mainly ponderosa pine) to minimise the risk of wilding spread outside the boundaries.

The two-field-day format for the Coop meeting met with approval, and it was agreed to do the same at next year's meeting, to be hosted by Blakely Pacific Ltd in Timaru.

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The Blue Mountain Lumber story

On 19 February members of the Cooperative were shown around Ernslaw One's Blue Mountain Lumber sawmill at Conical Hill in West Otago. As we left, one hour later, there were smiles all round — in strong contrast to the rather gloomy faces and forecasts which were present at the same venue one year earlier. What has brought about this dramatic change?

Not so long ago, two timber-use issues arose which acutely threatened the viability of commercial forestry in parts of NZ. One was an outcome of the leaky-building saga, which required that all timber used in construction of exterior walls must be preservative treated. "Douglas-fir growers and processors groaned when they heard this" commented Phil De La Mare, Ernslaw One's southern boss and Chairman of the Research Cooperative. "Why? Because the species does not treat easily — indeed its reluctance to absorb moisture is a core reason for its enhanced durability relative to pine." Hence, the treatment regulation put Douglas-fir timber at a disadvantage.

The other issue concerned structural timber stiffness. This resulted in a requirement that all structural timber will eventually need to have its stiffness and strength properties verified in accordance with NZ Standard 3622, adding to the cost of processing sawn timber within the mill. However, this was not all bad news, as Douglas-fir is inherently stiffer than radiata pine, and under machine stress-grading has little problem reaching the minimum stiffness criteria — whereas radiata pine, particularly that grown in southern latitudes, struggles to reach the threshold stiffness criteria as shown by machine stress-grading, even though the visual grades may appear to be met.

As a result of the stiffness requirement, Blue Mountain Lumber ceased all milling of radiata pine and had to shed 60% of its labour force. It also had to install expensive machine stress-grading equipment, and look for a means of preservative-treating Douglas-fir. Hence the frowning faces of a year ago. But, one year later, the stress graders are being replaced by even more modern technology — acoustic grading of timber (A-grader, developed by Ensis Research in Rotorua in conjunction with Falcon Engineering in New Plymouth), "and of even greater satisfaction" stated mill manager, Matt Hitchings "we have managed to locate and install a simple, cost-effective preservative treatment process." This NZ-developed Kopcoat treatment process utilises boron, a common, environmentally friendly chemical which has been around for a long time. The secret of the new success is that the boron is mixed with special ingredients which allow it to penetrate even heartwood of Douglas-fir.

Co-op members inspecting stress graded structural timber at Blue Mountain Lumber's sawmill.

It is now accepted that acoustically tested and boron treated 'Blue Mountain Oregon', the trade name for Conical Hill's sawn Douglas-fir timber, is a high-quality building material. "Although this is well known in much of Otago and Southland, we have confidence that we can spread the good word much further north" concluded a smiling Matt Hitchings.

Douglas-fir manual

The most popular publication ever produced by FRI/Ensis is the Radiata Pine Grower's Manual (FRI Bulletin No 184), written by Piers Maclaren in 1993. Last year, Coop members voted that funds be spent to produce a similar document for Douglas-fir. It will be developed in two steps. The first will be a technical manual, which will summarise all the Coop's technical reports and papers delivered at our annual meetings. The second will take the basics from the technical manual, plus other information, and make it available for more wide-spread use — as with Bulletin 184. We are fortunate that Piers Maclaren is still available to do this work.

At the D-fir Coop meeting in Gore, Piers presented the draft summary of all our past work. This has now been reviewed by six Coop members and is currently being printed.

Continuous-cover forestry and Douglas-fir

For some time now, the Permanent Forests Sink Initiative (PFSI) has attracted attention in forestry circles. When that occurs, Douglas-fir is soon mentioned — as the major NZ forestry plantation species which may have the best attributes for continuous cover forestry. A recent Coop Report (No. 51 "Continuous-Cover Forestry with D-fir") addresses this issue in some detail.

Despite popular belief in this country, D-fir is *not* a very shade-tolerant species and requires substantial light to survive. The good seedling growth that can occur initially under a canopy gap should not be taken as an indicator of subsequent canopy growth. North American researchers have concluded that understorey saplings require at least 30–40% of full light to be continuously maintained for sufficient vigour to allow seedlings/saplings to eventually form part of the canopy. To obtain such light levels, it is necessary to maintain stands with low stockings of canopy trees, or else stands must have "clearfell patches" of at least 0.25 ha, or with a diameter of 1–2 times the height of surrounding trees. The problem is that such large clearfell-patch sizes stretch the definition of "continuous cover".

With lighter stockings and reasonable rainfall, understorey woody species can survive under Douglas-fir in NZ (as seen above), but practising commercially viable continuous cover forestry with the species will not be easy.

Report No. 51 also explores the commercial aspects of a continuous cover regime. It concludes that, under the present rules, profitability will be less than for a typical even-aged D-fir regime. In summary, there is significant doubt as to whether D-fir could meet continuous cover specifications and remain profitable at the same time.

Exposure and stem malformation

How many times have we heard North American visitors remark on the poor stem form of our Douglas-fir in comparison with that in their home country? There has been much argument as to whether this is due to genetics, soil fertility, or topographic exposure. Coop Report No. 49 indicates that topographic exposure is more important than genetics.

A more recent Coop report (No. 52) looks more closely at siting, examining the effect of topographic position. The growth and form of trees on exposed and sheltered sites were related to TOPEX (a measure of exposure) within two South Island forests. Stem volume was much more strongly related to TOPEX than stem form — the malformation of which appeared to be masked by the stunted nature of trees on exposed sites. On sheltered sites where height growth was greater, although even slight malformation was more readily observed, volume was significantly greater.

While this study was preliminary in nature, results showed that there is considerable variation in the quantity and quality of trees within a stand, and that much of this variation can be predicted using a relatively simple measure such as TOPEX. Forest managers have welcomed this finding, as TOPEX can be readily calculated from GIS-based digital terrain models, giving them the opportunity to locate D-fir where growth and form are least likely to be affected by exposure.

Other recently completed projects

- Develop innovative techniques for vegetative propagation
- Estimate heritability of growth, branch size, and timber stiffness
- Evaluate growth differences due to provenance (Pacific North-west seed source), at age 47 years
- Develop new national stand-level volume and mortality functions
- Validate and improve the national stand-level growth model (DF NAT)
- Upgrade the Douglas-fir calculator
- Construct a suite of individual-tree growth models, suitable for "growing-on" inventory data
- Assess portable acoustic tools to measure stiffness (MoE) of trees, logs, and timber
- Compare stability of radiata pine and Douglas-fir timber when subjected to wetting and drying
- Evaluate and improve a model developed in Oregon to predict Swiss Needle Cast

Coop involved with MAF's Sustainable Farming Fund (SFF) wilding project

In July 2006, the SFF approved significant funding for a 3-year project titled "The prevention, management and control of wilding conifers". The recipient of the funds is the South Island Wilding Conifer Management Group, a body representing all those who have concerns about wilding spread (Federated Farmers, LINZ, Landcorp Farming, DOC, Regional Councils, Forest and Bird, and various forest owners). Funds from forest owners are being paid via the D-fir Research Cooperative, the members of which voted that $20,000 be paid to the project annually. This money is part of a total of over $200,000 being contributed by Group members over 3 years, with another $400,000 coming from the SFF.

The project's main aim is to collate and promote existing knowledge about wilding location, prevention, and control. This knowledge will be disseminated via workshops and field-days, an operational manual, and a website devoted solely to wilding issues. One objective will be better maps of wilding location, aimed at improving assessment of risk of wilding conifer spread, and prioritisation of control operations. Mapping will be taken right down to individual property level; farmers in high spread-risk areas will be sent a map complete with customised recommendations and costs for long-term control. A second objective deals with control techniques, with the end result being an operational manual. The third and final objective looks at how to influence vegetation successions occurring after control, so that the "vacuum" created by wilding removal is filled by desired species (be they native conservation or exotic production plants) rather than by a new volunteer crop of "weed" species.

Douglas-fir Research Cooperative members seek a sheltered spot to discuss Ernslaw One's Barnill forest plantings. Here forestry is being practised on the slopes below wind turbines generating 58 MW of power.

Progress after the first year has been good. The mapping work indicates that the gross land area affected in the South Island is over 600,000 ha. Some of the data have been provided by Coop members, and this information is displayed in "secure" form. A report on wilding control techniques has been produced, which includes a provisional DSS to aid managers in sorting out the best control option for their situation. A wilding dedicated website has been set up and can be visited at www.wilding conifers.org.nz.

Membershipof the New Zealand Douglas-fir Research Cooperative

Members (13)
- Blakely Pacific Ltd
- Cainard Forestry LLC
- City Forests Ltd
- Ernslaw One Ltd
- Hancock Forest Management NZ Ltd
- NZ Redwood Co Ltd
- P.F.Olsen & Co. Ltd
- Proseed NZ Ltd
- Rayonier NZ Ltd
- Selwyn Plantation Board Ltd
- Timberlands Ltd
- Wenita Forest Products Ltd
- Weyerhaeuser New Zealand Inc.

Associate Members (20)
- Appletons Tree Nursery Ltd
- Canterbury University
- Department of Corrections
- Edendale Nursery
- Ford's Nurseries
- A W Gordon
- Guild Forestry
- Laurie Forestry Ltd
- Leithfield Nursery
- Mark Belton & Associates
- Oregon Nurseries Ltd
- Piers Maclaren & Associates
- Rangiora Nursery
- Ruru Willis and Co Ltd
- Southern Cypresses Ltd
- Southern Forests NZ Ltd
- Southland District Council
- Waiariki Institute of Technology
- Warren Forestry Ltd
- WSM Ltd

Next Coop meeting in Timaru, 25–27 February 2008 hosted by Blakely Pacific Ltd

Require further information? **Contact the Secretary, Nick.Ledgard@ensisjv.com or call him on (03) 364-2949**