

Stand Growth Modelling Cooperative

NEWSLETTER
September 2006

Welcome to our Sept 2006 Newsletter. After each year (1 July to 30 June), we provide a detailed Annual Report for Members, but for a wider audience, this Newsletter provides an abbreviated version of recent accomplishments.

Currently, we comprise:

Chairman (Industry): Peter Oliver, City Forests Ltd, Dunedin

Programme Manager (Ensis): Bob Shula

Secretary (Ensis): Judy Hayes

Researchers (Ensis): Jenny Grace, Bob Shula, Judy Hayes, Dave Pont, Mina van der Colff, Rod Brownlie, Heidi Dungey, Carolyn Andersen, Lisa Blomquist

Research links: Radiata Pine Breeding Company, WQI Ltd

Membership: 3 large, 10 medium and 4 small companies, plus 2 consultants

Cooperative Contact People		
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Destructive sampling for Internal Stem Modelling

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Mission Statement

The mission of the Cooperative is to develop growth and yield modelling technology to improve the predictions of stem volume and quality from radiata pine plantations through:

- obtaining appropriate data,
- conducting appropriate research, and
- transferring the resulting knowledge to members of the Cooperative.

New Policy

There has been a change to the Intellectual Property Policy (new Clause 6.3).

- *Consultants will not be permitted to use the SGMC models on large forest estates unless the owners are members of the Cooperative. Non-members (above 6,000 ha of managed forest) will be levied for any such use.*



Pan-Cooperative

Currently, New Zealand Forest Research Institute Ltd is developing a 'Pan Industry' R&D strategy looking across Cooperatives and the value chain they collectively represent. Industry, at large, is more concerned to see improved coordination and focus of the overall programme with the best people doing the research and delivering good value-for-money results. This needs to be done without unnecessary overlap, and in an overall programme driven by and focused on specific research needs identified by Industry. An opportunity exists to secure longer term sustainable funding from FRST to support industry contributions to allow forest management research to be better coordinated with clearer commercial justification and delivery of research in terms of outcomes.

Consultant Russell Dale, has put together a Terms of Reference document; a Business Case defining a range of research programmes and outputs; and a new 'management company' model, to be known as Future Forests Research Ltd, which has been accepted in principle by our Coop. A working group comprising of people from the FOA, Ensis, Pan-Coop Board, NZ Farm Forestry Association and Regional Councils, together with Russell Dale, will hopefully complete the establishment details of the new Management Company during the 2006/07 financial year.

Overview of Current Projects

1. Data Provision

Long term trials

Remeasurement of the long term trials has continued during the winter months, with 'in kind' assistance from several companies.

Members agreed to continue measurements of damaged or compromised plots, even though these plots would not be able to be analysed within the original experimental design. This data is to show how growth is affected 'outside the square' – with unusual thinning patterns and/or severe damage.

Next generation of clonal trials

Heidi Dungey completed a report on the gap analysis of clonal trials in New Zealand to determine what material exists for incorporating clones in growth models. She concluded that there were a large number of clonal trials already established, but the majority were below the age of 15, and of single-tree-plot (STP) design.

There is a very limited amount of clonal information available for PSP's to build individual-tree models, thus some creative thinking is required in the future.

There are some fundamental questions that should be addressed:

- examining the way clones grow when they are grown in mixtures versus monoclonal blocks,
- validating the existing models through clonal trials already available,
- and consider the design and feasibility of developing response-surface trials for future modelling purposes.

2. External Stem Modelling

Validation of individual tree model (ITGM)

Datasets from SGMC trials, including the 1975 Final Crop Stocking Trials, 1978 Genetic Gain Trials and 1987 Silviculture /Breed Trials, were used to carry out validations for the individual growth modelling regions.

Results showed less error with short increment periods but for individual trees there were some large errors, particularly when the model was started immediately after silviculture.

Brian Rawley also carried out a behavioural analysis of the models in YTGEM, using a large dataset of real inventory plots with both the CLAYS and Kaingaroa ITGM models. Results for both models showed that the height increment behaved within acceptable boundaries but the DBH increment showed some trees well outside the limits. Brian showed that 'bad' things were happening with small trees at very low stockings. The problem was helped by constraining the individual-tree model with the stand level model in both cases. The number of plots affected by this effect may be small but it is very severe on plots that represent real inventory situations, such as gaps.

Individual-tree Model for silviculture years

In attempting to implement an individual-tree model for the silviculture years a major problem arose in the need to have a crown height predictor. The crown ratio variable explains up to 12 % of variation and is one of three most important variables for explaining variability in the model.

An unsuccessful attempt was made to define a variable within the branch model that mimicked field measurements of crown height.

The future strategy for implementing the silviculture years' model now is to either develop a suitable crown height function or a model that excludes crown height. Following implementation, testing of ITGM and the silviculture years' model will be required to ensure a smooth transition between the models.

One question to consider is, will an individual tree distance independent model perform well when there is uneven spacing after thinning?

3. Crown Modelling

Data collection for testing TreeBLOSSIM

Quantitative measurements of branching are being obtained from scaled images. The film-based system, PhotoMARVL, has now been replaced by a digital-based system known as TreeD. The new system has lower photo costs and less time is taken digitising measurements, but the actual field work costs have not been significantly reduced.

Three TreeD studies were recently completed in an East Coast trial, with varying silvicultures and seedlots; Westland PSPs, from eight forests with a range of branching habits; and Southland PSPs, with a wide range of site conditions and genetics.



Model works well

Model doesn't Work!

Model predictions were often reasonable, but there were some instances of poor performance.

Some issues that arose:

- Very low stocked plots / trees in gaps – should there be a different growth allocation strategy?
- Stem damage may require an exposure rating for PSPs
- Site and stocking potentials for Westland will need to be modified
- There are differences in productivity between forests within a region

4. Internal Stem Modelling

Destructive Sampling in Shellocks Forest, Canterbury

The early felling of this trial (due to sale of the land) presented a rare opportunity to make unrestricted sample selections in a trial of known and detailed history.

A team of 10 staff from Ensis spent a week in Christchurch, carrying out the PhotoMARVL and field data collection. Selwyn Plantation Board willingly contributed 'in-kind' clearing undergrowth and felling trees. The Ensis team also carried out this project within budget, a great effort considering the severe weather conditions during the stay (a late Canterbury snow storm - see front page).

A large amount of data has been analysed, including samples sent to Silviscan, in particular, to predict variation in wood properties in three dimensions (see stem disc images on back page). Some results shown were that compression wood below branch clusters appears to be related to branch diameter and within ring variation is influenced by stocking. Conclusions are that further data is required to understand the role of branches and stocking on within-tree wood property variations.

Meeting and Field Trip February 2006

This meeting was the 50th meeting since the Cooperative was formed in 1986 and we celebrated with a birthday cake and members awards at the Hot Springs Hotel in Hanmer.

'Service Awards' were given out to the following members present at the meeting:

- Jeff Schnell - Longest time as a company representative
- Brian Garnett - 100% attendance at meetings since his company joined the Cooperative
- Brian Rawley – Most meetings attended in total
- Judy Hayes – Secretary at all 50 meetings since October 1986

The field trip, beginning in Hanmer, was a great success. The group visited the covenanted recreational area in Hanmer forest which boasts the oldest plantation of mixed exotic trees in the country.



Conical Hill lookout over Hanmer Forest

Then on to Burnham forest to look at several trials managed by the Site Management Cooperative:

- Long-term effects of intensive vegetation management
- Effect of initial spacing and genotype on stiffness
- Determination of critical buckling height

Finally we were given an overview, by Kerry Ellem, of the deforestation on the Canterbury plains being carried out by Selwyn Plantation Board. He explained the process of forest conversion, saying that it was no longer economic to grow trees in the region, given the problems of moisture, fire and wind. Currently they are converting land (at a cost of \$4-6,000/ha) to various levels from lifestyle blocks to high intensity productive pasture.

Membership

New membership was approved for Blakely Pacific; Gareth Waugh is their Technical Rep. Marion Hughes was welcomed back from maternity leave and Kaingaroa Timberlands, Rayonier and Ernslaw changed Reps. Thanks go to Steve Dowman for his contributions to the SGMC during a long association with many of the Cooperatives. Forest and Woodlot and Forestworks both resigned during the year.

When and Where Is Our Next Meeting?

Our next meeting is on October 24-26 at Palmerston North, combining with all the Radiata Pine Cooperatives for a joint meeting and field trip. The purpose of the meeting is to give members of the three radiata cooperatives the opportunity of reviewing and taking stock of their achievements.

Cooperative Membership @ Sept 2006	
Blakely Pacific Ltd	Gareth Waugh, Timaru
Carter Holt Harvey	Fred Schipper, Tokoroa
Chandler, Fraser, Keating	Mike Colley, Rotorua
City Forests	Peter Oliver, Dunedin
Corrland	Graham Hardisty, Turangi
Ernslaw One	Iain McInnes, Tauranga
Hancock Forest Mngt (NZ)	Ian Jenkin, Rotorua
Hikurangi Forest Farms	Ross Wade, Gisborne
JP Management Consulting	Steve Croskery, Masterton
Timberlands (Kaingaroa)	Ian Hinton, Rotorua
Pan Pac Forest Products	Brian Garnett, Napier
Matariki Forests	Jeremy Wilson, Auckland
Ministry of Agric & Forest	Peter Gorman, Wellington
P.F. Olsen & Co	Jeff Schnell, Rotorua
Selwyn Plantation Board	Hugh Stevenson, ChCh
Silmetra	Brian Rawley, Tokoroa
Timberlands West Coast	Ross Jackson, Greymouth
Wenita Forest Products	James McEwan, Dunedin
Weyerhaeuser NZ Inc	Marion Hughes, Nelson



Stem discs showing variation in wood colour around the stem and within an internode