NZDFI NEW ZEALAND DRYLAND FORESTS INITIATIVE
breeding tomorrow's trees today

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Project Update - December 2013 – June 2014

BREAKING NEWS – exciting developments for the NZDFI

On June 25th 2014 the NZ Dryland Forests Initiative held its Annual Project Meeting at the Marlborough Research Centre in Blenheim. At this meeting, NZDFI project chairman, Shaf van Ballekom, announced three exciting developments:

- **State of the art propagation facilities to be available at Proseed**

Good news for NZDFI is that Ngai Tahu-owned tree seed company Proseed is well advanced with building a new propagation facility at its site in Amberley, Canterbury. Proseed are one of NZDFI's founding partner with Shaf their CEO. This new facility, together with Proseed's skilled staff, enhances NZDFI's potential to do controlled pollination of selected parent trees and develop techniques for the propagation of cuttings.

Shaf is excited about collaborating with NZDFI in the new facility.

"This is a significant investment by our owners and reflects Proseed's commitment to the durable eucalypt programme. Not only will the facility allow us to graft new orchard selections from the breeding programmes, but also we intend investigating techniques for early flowering, and creating hybrids, as well as propagation techniques."

Shaf van Ballekom and Paul Schroeder discuss progress with construction of Proseed's new propagation facility at Amberley

- **Marlborough beekeeper donates $50,000 to support NZDFI research**

Marlborough beekeeper James Jenkins, of Marlborough Gold Honey, has made an unsolicited donation of $50,000 to the project. James's donation comes without obligation, but James has an interest in two aspects of the NZDFI's work – growing high-value, durable timber as an alternative to radiata pine, and the potential for using eucalypts as part of a strategy to provide pollen and nectar to support bees year-round.

"Initially I backed this project from the timber perspective," says James *"I am fascinated by the potential of these trees, and the exciting markets and returns to growers. But now I realise that they have the potential to provide pollen and nectar in the autumn and winter off-season. For beekeepers this means more beehives can be kept, which will be good for individuals, the region and the country."*

James acknowledges that he works with many farmers in Marlborough who are happy to have his hives on their property and not be paid because they value the bees as crop pollinators. James considers that the money he would otherwise be paying to these farmers is a significant part of his donation to NZDFI.

Shaf van Ballekom (R) thanks James Jenkins (L) for his generous donation of $50,000 to NZDFI

- **NZ Forest Growers Levy Trust Funding for four new PhD scholarships**

The University of Canterbury's School of Forestry has secured forest growers levy funding of $50,000 per annum for up to four new PhD scholarships that will focus on NZDFI work. The School of Forestry is a foundation partner of the NZDFI, with a number of academics and students already contributing to the rigorous science which underpins all the NZDFI's work.

Three students have already been selected to start work on projects looking at breeding for heartwood properties, measuring timber durability and inter-site variation in tree growth, and further projects will come on stream soon.

School of Forestry head, Professor Bruce Manley, says:

"We are pleased to be a partner in a project that is attempting to broaden the base of plantation forestry in New Zealand and enabling the planting of new species on new sites. The project provides exciting research opportunities for our students - both postgraduate and undergraduate. The energy and enthusiasm associated with NZDFI makes it a stimulating initiative to be part of."

OTHER NEWS FROM THE PAST FEW MONTHS –

Forest Operational Research and Extension Programme - SFF 13-024 project: Enabling growers to maximise value from planting durable eucalypts

- **Successful pruning workshops held**

As part of NZDFI's on-going Sustainable Farming Fund project, Paul Millen recently held five pruning workshops in the Wairarapa, Bay of Plenty, Gisborne, Hawkes Bay and in Marlborough as an adjunct to the NZFFA annual conference. These were popular and focused on transferring form-pruning knowledge and practical skills to core groups of growers, advisers and contractors. Paul was supported at all the workshops by Ken Scott, of Lakewood Products, whose company produces a range of high-quality pruning tools including the Pro Pruner and is sponsoring NZDFI's pruning workshops and videos.

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At the Marlborough workshop Ruth McConnochie, NZDFI's Tree Breeding consultant and Dean Satchell of Sustainable Forest Solutions also gave presentations at MRC and led discussion on the field trip.

Dean Satchell explains form pruning on the field trip held for the NZFFA national conference NZDFI workshop, Marlborough.

Ken Scott speaking about pruning equipment during the Hawkes Bay pruning worshop at Rick Alexander's property.

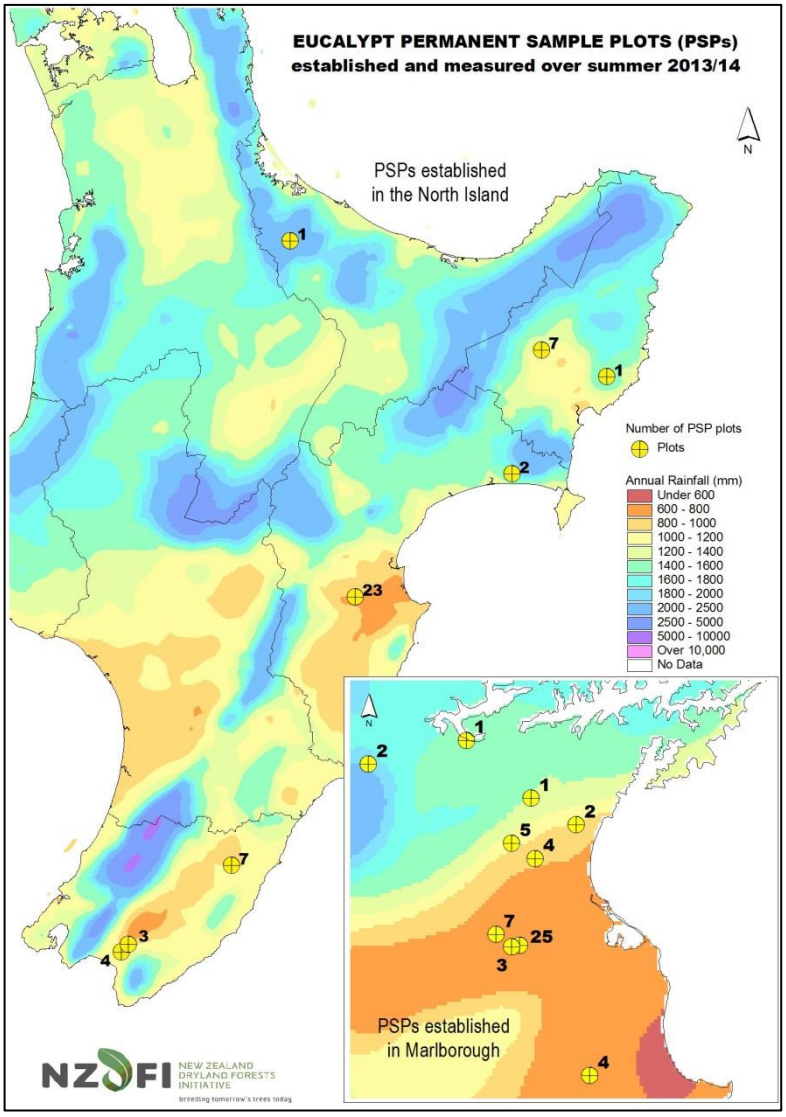
A set of practical guidelines on form pruning is now available on the NZDFI website www.nzdfi.org.nz. A further output from the project will be a short video demonstrating form pruning techniques which will also be freely available on-line, and more workshops are planned for 2015. A second video describing best-practice establishment techniques is also scheduled into the 2015 work programme.

- **Forest productivity measurement programme underway**

A key part of NZDFI's R&D work is the network of trials and the landowners hosting them. A total of 20 sites are now established with trials. Some sites have multiple trial types while others only have one. In total 22 'demonstration trials' have been planted, where a range of the species selected for development that are being tested under different environmental conditions, and 16 'breeding populations' have been planted, the purpose of which is to find the best families within individual species for future breeding work.

Over the past six months 102 permanent sample plots (PSPs) have been established within these trials that are widely distributed across sites in different rainfall zones (see map below). While PSPs in the demonstration trials will measure the 'best bet' species on different site types, PSPs in the breeding trials will measure the best-performing families within a species – a key objective of the project, as the best-performing families are planned for inclusion in NZDFI's first seed orchards.

University of Canterbury (UC), Proseed NZ Ltd and NZDFI collectively funded two undergraduate summer scholarships with Bridget Armstrong and Anna O'Grady who worked in Marlborough with consultant Tree Breeder Ruth McConnochie and Paul Millen to assist in NZDFI's permanent sample plot (PSP) establishment and measurement programme.



In total, 102 PSP's were established and measured (see map) with the data from around 6,500 individual trees being archived in NZDFI's new PSP Register by Kevan Buck who is an expert in forest data capture and analysis. The data within this register is the base for NZDFI's growth and productivity modelling work. The PSP plots are all mapped by GIS specialist Roger May and highlight the amount of intra-site variation within and between species.

More PSP's will be established next summer if additional funding can be won through a new AGMARDT application that has been made by UC. Otherwise, SFF funding ensures that the PSPs now established can be re measured in two years time.

NZDFI Tree Improvement Programme

- **Breeding populations continue to be assessed**

  Some exceptional family growth rates were recorded in the *E. globoidea* breeding population that was planted in 2011 at Atkinsons in southern Wairarapa. About fifty percent of this site was assessed by Ruth McConnochie and Bridget Armstrong (one of the UC students) in January. Within this 20 month old trial the maximum height recorded was 4.45 m with the mean family height ranging 180.2 – 288.2cm. Due to the fast growth rates at this site this area of the trial is planned for early thinning and pruning later this year.

Bridget Armstrong measures a 20 month old E. globoidea with a height of 4.45 m in the breeding population at Atkinsons

- **UC summer student wood durability research project completed**

  Another University of Canterbury under graduate student in Chemical & Process Engineering, Tobias McLaughlin worked on an additional summer scholarship project funded by UC and NZDFI.

  Tobias used the scholarship to study '*Methodology for the Analysis of Variations in the Natural Durability of Eucalyptus bosistoana Wood'.* This honours project focused on developing and testing novel methodologies including UV/Visible spectrophotometry as a suitable method for the rapid non-destructive analysis of the durability of the best families in our breeding populations is needed for accurate analysis of the 1000's of samples that are planned for collection.

IN THE PIPELINE - NZDFI activities 2014-2016

- **New trial sites**

Up to seven new demonstration trials are planned for planting in spring 2014. These will spread the geographical range of sites especially in the North Island and also add diversity in terms of site type and the environmental conditions in which durable eucalypt species are being trialled. Tree stocks, grown by Morgans Road Nursery in Blenheim, are of *E. bosistoana, E. camaldulensis, E. cladocalyx, E. globoidea, E. longifolia, E. macrorhyncha, E. quadrangulata* and *E. tricarpa.*

All these species meet the criteria identified by the NZDFI team as essential for future markets:

- Class 1 or 2 durability (Australian standard)
- Good stiffness and strength properties
- Established timber potential (experience from Australian markets)

- **Eucalypts for bees – a new research opportunity**

Eucalypts have huge potential to be part of the solution to maintaining healthy bee populations in New Zealand. Many species are precocious flowerers, and may also flower in autumn and winter - times of year when other species, including manuka, are not flowering. However, there is a dearth of knowledge about the flowering behaviour of different eucalypt species in different parts of the country, and also the quantity and quality of pollen and nectar produced by different species.

As a first step, NZDFI is collaborating with the Trees for Bees group to plan a research project to investigate the timing of flowering of eucalypts nationwide, and then develop guidelines for landowners, beekeepers, regional councils and nursery growers. The guidelines will enable ground durable eucalypts to be incorporated into plantings that will enhance bee health and viability without threatening manuka honey production. The questions the project will seek to answer are:

- What are the flowering times of durable eucalypt species in New Zealand and how do these times change from north to south?
- Which durable eucalypt species (and genotypes) offer high quality pollen and nectar?
- How many of these species are needed in a woodlot or shelterbelt to support the bees on a particular site?

Bees at work in E. bosistoana flowering in March in Marlborough

A final word from Paul....

In the past few months there's been some excellent growth in many of NZDFI's trials as well in the interest and support for NZDFI. **A big thank you** to all those that hosted and helped organise the pruning workshops as well as to those that attended. Your support, interest and enthusiasm for growing eucalypts made all these workshops successful.

This support has been topped off by the huge generosity of James Jenkins in making a donation of $50,000 to support NZDFI's R&D programme. James has kept hives at Tai Tane (my property in the Marlborough Sounds) for over 25 years and we have always appreciated the value of the bees in our gardens and orchard as well as the pots of honey he gave for rent every year. So it's really wonderful that he's now being able to turn his pots of honey into pots of gold and has given one of these to NZDFI!

Anyone wanting further information and you can encourage others to contact:

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