NEW ZEALAND INSTITUTE OF FORESTRY FOUNDATION

ANNUAL REPORT

Year Ended 31 March 2023

MESSAGE FROM THE CHAIR

The NZIF Foundation was established by the Institute in December 2011. It is a legally separate entity from the Institute and is a registered charity with IRD donee status (meaning donations to it are eligible for tax credits).

The purpose of the NZIF Foundation is to raise funds that can be used to encourage and support forestry related research, education and training through the provision of grants, scholarships and prizes; promote the acquisition, development and dissemination of forestry related knowledge and information and other activities that do not conflict with the Foundation's charitable purpose. In the Trust Deed, forestry has been given a broad definition to include all those activities involved in the management and use of forests and their products, the objects of which are the production of wood or other forest benefits and the maintenance of the environment in its most beneficial form.

Subject to certain powers retained by NZIF under the Trust Deed (e.g., appointment of Trustees, approval of any name change, approval to any changes the Deed and approval to winding up the Foundation) and to the provisions of the Deed, all activities of the Foundation are under the control of the Trustees.

The Trustees in the year to 31 March 2023 were:

Tim Payn (appointed as trustee 1st August 2020 and Chair on 1 March 2022)
Andres Katz (appointed 30 November 2017)
Prue Younger (appointed 1 July 2021)
Lou Sanson (appointed 1 July 2021)

Jay Matthes and Raewyn Agnew, NZIF Administrators, assist with administration of the Foundation.

The Foundation announced the following awards at the NZIF Conference dinner in Auckland on 12th September 2022:

- Future Forest Scholarship: A scholarship of $10,000 went to Carolin Weser, a PhD student at the University of Canterbury School of Forestry for her research on 'Phenology and natural enemies of *Paropsisterna cloelia and Paropsis charybdid* in Marlborough. This award was made possible by a 2017 donation of $70,000 from the forest investment company New Forests.
- NZ Redwood Company Scholarship: Liam Walker a 3rd year B.For.Sc. honours student at the School of Forestry at the University of Canterbury, received the $5,000 NZ Redwood Company Scholarship.
- Mary Sutherland Scholarship: Treen Hawker a 2nd year Diploma in Forest Management student at Toi Ohomai received the $1000 Mary Sutherland award
- Undergraduate scholarship: Heather Harper, a 3rd year B.For.Sc. student at the School of Forestry at the University of Canterbury received the $1,000 undergraduate award.
- Student poster awards: Equal first – Treen Hawker and Lily Marshall ($650 each); third Uliana Anderson ($200). All are Diploma in Forest Management students at Toi Ohomai.

This was the final year the Foundation was able to offer the Future Forest and Redwood scholarships and I would like to acknowledge the generosity of New Forests and the Redwood Company in their support over past years.

Students have been putting their scholarships to good use. Vikash Ghildiyal, Future Forest award winner 2021, who is studying the improvement of the drying quality of Eucalyptus continues to

report good progress towards completion of his Ph.D. He has finalised five chapters of his Ph.D and has one scientific journal article on genetic variation in drying collapse and other wood properties of Eucalyptus globoidea submitted and under review, and he will shortly submit a second journal article on electrical phenomena in trees and green timber (see Appendix 1).

Carolin Weser, Future Forest award winner 2022, is deeply involved in her field sampling programme at two sites, Dillon and Lawson which have differing climates. Sampling is focussing on egg sampling and surveys of predator presence and abundance. Incubation of egg masses in the laboratory are being undertaken to determine the amount of parasitism. She has also started the development of the molecular procedures for future analysis of gut content of predators (see Appendix 1)

The Board agreed to offer the following awards, totalling $11,500, in 2023:

- One Otago Southland Award of $2,000 to assist a project or projects of relevance to forestry in the Otago/Southland region
- A Mary Sutherland Scholarship of $2,000 for a polytechnic student
- A University Undergraduate Scholarship of $2,000
- A Frank Hutchinson Postgraduate scholarship of $2,000
- The Chavasse travel award of $3,500

The Board agreed not to offer the student poster awards as the 2023 conference will be held in Brisbane jointly with the Australian Institute of Forestry as the trustees felt this would limit New Zealand students' ability to participate.

The funds for the awards offered, arise from donations given in return for a commitment from the Foundation to establish the awards.

The Trustees were pleased to receive $5,110 in donations from members during the year. This is lower than in past years and the trustees will focus on ways to increase this in 2023 and onwards. Activities will involve developing a picture of what awardees have done since receiving their awards and how the awards have helped them; developing a new and more informative Foundation website, developing regular communication to NZIF and the wider community promoting the benefits of the Foundation and its awards, and developing a donation prospectus to share with potential donors. Donations are the lifeblood of the Foundation, and I would encourage members to donate, however small an amount. This benefits future generations of foresters.

In closing my report I thank my fellow Trustees Andres Katz, Lou Sanson and Prue Younger for their inputs. I also thank Jay Matthes and Raewyn Agnew for their assistance with administration of the Foundation during the year, and the NZ Institute of Forestry for funding that assistance.

The financial statements for the year to 31 March 2023 are attached. They have been prepared using the template and associated guidance notes applying to a Tier 3 not-for-profit entity available on the External Reporting Board web site (www.xrb.govt.nz).

Tim Payn

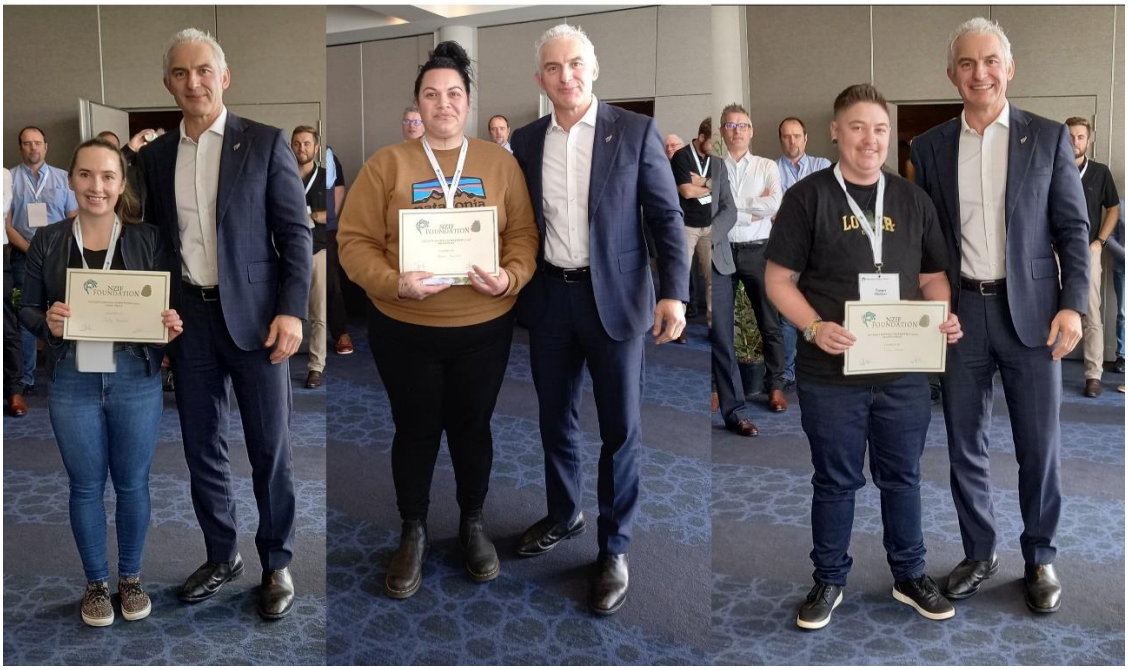
Chair, NZIF Foundation

REPORTS FROM AWARD WINNERS

Reports from two of those who received NZIF Foundation scholarships and awards in 2021 and 2022 are contained in Appendices 1 and 2.

Vikash Ghildiyal a PhD student at the School of Forestry at the University of Canterbury. received a 2021 $10,000 **Future Forest Scholarship** for his research on improving the drying quality of Eucalyptus.

The winner of the 2022 **Future Forest Scholarship**, worth $10,000, was **Carolin Weser** a Ph.D student at the University of Canterbury.



Student Poster Awards presented by Forestry Minister Stuart Nash at the Auckland NZIF Conference in September 2022. Left to Right. Lily Marshall, Uliana Anderson, Treen Hawker all of Toi Ohomai Institute of Technology – Te Pūkenga.

New Zealand Institute of Forestry Foundation

Performance Report

Year ended 31 March 2023

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New Zealand Institute of Forestry Foundation

Entity Information

Year ended 31 March 2023

Legal Name:	New Zealand Institute of Forestry Foundation
Other Name:	NZIF Foundation
Legal Basis:	Registered Charity, Incorporated under the Charitable Trusts Act 1957
Registration Number:	Registered Charity CC47691 Incorporated Society 2556124

Purpose:

The advancement of education in relation to forestry, including, in particular:

1. Acquiring, developing and disseminating knowledge
2. Educating the New Zealand public in relation to forestry.

The activities may include:

(a). Research, education and training assistance through the provision of grants, scholarships, prizes or other forms of assistance

(b). Educational initiatives and publications, through supporting conferences, seminars, courses and the publication and distribution of forestry-related publications

(c). Activities incidental to the Foundation's purposes.

Note: Forestry includes all those activities involved in the management and use of forests and their products, the objects of which are the production of wood or other forest benefits and the maintenance of the environment in its most beneficial form.

Entity Structure

The Council of the New Zealand Institute of Forestry (NZIF) is responsible for appointment, reappointment and removal of trustees.

There must be between three and five Trustees.

The NZIF Council is entitled to appoint one of the Trustees to hold office as chairperson and may also remove and replace any person so appointed.

The Trustees in the year to 31 March 2023 were:

Tim Payn (Chair)

Appointed as a trustee for a five-year term from 1 August 2020 to 31st July 2025
Appointed as Chair at 1 March 2022.

Andres Katz

Appointed as a trustee for a five-year term from 30 November 2017 to 30 November 2022.

Prue Younger

Appointed as a trustee for a five-year term from 1 July 2021.

Lou Sanson

Appointed as a trustee for a five-year term from 1 July 2021.

Jay Matthes and Raewyn Agnew, NZIF Administrators, assist with administration of the Foundation.

Main Source of Cash and Resources

The main source of revenue is donations from NZIF members and other individuals, companies and associations operating in the NZ forestry sector.

Main Methods to Raise Funds

Appeals to NZIF members and to companies and associations operating in the NZ forestry sector.

Reliance on Volunteers and Donated Goods or Services

The Foundation is administered by the Trustees in a voluntary capacity, assisted by Jay Matthes and Raewyn Agnew.

Physical Address:	c/- NZ Institute of Forestry Level 9, 93 The Terrace Wellington, New Zealand
Postal Address	c/- NZ Institute of Forestry PO Box 10 513 The Terrace Wellington 6143 New Zealand
Phone	+64 4 974 8421
Email:	foundation@nzif.org.nz
Website:	http://www.nzif.org.nz

New Zealand Institute of Forestry Foundation

Statement of Service Performance

Year ended 31 March 2023

Description of Outcomes

The objectives of the Foundation for the year to 31 March 2023 were:

- To solicit donations from NZ Institute of Forestry members and other individuals, companies and organisations operating in the NZ forestry sector;
- To offer the following scholarships and awards during the year:

  One final Future Forest Scholarship of $10,000, for post graduate research at a recognised New Zealand tertiary institution into NZ plantation forestry, with a preference given to projects in the areas of environmental markets, wood fibre markets, forest logistics, productivity and genetics.

  NZ Redwood Company Scholarship of $5,000 for a Bachelor of Forestry Science student at Canterbury University.

  One or more Otago Southland Awards up to a combined total of $5,200 to assist a project or projects of relevance to forestry in the Otago/Southland region

  Frank Hutchinson scholarship of $1,000 – available to students enrolled for a forestry or forestry-related postgraduate degree at a NZ University.

  Undergraduate scholarship of $1,000 – available to students enrolled for a forestry or forestry-related degree at a NZ University.

  Mary Sutherland scholarship of $1,000 – available to students enrolled for a forestry or forestry-related course at a NZ Polytechnic.

  Prizes for the best student posters submitted to the 2022 NZIF Conference to be held in Auckland in September 2022.
- The following was not offered in the 2022/23 year.

  Due to travel restrictions caused by Covid, plus reduced income in the year to 31 March 2022, the Trustees decided not to offer the Chavasse Travel Award.

Description and Quantification of Outputs

	Actual This Year	Budget This Year	Actual Last Year
Seek donations	$5,110		$44,940
A Future Forest Scholarship awarded to Carolin Weser, a PhD student at the University of Canterbury	$10,000	$10,000	$10,000
NZ Redwood Company Scholarship – awarded to Liam Walker a 4th year B.For.Sc. student at the University of Canterbury School of Forestry	$5,000	$5,000	$5,000
Jon Dey Memorial Award – no award made	$0	$0	$4,000
Otago Southland Award – no award made	$0	$5,200	$0

Frank Hutchinson Award - no award made	$0	$1,000	$1,000
University Undergraduate Scholarship – awarded to Heather Harper, a 3rd year Bachelor of Forestry Science student at the School of Forestry at the University of Canterbury	$1,000	$1,000	$1,000
Mary Sutherland Award – awarded to Treen Hawker, a 2nd year Diploma in Forest Management student at Toi Ohomai Institute of Technology in Rotorua	$1,000	$1,000	$2,000
Poster Prizes – Three 2nd year Diploma in Forest Management students at Toi Ohomai received prizes in the student poster competition - Treen Hawker received first equal prize of $650 - Lily Marshall received first equal prize of $650 - Uliana Anderson received third prize of $200	$1,500	$1,500	$0

New Zealand Institute of Forestry Foundation

Statement of Financial Performance

Year ended 31 March 2023

	Notes	2023	2022
Revenue			
Donations	1	5,110	44,940
Interest	1	6,611	4,591
Total Revenue		11,721	49,531
Expenses			
Awards and Grants	2	18,500	20,500
Bank charges	2	0	40
Total Expenses		18,500	20,540
Surplus /(Deficit) for the Year		(6,779)	28,991

New Zealand Institute of Forestry Foundation

Statement of Financial Position

Year ended 31 March 2023

	Notes	2023	2022
Current Assets			
Bank accounts	3	11,421	3,554
Term Deposit	4	267,873	287,601
Accrued interest	3	6,772	1,732
Total Current Assets		286,066	292,886
Non-current Assets		0	0
Current Liabilities		0	40
Non-current Liabilities		0	0
Net Assets		286,066	292,846
Accumulated Funds			
Capital contributed by owners or members			0
Accumulated surpluses/(deficits)	6	286,066	292,846
Reserves			0

Total Accumulated Funds	6	286,066	292,846

For and on Behalf of the Trustees

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T.W. Payn, Chairperson Prue Younger, Trustee

New Zealand Institute of Forestry Foundation

Statement of Cash Flows

Year ended 31 March 2023

	Notes	2023	2022
Cash Flows from Operating Activities			
Cash was received from:			
Donations, fundraising and similar receipts	1	5,110	44,940
Interest, dividends & other investment receipts		1,566	5,512
Cash was applied to:			
Payments to suppliers	2	40	40
Donations or grants paid	2	18,500	20,500
Net Cash Flows from Operating Activities		(11,864)	29,912
Cash flows from Investing and Financing Activities			
Cash was received from			
Withdrawal from investments		21,274	18,496
Cash was applied to			
Payments to purchase investments		1,542	50,504
Net Cash flows from Investing & Financing Activities		19,732	(32,009)
Net Increase/(Decrease) in Cash		7,868	(2,096)
Opening Cash		3,554	5,650
Closing Cash	3	11,421	3,554
This is represented by:			
Bank Accounts & Cash	3	11,421	3,554

New Zealand Institute of Forestry Foundation

Statement of Accounting Policies

Year ended 31 March 2022

Basis of Preparation

New Zealand Institute of Forestry Foundation has elected to apply PBE SFR-A (NFP) Public Benefit Entity Simple Format Reporting - Accrual (Not-For-Profit) on the basis that it does not have public accountability and has total annual expenses of equal to or less than $2,000,000. All transactions in the Performance Report are reported using the accrual basis of accounting. The Performance Report is prepared under the assumption that the entity will continue to operate in the foreseeable future.

Goods and Services Tax (GST)

New Zealand Institute of Forestry Foundation is not registered for GST. Therefore, amounts recorded in the Performance Report are inclusive of GST (if any).

Income Tax

New Zealand Institute of Forestry Foundation is wholly exempt from New Zealand income tax having fully complied with all statutory conditions for these exemptions.

Bank Accounts and Cash

Bank accounts and cash in the Statement of Cash Flows comprise cash balances and bank balances (including short term deposits) with original maturities of 90 days or less.

Tier 2 PBE Accounting Standards Applied

None applied.

Changes in Accounting Policies

There have been no changes in accounting policies during the financial year (last year – nil).

New Zealand Institute of Forestry Foundation

Notes to the Performance Report

Year ended 31 March 2023

Note 1: Analysis of Revenue

Revenue Item		2023	2022
Donations and other similar revenue			
General donations		5,110	39,940
Donation to Otago Southland Award		0	0
Donations to Dey Award		0	0
Donations to Future Forests Award		0	0
Donations to Invercargill City Forests Award		0	0
Donations to Redwood Scholarship		0	5,000
Stout Trust grant for Mary Sutherland book		0	0
	Subtotal	**5,110**	**44,940**
Interest, dividends and other investment revenue			
Interest on bank account		25	8
Interest on term deposits		6586	4583
	Subtotal	**6,611**	**4,591**
Total		**11,721**	**49,531**

Note 2: Analysis of Expenses

Expense Item		2023	2022
Costs related to providing goods or services			
Bank related fees		0	40
Administration and overhead costs			
	Subtotal	0	40
Grants and donations made			
Future Forests Scholarship		10,000	10,000
NZ Redwood Company Scholarship		5,000	5,000
Mary Sutherland Scholarship		1,000	2,000
University undergraduate scholarship		1,000	1,000
Frank Hutchinson scholarship		0	1,000
Student Poster Prize		1,500	1,500

	Subtotal	18,500	20,500
Total Expenses		**18,500**	**20,540**

Note 3: Analysis of Assets and Liabilities

Asset Item		**2023**	**2022**
Bank accounts and cash			
Cheque account balance		11,421	3,554
	Subtotal	11,421	3,554
Other current assets			
Short term deposits		267,873	287,601
Accrued interest		6,772	1,732
	Subtotal	274,645	289,333
Total Assets		**286,066**	**292,886**
Liability Item			
Creditors			
BNZ audit certificate		0	40
	Subtotal	0	40
Total Liabilities		**0**	**40**
Total Assets less Total Liabilities		**286,066**	**292,846**

Note 4 : Term Deposits Maturity Dates

		Opening value	**Current Term**	**Interest rate**	**Start date**	**Maturity date**
Term Deposit 1	67396764-00001	$ 131,211	18 mths	2.20%	20/01/2022	20/07/2023
Term Deposit 4	67396764-00004	$ 31,818	12 mths	5.30%	27/01/2023	28/01/2024
Term Deposit 5	67396764-00005	$ 21,858	18 mths	1.45%	7/10/2021	11/04/2023
Term Deposit 6	67396764-00006	$ 21,858	16mths	1.45%	7/10/2021	11/04/2023
Term Deposit 7	67396764-00007	$ 5,472	269 days	4.50%	18/01/2023	14/10/2023
Term Deposit 9	67396764-00009	$ 10,655	269 days	4.50%	11/04/2023	13/11/2023

Term Deposit 11	67396764-00011	$ 45,000	2 yrs	2.30%	29/11/2021	29/11/2023
		$ 267,873				

Note 5: Property, Plant and Equipment

The Foundation does not own any property, plant or equipment.

Note 6: Accumulated Funds

Description	**2023 Capital Contributed by Owners or Members**	**Accumulated Surpluses or Deficits**	**Reserves**	**Total**
Opening Balance	**0**	**292,846**	**0**	**292,846**
Capital contributed by owners or members	0	0	0	0
Capital returned to owners or members	0	0	0	0
Surplus/(Deficit)		(6,779)		(6,779)
Distributions paid to owners or members	0	0	0	0
Transfer to Reserves	0	0	0	0
Transfer from Reserves	0	0	0	0
Closing Balance	**0**	**286,068**	**0**	**286,068**

Description	**2022 Capital Contributed by Owners or Members**	**Accumulated Surpluses or Deficits**	**Reserves**	**Total**
Opening Balance	**0**	**263,855**	**0**	**263,855**
Capital contributed by owners or members	0	0	0	0
Capital returned to owners or members	0	0	0	0
Surplus/(Deficit)		28,991		28,991
Distributions paid to owners or members	0	0	0	0
Transfer to Reserves	0	0	0	0
Transfer from Reserves	0	0	0	0
Closing Balance	0	292,846	0	292,846

Note 6: Commitments and Contingencies

Commitments

There are no commitments as at balance date (Last Year - nil).

Contingent Liabilities and Guarantees

There are no contingent liabilities or guarantees as at balance date (Last Year - nil).

Note 7: Other

Significant Grants and Donations with Conditions which have not been Recorded as a Liability

The Otago-Southland Award was created in 2013/14 from funds arising from the members of the Otago Southland section of NZIF. Awards can be made to assist or enable a project of relevance to forestry in the Otago Southland Region. The award will continue until the fund is exhausted.

The Future Forest Scholarship was established in 2016/17 from funds donated by the Australia and New Zealand Forest Fund 2 for research at any recognised NZ tertiary institution into NZ plantation forestry with a preference given to projects in the areas of environmental markets, wood fibre markets, forest logistics, productivity and genetics. Up to two scholarships, each of $10,000 may be awarded each year until the fund is exhausted.

The NZ Redwood Company scholarship was established in 2017/18 to make one $5,000 scholarship available annually to students at the University of Canterbury, enrolled for a Bachelor of Forestry Science. The award will continue until the fund is exhausted.

2023

Description	Original Amount	Balance at start of year	Additions	Expensed this year	Balance at Year End
Otago Southland Award	9,700	5,200	0	0	5,200
Jon Dey Award	7,000	0	0	0	0
Future Forest Scholarship	70,000	10,000	0	10,000	0
Invercargill City Forests Award	5,000	0	0	0	0
NZ Redwood Co Scholarship	5,000	5,000	0	5,000	0
Stout Trust (Mary Sutherland biography)	14,000	0	0	0	0
Totals		**20,200**	**0**	**15,000**	**5,200**

2022

Description	Original Amount	Balance at start of year	Additions	Expensed this year	Balance at Year End
Otago Southland Award	9,700	5,200	0	0	5,200
Jon Dey Award	7,000	0	0	0	0
Future Forest Scholarship	70,000	20,000	0	10,000	10,000
Invercargill City Forests Award	5,000	0	0	0	0
NZ Redwood Co Scholarship	5,000	5,000	5,000	5,000	5,000
Stout Trust (Mary Sutherland biography)	14,000	0	0	0	0
Totals		**30,200**	**5,000**	**15,000**	**20,200**

Goods or Services provided to the Foundation in Kind

Nil (Last Year: Nil).

Assets Used as Security for Liabilities

Nil (Last Year: Nil).

Note 8: Assets Held on Behalf of Others

Nil (Last Year: Nil).

Note 9: Related Party Transactions

There were no transactions involving related parties during the financial year (Last year: Nil).

Note 10: Events After the Balance Date

There were no events that have occurred after the balance date that would have a material impact on the Performance Report. (Last year: Nil).

Appendix 1. Reports from Carolin Weser.

NZIF 'Future Forest Scholarship' Progress Report (September – December 2022)

Recipient: New Zealand Institute of Forestry (NZIF)
Project: Phenology and natural enemies of *Paropsisterna cloelia* and *Paropsis charybdis* in Marlborough
Period: September – December 2022
Author: Carolin Weser

Field sampling

The two field sites, Dillon and Lawson, are different in the growth form of the plants (small trees at Dillon, coppices at Lawson), and also vary in climate. Lawson field site is close to Seddon, the climate is more coastal and therefore warmer, especially during winter months. Moreover, the coppices are sheltered under the big trees. Dillon is further inland, according to recordings of the weather stations about 2 degrees colder on average in winter. Consequently, the coppices at Lawson had already started producing new foliage at the end of August, whereas cold temperatures and occasional frosts at Dillon inhibited the growth of new leaves until end of October. At both sites, *E. quadrangulata* trees are also present.
Eight sampling trips to Marlborough have been completed to date.

Phenology

Due to the difference in temperature, the timing of the start of the first beetle generation varied between the two field sites: At the Lawson site, egg laying started early around mid-September, but survival of eggs and early-instar larvae was low. However, the coppices produced a high amount of new foliage, and as a result, low numbers of egg batches were still present on the branches beginning of November.
At Dillon, on the other hand, the cold spring temperatures delayed phenology so that the first eggs were only recorded mid-October.

Predator presence and abundance

At Lawson, so far only few predators have been recorded: mainly spiders and in mid-October, the numbers of the predatory European whirling mites *Anystis baccarum* (Anystidae) increased. This species was for the first time observed feeding on *Pst. cloelia* eggs and newly hatched larvae. Additionally, the Tasmanian lacewing *Micromus tasmaniae* has been observed feeding on *Pst. cloelia* eggs for the first time. Despite the lack of egg batches in the beginning of the season, Dillon has already had a higher number of predatory species and specimen.

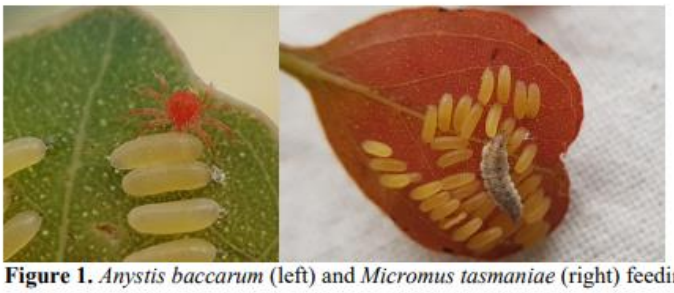


Figure 1. *Anystis baccarum* (left) and *Micromus tasmaniae* (right) feeding on *Pst. cloelia* eggs.

Egg parasitism

So far, I have completed four egg collections at Lawson and three at Dillon. Eggs were collected from 10 *E. bosistoana* and 10 *E. quadrangulata* trees. The aim was to collect three egg batches of each paropsine species with no or few signs of predation (depending on availability) per tree, adding up to 30 egg batches per beetle species, tree species, site, and sampling date. Otherwise, more batches from other trees were collected as compensation. After collection, egg batches were kept in a chilly bin with ice packs at about 10-15°C. In the lab, number of eggs per batch were counted and recorded. Egg batches were incubated in controlled climate chambers at 20°C and 14:10 L:D, 70% relative humidity and checked daily. Hatched beetle larvae and larvae at point of hatch (6 egg bursters and eyes visible)

were removed to prevent cannibalism of the remaining eggs. Egg fate was recorded as hatched, parasitised (including parasitoid species), or no emergence (damaged, collapsed, infertile eggs) and eggs eaten by hatched larvae (that were present in initial egg count but disappeared in between). Survival of eggs of the first collection at Lawson was low, probably because eggs had died before collecting as a result of low temperatures in the field. Egg survival increased from first to third collection (59-88%). It was therefore decided to carry out one additional (fourth) egg collection at Lawson at the end of first generation.

So far, there have been parasitised eggs from both sites. Mostly *Enoggera nassaui* has hatched, but a couple of batches from the last collection were hyperparasitised by *Baeoanusia albifunicle* (Figure 2).

Figure 2. Parasitoid marking (early to late stage from left to right) on *P. charybdis* (1. row) and *Pst. cloelia* (2. row). Hatched parasitoid wasp *Enoggera nassaui* (3. row). *Baeoanusia albifunicle* (female left, male right) hatched out of *Enoggera nassaui* eggs. Female with clubbed antennae, male with straight antennae but feathery, both with thick waist.

Molecular gut content analysis of predators

Steps of qPCR assay development completed to date:

- Collection of COI sequences from different sources (downloaded from NCBI, received from MPI, DNA extraction and sequencing of specimens) for target and non-target species included in primer design and in-silico testing
- Primer design and in-silico testing of designed primers using Geneious software
- Establishing a decontamination protocol for field-collected samples (based on previous studies) using bleach and water
- A total of 70 DNA extractions of non-target and target species for in-lab primer testing:
- In-lab testing of designed primers in qPCR using standard protocol → short-listing two primer pairs per species with the smallest Cq values (show best efficiency) and based on all in-silico analysis values, such as secondary structure potential and similarity of melting temperature
- Preparation of standards for primer testing and qPCR assay optimisation
- With the 2 short-listed primer pairs per target species, run qPCR with all target and non-target extracts, plus standard curve (7-point standard dilution series of 10^8-10^2 copies of target species):
    - All targets got amplified
    - no non-template control (NTC) amplification
    - few random non-target amplification (mostly only one of the duplicates)
    - low efficiency: primer pairs for *Pst. cloelia* 44-53%, for *P. charybdis* 70-80%
- optimisation of annealing temperature (Ta) of *Pst. cloelia* primer pairs using temperature gradients (one wide 61-51°C, one narrowed 59-56°C):
    - primer pair 9: optimal temperature 57.9°C (93.1% efficiency),
    - primer pair 10: optimal temperature 58.2°C (93.4% efficiency),

Appendix 2. Reports from Vikash Ghildiyal.

NZIF FOUNDATION

Report

October 2022 to January 2023

Improving the drying quality of Eucalyptus

Vikash Ghildiyal

PhD Candidate

School of Forestry,

University of Canterbury

"Over the past three months, I have written another manuscript on genetic variation in drying collapse and other wood properties of *Eucalyptus globoidea*. Results were summarised in the previous reports. This manuscript has been submitted to a peer-reviewed International Journal for publication. Additionally, I was awarded "UC Foundation doctoral publication award 2022" for my previously published Journal article:

Ghildiyal, V., R. v. Herel, B. Heffernan and C. Altaner (2022). "The effect of Joule heating on collapse and water absorption of wood." Wood Material Science & Engineering: 1-9. DOI 10.1080/17480272.2022.2121660

I also prepared another review article on electrical phenomena in trees/green timber, which will be submitted for publication soon.

Furthermore, I participated in "3-MT competition 2022" organised by Asia Pacific Young Scientists Association, the University of British Columbia (UBC) Canada . I was selected one of the finalists in this competition.

In addition, I have been working on my 3rd objective (Ionic effects on the water transport in wood). For that, *E. nitens* log samples were collected from the field. A constant pressure was applied to force salt solutions through the logs. Sap-flow rate and electrical potential were monitored during the treatment. Subsequently, a central board was cut from each log and the boards were dried. Shrinkage and collapse were measured and compared between the treated and control boards. Data analysis is ongoing. To date, I have finalised five chapters of my PhD thesis. The next step is to finalise a 6th thesis chapter from this last experiment.

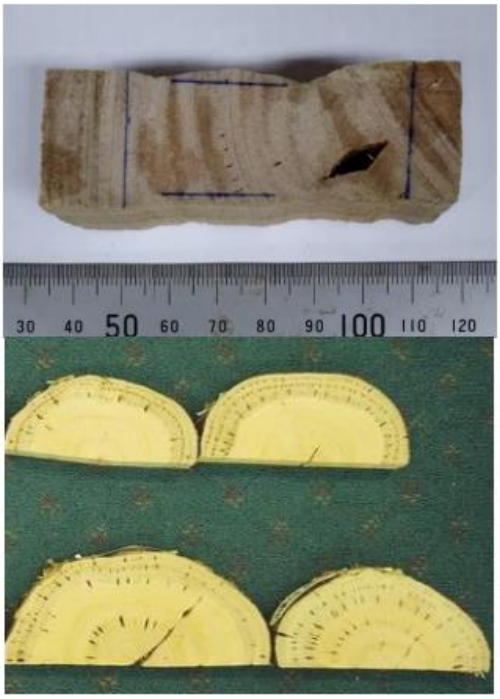
Finally, I would like to thank NZIF Foundation for awarding me a Future Forest scholarship, 2021. With the support of this scholarship, I am accomplishing a lot of tasks, without any worries about timeframe and finances."

NZIF FOUNDATION

Report

February 2023 to April 2023

Improving the drying quality of Eucalyptus



Vikash Ghildiyal

PhD Candidate

School of Forestry,

University of Canterbury

"Over the past three months, I have been working on my third objective (ionic effects on the water transport in wood). The methodology for this experiment was summarised in the previous report. I have finished with the data analysis. Results indicate that volumetric and tangential collapse decreased significantly for salt-treated logs compared to the control. However, the logs treated with deionized water showed higher volumetric and tangential collapse than the control. This study confirms that drying collapse was negatively corelated to sap flow and green wood permeability, and it was related to ion-mediated flow as ion movement in small capillaries could improve the hydraulic conductivity of wood. I am confident that I would be able to produce a research article from these results.

Furthermore, a manuscript on genetic variation in drying collapse and other wood properties of *Eucalyptus globoidea* is now "under review" in a peer-review international journal. I also prepared another review article on electrical phenomena in trees and green timber, which will be submitted for publication soon. To date, I have finalised five chapters of my PhD thesis.

Finally, I would like to thank the NZIF Foundation for awarding me a Future Forest scholarship in 2021. With the support of this scholarship, I am accomplishing a lot of tasks without any worries about timeframe or finances."