

Forest Biosecurity Research Strategy 2023-2030

Protecting New Zealand's plantation forests and the export trade from biosecurity threats

Protecting New Zealand's plantation forests and log and lumber export trade from biosecurity threats requires constant operational effort underpinned by robust, strategically relevant research and development. In 2022, the Forest Biosecurity Committee, which represents New Zealand's forest owners, undertook to review and update the Forest Biosecurity Research Strategy. The Strategy was originally prepared in 2011, and last revised in 2016.

Research Strategy Goals

- ✓ To protect radiata pine, Douglas-fir, and other important commercial plantation species from pests and pathogens and achieve greater productivity with no loss in quality.
- ✓ To protecting the log trade and other wood exports from biosecurity threats that might lead to trade bans.

The intention is for research providers to respond to this strategy by working closely with the Forest Biosecurity Committee to develop and submit research proposals that target forestry sector research priorities to funding sources including FGLT, MBIE, and SFFF.

Key Research Drivers

Research strategies need to respond to key drivers: these can change over time. Insect pests and pathogens already present in New Zealand that impact the health and productivity of plantation forest species must continue to be addressed; also the significant existing biosecurity issues and market requirements that dictate log and lumber export treatments.

New research drivers include:

- ✓ the impact of climate change on forest health and biosecurity risks
- ✓ concern around over-reliance on radiata pine and Douglas-fir considering increasing biosecurity threats both in NZ and overseas
- ✓ government policies and their effects on biosecurity risk – for example, policies resulting in carbon forestry
- ✓ societal shifts and pressures impacting biosecurity readiness and response
- ✓ new tools, technologies and science capability.

Strategic Research Priorities 2023

A	Understanding the potential impacts of pests and pathogens not currently present in New Zealand, and the changing activity of existing ones.	Several new pests and diseases affecting radiata pine are emerging and highly damaging internationally: the threat these pose needs to be better understood. New work is needed in surveillance and diagnostics.
B	Increasing plantation and tree species' resistance and resilience to increased stress.	Stressors include climate as well as increased pest and pathogen loadings. Research priorities include genetic manipulation, including the use of new technologies, and the potential for influencing tree and plantation microbiomes.
C	Improving operational biosecurity.	Forestry operations generate their own biosecurity threats. Research priorities include reducing the risks associated with nursery stock pathways and movements and improving knowledge on risks associated with machinery and truck movement.
D	Developing or improving solutions to pests and diseases, including social research.	Research must continue to reduce social, cultural and environmental impacts of biosecurity operations. The potential to use molecular technologies could raise extreme (and misinformed) reactions. We need to better understand societal attitudes and build public support for biosecurity activities.
E	Better understanding the current pests and pathogens situation in NZ, and implications to trade. Also implications of carbon forestry as a biosecurity threat.	Priorities include increasing our knowledge of pest populations in plantation nurseries and native tree nurseries, and the risks associated with moving stock around the country and out to planting sites. Also the risks associated with 'plant and leave' (carbon) forestry.

Forest Biosecurity Committee ranking of research topics 2023

Rank	Strategic priority	Research priority
1	A	Understanding the potential impact on radiata pine and Douglas-fir of pathogens and insects currently not present in NZ. E.g., <i>Lecanosticta acicola</i> , <i>Lymantrid monacha</i> ; <i>Phytophthora pinifolia</i> , <i>P. ramorum</i> , <i>Dothistroma pini</i> , various bark beetle species etc.
2	B	Realising the opportunity to increase plantation and tree species' resistance and resilience to increased stress. This includes tree breeding, genetic technologies such as gene editing, microbiomes manipulation, and silvicultural treatments, e.g., mixed species planting.
3	A	Understanding the risk posed by the emergence of new insect pests and pathogens or the changing activity and potential impact of existing ones. This includes advances in surveillance and diagnostic technology.
4	C	Investigating nursery pathway risk to forests and the opportunity to reduce this risk by applying greater biosecurity measures including Plant Pass.
5	D	Developing solutions to foliar diseases of radiata pine and Douglas-fir as alternatives to copper spraying.
6	E	Need for baseline of current insect and pathogen species present in NZ including on native tree species. This includes a baseline of pathogens currently in forest nurseries.
7	B	Assessing alternatives to radiata pine and Douglas-fir including biosecurity risk of contingency species and carbon forestry species.
8	D	Researching and or adapting remote sensing and chemical delivery technologies (e.g., UAVs etc).
9	C	Investigating operational biosecurity risk to forests and the opportunity to reduce the risk associated with equipment movement etc. Investigating guidelines to reduce biosecurity risk, e.g., Kauri Dieback guidelines.
10	E	The impact of non-forestry 'pests' on forest operations and trade.
11	E	Potential insect and disease problems that may arise from plant-and-leave forestry.
12	D	Understanding increasing social, cultural, environmental concerns – chemicals, aerial spraying.
13	E	Assessing radiata pine and Douglas-fir productivity losses caused by needle diseases and other disorders.
14	B	Attraction of current/new pests to new species and their ability to jump host plant species to radiata pine.
15	D	Reduce the need for and/or the cost of <i>Dothistroma</i> spraying. Also fully understanding the impacts of drift spraying copper on the aquatic environment.
16	E	Understanding the potential for a "biosecurity" interruption of the log and green lumber trade because of real or perceived biosecurity threats.
17	D	Understanding societal attitudes around the application of molecular technologies and other new technologies.
18	D	Developing new methods/systems to provide greater assurance of pest-free log and lumber exports outside STIMBR's mandate, e.g., research the forest-to-market pathway approach.
19	A	Ensuring strong linkages with international scientists and technology suppliers as resources, and in some cases technology availability remain limited in New Zealand.
20	A	Changes to science structure and greater emphasis on Te Tiriti – implications to forest biosecurity govt research funding; addressing declining forestry biosecurity science capability.
21	A	Ensuring adequate funding and training or recruitment in taxonomy.



Full details of the Forest Biosecurity Research Strategy are available on the Forest Owners Association website at <https://www.nzfoa.org.nz/committees/forest-biosecurity-committee>