Most of the species listed are yet to undergo management assessment by Environment Canterbury.

During the time I was working in Switzerland, I remember that these evergreen laurels were susceptible to frosting. Interestingly enough, based on my observations and confirmed by available research data, cherry laurel has naturalised in Swiss forests over the last two decades. The use of any herbicides in Swiss forests and public areas is banned, therefore the removal of cherry laurel and the equally invasive Japanese knotweed is a huge challenge for everybody.

Portuguese laurel is locally naturalised in temperate zones such as northern France, Great Britain, Western Canada to name a few locations. It is considered invasive in western Washington and Oregon. It is invasive at least here in our region and should be banned from being propagated and sold.

Understanding the role of plant nursery biota in promoting fungal disease

Georgia Steel

Plants do not exist in isolation, rather they can be thought of as members of a complex community of organisms, including viruses, bacteria, archaea, fungi, oomycetes, protozoans, insects, and animals (Guerrero et al. 2013). All these groups participate in a myriad of biological interactions both above- and belowground (Hassani et al. 2018). Fungi and oomycetes are the most important groups of organisms to plants with respect to their potential to affect plant health (Vincent et al. 2020). Mycorrhizal fungi are essential for plant health, so much so that plants would never have colonised a terrestrial environment without their symbionts; while other fungi and oomycetes are pathogenic, and can cause severe disease, threatening food security, economic productivity, and biodiversity (Ristaino et al. 2021). To effectively monitor the risk of pathogen spillover, it is important to increase our understanding of diversity of fungi in different environments through methods such as culturing, DNA identification, and morphological identification.

Biosecurity at Aotearoa New Zealand’s border is stringent to prevent incursions of unwanted organisms on imported foods, live plants, and animals (Biosecurity Act 1993). However, domestic biosecurity (environmental pathogen surveillance) is lacking for fungi and oomycetes, many of which were unknowingly introduced prior to the implementation of biosecurity legislation. In addition, we have only just begun to grasp global fungal diversity through the development of molecular methods (Blackwell 2011, Wu et al. 2019). Together, lack of domestic biosecurity surveillance, unknown introductions, and a poor understanding of fungal diversity, mean we don't know what potentially harmful exotic species of invasive mycorrhizae and pathogens are being spread (Leach 2005), nor do we understand how they may be affecting our unique ecosystems and primary industries (Leach 2005).

Perhaps the most important source of fungal and oomycete spread are plant nurseries, as the nursery trade results in the introduction of plant- and soil- associated microorganisms to new environments (Marshall et al. 2021). In one example, *Phytophthora* was identified in 87% of pots, 70% of which contained asymptomatic plants. A diverse array of plant pathogens has also been found in irrigation systems (Hong and Moorman 2005, Marčiulynas et al. 2020), compost, potting soils, and plant tissue. In Australia, the nursey trade has been recognised as a major contributor to the spread of myrtle rust across state borders on asymptomatic plants due to a lack of domestic biosecurity measures. Based on these findings, we postulate that the plant nursery trade in Aotearoa New Zealand may be harbouring a myriad of fungi and oomycetes, including beneficial mycorrhizae and pathogens.

Our lack of knowledge of the plant nursery biota in Aotearoa New Zealand is concerning, as plants are being propagated *en masse* for the One Billion Trees programme. As of 31 November 2021, 47 million trees have been planted, including natives (72%) and exotics (28%), and a further 99 million tree seedlings are estimated to have been planted in 2021 (Ministry for Primary Industries 2021). To ensure the success of the One Billion Trees plantings, there has been a strong focus on eco-sourcing seed, that is, best genetically adapted to a given environment, which led to phrase, "the right tree, in the right place" being widely used (Edwards et al. 2019). While eco-sourcing may be an effective strategy to ensure plants grow successfully in their local environment, it fails to recognise that plants do not, and have never existed as individuals as they co-evolved with fungi and oo mycetes. Given the significant knowledge gap of the fungal and oomycete plant nursery biota, and its relevance to the restoration ecology, we aimed to characterise these communities in the roots of the commonly planted species, *Leptospermum scoparium* (mānuka). To do so, we sampled the roots of ca. 2-year-old mānuka plants at 15 plant nurseries and 15 field sites (Figure 1, p. 66; Table 1, p. 68). These roots were plated onto agar (Figure 2, p. 66), and samples of mycelial growth were taken for DNA identification and stored at -80 degrees Celsius. Roots were also stored in ethanol for staining and measurement of mycorrhizal fungi and pathogen colonisation. In addition, soil was sampled from all sites, and mānuka seeds grown in the same soils of three categories – sterile control, field soil, and nursery soil. The aim of growing seedlings in these soils was to determine the pathogen load in the roots in comparison to those at 15 field and 15 nursery plants sampled.

This project did not reach completion, despite the effort put in, although the samples taken from this research will hopefully be used in future projects so this work will unlikely go to waste. I thank the Canterbury Botanical Society for its support of this project.

Figure 1. Sampling mānuka roots at Cass Field Station, Canterbury, New Zealand.

Figure 2. A sample of the diversity of fungal cultures isolated from mānuka roots.

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Table 1. List of field sites and plant nurseries at which samples were taken.

ID No.	Field site name	ID No.	Nursery site name
GS50	Omahu Bush, Banks Peninsula	GS65	Riverside Horticulture, Rangiora
GS51	Duvauchelle, Banks Peninsula	GS66	Woodend Nursery, North Canterbury
GS52	Clarence Valley, Hanmer Springs	GS67	Texture Plants, Christchurch
GS53	Hinewai Reserve, Banks Peninsula	GS68	Mitre 10, Christchurch
GS54	Cass Field Station, Castle Hill	GS69	Styx Mill Plant & Garden Centre
GS55	Bealey Spur, Aruthurs Pass	GS70	Southern Woods, Christchurch
GS56	Boyle River, Lewis Pass	GS71	Oderings Barrington, Christchurch
GS57	Cass Saddle, Castle Hill	GS72	Bunnings Airport, Christchurch
GS58	Mt Cook Village	GS73	Oderings Linwood, Christchurch
GS59	Lake Ohau	GS74	Mitre 10, Ashburton
GS60	Mt Hutt	GS75	Nat's Hororata, Hororata
GS61	Mt Cook, Glentanner	GS76	Mitre 10, Timaru
GS62	Mt Somers	GS77	Orari Nursery, Orari
GS63	Mt Lyford Ski Area	GS78	Springburn Nursery, Queenstown
GS64	Mt Lyford Area	GS79	Lushingtons Nursery, Ashburton
		GS80	The Garden Centre, Timaru