THE 24th NZ FUNGAL FORAY, GLENTUI, May 2010

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Introduction

The 24th New Zealand Fungal Foray was held at the Glentui Meadows Conference Centre from 2nd – 8th May 2010. The centre is near Oxford in the foothills of North Canterbury 56km north-west of Christchurch.

There hadn't been much rain before the foray so in lowland areas fungal fruiting bodies were scarce and it was necessary to go to higher elevation to find greater diversity. Behind the conference centre, across a paddock and a stream there was a steep area of beech (*Nothofagus*) and broadleaf forest. The beech was fairly dry underneath but the *Fuchsia excorticata* dominated broadleaf forest had some damp areas. The only fungi I found there when I visited after the Colloquium were *Trametes versicolor* (Fig. 6) and *Schizophyllum commune*.

Monday 3 May, Bealey Bridge and Craigieburn

We drove through steep bare hills covered in gorse (*Ulex europaeus*), a lot of which had been sprayed, probably by helicopter. Hawthorn (*Crataegus monogyna*) was common and wild rose (*Rosa* sp.). The latter became more prevalent as we got further up into the Southern Alps. Here matagouri (*Discaria toumatou*) and tussock (*Chionochloa*) dominated the landscape and clung to the screed slopes of the Alps. Here and there patches of beech forest clung in amongst the scree. In one place a forest of *Pinus contorta* was partly dying from recent spraying efforts.

At Bealey Bridge *Amanita muscaria* was common and there was no *Pinus radiata* in sight. The species has naturalised into beech forest. *Cortinarius* species were common everywhere. There was a large group of *Cyclocybe parasitica* growing from buried wood, with one fruiting body being as large as a dinner plate. Growing on wood was a collection of *Hypoxylon howeanum* (Fig. 2) and wonderful displays of *Aleurodiscus berggrini* (Fig. 1).

A notable species found here was a purplish *Leucopaxillus*, the second time recorded in New Zealand (NZ), the first time being on the 23rd Fungal Foray, but this was a first South Island record.

From Bealey Bridge we went to Craigieburn Picnic Area. *Amanita muscaria* was once again common, this time growing with *Chalciporus piperatus*. *Cortinarius* spp. were very common as well as the wood inhabiting species *Austeria citrea* and *Hypholoma*.

Tuesday 4 May, Mount Grey

The dryness of the previous weeks was brought very much in focus with our trip to Mount Grey. Mycorrhizal species were largely absent. Saprobic species however were abundant with great displays of *Armillaria*, *Trametes versicolor* and *Stereum ostrea*. I found a collection of *Xylaria castorea* (Fig. 4) growing on a dead tree branch, its finger-like fruiting bodies protruding from the wood. Of note was a species of *Lentinellus*, a new record for NZ, growing on the ground among stones.

Figure 1 ***Aleurodiscus berggrini***

Figure 2 ***Hypoxylon howeanum***

Figure 3 ***Pleurotus purpureo-olivaceus***

Figure 4 ***Xylaria castorea***

Figure 5 ***Dermocybe veronicae***

Figure 6 ***Trametes versicolor***

Wednesday 5 May, 9th NZ Fungal Foray Mycology Colloquium

IAN DICKIE began the day with a talk on the question of whether fungi eat rocks. He set up plots across a series of plant gradients and measured everything that could be measured in the soil contained in the plots. He found no evidence that Arbuscular Mycorrhizal fungi eat rocks. In NZ one person looked under kauri (*Agathis australis*), location unknown, and found no evidence.

PETER JOHNSTON followed with a talk entitled "Biosecurity Risk of Native Fungi". He asked whether ensuring plant introductions are disease-free is sufficient for robust biosecurity or does the simple fact that new plant species are being introduced pose a risk? In the 1920's explorers from the British Empire brought back plants and animals from around the world

they thought would be useful. When coffee production shifted into Africa and Asia coffee rust destroyed the crop and Sri Lanka developed a tea market instead. In NZ diseases include potato blight (*Phytophthora infestans*), rust of smilax (*Asparagus asparagoides*), poplar rust (*Melampsora* sp.) and*Colletotrichum horii* on persimmon (*Diaspyros* sp.). From 1980 to 2007 the number of known NZ fungi doubled. A third to half of exotic trees now have native fungi associated with them but there are hardly any exotic fungi in indigenous forests. Native fungi causing diseases in newly introduced exotic plants pose a potential for trade barriers. New diseases impact on commercial orchards. One suggestion is to take plants to other parts of the world to see if they develop diseases that could post a biosecurity risk – but could this be a biosecurity risk in itself? [some overseas examples not included. Check this makes sense.]

Next, PETER BUCHANAN (presenting on behalf of Ross Beever et. al.) spoke about *Phytophthora* taxon *Agathis* (PTA) in kauri. PTA was mis-identified in 1974 as *P. heveae*, morphologically distinct from close *Phytophthora* neighbours. P. heveae was reported on kauri on Great Barrier Island in 1972-4. Ross Beever in 2005-6 noticed kauri dieback on the mainland. It is now present in several places in the North Island. Beever et. al. looked at other places where *Agathis* is present to see whether there are similarities to the NZ *Phytophthora* species, proceeding with the supposition that PTA is exotic. *P. katsurae* is found in soil in New Guinea under *Agathis* seedlings there.

A number of host trees were inoculated with PTA but only *Agathis* died. *P. cinnamomi* has a broader host range but is non-lethal. PTA has caused death of kauri hundreds of years old. *Phytophthora* collar rot of *A. australis* could be initiated in root infection. It forms cankers, blocking conducting tissue resulting in resin bleeding (gummosis), essentially ringbarking the tree with resultant dieback. Contributing to "Kauri dieback" are environmental factors - drought, waterlogging, logging, track building, roading, and pig-rooting. All these activities help PTA spread.

Is PTA moving through soil or root to root? Soil based detection is theoretical but not so easy. It is easier from bark tissue, which gives characteristic cultures in four days and is the most definitive way to detect PTA. Phytophthora being a water mold can be carried in streams. *P. cinnamomi* and *P. kernoviae* were recovered in Waitakere streams but not PTA. *P. kernoviae* could be a native species. *Phytophthora* has been found within 500m of Tane Mahuta, a NZ icon, the largest kauri in the country.

There is still a lot of research to be done on what PTA is, where it comes from how it spreads, and whether it's present on other hosts but not causing a disease. Also in operational areas research is needed in how to control it and how to prevent it spreading.

After morning tea REBEKAH FULLER presented a video featuring some of the regular attendees at the fungal foray talking about the foray, what their role is and what they get out of it.

JERRY COOPER followed with a talk on the FUNNZ database. Jerry is a professional computer scientist and mycologist. He started the FUNNZ database in 2005 with a grant from the Dept of Conservation's TFBIS fund with the purpose of increasing our knowledge of our second largest kingdom of organisms, essential to the health of forest ecosystems. The database was built and backdated from historical records from previous forays, then added to on each foray and additional data keyed in afterwards. At present it houses 6,542 records.

Jerry was instrumental in setting up the United Kingdom (UK) database also. It now has 1.2 million records. Our database has 600-800 records per year added. The reasons for keeping this database are:

(1) Information on NZ threatened fungi. In 2002 there were 50 nationally critical species and 1,416 data deficient. This included 1 in serious decline, 10 in gradual decline and 5 sparse. Twenty-one records of 12 nationally critical species have been added to the database. Also added are 599 records of 275 species that a data deficient – so not data deficient anymore.

(2) Information on distribution of our fungal species.

(3) Information for research. There have been 3,161 vouchers added to PDD (nearly half the collection). This includes 8 'type' collections and 75 'first records' for NZ. Photos of 1,000 species have been added to the NZFungi website.

Some highlights are Stevenson's *Hygrophorus waikanaensis*, which is not a *Hygrophorus* or *Hydropus*, a *Trichocomaceae* sp. from Westport, *Chalciporus aurantiacus* (on the nationally critical list), *Tetrapyrgos olivaceonigra* from Masterton, a *Hohenbuehelia* sp. found in sand dunes at the Dunedin 2008 foray, *Volvariella taylori* (new species), *Pluteus nanus* (new species), *Entoloma rusticoides*, and finally *Omphalina pyxidada* and *Boletopsis* sp. from the Waikanae 2009 foray (a classic northern hemisphere 'Red Data' genus).

Jerry finished with a brief mention of NZBRN, a national portal for the public to enter fungal distribution information.

MAX CROWE was next with a research proposal on the growth response of *Heracium lepidulum* to arbuscular mychorrhizal fungi from two Central Otago sites. This European species has a national distribution but particularly in the Otago area. It causes changes in the soil and was designated invasive in 1990. It grows in beech and pine forests and in grasslands. In the tussock grasslands of the Old Man Range there is not much H. lepidulum but in the exotic grasslands of Locharburn Station it is plentiful.

The last speaker in the morning was BEN MYLES with a talk on a case study using *Menegazzia* (*Parmeliaceae*) to determine whether we can reliably use fossil calibrated molecular clocks on the *Lecanoromycetes*. In NZ we have 20 species of *Menegazzia*, 8 of which are endemic. The genus appears to be quite ancient, 300 million years old. His reasons for this resear ch are (1) interesting in itself; (2) it will contribute to the "Gondwana life-raft's" "flypaper of the south" argument, and (3) good for conservation decisions.

After lunch BEVAN WEIR spoke on the origins of NZ's Rhizobia, a diazotrophic bacteria that has a specific symbiosis with legumes and fixes Nitrogen from the atmosphere. An enzyme in the bacteria breaks the Nitrogen down. NZ members of the legume family (*Fabaceae*) include *Sophora chathamica*, *Clianthus puniceus*, *Carmichaelia australis* and *Montigena novae-zelandiae*. Introduced legumes include gorse, Scotch broom (*Cytisus scoparius*) and wattles (*Acacia* spp.). The legume family evolved 80 million years ago. It arrived in NZ 5 million years ago and can be presumed to have co-evolved with native Rhizobia. He has found no cross nodulation between Rhizobia of native and exotic species. *Rhizobium leguminosarum* formed ineffective nodules on native legumes. This research is potentially useful for biodiversity in that it may help restoration of *Clianthus*. Foreign

Rhizobia from imported goods and commercial inoculants may enhance growth of weed species.

Then ERIC McKENZIE took us into the world of asexual fungi, mainly *Hyphomycetes* and *Coelomycetes*. A book published in Cuba described 200 species, 70 (35%) of which occur in NZ. A Russian book describes 236 species *Hyphomycetes*, 87 (37%) occurring in NZ. Anamorphs are found everywhere: (1) freshwater aquatics, (2) marine aquatics, about which we know little, (3) aero-aquatics, (4) insect pathogens, (5) *Rotifer* pathogens, (6) nematophagous fungi, (7) sap stain fungi, (8) sooty moulds, (9) saprobes on wood/bark/leaves, (10) saprobes on leaf litter, (11) *Phyllophora* yeasts on native plants, (12) plant pathogens, (13) grass endophytes (*Neotyphodium* spp.), (14) fungi parasitising other fungi, and (15) things that make human hosts ill.

The last speaker for the day, JERRY COOPER, gave a talk entitled "URBAN FUNGI (or Christchurch, the European Fungal Garden City). Jerry had spent 20 years collecting in the UK and 10 years in NZ. Introduced urban ectomycorrhizal (ECM) trees in NZ produce more fungal fruiting bodies than in their home country. They have far less larval damage. Introduced urban ECM fungi in NZ show a broader host spectrum than their home range (e.g. *A. muscaria*).

In Hadley Park, Christchurch, *Boletus edulis* and *Amanita excelsa* var. *spissa* is very common but not in their home country. A rubescens is common in the UK but not in NZ. *Leccinum scabrum* in NZ is common but *Fomitopsis betulina* is absent; both species are specific to birch (*Betula* sp.).

Four new weed species are recorded per year in Auckland alone. Urban habitats are an obvious source of future fungal weeds. *Naucoria escharoides* has spread across Christchurch but not outside. *Laccaria* 'pumila' is common in Christchurch city and where you find willows in Canterbury on braided river systems. *A. muscaria*, which associates with birch and pines (*Pinus*) is now found with *Nothofagus* and is spreading further each year into beech forests. There is some evidence that exotic fungi are jumping the fence (e.g. *A. muscaria*) and natives also (e.g. *Armillaria novae-zelandiae* is found on willows in Christchurch).

There are 40,000 exotic species in cultivation. In the wild there are 4,793 plant species, a little over half of which (2,436) are naturalised and the rest (2,357) indigenous. A similar situation exists for fungi, where 15,170 species are present in the wild comprising 7,617 naturalised and 7,553 indigenous, plus an unknown number in cultivation. In Christchurch a massive 72% of fungal species are exotic and only 28% indigenous, whereas the reverse is the case in the countryside, where 88% are indigenous and only 12% exotic. Of the exotic countryside species 60% are parasites of roadside weeds, 20% mycorrhizal in forests and 20% are saprophytes. Exotic fungi make up 50% of the species in Auckland, 48% in Wellington, 16% in the Waitakeres and 12% in the Southern Alps.

Jerry commented that this data is too biased, based as it is on PDD collections.

That evening COLIN MEURK presented a talk about the NZBRN project and NOAH SIEGEL showed a series of photographs taken in Australia, scenic shots, animals and finally fungi.

Thursday 6 May, Klondyke Corner and Greyneys Corner
Klondyke Corner was dominated by mountain beech () over moss covered ground. Crown fern (*Blechnum discolor*) was common in the ground tier. There were fantastic displays of *Dermocybe veronicae* (Fig. 5) and *Phellodon* spp. Near a waterfall we found a lovely purple *Cortinarius*. Hiding at the base of a tree stump was a beautiful pinky mauve bracket (*Postia* sp.), and near where we parked the car, on a log lying on the ground, was tier upon tier of *Pleurotus purpureo-olivaceus* (Fig. 3).

Greyneys Corner was also dominated by mountain beech over moss covered slopes. Kiokio () was common. *A. muscaria* was found along the roadside but not invading the bush as seen on Monday at Bealey Bridge.

Friday 7 May, Kowai Bush and Castle Hill
On this last day of the foray we went from the mixed forest of Kowai Bush, which was very dry and not much to be seen except *Tremella fuciformis*, to mountain beech country behind the village at Castle Hill. Here there was plentiful *Hypholoma* and *Cortinarius* spp., and once again evidence of *A. muscaria* invading the beech forest.