THE 25th NZ FUNGAL FORAY, TAUPO, May 2011

Petra Gloyn

Introduction

The 25th New Zealand Fungal Foray was held at the Tauhara Retreat and Conference Centre from 13-20 May 2011. The centre is 10 minutes drive from Taupo and located in Acacia Bay overlooking Lake Taupo. We had visitors from Australia, Japan and Sweden on the foray.

I went down with Paula Wilkie for the four hour drive from Auckland, with Paula driving the first half of the journey and me the second. The grounds are a mixture of native plants and a small stand of native bush with tracks running through it. Common in the garden beds was *Iliodictyon cibarium*.

Saturday 14 May, Clement Mill Road

We travelled east to Clement Mill Road, an area of beech (*Nothofagus*) forest with pepperwood (*Pseudowintera colorata*) and horopito (*Rhabdothamnus solandri*) over a ground tier of crown fern (*Lomaria discolor*). *Armillaria novae-zelandiae* and *A. limonea* were common on beech wood. *Cortinarius* spp., including a purple species, were common growing from soil. There were tiers of *Ganoderma* and *Fomitopsis hemitephra* growing up living trees.

Sunday 15 May, Waihora Lagoon

We travelled west to Waihora Lagoon, a beautiful area dominated by kahikatea (*Dacrycarpus dacrydioides)* and rimu (*Dacrydium cupressinum*). The lagoon can dry out in summer. The understory consists of tree ferns – katote (*Cyathea smithii*), wheki (*Dicksonia squarrosa*) and wheki ponga (*D. fibrosa*) – and tree fuschia (*Fuschia excorticata*) over a ground teir of crown fern. There were no mycorrhizal tree species so there was a different mix of species present to the previous day. A yellow waxgill (*Hygrocybe firma*) was common growing from the ground and *Ganoderma* growing from wood. On a rapidly disintegrating tree stump there was a lovely display of *Lycoperdon compactum* by the edge of the track. On a dead totara (*Podocarpus totara*) log we found *Hypholoma acutum* and *H. brunneum* growing together.

After dinner CARL SOOP gave a talk on *Cortinarius* in the two hemispheres. *Cortinarius* is a cosmopolitan genus found mostly in temperate regions. There are over 2,000 species described from the north. It is the largest genus among the *Agaricales*. Diversity is expected to be at least equal in the south but only about 570 species have been described from the south (Australasia and Patagonia). In the north the genus is ectomycorrhizal (ECM) with *Pinus*, *Picea*, *Fagus* and *Quercus*, whereas in the south the ECM relationship is with *Nothofagus*, *Eucalyptus* and *Kunzea*. We should expect no overlap in fungal ECM symbiosis (e.g. *C. calochrous* is host specific with *Fagus* and *C. naasii* with *Abies*). There are no species overlap between hemispheres. At section rank many monophyletic sections are bihemispherical but others are endemic to one hemisphere, indicating a later evolution. Diversification of *Cortinarius* occurred 145-65 million years ago and *Nothofagus* appeared in Gondwana 80 million years ago. ECM fungi evolved many times beginning from 100 million years ago, but only once with *Cortinarius*. There are fewer species shared between Australia/NZ and Patagonia than between Australia and NZ. Carl showed a number of examples of similar species from north and south but with different hosts.

Monday 16 May, Kanuka/Manuka Reserves

We headed south down the eastern edge of Lake Taupo to Hinemaia Bridge. This was a an area of kanuka (*Kunzea ericoides*) forest badly infested with blackberry (*Rubus fruticosus*). There was young broadleaf forest in the understory and hounds tongue (*Microsorum pustulatum*) everywhere. Even so, we found several *Cortinarius* including *C. rotundisporus* and a couple of *Russula*, a *Daldinia*, *Geastrum* sp., and several other species.

Our next stop was Waikari Scenic Reserve, also dominated by kanuka but with a little manuka (*Leptospermum scoparium*) and a dense understory of regenerating broadleaf forest. It was also infested with blackberry on the bush margins and very wet. A purple *Cortinarius* was very common along with *C. rotundisporus*. It was a much more prolific area than our first stop.

We went on to Lake Rotopounamu, an area beech-podocarp-broadleaf forest. Species we found here included *Conchomyces bursiformis*, *Polyporus hypomelanus* and *Australoporus tasmanicus*. It started raining quite hard however so we decided, as we had a lot of collections already, it was a wise move to head back to Taupo.

Tuesday 17 May, 9th NZ Fungal Foray Mycology Colloquium – Title, Abstract and Notes

IAN HOOD – (Author of *An Illustrated Guide to Fungi on Wood in New Zealand*)[i]
Basidiomycete decay fungi in *Nothofagus* windfalls[ii].

Abstract: A study was conducted in a central North Island red (*Nothofagus fusca*) and silver (*N. menziesii*) beech forest to determine the main decay fungi decomposing stems that had fallen 24 years earlier. This was undertaken in order to make comparisons with those active in stems that had fallen during the same storm in a dense podocarp forest 60kms. distant. Basidiomycetes were obtained in 55% of isolation attempts from discs cut from 6 trees of each species. Altogether 96% of these isolates were composed of 18 spp., the most abundant being *Armillaria novae-zelandiae* (mainly from the outer 12cm.) and *Ganoderma applanatum* sensu Wakef. and *Hymenochaete mycrocycla* (which both penetrated more deeply). These fungi were distributed along the stems as somatically incompatible individuals reaching lengths of 11, 2 and 3m. for each species respectively, those of *G*. Cf. *applanatum* being separated by brown pseudosclerotial plates (‘zone lines’). The first two spp. were also major decomposers in the earlier podocarp study, but basidiomycete diversity was greater in the *Nothofagus* stems. Fruiting of these fungi was significantly associated with isolation of cultures, and for *G*. cf. *applanatum* and *H. mycrocycla* provided a reliable guide to stem colonisation. An associated investigation[iii] using the same trees demonstrated that wood occupied by *G*. cf. *applanatum* had decomposed more rapidly than that occupied by other basidiomycetes.

The aim of the study was to determine the main decay fungi and whether they influence decay rates and carbon release. The earlier study was conducted in dense podocarp forest in Whirinaki Forest Park 4 years and 15 years after windfall. Discs were taken from 8 rimu (*Dacrydium cupressinum*) and 8 matai (*Prumnopitys taxifolia*) trees, fungi isolated and identification attempted, then repeated at 19-20 years. At 4 years there was not much decay but at 19 years there was a lot of decay. There were fewer basidiomycetes found in matai than in rimu. *Ganoderma* cf. *applanatum* and two species of *Armillaria* were the most common species found. The frequency of these species increased with time but the frequency of other species – *Cerrena zonata*, *Sistotrema*, *Hypholoma*, *Hyphodermopsis polonensis* and others not identified – decreased with time. Conclusion – *Ganoderma* sets up many colonies and penetrates the wood but *Armillaria* is more on the surface.

The same methodology was used in the later study involving 6 red beech and 6 silver beech trees. As with the earlier study *A. novae-zelandiae*, *H. microcycla* and *G.* cf. *applanatum* were the most common. Less common species included *Hypholoma* spp., *Ryvardenia campyla*, *Australoporus tasmanicus*, *Neofomitella hemitephra*, *Gymnopus otagensis* and *Luteoporia lutea*. Wood colonised by *G.* cf. *applanatum* decayed more rapidly. There was a greater diversity of species in beech than podocarp forest. Conclusions were the same as in the other study.

Both studies gave a better understanding of the ecology of fungi decomposing fallen trees in native forests.

KATRINA WALBERT –Ectomycorrhizal fungi of exotic host species (*Pinus radiata* and *Pseudotsuga menziesii*) in nurseries and the initial year of out planting in New Zealand.

Abstract: The symbiosis with ectomycorrhizal (ECM) fungus known to be essential for a plant's ability to take up sufficient nutrients and water and, to a certain degree, defend itself from soil pathogens. This symbiosis is particularly important when nursery grown seedlings are out planted into clear-cut land, where the natural soil environment is depleted. We investigated ECM of seedlings of different stock (bare root, cuttings and root trainer stock) and hosts (*P. radiata* and *P. menziesii*) in five nurseries and during the first year of out planting in the five sites across New Zealand. Roots were assessed for ECM colonisation percentage and species abundance. ECM abundance was low yet cuttings had higher species diversity. Most nursery ECM remained abundant in the plantation, only few non-nursery ECM were found one year after out planting. ECM colonisation and plant material varied between nurseries - plants with low ECM abundance and small root system in the nursery stagnated in the plantation. For both hosts, *Rhizopogon* spp. Were the most abundant associate. The aim of this study was to create an inventory of 'what is there' for New Zealand's two most important plantation species. This knowledge is building the base for work on future sustainable forestry management practises such as the influence of nursery fertiliser and fungicide applications on the growth of ECM fungi.

Mycorrhiza is Greek for ‘root fungus’. ECM fungi grow around the tree’s root tips. Rhizomorphs and hyphae increase the root surface of the tree while also creating a barrier against pathogens. In 2005 Katrina started her PhD study on *P. radiata* ECM fungi. In the artificial environment of the nursery, roots are trimmed before planting before going into another artificial environment, clear cut land. In the first year nursery fungi dominate, then in 12-20 months forest ECM fungi take over. Nursery fungi are helping trees to survive in the wild. Nurseries of Douglas fir (*P. menziesii*) produced the same results, with *Rhizopogon* spp. being the most abundant in nurseries and out plantings. There were more species with cuttings than seedlings.

In 2010 a study started to assess the effect of fungicide and fertiliser applications in a glasshouse trial. The question now is, now that we know what is there, how can we manipulate the system and what ECM spp. colonisation are most effective.

PETER JOHNSTON – Patterns of fungal diversity in NZ *Nothofagus* forests.

Abstract: *Nothofagus* is represented in New Zealand in for species, one of these divided into two subspecies. *N. menziesii* is a member of the subgenus *Lophozonia*, the other four taxa are in the subgenus *Fuscospora*. The *Fuscopora* taxa are closely related, often forming inter-species hybrids. About half of New Zealand's remaining native forests are *Nothofagus* dominated. Based on historical specimens and literature records, these forests are reportedly the most myco-diverse in NZ. However, there is little knowledge on how, or whether, this diversity is structured in relation to host species or geography. We use leaf endophytic fungi to ask whether the different species of *Nothofagus* in NZ are associated with different communities of fungi. Endophytic fungi are ideal for studies comparing fungal diversity over an ecological gradient, because they are not dependent on the direct observation of fungal fruiting bodies, and they allow for standard statistically robust sampling strategies. Uniform volumes of leaf tissue can be gathered ad sampled under standard conditions from a range of sites. We sampled leaf endophytic fungi from N. *menziesii* and two species from the subgenus *Fuscopora*, growing in mixed stands at four sites, the sites 6-400 kms distant from each other. The fungal communities at all sites differed significantly, but these differences were not related to distance. However, NMDS (Nonmetric Multidimensional Scaling) analyses showed that the strongest influence on fungal community structure was host subgenus. The fungal communities associated with the two species in subgenus *Fuscopora* being more different to those on *N. menziesii* than they were to each other. The between subgenus differences were greater than any of the between site differences. An earlier study using similar methods to sample endophytic fungi in podocarp forests, allows a comparison between leaf fungal diversity associated with *Nothofagus* species and with podocarp species. Based on NZFungi data, historical literature and specimen records have reported on average 254 species of fungi (excluding ectomycorrhizal fungi) in association with each *Nothofagus* species, and 92 species of fungi on average in association with *Nothofagus* species and with each of the podocarp species for which endophyte data is available (*Dacrycarpus dacrydioides*, *Dacrydium cupressinum*, *Podocarpus totara*, and *Prumnopitys ferrugineus*). In contrast, the diversity of endophytic fungi associated with each group of hosts barely differed – an average of 41 species of fungi from the three *Nothofagus* taxa, and 30 from the four podocarp species, an average of 23.2 endophyte species per site for each *Nothofagus* taxon, 22.4 endophyte species per site for each podocarp species. Assuming leaf endophytic fungi are an acceptable surrogate for comparing total fungal diversity between sites and hosts, then perhaps historical records of diversity suggesting our *Nothofagus* forests have extreme levels of fungal diversity are biased by different levels of collecting effort between forest types.

Nothofagus is lower in plant diversity but higher in myco-diversity than other NZ forests. As a comparison of described species there are 906 in *Nothofagus* forests, 413 in *Kunzea*/*Leptosperumum* forests and 209 in *Metrosideros* forests. In this study the most species found belonged in *Ascomycetes*.

SULIANA TEASDALE – Molecular diversity of *Cortinarius* in three forest types.

Abstract: Ectomycorrhizal (ECM) symbiosis involves a close association between an ECM fungus and the roots of an ectomycchorizal host plant. This symbiosis is found in a limited number of plant host families but is important to many habitats worldwide. New Zealand has only seven native ECM plant host species in three genera: Nothofagus, *Kunzea* and *Leptospermum*. There is a large number of introduced ECM host spp. present in NZ; these species predominantly belong to the families *Pinaceae* and *Myrtaceae*. The ECM fungal genus Cortinarius is the most commonly recorded species found in association with native NZ beech, as well as native manuka/kanuka, stands. *Cortinarius* is also widely documented

in association with spp. from the *Pinaceae* and *Myrtaceae*. We used molecular and phylogenetic techniques to assess the diversity of *Cortinarius* within and between stands of *Kunzea ericoides*, *Nothofagus menziesii*/*N. solandri var. cliffortioides* and *Pinus radiata*. Using genus-specific primers for *Cortinarius,* we amplified environmental DNA samples extracted from soil collected within the three forest types. We have recorded the first molecular detection of *Cortinarius* in association with *P. radiata* in NZ. We also found more crossover of fungi between the three forest types than has been observed in respects to taxonomic diversity (i.e. sporocarp collections). Comparison of soil and ectomycorrhizal root tip DNA from the *Nothofagus* forest revealed similar total diversity; however the majority of operational taxonomic units were unique to each of the molecular analyses. The molecular sampling technique found a much greater diversity of *Cortinarius* in the *Kunzea* forest than expected from the taxonomic diversity within NZ. As ECM fungi are essential to the survival and vigour of both *Nothofagus* spp. and *P. radiata*, the use of genus specific primers for investigations involving ECM fungal diversity show great potential for understanding the ECM relationships of these forest spp. Higher diversity found using molecular techniques indicates that taxonomic identifications of sporocarps are underestimating fungal diversity of *Cortinarius* within all three of the forest types. Through our research we hope to refine tools for exploring ECM fungal diversity, to aid in understanding the role these fungi play in forest ecosystems.

90% of plants form mycorrhizal associations but only 3% are ectomycchorizal. Worldwide there are greater than 2000 spp. of *Cortinarius*. In NZ there are 147 spp. recorded, 140 of which form associations with *Nothofagus*, 12 for *Leptospermum* and 13 for *Kunzea*.

RENEE JOHANSEN – Clarifying the lifestyles of NZ's xylariaceous leaf endophytes.

Abstract: The *Xylariaceae* are known for their wood rotting ability. However they are also regularly isolated as leaf endophytes, a diverse group residing within plants without causing disease. The production of fruiting bodies in leaf endophytes generally occurs after leaf senescence. Some xylariaceous endophytes have been matched with *Xylariaceae* genera or species which fruit on dead wood, but others have never been matched genetically to specimens collected as fruiting bodies. Many of these unmatched endophyte isolates form a monophyletic clade within the *Xylariaceae*, potentially a group within this family that has an exclusively endophytic lifestyle ('leaf endophyte only clade'). This study aims to build on previous investigations to confirm the monophyly of the leaf endophyte only clade, and to investigate its biology. Past studies on leaf endophytes have shown that sites in the Hunua Ranges have high levels of diversity of *Xylariaceae* in genera common on fallen wood in New Zealand forests, as well as species in the possible endophyte only clade. Intensive collecting of *Xylariaceae* fruiting bodies will be undertaken in the Hunua Ranges and sequence data will be generated from these specimens to compare to that from leaf endophytes from the same area. It is hoped this will assist in the naming of species of leaf endophytes previously collected here and test the hypothesis that there are *Xylariaceae* in the area solely in leaves. A decomposition experiment will test whether specimens from the leaf endophyte only clade have lost the wood rotting abilities characteristic of the *Xylariaceae*. A multi-gene phylogeny will also be constructed to examine the degree of support for an endophyte only clade, at present recognised on the basis of an ITS gene tree. If such a group does exist, many further mysteries accompany its members, particularly with regards to their reproduction and dispersal mechanisms.

There are 1.5 million species globally, with only 5% possibly described. Traditional taxonomy is relied on for ID. Many collections do not fruit in culture. *Xylariaceae* belongs to the phylum *Ascomycota* and reproduce asexually via conidia and sexually via perithecial ascomata embedded in stromata. There is a great deal of variation in fruiting bodies. They have a worldwide distribution. They are wood decomposers and early colonisers and include white rot fungi leaf endophytes in every plant species, highly localised multiple species per leaf non-pathogenic and possibly Mutualists horizontally transmitted matched with fruiting bodies on dead tissues. She asks is there a xylariaceous clade with an exclusively endophytic lifestyle? There are 1,743 *Xylariaceae* collections in Landcare PDD.

JERRY COOPER – Fungal diversity associated with kowhai.

Abstract: Kowhai is frequently associated with symptoms of branch die-back. Affected branches provide a habitat for a surprising range of known and novel fungi. Here we report preliminary investigations on the causal agent and the associated fungal diversity.

Kowhai (*Sophora* spp.) belongs to the bean family that includes pagoda tree (*S. japonicum*). We have 4-8 endemic spp. *S. cassioides* was once known as *S. microphylla*, but that is a Chilean species. *Sophora* are found in open habitats like river terraces, lake margins, flood plains and rocky hill slopes. In PDD there are 128 collections associated with 7 species of *Sophora*. *Uromyces edwardsiae* produces a gall of seed pots and is more closely related to *Uromycladium*. With *Sophora* die-back the branches die and remain attached, commonly caused by *Diaporthe* cf. *sophorae* and *Diaporthe* cf. *sophorae*, well known pathogens of *Fabaceae*. *S. microphylla* was grown and sprayed but healthy plants developed. *Cladosporium* cf. *herbarum* is another possibility but no results yet.

Collections of micro-fungi on dead attached branches: *Camarosporium* cf. *sophorae* (4), *Coniothyrium* sp., *Diplodia* cf. *sophora* (2), *Diplodia* sp. (1), *Stilbospora* sp. (1), *Jalapriya toruloides* (1), *Camposporium valdivianum* (1), *Linkosia* sp., ?*Elsinoe* sp., *Patellaria atrata* (long record back to 1868), *Sclerotinia sp. "anisotome"* P.R. Johnst., *Rhytidhysteron* cf. *hysterinum*, *Valsaria insitiva*, *Heteroradulum spinulosum*, *Exidiopsis* sp., *Helicogloea* cf. *lagerheimii*, *Dacrymyces* sp., *D. novaezelandiae*, *Chondrostereum*, *Lyomyces* sp., *Fomitiporia* sp., *Typhula micans*, *Lachnella alboviolascens*, *Merismodes anomala*, *Clitopilus hobsonii*, *Crepidotus praecipuus*, *Hohenbuehelia brunnea*, *H*. sp. 'Okuti', *Simocybe pruinata*, *S*. sp. (most common spp.), *Flammulina velutipes*, *Hemimycena* sp.

SHIRLEY KERR – Fabulous fungi.

Shirley played a short DVD showing many different types of fungi. It included species of waxgills, *Entoloma*, *Mycena*, *Aseroe rubra*, coral fungi, boletes, *Cyptotrama*, *Geastrum*, *Leotia*, *Cortinarius*, *Hericium novae-zelandiae*, *Oudemansiella australis*, and *Stereum*.

BEN MYLES – Do green algal photobionts co-evolve with their lichenized ascomycete hosts? A case study using *Menegazzia* (*Parmeliaceae*, *Lecanoromycetes*).

Abstract: Only recently has the ability to study the separate evolutionary histories of lichen photobionts and mycobionts become widely available. With universal primers for numerous genomic regions now obtainable for both groups, co-evolutionary questions that could only be speculated on in the past can now be thoroughly investigated. Such methods were employed here on the lichenized ascomycete genus *Menegazzia* and its green algal

photobiont *Trebouxia*. To achieve this multiple collections were made of 15 *Menegazzia* spp. in NZ and Australia. The ascomycete phylogeny was then constructed using the nuclear ITS and mitochondrial 12S, while the algal phylogeny was constructed using the nuclear ITS and cloroplastic *rbc*L. The evolutionary histories of both groups were compared for similarity, under the assumption that high levels of topological concordance would indicate co-evolution. The results are in agreement with several other recent studies that have looked at this relationship: genus-wide co-evolution is not supported. The algal diversity is found to be much lower than that of the fungal diversity, with the most common photobiont, *Trebouxia jamesii*, involved in symbiotic relationships with several different *Menegazzia* spp. However, in contrast to other studies, there is evidence for fungal-algal host specificity within some clades. These patterns are discussed in light of lichen dispersal strategy differences.

There are 80 described *Menegazzia* spp., 22 in NZ and 30 in Australia. Distribution is via spores and asexual reproduction. There are 36 described *Trebouxia* spp., but in reality there are probably hundreds of thousands.

JERRY COOPER – Keys to NZ species of *Russula* and *Lactarius* (a TFBIS funded project done with Pat Leonard).

Abstract: We will present progress on the development of an illustrated multi-access identification key to the NZ species of *Russula* and *Lactarius*. The work has required a re-evaluation of the existing species concepts combining morphology and molecular evidence from recently collected material. Several new and cryptic taxa have been identified. Findings are contributing to a new revision of the group.

There are 60+ spp. of ECT in this group associated with *Nothofagus* and *Kunzea*/*Leptospermum* plus some introduced tree species. They are often large and colourful and noticed in the field. Some species are on the rare and threatened list. Ross McNabb *Russula* (1973) and *Lactarius* (1971) are both out of date. This group is easy to recognise at a genus level but difficult at a species level.

The approach they took was to use the FUNNZ forays to collect, define a character matrix from McNabb's data and subsequent work by Pat, work out how Lucid (a quirky program) works and set it up, enter data and refine how the key operates, and finally field test the key on FUNNZ forays. There were problems with the preliminary key.

They needed to combine the strengths of molecular and morphological approaches but had problems with this approach. The work added 20 new spp. to McNabb's list and there are more out there. They revisited McNabb's collection sites using a pragmatic combination of morphological and molecular data to define good/useful/testable species boundaries. This turned into a major revision of these fungal groups. In June (2011) an interim key is proposed to be introduced onto the Landcare website to satisfy the TFBIS contract.

Spinoffs – where do our species fit in the current taxonomic classification? Where do our species fit in the current subgeneric classification? For the moment there is enough information to deliver a final key on a modern revision of the group including many new taxa in a potentially richly illustrated volume in the Fungi of NZ series, given 18 months and some good data.

MEGAN ROMBERG (MAF) – Found Something Unusual? The MAF New Organism Notification Process.

Abstract: The Ministry of Agriculture and Forestry works under two key pieces of legislation, the Hazardous Substances and New Organisms Act 1996 (HSNO Act) and the Biosecurity Act 1993. The HSNO Act aims to protect people and the environment by preventing or managing the adverse effects of hazardous substances and new organisms. MAF is the enforcement agency for the HSNO Act's new organisms provisions and responds to detections of new organisms present in NZ without HSNO Act approval. Under section 44 of the Biosecurity Act, "Every person is under a duty to inform the Minsistry, as son as practicable in the circumstances, of the presence of what appears to be an organism not normally seen or otherwise detected in NZ". But what actually happens when you call the 0800 number (0800 80 99 66)? This talk covers what happens when a new organism is reported to MAF, the reporting and investigation process, and what to do, and not to do when reporting a new organism to MAF.

Foresty and Agricultural exports amount to 26.5 billion and imports to 40.2 billion dollars, according to a 2009 estimate. There are a lot of things coming to the country, which is a potential source of new organisms. Information to give when calling the 0800 number include whether it is a pest or disease, whether it is associated with a recent import and whether you are a number of the scientific community. In 2009 there were 12,480 calls. Of these 2,645 were of plant health and environmental concerns. 819 went to an Incursion Investigation by the Plant and Environment team. 436 were classed as 'stand down' after an initial phone call. Of 383 that went to the investigation phase 198 were deemed of no biosecurity issue and the remaining were considered new to NZ and potentially presented a pathway risk.

PAM CATCHESIDE – Fungi and fire: An example from Kangaroo Island, South Australia.

Abstract: In Australia fire has a major impact on its ecosystems. Although fungi are an essential part of the biota acting as decomposers, symbionts, recyclers of nutrients and as food sources for vertebrates and invertebrates, there have been relatively few surveys in Australia that consider both fungi and fire. With an absence of data it becomes difficult to determine efficient management regimes to optimise return, after fire events, to balanced ecosystems. A study of the macrofungi on Kangaroo Island (KI), the largest island off the coast of South Australia, is providing data on pre- and post-fire fungi and examining fungal succession after fire. These data will help in the development of effective fire management plans for the island.

In the past fire has played a major part in evolution and the development of the environment. Fire management policies aim to maximise biodiversity. There is a lack of knowledge of the effects of fire on fungi.After fire fungi act as important soil and habitat colonisers. Kangaroo Island covers approximately 75000 hectares. Of this 30,000 hectares comprise the Flinders Chase National Park (FCNP) and 41,000 hectares comprise the Ravine Des Casoars Wilderness Protection Area.

Species that appeared post fire in the first and/or second years included *Pyronema omphalodes* (one of the first colonisers), *Anthracobia muelleri* (1^{st}), *A. maurilabra* (1^{st} and 2^{nd}), *Pulvinula archeri* (1^{st}), *P. tetraspora* (2^{nd}), *Geopyxis carbonaria* (a mycorrhizal soil stabilizer), *Byssonectria fusispora*, *Scutellina scutellata* var., *Plicaria recurva* (1^{st}), *P. endocarpoides* (2^{nd}), *Peziza* aff. *echinospora*, *P. praetervisa*, *P. tenacella*, *P. petersii*, *Daldinia* sp. on *Hakea* sp. (2nd), and *Laccocephalum* spp. (1st). *Laccocephalum* grow from the ground under logs. The spores are deposited on the log and develop a fruiting body after a fire.

SIMON COOK – NZ's Dutch elm disease programme–highs and lows of a fungus on the wing!

Abstract: *Ophiostoma novo-ulmi* was first found in Auckland in the summer of 1989, in Myers Park, Auckland. A programme was immediately set up to eradicate the disease, an incredibly nasty fungus that has decimated elms throughout the world. Since then the disease has been kept at bay by the fantastic work of forest research, forestry dept., MAF, Vigil, Scion, local councils and SPS Biosecurity and many others. Today the programme is underfunded and managed by the new Auckland Council, which hopes to increase the scope of the eradication programme and get rid of the disease once and for all.

Simon is Arborical Advisor Parks, Hauraki Gulf Island Biosecurity Parks Sport and Recreation. In 1989 the first tree found to be infected with Dutch Elm Disease was found in Myers Park. The disease spread to Napier around 1993. The control of the disease was originally under MAF but is now an Auckland Council project. The transition from MAF to Auckland Council resulted in a reduction in budget to $135,000 per year. Dutch Elm Disease is a vesicular wilt disease caused by the beetle *Scolytus multistriatus*. It's found from Albany to Pukekohe and therefor it is useful for Auckland Council to be managing the project as all in the Auckland Council boundaries. The epicentre is at Mount Hobson. There are 4.5 thousand elms affected and 16,400 elms in the control area. Control is by surveying of canopies in summer, sanitary removal of infected trees, beetle pheromone traps and public enquiries. In 2004 there were 103 trees tested and 14 were found diseased. Thirteen died the year later. In 2011 there were 150+ trees infected with beetles and 10 diseased trees.

MEGAN ROMBERG – Dyeing wool with mushrooms.

Megan showed a slide show illustrating all of the colours and artistic works possible with mushroom-dyed wool.

History – 1968 Miriam C. Rice began dyeing wool with sulphur tufts (*Hypholoma* spp.) and then in published her first book *Let's Try Mushrooms For Color*[iv]. Later she published expanded works, 1980 her expanded works *Mushrooms For Color*[v] and *Mushrooms for Dyes, Paper, Pigments and Myco-Stix*[vi], and *Mushrooms for Color and Papermaking with Polypores*[vii]. In 1985 the International Mushroom Dye Institute was established.[viii] She also wrote a number of articles. There is also *The Rainbow Beneath My Feet* (Arleen et. al. 2009)[ix]

This is the documented history but people have been using mushrooms and lichen for some time. Megan gave a talk on how to make dyes. Dyes from fungi have to have colour, be stable against sunlight and air, and be water soluble to bind to fabrics. She showed photos of various articles made from fungal dyes.

Fungi used for dyes include *Xerocomellus chrysenteron*, *Cortinarius phoeniceus* var. *occidentalis*, *Daldinia* spp., *Echinodontium tinctorum*, *Hydnellum aurantiacum*, *Hypholoma* sp., *Pisolithus tinctorius* and *Phaeolus schweinitzii*.

DAVID ORLOVICH – Mushroom Poisoning by *Lepista Irina*.

Abstract: A six-year-old patient presented to Dunedin Public Hospital after experiencing abdominal and chest pain following consumption of up to nine fruit-bodies of an unidentified mushroom. The mushroom species could not be identified by the doctor and was not immediately recognised by the first author [(David Orlovich)] from a photograph of specimens collected at the patient's home. Following a macroscopic and microscopic examination, sequencing and phylogenetic analysis of the internal transcribed spacer (ITS) region of ribosomal DNA, and comparison with online data from other genetic and herbarium records, the specimen was identified as *Lepista irina*, once a misidentified record on GenBank was ruled out. The patient recovered unremarkably and limited information available on the toxicity of this species indicated that it might cause gastrointestinal upset if eaten raw. The exercise highlighted the value of the immediate availability of laboratory facilities, human and online resources for taxonomic identification of a poisonous mushroom.

Miss S., a 6-year old girl, presented at Dunedin Public Hospital with abdominal pain and chest pain 15-30 minutes after eating some mushrooms. She told the doctor she'd eaten nine. The doctor sent the photo to people he knew, then looked in a book and thought it resembled *Amanita phalloides*, but it was a very different mushroom. Anna Hopkins looked at the mushrooms, did a description and then looked under a microscope and cross-referenced with photos of spores. They looked like *Lepista* spores. Mike Lucas did a DNA sequence and found two different species, one *L. irina* and the other *Clitopilus prunulus* (but maybe a *Lepista*). Mike went into the NZFungi website (now BiotaNZ) to read the online descriptions. Is L. irina poisonous. There was one report of a husband and wife who had gastro-intestinal upset from eating them. Wikipededia was also referenced for information on *L. nuda*.

Miss S. was fine overnight. She felt nausea and vomited once and the following afternoon was feeling much better.

Author's Note: There is now a Facebook group catering for worldwide suspected mushroom poisoning cases – Poisons Help; Emergency identification For Mushrooms & Plants.

Wednesday 18 May, Kowai Craters of the Moon

Heading north we passed by the National Equestrian Centre and then stopped briefly to watch a forestry operation underway near a thermal power station. One machine was taking off branches from newly cut down trees and another was picking up logs and sorting them into different piles. A third machine with two legs was chainsawing branches the first machine didn't remove.

From there we went to Craters of the Moon, a geothermal area managed by a trust. A unique species (*Pisolithus thermaeus*) grows there that is adapted to geothermal areas. The vegetation is a prostrate form of *Kunzea* with *Cyathodes juniperina* and *Lycopodium* sp. There are small areas of broadleaf scrub. A *Podoserpula* species was found at the track edge.

We returned briefly to Tauhara and then went to a local reserve, Rangitira Point Scenic Reserve on the edge of Lake Taupo. A fallen mahoe (*Melicytus ramiflorus*) log was covered with *Xylaria* sp., *Auricularia cornea*, *Favolaschia claudopus* and *Coprinellus* sect. *disemminati*. Another species of note we found there was *Pholiota glutinosa* on a kowhai (*Sophora*) tree.

Returning to the Tauhara Centre we then walked five minutes down the road to the L'Arte Café & Gallery, where we had been invited to view a house and garden overlooking Lake Taupo full of artworks, and sip mulled wine. There were paintings and drawings in every room of the house including the bathroom and toilet. Paintings ranged from still life to portraits, landscapes and modern art. I was particularly interested in a couple of limited edition prints by John Lennon hanging in the toilet. There were also a range of sculptures both inside the house and in the garden constructed from various mediums.

Thursday 19 May, Tourist Trail

A group of us went north again. Our first stop was Craters of the Moon. Wile the others went inside I took a walk through a pine forest following bridle trails of a local horse trekking company. I was thinking of dinner, of maybe finding some *Suillus granulatus*, but I could find none. Each night during the foray we had eaten mushrooms as a component of dinner, either button mushrooms (*Agaricus*) or the native *Armillaria novae-zelandiae*. The only fungi I saw was *Hypholoma* sp., *Scleroderma* sp. and *Calvatia* sp.

The next stop was Aratiatia Rapids Scenic Reserve, where we walked to the first lookout to watch as the sluice gates of the Aratiatia Dam opened and water cascaded out. This happens twice a day. It was amazing to see how much water came through and how high the water rose through the rapids. The only fungi seen was *Auricularia cornea*, *Favolaschia claudopus*, a *Geastrum*, and one *Amanita muscaria*.

We spent lunch at Huka Falls, where we found *Trametes versicolor*, *Fuscoporia wahlbergii*, *Pholiota glutinous* and *Armillaria limonea*.

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