



Australasian Mycological Society Newsletter 1

Welcome to the first edition of the AMS newsletter. This newsletter aims to facilitate and enhance communication between our society members. A special thank you to all contributors to our first edition!

This newsletter's success will depend on member contributions, so please do not hesitate to send in any mycological news that you would like to share. Items could include: business news from the council executive, media items (press releases), interesting sightings of fungi, biographies, project proposals and reviews, meeting and workshop announcements, book reviews, field trip reviews, mycological classifieds and websites, interaction with other societies or fungal groups such as Fungimap, and regional news from the various fungal studies groups in Australasia. Black and white artwork or photos also accepted. I hope to put together the next edition of the newsletter early in 2005, so please send your news items in.

Can you think of a suitable name for our newsletter? MSA has "Inoculum," BMS has "The Mycologist." The Australasian Plant Pathology Society has "APPS News". Can you think of a catchy name that reflects our joint interest in mycology, our society or our regional role in mycology? If so, then send in your suggestions.

Australian Myxomycetes

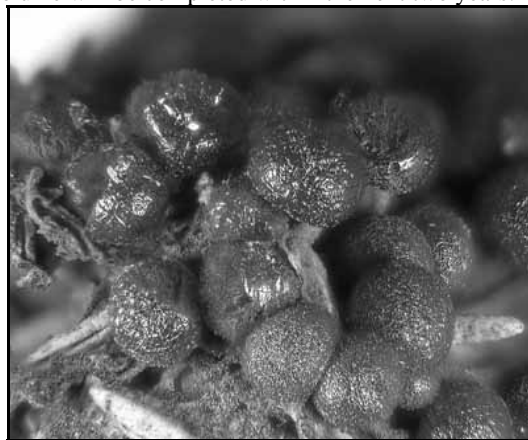
For the past three years, thanks to funding provided by a grant from the Australian Biological Resources Study (ABRS) Participatory Program, Steve Stephenson (University of Arkansas in the United States) has been studying the myxomycetes of Australia. During the period of late March to mid-April of 2004, he visited a number of study sites in the southern and western portions of the country. Many of these study sites were located in national parks, including Kinglake, Yarra Ranges, Lake Eildon, Mitchell River and Wilsons Promontory in Victoria; Kosciuszko in New South Wales; and Moore River, Avon River, and Kalbarri in Western Australia. In addition to carrying out fieldwork, Steve presented seminars at Curtin University of Technology in Perth (where he was hosted by Elaine Davison) and the Royal Botanic Gardens in Melbourne (where his host was Tom May).

Margaret Brims and her husband Alex accompanied Steve throughout the entire trip. Margaret, who works at the Western Australian Herbarium in Perth, is one of the few Australians currently studying myxomycetes. The participation of Margaret and Alex in the survey work carried out in 2004 was supported in part by a grant from the *Australian Geographic*.

During the period of mid- to late October of 2004, Steve returned to Australia to search for snowbank-associated

myxomycetes. He spent most of his visit in the high-elevation region around Mt. Kosciuszko, but trips also were made to Mt. Buller and Mt. Hotham. Snowbank myxomycetes were found to be quite common at some study sites, and about 300 specimens were collected over a period of approximately two weeks. These specimens appear to include a number of species not previously known to occur in Australia.

The ultimate objective of these studies is to obtain the data necessary to produce a monograph on myxomycetes for the series of volumes on the "Fungi of Australia" published by ABR/CSIRO Australia. It is anticipated that a draft manuscript of the proposed volume will be completed within the next two years.



Prototrichia metallica, one of the myxomycetes recorded from snowbank habitats in New South Wales.

Steve Stephenson

Funding for Chytrids

Researchers at James Cook University have been awarded support by the Department of Environment and Heritage to develop better understanding of the exotic pathogenic chytrid of amphibians, *Batrachochytrium dendrobatidis* that has devastated populations of native amphibians in more temperate parts of eastern Australia. I gather that they are to commence work next year. At the same time, the NSF in the USA is currently reviewing support for chytrid research, especially that involving the pathogen.

Peter McGee

IMC8 - what is it?

Have you heard the news? The AMS has won the right to host the International Mycological Conference (IMC8) in sunny Cairns, Qld., 20th-26th August, 2006. Get ready for a mycological explosion as potentially 1000+ international mycologists descend on Australia for the conference of the decade. Stay tuned for updates on the IMC8 website www.sapmea.asn.au/imc8

Ceri Pearce

IMC 8 and Fungus of the month

At the last AMS AGM in Sydney (Sept. 2004) the Royal Botanic Gardens Melbourne and Fungimap were thanked for their development and ongoing contribution of the "Fungus of the Month" component (link) of the IMC8 website. At the meeting, it was suggested that "Fungus of the Month" be expanded to include other groups of fungi such as microfungi, medical fungi, plant pathogens, etc. Members who can provide these images and background information suitable for inclusion on the website are asked to contribute. Contact Tom May, Email: tom.may@rbgs.vic.au for further information.

The 3rd New Zealand mycology colloquium, 9th - 15th MAY 2004: Report and abstracts.

The 18th New Zealand Fungal Foray was held in Brightwater, near Nelson, between 9th and 15th May 2004. This popular annual event attracts professional and amateur mycologists from all over the world and is always a fantastic mixture of foraging and socialising. In 2000, the 14th NZ Fungal Foray (in Te Anau) was lucky enough to host the Annual Conference of the Australasian Mycological Society. The day of talks and posters added a new dimension to the foray, where people could find out in an informal setting what research was going on in a wide range of mycological fields. Two years later, in planning the 16th Foray in Haast, Anne Maree Oliver and I thought it would be good to organise another day of talks at that foray, and that day became the 1st Mycology Colloquium. We were again treated to a wonderful array of topics ranging from beautiful dung fungus illustrations by Ann Bell to baking cars in an oven to kill bugs by Geoff Ridley – and everything in between! This year was the third such Mycology Colloquium at Brightwater, and we had 18 speakers from NZ, Australia, Europe and the USA. It was a thoroughly enjoyable day for all attendees and rivalled any international mycology conference I've ever been to for the range, depth, excellence of the presentations and great humour! In addition to the topics presented below, we were also treated to beautiful slide shows on fungal highlights from last year's NZ foray in Katikati (by Ann Bell and Dan Mahoney) and on fungi collected in South Australia during 2003 (by Pam Catcheside). If you've never been to a NZ Fungal Foray then you're missing a great week of fun, fungi and fantastic scenery. You can find out more about the NZ Fungal Foray from <http://www.landcareresearch.co.nz/research/biodiversity/fungiprogram/foray/>. When you come next year, consider giving a talk or slide show at the colloquium!

David A. Orlovich

Abstracts**Introduction to aquatic fungi of New Zealand**

The presentation introduced the major aquatic groups of fungi. Two groups were highlighted: the Ingoldian aquatic hyphomycetes and the aero-aquatic fungi. The distribution and techniques for collecting these groups were introduced followed by a discussion of their niche

habitat requirements and convergent microscopic morphology. Previous New Zealand based studies on aquatic fungi have been few with none dedicated to the aero-aquatic group. The latter group has received very little attention anywhere compared with the Ingoldian fungi. The presentation showed micrographs of many of the common species of Ingoldian fungi and, additionally, several forms tentatively identified as new, based on their unique morphology. The study has concentrated on isolating and identifying aero-aquatic fungi in New Zealand. Many collections have been examined and so far found to represent 29 taxa with 14 newly recorded for New Zealand and 10 currently undescribed. 20 collections are currently maintained in pure culture (ICMP). The morphology of all described aero-aquatic fungi has been scored into a DELTA character matrix and used to create on-line identification keys available on the web (<http://nzfungi.landcareresearch.co.nz>). The character matrix has also been analysed using clustering techniques and the resulting trees indicate several probable instances of misidentifications and synonyms amongst existing descriptions. Several isolates have had their ITS regions sequenced and the data combined with sequences from Genbank and also from unpublished data of H. Voglmayr for European isolates. The analysis has provided some preliminary conclusions: 1) European taxa are present in New Zealand (mainly in modified habitats); 2) some asexual forms have a suggested affiliation with known teleomorphs; 3) taxa potentially identified as new species have unique sequences.

J A Cooper

Ascospores vs. ascomal walls in predicting phylogenetic relationships in the Sordariales

Few morphological characters exist with which to delimit taxa in the pyrenomycetes most likely due to their small stature and simple structure. Ascospore characters have commonly been used for distinguishing pyrenomycete taxa, while ascomal wall characters have received little attention. Although taxa in the Sordariales possess a wide range of variation in both their ascomal walls and ascospores, genera have traditionally been delimited based on differences in their ascospore morphology. Phylogenetic relationships of multiple representatives from each of several genera representing the range in ascomal wall and ascospore morphologies in the Sordariales were assessed with partial nuclear DNA sequences from the 28S ribosomal large subunit (LSU), b-tubulin, and ribosomal polymerase II subunit 2 (RPB2) genes. Maximum parsimony and Bayesian analyses conducted on separate and combined data sets indicate that ascospore morphology is extremely homoplastic and not useful for delimiting genera. Genera based on ascospore characters and represented by more than one species were paraphyletic or polyphyletic in all analyses. However, taxa with similar ascomal wall morphologies clustered in five well-supported clades suggesting that

ascomal wall morphology is a better indicator of generic relationships in the Sordariales.

Andrew N. Miller

Fungi of the phylloplane, late Eocene epiphyllous fungi from Pikopiko, Southland, New Zealand

Several different types of epiphyllous fungi have been isolated from 40 million year old leaf litter, preserved as carbonaceous material, associated with the Pikopiko fossil forest, near Tuatapere, Southland. The leaves were macerated to release the cuticle and glycerin jelly mounts made of the leaf cuticle. Cellulose acetate peels were also made directly from the cuticle remaining on the sediment after maceration. These were also mounted in glycerin jelly. The fungi identified include species of *Meliolinites*, *Asterina*, *Trichopeltinites*, *Entopeltacites*, *Callimothallus*, *Phragmothyrtes*, *Plochmopeltinites* and a new genus. On the leaves there were also fungal germlings (possibly forms of *Desmidiospora*) and an assortment of spores, setae and hyphae. None of these fungi have been reported from fossil leaves in New Zealand before, although some fructifications and spores have been noted in palynological preparations. This highly diverse assemblage of fungi are associated with a variety of angiosperm leaves, mainly dicotyledonous, and suggests that climatic conditions in this late Eocene fossil forest were warm temperate and humid.

J.M. Bannister, D.E. Lee & David A. Orlovich

Glomerian fungi in New Zealand forest

Arbuscular fungi in the phylum Glomeromycota form the predominant mycorrhizal symbiosis in New Zealand's mixed broadleaf/podocarp forest. Many lower plants also form associations with arbuscular fungi in this group. All New Zealand species of podocarp have specialised nodules on their roots, which are packed with arbuscular fungi. These arise in the same manner as lateral roots from cells in the pericycle, but lack a root cap and central meristematic area, so are anatomically distinct from lateral roots. Each new nodule is infected afresh from the soil and not from fungi colonising the main root.

In order to identify the colonising fungi, both universal and existing taxon-specific primers were used in the first instance to obtain partial fungal ribosomal gene sequences from root nodules. The samples were from podocarp species growing in West Coast and Catlins forest sites. Partial fungal ribosomal gene sequences were also obtained from two species of forest liverwort. One of these, *Marchantia foliacea*, was collected from five sites across the South Island. Specific primers were designed from first sequences in order to obtain full-length ribosomal gene sequences for the purpose of taxonomic analysis. These primers could also be used as markers for an ecological study of the distribution of New Zealand strains of AM fungi.

When compared to sequences in the data base, and analysed phylogenetically, the NZ AM sequences all fell into the existing grouping of *Glomus* gp A

(Schuëbler et al 2001). However the monophyly of *Glomus* gp A was upset by the addition of the NZ species, with at least one group of sequences forming a clade basal to all other sequences. No sequences outside *Glomus* gp A were detected in this study. This raises the interesting question whether these are the predominant AM fungi in NZ forest, or whether a refinement of the techniques would detect other species.

The endophyte of the liverwort *Marchantia foliacea* was identified as also *Glomus* gp A. trees. The same *Glomus* sequences were found in podocarp roots and liverwort. This is the first identification of an AM endophyte colonising the photosynthetic tissue of a lower plant as well as the roots of trees.

Julia Russell, Simon Bulman & Brian Butterfield

Wild plants need mycorrhizas

Observations at a mine restoration site in Westland suggested that the presence of mycorrhizas protected natural *Nothofagus* seedlings against attack by the root pathogen *Phytophthora cinnamomi*. Nursery-raised seedlings, with few or no mycorrhizas on the roots, appeared to be highly susceptible to *P. cinnamomi* at this site. These observations were tested experimentally, both in the shadehouse and in the field in soils naturally infested with *P. cinnamomi*. However, the mycorrhizal status of our experimental plants had no impact on their susceptibility to *P. cinnamomi*. The only seedlings surviving in our experiments were those treated with the Oomycete-specific fungicide phosphoric acid. Despite this, the lack of disease in natural *Nothofagus* seedlings at sites with *P. cinnamomi* present in the soil still requires an explanation. It is likely that the mycorrhizal community established on our experimental plants comprised a different set of species to those found in a natural forest. We established mycorrhizas in the highly disturbed, stressful environment of the shadehouse, the kind of environment likely to be best suited to "weedy", early-succession mycorrhizal fungi. Seedlings germinating in natural, mature *Nothofagus* forests will quickly become infected with late-stage mycorrhizal species through direct contact with mycelium already in the soil. These two sets of mycorrhizal species are likely to differ in their physiological and biological properties. Our experiments appear to have been confounded by the complexity of natural biological communities. This complexity means that attempting to utilize mycorrhizal fungi to assist the establishment of *Nothofagus* seedlings at restoration sites in New Zealand might not be practical. Although *Nothofagus* seedlings from the nursery can be established with the assistance of fungicides, the community of microbes associated with the plants will be very different to those associated with natural plants. Whether or not this is of concern depends on the aim of the restoration project. If the aim is to produce healthy looking plants, the fungicide will work. However, if the aim is to produce a healthy, functioning community, the fungicide may simply be masking problems associated with a lack of microbial diversity.

Peter Johnston, Ross Beever & Ian Horner

The genus *Laetiporus*: its evolution in the last ten years

The genus *Laetiporus* has been known mainly through one species, *L. (Polyporus) sulphureus*, in both Europe and North America (N.A.). A variety *L. s. var. cincinnatus* was also discussed but hardly accepted in N.A.

Ecological observations for many years suggested that more than one species was contained within the species concept of *L. sulphureus* in North America. Occurrence on hardwood vs conifer, eastern USA distribution vs western USA distribution as well as southern vs northern were examined to determine the accuracy of the species concept of *L. sulphureus* in North America.

Restriction enzyme technology was used to also support the results obtained using the ecology, morphology, and incompatibility matings. The results from all studies indicated conclusively that there are at least five species in N. A.

Laetiporus sulphureus is distributed through eastern N.A. on hardwood trees, mainly *Quercus*, as a brown-rot of heartwood of living trees causing trunk breakage and as a saprobe on dead trees. *Laetiporus cincinnatus* is a brown-rot of roots of living *Quercus* and a saprobe of roots after the tree falls. *Laetiporus huroniensis* and *L. conifericola* occur as brown-rot of heartwood in conifer trees, *L. huroniensis* in the north central USA and *L. conifericola* in the Intermountain West and north into Alaska. Both result in main stem breakage and occur as saprobes on the dead and fallen trees. *Laetiporus gilbertsonii* occurs especially on *Quercus* and *Eucalyptus* along the coasts of the western USA and across the southern tier of states near the Gulf of Mexico. It composes two varieties that are differentiated only through morphology, *L. gilb. v. gilb.*, being typical orange above and sulphur yellow below and *L. gilb. v. pallida*, pink above and pale to near white below.

The relationship of *Laetiporus sulphureus* in N.A. to that in Europe has not yet been studied. To determine the correct name this need to be done. Preliminary results indicate that *L. portentosum* and *L. persicinus* belong in other genera and *Pycnoporellus* and *Phaeolus* appear to be distinct from *Laetiporus*.

Harold H. Burdsall, Jr (retired) & Mark T. Banik

The earthball genus *Pisolithus* in New Zealand reflects long distance dispersal from Australia?

The earthball genus *Pisolithus* forms ectomycorrhizal associations with a range of host trees around the world. Although it has often been regarded as comprising a single variable species *Pisolithus arhizus* (syn. *Pisolithus tinctorius*), morphological, ecological and molecular studies clearly indicate a number species should be recognised. In New Zealand, the genus is restricted to geothermally heated soils in the Taupo Volcanic Zone, where it is associated with *Kunzea* and *Leptospermum* (Myrtaceae). We have recognised three species in New Zealand on the basis of ITS gene sequences, spore morphology and sporocarp colour

(Moyersoen *et al.* 2003). All three fall within ITS clades (phylogenetic species) previously recognised in Australia (Martin *et al.* 2002): *Pisolithus marmoratus*, *Pisolithus albus*, and the unnamed *Pisolithus* "species 10". In Australia these species are associated primarily with eucalypts (Myrtaceae). While eucalypts have been introduced into New Zealand, *Pisolithus* has not been found there in association with them. We propose that the three species dispersed to New Zealand from Australia by trans-oceanic airflow during recent geological times. The success of this long-distance dispersal of ectomycorrhizal fungi can be related to: a) the capacity of *Kunzea* and *Leptospermum* species to host both arbuscular and ectomycorrhizal fungi, and thus act as "nurse plants" for wind-blown spores; b) the occurrence of sterile colonisation land surfaces following volcanic and hydrothermal eruptions over the last 1M years; c) the tolerance of these *Pisolithus* species to the stresses imposed by hot (sometimes exceeding 55°C at 8 cm depth), acid soils with high Al levels; and d) the ability of these fungi to promote host plant growth through ameliorating chemical stress and assisting nutrient acquisition.

Ross E. Beever, Bernard Moyersoen & Francis Martin

Armillaria hinnulea in New Zealand: a recent invader?

Armillaria hinnulea was described by Kile and Watling from Tasmania, Victoria, and New Zealand in 1983 based on thirty-three Tasmanian, five Victorian, and one New Zealand collection. It is distinguished macroscopically from *A. novae-zelandiae* by its non-viscid cap, and stipe that broadens at the base, and from *A. limonea* by its brown cap which lacks sandpaper-like scales, and its overall pinkish-brown colours especially in the gills. It is easily distinguish microscopically by the presence of clamp connections on the basidia and in the subhymenium. *Armillaria hinnulea* is the only *Armillaria* species in the Southern Hemisphere to exhibit this characteristic and it has been speculated that it is more closely related to Northern Hemisphere species. Recent phylogenetic analysis of the internal transcribed spacer region of the ribosomal DNA supports this Northern Hemisphere relationship. *Armillaria hinnulea* has only been found in the *Nothofagus* forests of north-western quadrant of the South Island. Could this be a recent invasion of New Zealand as a result of wind dispersal from Australia? The current research programme will look at the population genetics *A. hinnulea* and assess current state of variation between populations and for any indication of a genetic bottleneck. Techniques to be employed will include Randomly Amplified Polymorphic DNA (RAPD) or Amplified Fragment Length Polymorphism (AFLP) and assessment of the results through analysis of pair-wise differences and cluster analysis, as well as Analysis of Molecular Variation (AMOVA). Some further points that will be explored are the tetrapolar mating system of *A. hinnulea*, resulting in an outcrossing rather than clonal population, the role of basidiospores in dissemination, and the epidemiology of

the fungus in the *Nothofagus* forest. The goal of this FRST funded research programme is to shed light on how a soil basidiomycete might invade a native forest, and how such insight could be used to enhance New Zealand's biosecurity against human assisted invasions.

Geoff Ridley & Tod Ramsfield

Ordinal placement of *Hysterangium* and related taxa: phylogenetic support for recognizing the Hysterangiales.

It is now clear that two orders of Homobasidiomycetes, Gomphales and Phallales, are closely related, forming a well supported clade. Although monophyly of Gomphales, including *Ramaria*, *Gomphus*, *Clavariadelphus*, and *Gautieria*, has been supported by previous phylogenetic analyses, support for monophyly of the Phallales was inconclusive. This uncertainty was largely due to the unstable grouping of the hypogeous taxa (e.g., *Hysterangium*) with the epigeous gasteroid fungi, collectively known as "stinkhorns". Subsequent phylogenetic analyses using DNA sequences of nuclear LSU rDNA, mitochondrial SSU rDNA, and ATP6 with an expanded sampling of *Hysterangium* and related taxa revealed that Phallales is not monophyletic. These results support the recognition of the order Hysterangiales, which contains several hypogeous genera including *Hysterangium*, *Protuberata*, and *Gallacea*, from Phallales, which comprises the families Phallaceae and Clathraceae. Also, several unexpected relationships were found within the Hysterangiales clade, including the sister relationships of *Hysterangium* and the family Mesophelliaceae. We will present results from multigene phylogenetic analyses of Gomphales/Phallales/Hysterangiales clade based on parsimony and Bayesian methodologies, and we will discuss character and character state evolution of basidiomata.

Hosaka, Kentaro, Colgan III, Wesley, Castellano, Michael, & Spatafora, Joseph.

Mycology research at Otago University

The University of Otago has a long history of research in mycology, in particular through the pioneering contributions of the late Prof. G. T. S. Baylis, who worked on arbuscular mycorrhizas and inspired an entire generation of mycologists and other professionals who were lucky enough to be his students, colleagues and friends. I took the opportunity at this colloquium to outline some of the research in mycology currently being done in the Dept of Botany at the University of Otago. My own interest in ectomycorrhizas has most recently resulted in a collaborative review with Prof. John Cairney (University of Western Sydney) on ectomycorrhizal research in New Zealand (Orlovich & Cairney 2004 *NZ Journal of Botany* 42(5) in press). From literature and herbarium searches we identified 76 genera or ectomycorrhizal fungi in NZ, with 42 genera found only on native trees, 10 genera only on introduced trees, and 24 genera forming ectomycorrhizal associations with both. Only 2 introduced species really stand out as being regularly found to infect both native

and introduced trees, and these are *Amanita muscaria* and *Chalciporus piperatus*. The impact that these fungi may have on native fungal species diversity is unknown, and a subject worthy of future study (Bagley & Orlovich 2004 *NZ Journal of Botany* 42(5) in press). I briefly mentioned ongoing work started by Honours student Melanie Stephen to identify ectomycorrhizal root tips from *Nothofagus* trees in Southern Otago. So far we have over 50 ITS DNA sequences (not all unique), with the bulk of these being from the genera *Cortinarius* and *Russula*. In collaboration with Prof. Steve Stephenson (University of Arkansas), we are studying fungal diversity in canopy soils (aerial soil formed on the tops of branches) of silver beech (*Nothofagus menziesii*) and kahikatea (*Dacrydium dacrydioides*) growing in the cool temperate rainforests of NZ's beautiful West Coast (see: <http://www.botany.otago.ac.nz/canopy/>). For other mycology projects and personnel in Botany at Otago, see <http://www.botany.otago.ac.nz/mycology/>.

David A. Orlovich

Fungi on postage stamps

Thematic philately is a popular hobby and a fascinating theme is postage stamps depicting fungi. In 1958 Czechoslovakia and Rumania were the first countries to issue stamps featuring fungi. Few similar stamps were released until the late 1970s, but from 1980 onwards, fungal stamps have appeared in increasing numbers. Approximately 160 countries have issued fungal stamps, out of 273 issuing countries. There have been about 430 issues, and just over 3000 stamps. 'Mushrooms' are the most commonly depicted fungi, but other taxonomic groups have included pore fungi, 'gasteromycetes', smut fungi, and slime moulds. To widen the appeal, and to increase sales, stamps sometimes feature more than one theme. Thus, fungi are combined with subjects such as insects, flowers, scouting, royalty, etc. Fungi may be a minor component of a stamp. For instance, the New Zealand (1988) brown kiwi stamp has three basidiomata of an unrecognizable genus. 'Toadstools' are sometimes combined with fairies and of course toads. Most commonly paintings of the fungi are used (e.g., Australia 1981, Christmas Island 1984, Norfolk Island 1983), but photographs can be used to stunning effect (e.g., New Zealand 2002). Fungi in art have appeared on stamps; Kyrgyzstan (2001) and Tadjikistan (2001) featured modern glass mushrooms, while Italy (1977) reproduced the painting 'Winter' by G. Arcimboldi in which the lips of a face consist of a bracket fruitbody, perhaps *Fomitopsis*. To celebrate the 500th birth anniversary of A. Dürer, East Germany (1971) reproduced a painting of 'The Three Peasants' with one person carrying a basket of mushrooms. Fungi as food have appeared on stamps. Guernsey (1995) produced a stamp with a 'vegetable' face, the nose made from a sliced field mushroom. Mexico (1988) showed edible 'huitlacoche', corn cob infected with the smut fungus, *Ustilago maydis*, while Zambia (1981) had a woman carrying a basket of edible *Termitomyces*. A miniature sheet from Mali (1996) featured *Coprinus atramentarius* on the stamp, with the

surrounding border advising of the consequences of consuming this mushroom with alcohol. Leaf spots caused by fungi have appeared on stamps, e.g., Great Britain (1993) and Niue (1969). Tuvalu (1988, 1989) issued stamps of fungi found on coconut palms, including leaf spots caused by *Pestalotiopsis palmarum* and *Pseudoepicoccum cocos*. Related topics on stamps include lichens, mycorrhizal trees, brewing vats, and Sir Alexander Fleming and penicillin.

Eric McKenzie

***Boletus edulis* Bull. Ex Fries in New Zealand.**

A study was undertaken to determine the taxonomic identity of *Boletus edulis* sensu lato (porcini) fruiting bodies that are found in the city of Christchurch, New Zealand. The study also endeavoured to determine how many introductions of *B. edulis* there had been into New Zealand and how far the species had spread in the province of Canterbury. The internal transcribed spacer (ITS) region of ribosomal DNA was sequenced in order to examine the interspecific relationship between the New Zealand samples of *B. edulis* and samples from Sweden, Scotland and other northern hemisphere countries. The ITS data was also used to attempt to confirm the identity of the New Zealand *B. edulis* sensu lato. The random amplified microsatellites (RAMS) technique was used to examine the genetic population structure of the Canterbury *B. edulis*. The Canterbury population was then compared with established populations from Upplands and Gotland in Sweden. The New Zealand samples of *B. edulis* seems most closely related to examples of *B. edulis* sensu stricto from Europe and North America, supported by a phylogenetic analysis of the ITS sequences. From a non-metric multidimensional scaling analysis of the RAMS data, the New Zealand *B. edulis* population is composed of small, genetically distinct genets. This suggests that there is sufficient intraspecific variation in the Christchurch population for multiple introductions to have occurred, or that a single introduction encompassed a range of genotypes. It is also possible that a high level of genetic diversity is characteristic of *B. edulis* as a species.

Alison Stringer, Wang Yun, Ian Hall, Graham Prime, Eric Danell, Christina Wedén, Simon Bulman, & David Orlovich

What I have learnt in 10 years, trying to grow two edible ectomycorrhizal mushrooms: the red milk caps and the Japanese matsutake

Ectomycorrhizal mushrooms are among the few natural products that man has not domesticated yet. This is unfortunate for several reasons: I wish one could select from more than just fresh button mushrooms or shiitake when using fungi for cooking; I wish the natural resources of the famous seasonal delicacies (chanterelle, porcini, matsutake, etc) could withstand today's commercial over-exploitation; and I wish we could better understand the tree/fungus mycorrhizal relationships in order that we might carry out innovative

and sustainable forestry. Ectomycorrhizal fungi live in symbiosis with woody plants; therefore if one wishes to grow them, he must first think about how to grow a tree at the same time!

In 1994, I began work on the edible red milk cap fungi (*Lactarius*, *Dapetes* section). Along with a molecular ecology study, the aim was to produce pine seedlings colonized by *Lactarius deliciosus* under controlled conditions for out-planting. I learned how significant the physiological link with the host plant is for this fungus to accomplish its life cycle, and how much the expression of the symbiosis relies on environmental conditions (*Canadian Journal of Microbiology* 46: 790-799). I also learned that *L. deliciosus* strongly stimulates *Pinus sylvestris* growth in forest soils and can persist and develop on the root system.

In 1998, I started working on Matsutake (*Tricholoma matsutake*), the famous pine mushroom, a Basidiomycete revered in Japan as Truffles are in Europe. A molecular ecology study indicated the predominance of a few genotypes in nature. However, most effort was devoted to demonstrating the mycorrhizal status of the fungus, identifying proper conditions for controlled mycorrhiza formation, and growing Matsutake and its host, *Pinus densiflora*, under controlled environments. I learned that Matsutake is an atypical ectomycorrhizal fungus. Despite the formation of Hartig net structures within roots, Matsutake's carbohydrate source remains unclear, and many of its trophic characteristics (saprobic and rock-eating potentials, associated micro-organisms) remain to be further investigated. Although the controlled fruiting of Matsutake still poses a considerable challenge, after 5 years in Japan techniques were successfully designed to infect seedlings suitable for out-planting, as well as mature pines in forest.

Alexis Guerin-Laguette

Fungi I have not known at the time

Or how to be dished up with truffles at dinner time. At NZ \$2 per gram truffles are swathed in mystery, conspiracy, deceit and glamour but when served to one in reputable restaurants mycology comes in useful to determine whether or not you are getting value for your money.

We have been served "truffle" in thirteen meals in the last thirty years; three times sliced and hence immediately recognisable by the gleba colour and peridium surface character – *Tuber melanosporum* (Black or Perigord) was excellent, *T. magnatum* (White or Piedmont) was superb whilst *T. aestivum* (Summer) was hardly worth its price; on seven occasions in sauce – twice it was *T. melanosporum*, four times *T. aestivum* and once fragments of black olive; in three services of "paté de fois gras" once it was *T. melanosporum*, but twice *Sclerocystis taiwanensis*!! Just how do you get 3 mm. black cubes of "truffle" when the sporocarps of this fungus are only 200-700 µm in diameter?? Moreover the chances of not being taken for a truffle ride at present are three out of ten.

Peter K C Austwick

A strange but typical group of cortinaria in New Zealand

The presentation deals with a very characteristic and typical group of fungi in the native forests of New Zealand that so far has received but scant attention. *Cortinarius* section *Xenosmata* Soop 2003 contains about 10 species at present, some of which are quite common. The section appears to be absent on the Northern Hemisphere. It is characterised by middle-sized fruit-bodies that exhibit an ochraceous veil of thick hyphae, especially on the cap, plus a number of other characters. Possible affinities with other groups are explored, one likely such being the genus *Cuphocybe*. Photos are shown of a number of species in *Xenosmata* along with related taxa.

Karl Soop

The forgotten flora project: hornworts, liverworts, mosses, lichens and fungi.

Why use the same old organisms every time to teach students about the environment, biodiversity and health of ecosystems?

What are the little green umbrellas growing with my pot plant? What are those bright splotches of colour on rock outcrops if they're not paint? What is the difference between a lichen, moss and liverwort? How does an orchid that has no chlorophyll, and therefore no way of making its own energy, grow? Is the mushroom I just picked a fruit or the whole plant? These are just a few of the questions we hope to answer by providing suitable resources (series of posters and education kits) and hands-on experience with the 'Forgotten Flora'. We aim to encourage participation in the sciences in general, and promote increased awareness of the 'Forgotten Flora', their importance to the environment (which includes us) and their beauty.

The posters will be well illustrated with photos and drawings, spelling out some basic information, structures, lifestyle and importance in nature of the 'Forgotten Flora'. Each education kit (CD-Rom format) is partially interactive. Each kit is in five parts and will expand on the basic information provided by the posters. The first two parts provide general background information on each group incorporating figures and/or photographs, which will also be of use in many of the activities. The third part outlines practical information on how to study a particular group of the 'Forgotten Flora'. Part four consists of suggested activities and worksheets. The final part of the kit consists of an extensive list of resources (books and websites), suppliers, suggested field sites and an image gallery.

Teresa Lebel, Josephine Milne & Gary Shadforth

Library News

The library has moved. With the closure of the ATRMC, the AMS library has moved to a new residence (with the librarian) to Cairns. Please address all enquiries to Ceri Pearce, AMS Librarian, PO Box 652, Cairns, 4870 QLD, Australia. Email: ceri.pearce@dpi.qld.gov.au

Global Biodiversity of Eumycetozoans

Several Australian mycologists, including Margaret Brims, Pam Catcheside, and Ceri Pearce, have been and/or are currently involved in a major new project entitled "Global Biodiversity of Eumycetozoans." The overall goal of this project, which is being funded by a major grant from the National Science Foundation in the United States, is to carry out a cooperative research effort that will involve numerous scientists from throughout the world. Specific objectives are (1) to conduct field-based surveys for eumycetozoans (slime molds) in areas of the world where data are currently lacking, (2) to compile a major specimen database that will include the majority of the collections in the world's herbaria and all available records or isolates relating to the occurrence of slime molds, (3) to use the information included in this database to construct world distribution maps for all known and new species of slime molds, (4) to develop a web-based information system on slime molds that would incorporate, in addition to the specimen databases and world distribution maps, a comprehensive body of information on each of the anticipated total of 1,200 to 1,300 known and new species revealed by a complete world-wide inventory, and (5) to prepare educational materials on the slime molds for use by interested laypersons, students and parataxonomists. One such item currently under development is a photoguide to some of the more common species of Australian myxomycetes.

The myxomycetes (or plasmodial slime molds) are the largest and best known group of slime molds, but the global biodiversity project also is obtaining data on the distribution and occurrence of dictyostelids (cellular slime molds) and protostelids (protostelid slime molds). Relatively little is known about either group in Australia, although the records that do exist, including those obtained from studies carried out in northern Queensland during the 2002 and 2003 field seasons, suggest that both groups are relatively diverse in at least some habitats and that some of the species of dictyostelids found in Australia are new to science.

The global biodiversity project, which is scheduled to last for at least five years, is being directed by Steve Stephenson at the University of Arkansas in the United States. In the first year of the project, field-based surveys were carried out in such regions of the world as New Zealand, Kenya, Chile, Costa Rica, Kazakhstan, Guatemala, Guyana, Russia, Tanzania, Mongolia, China, and Thailand. Photo galleries of images from many of these surveys, along with additional information on the project, can be found on the project web site: <http://cavern.uark.edu/ua/mycetozo/>. Specific questions relating to various aspects of the Australian component of the project should be directed to Steve (slsteph@uark.edu).

Steve Stephenson

Letter to the Editor

Pam O'Sullivan wrote in with the following queries, which she hopes will be answered through the AMS newsletter. Pam writes:

- *Classification of Fungi*

I would be interested to hear some thoughts on the current status of fungal classification and useful references. *Dictionary of the Fungi* (Hawksworth, D.L., Kirk, P.M., Sutton, B.C. and Pegler, D.N. 1996) seems to be an up-to-date and accessible general reference to have at home. Though there are some who don't fully agree with the classification in this publication. What is the general feeling?

- *Field Mushrooms*

The local farmers, down the valley where we live, were delighted by the prolific reappearance of 'mushrooms' in their paddocks this year. Reports of bucket fulls being collected, the like of which hasn't been seen for years!! Our paddocks also provided us with a number of delicious meals, and like the other landholders in this area it has been a number of years since this has happened. It would be interesting to hear if any other areas experienced this as well?

- *Drawing attachments for microscope*

How useful are they and what are their advantages/disadvantages? Any recommendations of brands or types that may be available?

Also, if there is anyone who is interested in fungi on the Central Coast of NSW or passing through this area and want to contact some like minded people we would love to hear from them. They can contact me on 02 4362 1543 or write to me at PO Box 154, Ourimbah NSW 2258, or e-mail: jimios@ozemail.com.au

Pam O'Sullivan

Announcing the FNCV Fungi Group!

The Field Naturalists Club of Victoria Inc. (FNCV) has a new Special Interest Group – the Fungi Group. The aim of this group is simply to “widen our knowledge of fungi in the field”.

This new group was born from an idea by Ed & Pat Grey who noticed that there were no regular fungi forays for the Victorian group of Fungimap Australia. “We thought it would be fun to try and get out and see as many fungi as possible and invite anyone interested to join us”. They drew up a schedule of 10 fortnightly forays between April and September, and it all started from there.

The interest in the forays has been fantastic. The forays attracted a wide range of people of various ages, experience, and knowledge. Apparently the opportunity to rub shoulders with like-minded souls (often on our hands and knees in damp and dark fern gullies, complete with leeches) proved irresistible for many. We soon found ourselves making new friends and acquaintances as we shared and explored our fascination with fungi.

After each foray, a list of the fungi we had found was published, together with Pat's informative and entertaining commentaries, and we found our knowledge and enthusiasm continued to grow. Samples of the species we could not recognise were sent to Tom May (Senior Mycologist, Royal Botanic Gardens Melbourne) who generously offered to identify them and provided additional information to help us identify them in the field.

The group has decided to produce a CD-ROM of photos of those species that we have found on our forays, and which we believe can be readily and unambiguously identified in the field (excluding those species already listed in Fungimap). We currently have about 370 photos of 60 species and hope that this will be a valuable identification aid for other fungi enthusiasts. We expect to publish the CD-ROM in the near future.

We have planned out a series of monthly meetings and presentations to further our knowledge in areas such as taking field notes, microscopical analysis and photography. Other areas of interest include developing field identification keys for selected genera, visiting the Melbourne Herbarium, searching for rare species and, of course, more forays next year.

The Fungi Group meets monthly - usually on the first Monday of the month at the FNCV clubrooms in Blackburn – check the calendar in the Field Nats Newsletter for details (or contact Paul George on 03 9830 1551 AH or Ed & Pat Grey on 03 9435 9019). FNCV members and visitors are welcome.

Paul George

Calendar of events**Joint Fungimap and AMS Conference and Foray**

April 28-May 2, 2005, Gowrie Park, Mt. Roland, Tasmania. Contact Fungimap co-ordinator Cassia Read (03) 9252 2374 or check out the AMS website.

6th International Congress on Cryptococcus and Cryptococcus

June 24-28, 2005, Boston, USA

www.bu.edu.cme/iccc.html

Mycological Society of America Annual Meeting

(with the Mycological Society of Japan)

July 30-August 5, 2005, Hilo, Hawaii

<http://msafungi.org>

15th Australasian Plant Pathology Conference

September 26-29, 2005, Geelong, Victoria, Australia

www.australasianplantpathologysociety.org.au

8th International Mycological Conference

August 20-26, 2006, Cairns, Queensland, Australia

www.sapmea.asn.au/imc8

Items for inclusion in the AMS newsletter should be sent to Ceri Pearce, email ceri.pearce@dpi.qld.gov.au, post to C. Pearce, PO Box 652, Cairns, 4870 Qld, Australia, or fax (07) 40355474