

A PRELIMINARY CHECKLIST OF THE MACROFUNGI OF THE WET TROPICS AND EINASLEIGH UPLANDS BIOREGIONS OF QUEENSLAND, AUSTRALIA

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Abstract

Information on a survey by the Queensland Herbarium (BRI) of the macrofungi of the Queensland 'Wet Tropics' and 'Einasleigh Uplands' bioregions is presented, together with a preliminary checklist of the macrofungal genera and species so far collected. A second list is provided of those genera for which herbarium material is now held, but for which an identification to species level has yet to be completed. Where collections are believed to represent the first records for the taxon within the bioregions, this is indicated by an asterisk (*).

A.M. Young *et al.* (2002). A preliminary checklist of the macrofungi of the Wet Tropics and Einasleigh Uplands Bioregions of Queensland, Australia. *Australasian Mycologist* 21 (1): 16–20.

Introduction

In February 2001, staff from the Queensland Herbarium (BRI) began a survey of the macrofungi of the Queensland 'Wet Tropics' and 'Einasleigh Uplands' bioregions. The 'Wet Tropics' has been defined in the past as that area of north-eastern Queensland that encompasses the 'hot, humid, vine forests' from near Cooktown in the north to Paluma in the south (Barlow & Hyland 1988, Webb & Tracey 1981). This rather narrow definition is not completely appropriate as the area is not entirely rainforest (vineforest), but also encompasses a range of eucalypt dominated communities, as well as swamps and mangroves. A detailed account of the vegetation types and geographic limits of this bioregion is given by Goosem *et al.* (1999) and for the adjacent 'Einasleigh Uplands' by Morgan (1999). The two bioregions contain a large variety of fungal habitats including those based on: tropical rainforest, vine thickets, woodland and forest with eucalypts contributing the dominant overstorey species, grassland, shrublands (often at high altitude with *Leptospermum woорооnoran*), mangroves and various disturbed habitats.

The bioregions have a monsoonal climate with high temperatures (25–35°C) and heavy rainfall (in some parts in excess of 3550 mm per year), much of which falls from about mid-December to early April. Heavy showers can persist to May but the climate then becomes much drier from June until late November when thunderstorm rains begin. The rainfall of tableland areas is also dependent upon the distance from the coastal mountains upon which much of the moisture falls. Inland from the coastal range, the annual rainfall drops very rapidly so that a distance of about 100 km inland often produces annual rainfalls of under 1000 mm per year while further inland, the rainfall drops even more.

There is very little published material specifically about the macrofungi of this part of Queensland, although there are probably some citations of taxa in other publications such as Cooke (1892) or McAlpine (1895). However, it is difficult to determine the collection locations without reference to the actual specimens which are often in overseas herbaria such as Kew. The very large sequence of publications by F.M. Bailey from 1877 to 1913 (a full listing of Bailey's papers will be available in *Fungi of Australia* Volume 2B) contain at least some north Queensland macrofungi; however, Bailey (1890) published a supplementary paper specifically on the fungi collected from the Bellenden-Ker area which contained fifty-seven taxa. Approximately 200 Bailey collections are known to be contained within the material at BRI and many of these may be relevant to the wet tropics study. (The uncertainty of the exact number is owing to lack of details on some of these early collections.) Cunningham (1944, 1953, 1965) also examined some fungi from the Queensland tropics but these are incidental to the general intent of each of his publications. One recent publication dealing with the genus *Podaxis* on either soil or termitaria (Priest & Lenz 1999) includes material from Coen in the Cape York

Peninsula region of northern Queensland, and while it is outside this project's study area, the content of the paper is very relevant to this study.

Methods

This survey aims to sample intensively the macrofungal diversity within the adjacent 'Wet Tropics' and 'Einasleigh Uplands' bioregions with deposition of vouchers in the Queensland Herbarium (BRI). The most westerly sampling for this project has occurred at Mungana (west of Chillagoe) and Irvinebank (west of Herberton), both in the 'Einasleigh Uplands' Bioregion (cf. Morgan 1999). Within the 'Wet Tropics', sampling has occurred from the Daintree National Park in the north, south to Koomboolooma Dam.

Previously the Queensland Herbarium has not acted as a depository for macrofungi. The macrofungal holdings of the Plant Pathology Herbarium (BRIP) have been transferred to BRI which is now the primary herbarium for macrofungal deposition for the State of Queensland. Researchers are requested to deposit material (especially types) at BRI and also to direct loan requests there.

Since the visits to the area required preliminary planning, each collecting trip to the area was predetermined and of 10 day's duration. This meant considerable dependence upon suitable climatic conditions occurring in the collecting region before and during the visits; however, this has so far proven to be very successful. During 2001, trips were made in February, May and early December. Trips during 2002 were made in February and April.

Collections have been made on a mainly opportunistic basis, using a network of main and council roads, forestry and national parks roads and tracks for primary access. The latitudes and longitudes of all collecting sites have been recorded using a GPS unit. All material is databased at BRI on the HERBRECS database and this data will be eventually accessible on the Australian Virtual Herbarium (AVH). Fertile only material was collected (occasionally photographed in the field where there were either particularly good fruiting bodies or possibly rare species) and then brought back to a temporary study centre at Malanda for further work. All collections were photographed, described (unless duplicates of already well known taxa) and air dried in a forced-air dryer before storage at BRI. No microscope work has been completed on the majority of these collections so that this preliminary checklist is only based on determinations from field characters.

Results and Discussion

Over 1200 collections of macrofungi from this area have now been lodged at the Queensland Herbarium (BRI) and this number is expected to rise to between 1500 and 2000 collections by the end of 2002. Although the project is still in its early stages, some trends in the set of data on the huge macrofungal diversity of the region including the specie's distribution and fruiting intervals are emerging.

Concepts on speciation and fruiting of the macrofungal taxa of the 'Wet Tropics' rainforests more or less agree with those found in the concurrent Lamington National Park study. Most of the rainforest taxa are wood- or litter-recycling and there is a very large component of either 'polyporaceous' or 'stereaceous' taxa. There have been occasional collections of taxa within the rainforest which are normally considered mycorrhizal (such as *Russula*); however, the host trees are as yet uncertain. A collection of a species of *Russula* during the April trip has provided suggestions that one rainforest host genus may be *Syzygium*, but this is still uncertain. The rainforest taxa appear to fruit over longer periods of time during the wet season as favourable humid conditions are maintained within the shelter of the canopy. It is stressed that these are early observations and subject to modification as the project continues.

In contrast, the large macrofungal flora of the drier eucalypt forests and woodlands of both the 'Wet Tropics' and 'Einasleigh Uplands' contains a very large mycorrhizal component. The fungi in these forests and woodlands fruit prolifically for short periods of time during the monsoon season but are then subject to rapid desiccation once rainfall ceases. Observations made during 2001 already suggest that only short 'windows of opportunity' (possibly as little as one or two days) are available for good collections of macrofungi in these areas so that the adage 'the collector must be the right person in the right place at the right time' is very true. During very heavy monsoonal downpours, the locations for consistently good macrofungal fruiting in these dryer habitats also vary. Usually the wetter gullies produce excellent quantities of macrofungal species and

fruiting bodies; however, in very heavy rainfall conditions the gullies become too wet for satisfactory fungal growth and the normally unfavorable drier ridges now produce abundant fruiting bodies.

The Checklists

The first checklist below contains only those taxa for which a reasonably confident identification has been obtained. Where the abbreviation 'aff.' is used, the collected taxon is considered to be extremely close to the named species but probably different from it. A second list is included which contains the names of genera that have been confirmed by the study to be present in the wet tropics but for which no species' epithets can as yet be confidently assigned. It should also be noted that a number of unidentified collections also exist for many genera within the first checklist (e.g. there are at least 20 unidentified collections of *Amanita*). Most of the 'polyporoid' taxa are excluded from these lists as they are currently under review; however, it is hoped that considerable numbers of species will shortly be determined.

Although this survey represents the first major investigation of the wet tropics macrofungi, a small number of collections have already been published, principally of the polyporoid taxa. Many of the species in the checklist are probably first records for the region, but without a complete literature survey of Australian publications, it is difficult to determine which species have already been noted as present in the area. The species marked as new records are only those where there is reasonable confidence that this is correct and it is therefore quite possible that the list should be larger.

The lists below are ranked alphabetically for ease of use and do not fully reflect systematic relationships. Information within Walker (1996) indicates that classes within this Division are still somewhat tentative; they are therefore omitted here.

Key

Habitat

Rainforest	Rf
Rainforest-Eucalypt forest ecotone	REf
Eucalypt forest	Ef
Eucalypt woodland	Ew
Grassland	G
Mangrove swamp	M
Palm swamp (<i>Licuala</i>)	L
Vine scrub	V

First Records indicated by an asterisk (*)

DIVISION ASCOMYCOTA

ORDER	FAMILY	SPECIES CITATION	HABITAT
Pezizales	Sarcosomataceae	<i>Plectania campylospora</i> (Berk.) Nannf. in Korf *	Rf

DIVISION BASIDIOMYCOTA

ORDER	FAMILY	SPECIES CITATION	HABITAT
Agaricales	Agaricaceae	<i>Chlorophyllum molybdites</i> (G. Mey. : Fr.) Masee	G
		<i>Macrolepiota dolichaula</i> (Berk. & Broome) Pegler & R.W.Rayner	G
		<i>Macrolepiota konradii</i> (Huijsman ex P.D. Orton) M.M. Moser	Rf, Ef
		<i>Macrolepiota procera</i> (Scop. : Fr.) Singer	G
		<i>Leucoagaricus fimetarius</i> (Cooke & Masee) Aberdeen	G
	Amanitaceae	<i>Amanita nauseosa</i> (Wakef.) D.A. Reid *	Ef
		<i>Amanita punctata</i> (Cleland & Cheel) D.A. Reid	Ef
		<i>Amanita</i> sp. aff. <i>A. roseolamellata</i> A.E. Wood *	Ef

	Coprinaceae	<i>Copelandia cyanescens</i> (Berk. & Broome) Singer <i>Coprinus disseminatus</i> (Pers. : Fr.) Gray <i>Coprinus truncorum</i> (Scop.) Fr. <i>Panaeolus antillarum</i> (Fr.) Dennis <i>Panaeolus sphinctrinus</i> (Fr.) Quél. <i>Psathyrella asperospora</i> (Cleland) Guzmán <i>Psathyrella candolleana</i> (Fr. : Fr.) Maire	Ref Rf Rf Ew REf, Ef Rf Ef, Ew, G
	Cortinariaceae	<i>Hebeloma aminophilum</i> R.N. Hilton & O.K. Mill. *	Ew
	Hygrophoraceae	<i>Camarophyllopsis darwinensis</i> * <i>Hygrocybe aurantiopallens</i> (E. Horak) A.M. Young * <i>Hygrocybe chromolimonea</i> (G. Stev.) T.W. May & A.E. Wood * <i>Hygrocybe mavis</i> (G. Stev.) E. Horak * <i>Hygrocybe persistens</i> (Britzelm.) Singer var. <i>persistens</i> *	Ef Rf Rf Rf Ew
	Pluteaceae	<i>Pluteus</i> sp. aff. <i>P. lutescens</i> (Fr.) Bres. *	Ew
	Schizophyllaceae	<i>Schizophyllum commune</i> Fr. : Fr.	Rf, Ef
	Strophariaceae	<i>Hypholoma</i> sp. aff. <i>H. fasciculare</i> (Huds. : Fr.) P. Kumm. <i>Hypholoma sublateritium</i> (Fr.) Quél. * <i>Pholiota</i> sp. aff. <i>P. adiposa</i> (Fr. : Fr.) P. Kumm. *	Rf Rf Rf
	Tricholomataceae	<i>Anthracophyllum archeri</i> (Berk.) Pegler * <i>Armillaria hinnulea</i> Kile & Watling <i>Cyptotrama asprata</i> (Berk.) Redhead & Ginns <i>Dictyopanus pusillus</i> (Pers. ex Lév) Singer * <i>Filoboletus manipularis</i> (Berk.) Singer <i>Lepista sublilacina</i> (Cleland) Grgurinovic * <i>Marasmius crinisequi</i> F. Muell. <i>Marasmius elegans</i> (Cleland) Grgurinovic * <i>Mycena austrororida</i> Singer <i>Mycena leaiana</i> (Berk.) Sacc. var. <i>australis</i> Dennis * <i>Mycena viscidocruenta</i> Cleland * <i>Oudemansiella canarii</i> (Jungh.) Höhn. * <i>Panellus longinquus</i> (Berk.) Singer * <i>Panellus stipticus</i> (Bull. : Fr.) P. Karst. * <i>Tricholoma eucalypticum</i> A. Pearson * <i>Tricholoma giganteum</i> Massee * <i>Tricholomopsis rutilans</i> (Schaeff. : Fr.) Singer * <i>Xeromphalina tenuipes</i> (Schwein.) A.H. Sm. * <i>Xerula australis</i> (Dörfelt) R.H. Petersen	Rf Rf Rf, Ef Rf, Ef, Ew Rf, Ref, Ef G Rf Rf Rf Rf Ef, Ew Rf Rf Rf Ef, Ew Rf Rf Rf Rf Rf Ef
Aphyllorphorales	Clavariaceae	<i>Clavaria sulcata</i> (van Over.) Petersen * <i>Ramaria ochraceosalmonicolor</i> (Cleland) Corner * <i>Ramaria</i> sp. aff. <i>R. subaurantiaca</i> Corner *	Ef Ef Ef
	Ganodermataceae	<i>Ganoderma australe</i> (Fr.) Pat. <i>Ganoderma lucidum</i> (W. Curt. : Fr.) P. Karst.	Rf, Ref, Ef, M Rf, L
	Lentinellaceae	<i>Lentinellus</i> sp. aff. <i>L. ursinus</i> (Fr.) Kühner *	Rf
	Podoscyphaceae	<i>Cymatoderma elegans</i> Jungh. var. <i>lamellatum</i> (Berk. & M.A. Curtis) D.A. Reid	Rf
	Polyporaceae	<i>Coltricia oblectans</i> (Berk.) G.Cunn. <i>Laetiporus</i> sp. aff. <i>L. sulphureus</i> (Fr.) Murr. <i>Microporus xanthopus</i> (Fr.) Kuntze <i>Polyporus arcularius</i> Fr. <i>Pycnoporus coccineus</i> (Fr.) Bondartsev. & Singer	Rf, Ef, Ew, G, V Rf Rf, Ef, M Rf, Ew, V Rf
	Stereaceae	<i>Stereum illudens</i> Berk. <i>Stereum ostrea</i> (Blume & Nees : Fr.) Fr.	Rf Rf, Ef
Poriales	Corioliaceae	<i>Lenzites betulinus</i> (L. : Fr.) Fr.	Rf, V
Auriculariales	Auriculariaceae	<i>Auricularia auricula-judae</i> (Bull. ex St.-Amans) Berk. <i>Auricularia delicata</i> (Fr.) Henn. <i>Auricularia polytricha</i> (Mont.) Sacc.	Rf Rf Rf
Boletales	Coniophoraceae	<i>Gyrodontium sacchari</i> (Spreng. : Fr.) Hjortstam *	Rf
	Strobilomycetaceae	<i>Austroboletus lacunosus</i> (Kuntze) T.W. May & A.E. Wood	Rf, Ef, Ew
	Xerocomaceae	<i>Boletellus emodensis</i> (Berk.) Singer	Ef, Ew
Cantharellales	Aphelariaceae	<i>Aphelaria complanata</i> (Corner) R.H. Petersen	Rf

	Cantharellaceae	<i>Cantharellus concinnus</i> Berk. * <i>Craterellus cornucopoides</i> (L. : Fr.) Fr. *	Ef, Ew Ef
Phallales	Clathraceae	<i>Colus pusillus</i> (Berk.) Reichert *	Ew
	Phallaceae	<i>Dictyophora multicolor</i> Berk. & Br.	Ef, Ew, G
Podaxales	Podaxaceae	<i>Podaxis beringamensis</i> Priest & M. Lenz	Ew
		<i>Podaxis pistillaris</i> (L. : Pers.) Fr.	Ew
Russulales	Russulaceae	<i>Lactarius clarkeae</i> Cleland *	Ew
		<i>Lactarius eucalypti</i> O.K. Mill. & R.N. Hilton *	REf, Ef, Ew
		<i>Russula erumpens</i> Cleland & Cheel *	Ef
		<i>Russula</i> sp. aff. <i>R. foetens</i> (Pers. : Fr.) Fr. *	REf, Ef
		<i>Russula lenkunya</i> Grgurinovic *	Ef
Nidulariales	Nidulariaceae	<i>Cyathus stercorea</i> (Schwein.) De Toni	Ew
Sclerodermatales	Sclerodermataceae	<i>Scleroderma verrucosum</i> Pers.	Ef
Tremellales	Exidiaceae	<i>Pseudohydnum gelatinosum</i> (Scop. : Fr.) Fr. *	Rf
	Tremellaceae	<i>Tremella fuciformis</i> Berk.	Rf

DIVISION MYXOMYCOTA

ORDER	FAMILY	SPECIES CITATION	HABITAT
Physarales	Physaraceae	<i>Fuligo septica</i> J.F. Gmel.	Rf

The list below indicates those genera for which material has been collected in the wet tropics but which is presently indeterminate at species level. It is presented in strict alphabetical order without reference to any systematic structure.

<i>Agaricus</i>	<i>Crinipellis</i>	<i>Helvella</i>	<i>Peziza</i>
<i>Agrocybe</i>	<i>Cyphella</i>	<i>Hexagona</i>	<i>Phellinus</i>
<i>Boletus</i>	<i>Dacrymyces</i>	<i>Hohenbuehelia</i>	<i>Pisolithus</i>
<i>Bovista</i>	<i>Dacryopinax</i>	<i>Hydnum</i>	<i>Pleurotus</i>
<i>Calocera</i>	<i>Daedalea</i>	<i>Hypoxylon</i>	<i>Rhizopogon</i>
<i>Calvatia</i>	<i>Delicatula</i>	<i>Inocybe</i>	<i>Scutellinia</i>
<i>Calycella</i>	<i>Entoloma</i>	<i>Laccaria</i>	'Secotioid taxon'
<i>Clitocybe</i>	<i>Favolaschia</i>	<i>Lepiota</i>	<i>Tricholoma</i>
<i>Collybia</i>	<i>Galerina</i>	<i>Lycoperdon</i>	<i>Tulostoma</i>
<i>Conchomyces</i>	<i>Geastrum</i>	<i>Marasmiellus</i>	<i>Tyromyces</i>
<i>Crepidotus</i>	<i>Gymnopilus</i>	<i>Panellus</i>	<i>Volvaria</i>
			<i>Xylaria</i>

References

- Bailey, F.M. (1890). Appendix 5. Annual report, Colonial Botanist. [Includes Appendix A. 'Supplement to the Report of the Botany of the Bellenden-Ker Expedition—Fungi collected or observed about the Bellenden-Ker Range'], Report (Annual) of the Department of Agriculture, Queensland 1889–1890, 32–42.
- Barlow, B.A. & Hyland, B.P.M. (1988). The origins of the flora of Australia's wet tropics. *Proceedings of the Ecological Society of Australia* 15, 1–17.
- Cooke, M.C. (1892). *Handbook of Australian Fungi*. Williams & Norgate, London.
- Cunningham, G.H. (1944). *The Gasteromycetes of Australia and New Zealand*. Published by the author.
- Cunningham, G.H. (1963). Theleporaceae of Australia and New Zealand, *Bulletin of New Zealand Department of Scientific and Industrial Research* 145, 1–359.
- Cunningham, G.H. (1965). Polyporaceae of New Zealand, *Bulletin of New Zealand Department of Scientific and Industrial Research* 164, 1–304.
- Goosem, S., Morgan, G. & Kemp, J.E. (1999). Wet Tropics, in P. Sattler & R. Williams (eds). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency: Brisbane.
- McAlpine, D. (1895). *Systematic Arrangement of Australian Fungi*. Robt. S. Brain, Government Printer, Melbourne.
- Morgan, G. (1999). Einasleigh Uplands, in P. Sattler & R. Williams (eds), *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency: Brisbane.
- Priest, M.J. & Lenz, M. (1999). The Genus *Podaxis* (Gasteromycetes) in Australia with a description of a new species from termite mounds. *Australian Systematic Botany* 12, 109–116.
- Webb, L.J. & Tracey, J.G. (1981). Australian rainforests: pattern and change, in A. Keast (ed.), *Ecological Biogeography of Australia* 605–694. W. Junk, The Hague.