New additions to the Myxomycota of Australia

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Abstract

Specimens of myxomycetes obtained as field collections or from moist chamber cultures during biodiversity surveys carried out in several regions of Australia during the period of 2004 to 2008 have included 12 species not previously known from the country and 61 new state records. In addition, previously unidentified collections of myxomycetes being held in Australian herbaria were found to represent one new record for the Southern Hemisphere and several state records. These new records bring the total number of myxomycetes reported from Australia to 239 species, and the new state records contribute additional information relating to the distribution and ecology of these organisms in what is still an understudied region of the world.

Key words: myxomycetes, Australia, new records.

Introduction

The myxomycetes (plasmodial slime moulds or myxogastrids) are a group of fungus-like organisms usually present and sometimes abundant in terrestrial ecosystems (Martin and Alexopoulos 1969). Myxomycetes have been known from their fruiting bodies since at least the middle of the seventeenth century, but most species tend to be rather inconspicuous or sporadic in their occurrence and thus not always easy to detect in nature. Berkeley (1859) was the first to report myxomycetes from Australia, and other early papers in which at least a few species are listed include those of Berkeley (1881), Cooke (1888a, 1888b, 1892), McAlpine (1895), Cheesman and Lister (1915), Creel (1918) and Fraser (1933). The first significant effort to compile a comprehensive checklist of Australian myxomycetes was made by Mitchell (1995), who listed a total of 146 species from the country. Since the appearance of Mitchell’s checklist, a series of papers (e.g., McHugh et al. 2003; Jordan et al. 2006; Stephenson and Moreno 2006; Powers and Stephenson 2006; Moreno et al. 2007, 2008; Rosing et al. 2007; Stephenson et al. 2007a, 2007b, 2008; Davison et al. 2008) has provided an appreciable number of new records. However, many regions of Australia remain understudied.

The purpose of this paper is to report the results obtained from biodiversity surveys for myxomycetes carried out at 29 localities in Queensland, the Northern Territory, South Australia, Western Australia and Tasmania. These surveys included efforts to collect specimens that had developed under natural conditions in the field as well as extensive use of the moist chamber culture technique as it applies to myxomycetes. In some instances the material used to prepare cultures was collected by someone else and sent to one of us for processing. In addition to the records from these surveys, several previously unidentified collections of myxomycetes being held in Australian herbaria were examined by the second author (DWM) or the fourth author (SLS) and determined to represent species new to the country.

Methods

The first author (RM) visited Queensland and the Northern Territory in June and July of 2006. At this time most of the localities visited were too dry for specimens of myxomycetes to have developed under natural conditions in the field, but numerous samples of material to be used for moist chamber cultures were collected. Some of this material was sent to SLS. The third author (MHB) and SLS visited Victoria and New South Wales in March 2004 and Western Australia in late May/early June 2003 and April 2004, while SLS visited Victoria and New South Wales in October 2004, Queensland in August 2006 and Tasmania in May 2008. These visits yielded some field collections, but major emphasis was placed on obtaining material for moist chamber cultures. Some of this material was sent to DWM for processing. All moist chamber cultures were prepared in the manner described by Stephenson and Stempen (1994). In brief, portions of the sample material (e.g., pieces of bark removed from living trees) were placed on filter paper in Petri dishes and soaked overnight with distilled water. After approximately 24 hours, the excess water was poured away and over the subsequent weeks each culture was scanned periodically with the use of a low power microscope. Myxomycetes fruiting in the dishes were removed, air-dried and placed in small boxes for permanent storage or (for some of the smaller forms) mounted on a microscope slide. The moist chamber culture technique is usually productive when applied to samples of bark, leaves, twigs and other dead plant material. However, bark samples taken from trees in regions of high precipitation, such as a rainforest, tend to be relatively unproductive. Following the discoveries of Wrigley de Basanta et al. (2008), portions of dead lianas were collected in such places, as having greater potential.

Collecting Localities

A brief description of each of the localities represented by specimens of myxomycetes recorded during the present study is provided below. (NT = Northern Territory; QLD = Queensland, WA = Western Australia, SA = South Australia, and TAS = Tasmania).

Locality 1: QLD, Cardwell Beach (18° 56’ S, 146° 02’ E). Bark samples were obtained from a single tree of *Terminalia* sp. growing close to the sea.

Locality 2: QLD, Magnetic Island (19° 06’ S, 146° 54’ E). This island, largely occupied by a national park, occupies 52 km² off the coast near Townsville. Principal trees include...
Araucaria, Cochlosperma and Eucalyptus. Higher elevation areas on the island visited included ‘The Forts’ and the footpath from Arcadia to Nelly Bay, both with Araucaria and Xanthorrhoea present, whereas bark samples were collected at lower elevations from various rainforest trees.

**Locality 3**: QLD, Malanda Falls Conservation Park (17° 22’ S, 145° 36’ E) on the Atherton Tableland. This park, located near the town of Malanda, preserves a remnant of an ancient upland rainforest. The Tulip Walk, with numerous examples of Argyroderdon actinophylum present, is located on the east side of the main road. Bark samples were removed from three different trees. On the west side of the road, the Rainforest Circuit provided a selection of trees from which bark samples were collected.

**Locality 4**: QLD, Mount Hypipamee National Park (17° 26’ S, 145° 26’ E) on the Atherton Tableland about 15 km from Malanda Falls. This park contains an area of upland rainforest that extends around the edge of a volcanic crater. Bark samples from a single tree of Desoxylum parasiticum were collected.

**Locality 5**: QLD, Tchupala Falls and Wallilcher Falls (17° 16’ S, 145° 43’ E) on the Atherton Tableland. These two sites are located in the same part of Wooroonooran National Park, an important area of ancient rainforest characterized by high rainfall, a condition that (as already noted) usually causes tree bark to be relatively unproductive. Some specimens of myxomycetes were obtained in the field and samples of lianas were collected.

**Locality 6**: QLD, Mossman Gorge (16° 28’ S, 145° 20’ E) W of the town of Mossman and S of Daintree National Park. A complex notophyll vine forest occurs in the gorge. Myxomycetes were found fruiting on fallen coarse woody debris and some samples of lianas were collected.

**Locality 7**: NT, Aurora Kakadu Lodge, South Alligator (12° 37’ S, 132° 30’ E), located by the Arnhem Highway 250 km E of Darwin. Bark samples were collected from several trees in the grounds of the lodge and on a footpath leading south to a lake.

**Locality 8**: NT, Casuarina Coastal Reserve (12° 18’ S, 130° 53’ E) in the northern suburbs of Darwin. This reserve is made up of a maritime sand dune system with numerous examples of Casuarina equistifolia, from which bark samples were collected.

**Locality 9**: NT, George Brown Darwin Botanic Gardens (12° 24’ S, 130° 50’ E). This parkland, established in 1886, contains many isolated trees; samples of bark and litter were collected from some of these.

**Locality 10**: NT, Fogg Dam (12° 33’ S, 131° 15’ E). This site consists of a combination of mangrove swamp and paperbark forest, with numerous trees of Acacia auriculiformis present. Samples of bark, litter and lianas were collected. Some of this material was sent to SLS for processing.

**Locality 11**: NT, Howard Springs Nature Park (12° 28’ S, 13° 14’ E), about 35 km S of Darwin. This park contains extensive areas of swamp and monsoon forest, with acacias similar to those at Fogg Dam. Bark and litter samples were collected, some of which were sent to SLS for processing.

**Locality 12**: NT, the town of Pine Creek (13° 46’ S, 131° 52’ E) on the Stuart Highway 90 km N of Katherine. Bark was collected from an individual tree of Lysiphyllum glium near the railway station.

**Locality 13**: NT, Window on the Wetlands Visitor Centre (12° 36’ S, 131° 21’ E) on the Arnhem Highway S of Fogg Dam. Near the entrance of the visitor centre there is a specimen of Casuarina australis from which samples of bark were collected.

**Locality 14**: NT, Stuart Highway approximately 20 km N of Alice Springs (23° 33’ S, 133° 52’ E). Samples of aerial litter, ground litter and bark were collected at this site.

**Locality 15**: SA, Flinders Chase National Park on Kangaroo Island (35° 21’ S, 138° 34’ E). The predominant vegetation of the park is coastal Eucalyptus diversisfolia open mallee, and samples of ground litter were collected by Pam Catcheis and sent to SLS for processing.

**Locality 16**: TAS, Mount Field National Park, along road to Lake Dobson (42° 41’ S, 146° 41’ E). This area of the park travels through a Eucalyptus/Nothofagus cunninghamii forest, where samples of ground litter and aerial litter were collected.

**Locality 17**: TAS, Mount Field National Forest, Tall Trees Walk (42° 41’ S, 146° 42’ E). Samples of ground litter were collected from a Eucalyptus regnans forest through which the trail extends.

**Locality 18**: TAS, Franklin River in the Franklin-Gordon Wild Rovers National Park (42° 13’ S, 146° 01’ E). The Nothofagus cunninghamii forest was unusually productive for myxomycetes, and more than 30 specimens were collected.

**Locality 19**: WA, Jandakot area of Perth (32° 06’ S, 115° 53’ E). This site contains a remnant Eucalyptus marginata/Banksia (mostly B. menziesii and B. attenuata) woodland on leached white sand. Specimens of myxomycetes along with samples of bark were collected at this site.

**Locality 20**: WA, on the sand plain along the shore of West Lake Deborah (30° 45’ S, 119° 01’ E). This is a salt lake, and samples of ground litter from a Eucalyptus corrugata woodland were collected by MHB and sent to SLS for processing.

**Locality 21**: WA, Shannon National Park (34° 47’ S, 116° 11’ E) 300 km S of Perth. The vegetation of this park is mostly mixed Eucalyptus forest, and samples of litter and bark were collected.

**Locality 22**: WA, Geike Gorge National Park; 20 km east of Fitzroy Crossing on Great Northern Highway #1. Samples of ground litter were collected from a dry sclerophyll woodland by Peter Letcher (University of Alabama) and sent to SLS for processing.

**Locality 23**: WA, Applecross area of Perth (32° 01’ S, 115° 50’ E). Specimens of myxomycetes were collected from an urban garden.

**Locality 24**: WA, Lake Haywood in the Peel-Yalgoo Wetland S of Perth (32° 53’ S, 115° 41’ E). Specimens of myxomycetes were collected from a Eucalyptus woodland, with Eucalyptus gomphocephala one of the more common species present.

**Locality 25**: WA, Sir Frederick Samson Park, Fremantle (32° 03’ S, 115° 48’ E). This is an urban park where specimens of myxomycetes were collected.

**Locality 26**: WA, Willie Creek Pearl Farm, 18 km NNE of Broome (17° 45’ S, 122° 13’ E). Samples of ground litter were collected from a dry sclerophyll woodland by Peter Letcher and sent to SLS for processing.

**Locality 27**: WA, Lochda Station (29° 12’ S, 116° 31’ E). Samples of ground litter were collected from a xeric shrubland on a granite hill above the campground by MHB and sent to SLS for processing.

**Locality 28**: WA, Hi Valee Farm natural area SW of Warradarge (30° 07’ S, 115° 24’ E). Samples of bark and litter were collected from xeric shrubland.

**Locality 29**: WA, Mount Caroline (17° 00’ S, 125° 59’ E). Samples of wallaby dung were collected from a dry sclerophyll woodland.

**Results**

**Annotated list of species**

At least 86 species of myxomycetes were represented among the specimens collected in the field (fc) or obtained from moist chamber cultures (mc) prepared with samples of bark, litter, other types of plant material or dung. These included several new records for Australia and a number of new state records. Three of the records listed are taxa currently lacking specific epithets.
If varieties are distinguished, the total is 90. In the list that follows, the myxomycetes we recorded are arranged alphabetically by genus and then species in each of the six orders generally recognized for myxomycetes. Nomenclature follows Lado (2001) and Hernández-Crespo and Lado (2005), with the conserved names of several genera (Lado et al. 2005) approved recently by the Committee for Fungi (Gams 2005) of the IAPT. The abbreviation ‘cf.’ in the name of a taxon indicates that the specimen(s) representing the source of the record could not be identified with certainty. This usually suggests scanty or aberrant material. Specimens listed herein are deposited in the personal herbaria of RM and DWM, the Western Australian Herbarium, or the mycological herbarium of the University of Arkansas (UARK). Unless otherwise indicated, collection numbers are those of McHugh (RM), Mitchell (DWM), Brims (MHB) or Stephenson (SLS). Collections represented by specimens that fruited in the field under natural conditions are indicated by ‘fc’ and those appearing in a moist chamber culture by ‘mc’ in the list that follows.

**Protosteliales**

*Ceratiomyxa fruticulosa* (O.F. Müll) T. Macbr.

Syn. *Faminzia fruticulosa* (O.F. Müll) Lado

**Loc. 2**: on coarse woody debris on the ground (fc), RM (material not retained).

**Loc. 4**: *Argyrodendron actinophyllum* (mc), RM1261.

**Loc. 17**: decaying wood (fc), SLS22837.

**Comments**: This species can be exceedingly common on all types of woody debris during periods of rainy weather. New for TAS.

**Echinosteliales**

*Clastoderma debaryanum* A. Blytt var. debaryanum

**Loc. 2**: *Cochlospermum fraseri* bark (mc), RM1253.

**Loc. 9**: *Caesalpinia cararia* bark (mc), RM1276.

**Loc. 19**: on bark from stump of *Banksia attenuata* (mc), MHB 477; on fallen *Nuytsia floribunda* (mc), MHB 575.

**Comments**: New to NT and WA.

*Clastoderma debaryanum* A. Blytt var. imperatorium Emoto

**Loc. 2**: *Cochlospermum fraseri* bark (mc), RM1348.

**Loc. 3**: *Canarium mouleri* bark (mc), RM1313.

**Echinostelium bisporum** (L. S. Olive & Stoian.) K. D. Whitney & L. S. Olive

**Loc. 20**: ground litter (recorded but not collected).

**Loc. 27**: ground litter (recorded but not collected).

**Comments**: This species, the smallest of all known myxomycetes, is usually recorded in surveys for protostelids. This was the case for the collection reported here, which appeared in culture plates prepared by John Shadwick (University of Arkansas) for isolation of protostelids. New to WA.

**Echinostelium coelocephalum** T.E. Brooks & H. W. Keller

**Loc. 1**: *Ficus obliqua* bark (mc), RM1332.

**Comments**: A very small myxomycete and thus easily overlooked. New to QLD.

**Echinostelium colliculosum** K.D. Whitney & H.W. Keller

**Loc. 3**: *Canarium australianum* bark (mc), RM1289.

**Echinostelium corynophorum** K.D. Whitney

**Loc. 2**: *Owenia acida* bark (mc), RM1349.

**Loc. 28**: *Eucalyptus macrocarpa* bark (mc), observed by DWM but not collected.

**Comments**: New to QLD and WA.

**Echinostelium aff. corynophorum** K.D. Whitney

**Loc. 9**: *Terminalia microcarpa* bark (mc), RM1268.

**Comments**: The sporocarps are yellow and the spore size 7–8 µm; typical material is white, with a spore size 9–15 µm. New to NT.

**Echinostelium minutum** de Bary

**Loc. 2**: *Cochlospermum fraseri* bark (mc), RM1265, RM1351.

**Loc. 3**: *Argyroderdon actinophyllum* (mc), RM1298; *Ficus obliqua* bark (mc), RM1339; *Eucalyptus fibrosa* bark (mc), RM1380.

**Loc. 10**: *Mararanga involucrata* bark (mc), RM1328.

**Liceales**

*Cribraria cancellata* (Batsch) Nann.-Brenek.


**Loc. 21**: on decaying wood (fc), SLS17399; on decaying wood (fc), SLS17404.

**Comments**: New to WA.

*Cribraria confusa* Nann.-Brenek. & Y. Yamam.

**Loc. 3**: *Endiandra palmerstoni* bark (mc), RM1246; *Flindersia brayleyana* bark (mc), RM1248; *Canarium mouleri* bark (mc), RM1249; *Endiandra sankeyana* bark (mc), RM1275; *Sloanea australis* bark (mc) RM1277.

**Loc. 10**: *Lophostomen lactifluus* bark (mc), RM1323.

**Comments**: New to NT.

*Cribraria microcarpa* (Schrad.) Pers.

**Loc. 3**: *Argyroderdon actinophyllum* bark (mc), RM1263.

**Cribraria violacea** Rex

**Loc. 3**: *Argyroderdon actinophyllum* bark (mc) RM1294.

**Loc. 4**: *Dysoxylum parasiticum* bark (mc), RM1285.

**Loc. 11**: *Euodia elleryana* bark (mc), RM1324.

**Loc. 13**: *Canarium australianum* bark (mc), RM1287.

**Loc. 22**: ground litter (mc), SLS21780.

**Comments**: New to NT and WA.
Licea biforis Morgan

Loc. 2: Sterculia quadrifida bark (mc), RM1280.
Loc. 3: Ceratopetalum succirabum bark (mc), RM1306; Ficus obliqua bark (mc), RM1358; Araucaria cunninghamii bark (mc), RM1368.
Loc. 11: Eucodia elleryana bark (mc), RM1357.
Loc. 23: Feijoa sellowiana bark (mc), MHB503.
Loc. 27: ground litter (mc), SLS22240.

Licea bullosa Nann.-Bremek. & Y. Yamam.

Syn. L. tropica Chao H. Chung & C.H. Liu
Loc. 11: Acacia auriculiformis bark (mc), RM1352.
Comments: A rare species, previously recorded once from Queensland.

Licea erecta var. erectoides Nann.-Bremek. & Y. Yamam.

Loc. 3: Litsea leeteana bark (mc), RM1257.
Loc. 11: Eucodia elleryana bark (mc), RM1357.
Comments: New to NT.

Licea floriformis T.N. Lakh. & R.K. Chopra

Syn. Licea longa Flatau
Loc. 3: Argyrodendron actinophyllum bark (mc), RM1260, 1262, 1273; Myristica insipida bark (mc), RM1338.
Loc. 4: Dysoxylum parasiticum bark (mc), RM1250.
Comments: Our material corresponds to variety aureospora M.T.M. Willemse & Nann.-Bremek. following the account by Wrigley de Basanta & Ladó (2005), but owing to the total absence of yellow pigmentation in the spores it has been thought more reasonable to drop the varietal epithet. New to Australia.

Licea kleistobolus G.W. Martin

Loc. 3: Argyrodendron actinophyllum bark (mc), RM1391.
Loc. 10: Lophostomen lactiflua bark (mc), RM1354.

Licea operculata (Wingate) G.W.Martin

Loc. 11: Eucodia elleryana bark (mc), RM1326.

Licea perexigua T.E. Brooks & H. W. Keller

Loc. 1: Terminalia sp. bark (mc), RM1281.
Loc. 7: Syzygium cumini bark (mc), RM1347.
Loc. 9: Pterocarpus indiensis bark (mc) RM1267.
Comments: New to QLD.

Licea pseudoconica T.E. Brooks & H. W. Keller

Loc. 3: Argyrodendron actinophyllum bark (mc), RM1272.
Comments: New to Australia.

Licea pygmaea (Meyl.) Ing

Loc. 9: Terminalia microcarpa bark (mc), RM1356.
Comments: New to Australia.

Licea scyphoides T.E. Brooks & H. W. Keller

Loc. 3: Endiandra sankeyana bark (mc), RM1305.

Licea testudinacea Nann.-Bremek.

Loc. 9: Calophyllum inophyllum bark (mc), RM1303.
Loc. 12: Lysiphyllum gilvum bark (mc), RM1363.
Comments: New to NT.

Licea sp.

Loc. 10: Acacia auriculiformis bark (mc), RM1366.
Comments: Two sporocarps of this species appeared. Total height ca. 900 µm, ochraceous. Sporotheca stalked, globose, diameter ca. 350 µm. Refuse material in stalk and coating peridium. Spores pale, smooth, 11-13 µm. Y. Yamamoto (personal communication) suggests an affinity with L. pedicellata.

Trichiales

Arcyria cinerea (Bull.) Pers.

Loc. 2: Cochlospermum fraseri bark (mc), RM1264.
Loc. 3: Ceratopetalum succirabum bark (mc) RM1274; Endiandra palmerstonii bark (mc), RM1283; Argyrodendron actinophyllum bark (mc), RM1304, RM1342; on fallen log (fc), RM1238.
Loc. 6: on decorticated stick (fc), RM1240; unidentified liana (mc), RM1385.
Loc. 9: Pterocarpus indiensis bark (mc), RM1302.
Loc.10: Lophostomen lactiflua bark (mc), RM1353.

Arcyria denu data (L.) Wettst.

Loc. 5: on fallen log (fc), RM1237.

Calomyxa metallica (Berk.) Nieuwbl.

Loc. 1: Terminalia sp. bark (mc), RM1270.
Loc. 2: Sterculia quadrifida bark (mc), RM1279; unidentified tree bark (mc), RM1382.
Loc. 3: Ceratopetalum succirabum bark (mc), RM1291.
Loc. 9: Terminalia microcarpa bark (mc), RM1295.
Loc. 22: ground litter (mc), SLS22047.
Comments: New to WA.

Hemitrichia calyculata (Spec.) M.L. Farr

Syn. Hyporhamma calyculata (Spec.) Lado
Loc. 3: on fallen log (fc), RM.
Comments: Not retained; already known from QLD.

Hemitrichia clava (Pers.) Rostaf.

Syn: Hyporhamma clava (Pers.) Lado
Loc. 3: Myristica insipida bark (mc), RM1255.

Hemitrichia leioarpa ( Cooke) Lister

Syn: Hyporhamma leioarpa ( Cooke) Lado
Loc. 12: Lysiphyllum gilvum bark (mc), RM1364.
Comments: New to NT.

Hemitrichia minor G. Lister

Syn. Hyporhamma minor (G. Lister) Lado
Loc. 13: Canarium australianum bark (mc), RM1296.
Comments: New to NT.
**Hemitrichia pardin**a (Minakata) Ing  
Syn: Hyporhamma pardin (Minakata) Lado  
Loc. 2: **Owenia acidula** bark (mc), RM1361.  
Loc. 4: **Dysoxylum parasiticum** bark (mc), RM1311.  
Loc. 7: **Brachychiton populneus** bark (mc), RM1335.  
Loc. 9: **Pterocarpus indi**ensis bark (mc), RM1301; **Terminalia microcarpa** bark (mc), RM1317; **Caesalpinia cararia** (mc), RM1329.  
Loc. 10: **Barringtonia acutang**a bark (mc), RM1355.  
Loc. 11: **Eucalyptus elleryana** bark (mc), RM1325.  
Loc. 13: **Canarium australianum** bark (mc), RM1300.  
**Perichaena chrysosperma** (Curr.) Lister  
Loc. 2: **Owenia acidula** bark (mc), RM1361.  
Loc. 4: **Dysoxylum parasiticum** bark (mc), RM1311.  
Loc. 7: **Brachychiton populneus** bark (mc), RM1335.  
Loc. 9: **Pterocarpus indi**ensis bark (mc), RM1301; **Terminalia microcarpa** bark (mc), RM1317; **Caesalpinia cararia** (mc), RM1329.  
Loc. 10: **Barringtonia acutang**a bark (mc), RM1355.  
Loc. 11: **Eucalyptus elleryana** bark (mc), RM1325.  
Loc. 13: **Canarium australianum** bark (mc), RM1300.  
**Perichaena corticalis** (Batsch.) Rostaf. var corticalis  
Loc. 7: **Brachychiton populneus** bark (mc), RM1310; **Syzygium cumini** bark (mc), RM1316.  
Loc. 27: **Acacia** litter (mc), SLS22243.  
Loc. 29: wallaby dung (mc), MBH526.  
**Perichaena corticalis** var. **liceoides** (Rostaf.) G.Lister  
Loc. 9: **Pterocarpus indi**ensis bark (mc), RM1372.  
Comments: New to Australia.  
**Perichaena depressa** Lib.  
Loc. 9: **Pterocarpus indi**ensis bark (mc), RM1330.  
**Perichaena pedata** (Lister & G. Lister) G. Lister ex E. Jahn  
Loc. 2: **Cochlospermum fraseri** bark (mc), RM1340.  
Loc. 8: **Casuarina equisetifolia** bark (mc), RM1381.  
Comments: New to NT.  
**Perichaena tessellata** G. Lister  
Loc. 10: ground litter (mc), SLS21942.  
Loc. 11: ground litter (mc), SLS21943.  
Comments: New to Australia.  
**Perichaena vernicul**aris (Schwein.) Rostaf.  
Loc. 5: unidentified liana (mc), RM1374.  
**Trichia contorta** (Ditmar) Rostaf.  
Loc. 19: decaying bark of **Banksia** sp. among plant debris on the ground (fc), MHB514.  
Comments: New to WA.  
**Trichia decipiens** (Pers.) T. Macbr.  
Loc. 3: **Argyroden**dron actinophyllum bark (mc), RM1284.  
Loc. 17: decaying wood (fc), SLS22836.  
Comments: New to QLD.  
**Trichia erecta** Rex  
Loc. 2: **Cochlospermum fraseri** bark (mc), RM1282.  
Loc. 3: **Argyroden**dron actinophyllum bark (mc), RM1293; **Ceratopetalum su**cicirabum bark (mc), RM1307.  
**Trichia munda** (Lister) Meyl.  
Loc. 3: **Argyroden**dron actinophyllum bark (mc), RM1299; **Castanospermum austral**e bark (mc), RM1320; **Flindersia bra**leyana bark (mc), RM1322.  
Loc. 4: **Dysoxylum parasiticum** bark (mc), RM1251.  
**Trichia varia** (Pers. ex J. F. Gmel.) Pers.  
Loc. 17: decaying wood (fc), SLS22835.  
Loc. 21: dead bark (fc), SLS17397; dead bark (fc), SLS17406.  
Comments: New to WA.  
**Trichia verrucosa** Berk.  
Loc. 17: decaying wood, SLS22835.  
Comments: This species often forms large fruitings in moist temperate forests of the Southern Hemisphere but is surprisingly rare in comparable forests in the Northern Hemisphere.  
 **Physarales**  
**Badhamia cf. affinis** Rostaf.  
Australian National Capital Territory, Charnwood, near the playing fields, 13 km NW from Canberra City (35° 12’ S, 149° 02’ E), sparse **Eucalyptus**, **Acacia** and **Casuarina** amongst grasses, associated with bryophytes on the side of an **Eucalyptus** tree, 18 March 1993, S. Podreka 19 (Collection in the Australian National Botanic Gardens Herbarium).  
Comments: New to ACT.  
**Badhamia foliicola** Lister  
Loc. 19: on bark from stump of **Banksia attenuata** (fc), MHB553.  
Comments: New to WA.  
**Craterium concinnum** Rex  
Loc. 10: ground litter (mc), SLS21765.  
Comments: Only two sporocarps of this species appeared in moist chamber culture. New to Australia.  
**Craterium leucocephal**um (Pers. Ex J. F. Gmel.) Ditmar  
Loc. 19: on leaf litter beneath **Eucalyptus camaldulensis** (fc), MHB676.  
Comments: New to WA.  
**Craterium sp.**  
Loc. 22: ground litter (mc), SLS21807.
Comments: This material will be described as a species new to science in a forthcoming paper.

**Diderma effusum** (Schwein.) Morgan

Loc. 8: *Casuarina equisetifolia* bark (mc), RM1350.
Comments: New to NT.

**Diderma effusum var. pachytrichon** Nann.-Bremek.

Loc. 9: *Calophyllum inophyllum* bark (mc), RM1334.
Comments: New to Australia.

**Diderma hemisphericum** (Bull.) Hornem.

Loc. 10: ground litter (mc), SLS21730; ground litter (mc), SLS21786.
Comments: New to NT.

**Diderma radiatum** (L.) Morgan

Loc. 18: decaying wood (fc), SLS22898.
Comments: New to Australia.

**Diderma umbilicatum** Pers.

Loc. 3: *Sloanea australis* bark (mc), RM1244; *Alstonia scholaris* bark (mc), RM1247; *Doryphora aromatica* bark (mc), RM1258; *Argyrodendron actinophyllum* bark (mc), RM1259.
Comments: Abundant and frequently with sporothecae as small as 0.5 mm in diameter.

**Diderma sp.** Figs 1–4.

Loc. 19: on bark from stump of *Banksia attenuata* (fc), MHB624 (~DWM7007 and PERTH 07645805).
Comments: The sporocarps are arranged in small groups, stalked and ca. 1 mm total height. Sporothecae dome-shaped and somewhat umbilicate below, ca. 1 mm diameter, with a white pulvinate columella, 0.4–0.5 mm in diameter. Peridium double, yellowish-brown and patterned radially with paler streaks. Dehiscence circumscissile. Stalk ca. half the total height, flared at the base, shining, yellowish-brown. Capillitium of free threads with dark purple-brown expansions, attached to groups of lime globules. Spore-mass dark brown. Spores globose, evenly verrucose, 10–12 μm diam.

**Didymium anellus** Morgan

Loc. 23: twigs (mc), SLS17707.
Loc. 25: ground litter (mc), SLS22247.
Loc. 27: ground litter (mc), SLS22241; ground litter (mc), SLS22258.
Comments: New to WA.

**Didymium bahiense** Gottsb.

Loc. 5: unidentified liana (mc), RM1375; unidentified liana (mc), RM1374.
Comments: New to QLD although genetically identical to *D. iridis*, which has already been recorded there.

**Didymium dubium** Rostaf.

Loc. 2: unidentified tree bark (mc), RM1369.

Comments: New to WA.

**Didymium minus** (Lister) Morgan

Loc. 23: twigs (mc), SLS17704.
Loc. 24: ground litter (mc), SLS21763.
NT: Newcastle Range, 12 km SSW of Timber Creek (15° 44' S, 130° 26' E), within escarpment dominated by *Xanthostemon* and *Gardenia*, on leaf litter, 13 April 1989, J. A. Curnow 2846 (Collection in the Australian National Botanic Gardens Herbarium).
Comments: Concepts of *Didymium minus* vary, and it is possible that some specimens referred to this species actually belong elsewhere. New to WA.

**Didymium nigripes** (Link.) Fr.

Loc. 10: aerial litter (mc), SLS21790.
Loc. 11: ground litter (mc), SLS21793.
Comments: New to NT.
Physarum robustum (Lister) Nann. - unidentified liana (mc), RM1379.

Physarum pusillum (Berk. & Broome) Morgan - aerial litter (mc), SLS21792.

Physarum album (Lister) Nann. - Syn. Physarum album (Berk.) Rostaf.

Physarum serpula Morgan - aerial litter (mc), SLS21792.

Willkommlangea reticulata (Alb. & Schwein.) Kuntze - unidentified liana (mc), RM1378.

Loc. 10: on fallen Banksia bark (mc), MHB549.

Loc. 27: Hakea recurva litter (mc), SLS22430.

Comments: New to NT and WA.

Stemonitales

Comatricha alta Preuss


Comments: New to ACT.

Comatricha laxa Rostaf.

Loc. 27: ground litter (mc), SLS22244; ground litter (mc), SLS22259.

Comatricha nigra (Pers. ex J.F. Gmel.) J. Schröt.

Loc. 3: Canarium mouleri bark (mc), RM1312.

Comatricha pulchella (C. Bab.) Rostaf.

Loc. 3: Litsea leeteana bark (mc), RM1242.

Loc. 15: Allocasuarina sp. bark (mc), MHB440.

Loc. 23: twigs (mc), SLS17831.

Comments: New to SW and WA.

Comatricha tenerrima (M. A. Curtis) G. Lister

Loc. 21: on decaying Eucalyptus log, MHB704.

Comments: New to WA.

Elaeomyxa cerifera (G. Lister) Hagelst.

New South Wales: Hanging Mountain Forest Reserve, 24 km SW of Moruya (36° 01’ S, 149° 52’ E), dry sclerophyll forest, on decaying wood, 20 June 1990, H. Lepp 437 (Collection in the Australian National Botanic Gardens Herbarium in Canberra).

Comments: This collection represents the first record of Elaeomyxa cerifera from the Southern Hemisphere.

Lamproderma echinulatum (Berk.) Rostaf.

Loc. 18: decaying wood (fc), SLS22878.

Comments: This species was described originally from material collected in Tasmania, but our specimen represents the first time it has been reported from Tasmania in almost a century.

Lamproderma scintillans (Berk. & Broome) Morgan

Loc. 10: aerial litter (mc), SLS21781; aerial litter (mc), SLS21787.
RM visited Queensland in 2001, bark samples were collected from 61 trees, and these samples were used to prepare a total of 284 moist chamber cultures. Only 28% of the cultures produced some evidence (either plasmodia or fruiting bodies) of myxomycetes. In 2006, bark samples were collected from 34 trees in the same region of Australia and used to prepare 156 moist chamber cultures. In striking contrast to 2001, 65% of the cultures produced myxomycetes. Also in 2006, samples were collected from 23 trees in the Northern Territory. Seventy-five percent of the 102 cultures prepared from these samples were positive for myxomycetes.

For the Queensland series of cultures, it is interesting to note the differences obtained from one place to another even when similar types of forests were involved. In 2001, vine forests on the Atherton Tableland were sampled rather extensively. Visits to Wongabel and Lake Eacham yielded bark samples from 21 trees, with 101 cultures prepared and 44% positive. In 2006, samples were collected from 17 trees at Malanda Falls and Mount Hypipamee. These were used to prepare 89 cultures (74% positive). In each year, a fruiting of Ceratiomyxa fruticulosa appeared in a bark culture. This species, although common in the field, very rarely fruits in cultures. The trees providing the bark samples were only 10 km apart, which suggests the presence of a distinct local strain, although the sporocarps appeared entirely normal for the species. Comparisons of the results obtained for sets of samples obtained for offshore islands are also worth considering. In 2001, Fitzroy Island provided material from 17 trees (79 dishes, 15% positive). In 2006 samples were taken from 16 trees on Magnetic Island (62 dishes, 51% positive). It should be noted that in every instance the samples collected in 2006 produced numerous plasmodia that failed to fruit, and there were fewer rare or unexpected species than in 2001.

SLS collected samples of litter (both ground and aerial) in Tasmania and southeast Australia. In addition, he processed samples collected by RM near Darwin in the Northern Territory and by Peter Letcher in the northern part of Western Australia. The sets of samples from Tasmania (11 samples, 28 moist chambers, 96% positive), the Northern Territory (12 samples, 41 cultures, 87% positive), and the northern part of Western Australia (15 samples, 43 cultures, 84% positive) were more productive than those from southeast Australia (13 samples, 39 cultures, 62% positive). Naturally, different types of substrates favour particular taxa. The small sporocarps of Echinostelium and Licea appear principally on bark in cultures. So does Machrideola martini (10 records here). However, certain species, including Didymium anellus and Perichaena tessellata, seem to be restricted largely to litter. The species recorded from lianas in this study (Didymium squamulosum, Physarum compressum and Perichaena vermicularis) are not very unusual. Whilst the majority of myxomycetes appear to be cosmopolitan, some examples on the present list are characteristically tropical. Among these are Physarum flavicomum, P. lakanapali and Machrideola scintillans var. verrucosa. An interesting new record for Australia is that of Elaeomyxa cerifera, whose scattered world distribution has been uncovered principally over the last decade.
As the considerable number of new state records indicates, many areas of Australia remain understudied for myxomycetes. These organisms are known to be widely distributed and many species probably occur wherever suitable conditions exist. Much of Australia is generally more xeric than comparable regions at the same latitudes in the Northern Hemisphere, which places constraints on the number of specimens encountered in the field. However, the moist chamber culture technique as it applies to myxomycetes is often exceedingly productive. The fact that the surveys we carried out yielded several species apparently new to science also suggests that the myxomycete biota of Australia warrants additional study.

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References


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