MOIST CHAMBER AND FIELD COLLECTIONS OF MYXOMYCETES FROM THE NORTHERN SIMPSON DESERT, AUSTRALIA

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Abstract

This is the first species list of myxomycetes from the northern Simpson Desert, Northern Territory. Bark, dung and litter substrates from the Hay River region were used for moist chamber culture incubation for myxomycetes. Field collections, together with specimens obtained from the moist chamber cultures have resulted in 35 species from this region of Australia. Nine of these species (*Badhamia melanospora, Comatricha vineatilis, Didymium dubium, Echinostelium arboreum, E. coelocephalum, Licea* cf. *perexigua, Macbrideola oblonga, Physarum ovisporum* and *Stemonitis laxifila*) are recorded for the first time from Australia. An additional 13 species are first records for the Northern Territory.

Key words: Australia, Northern Territory, Simpson Desert, myxomycetes, new records.

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Introduction

Myxomycetes, or plasmodial slime moulds, are common and relatively cosmopolitan in their distribution. They have been widely studied in Europe and North America, but those from Australia are still poorly known. Mitchell (1995) collated the first recent check list, recording 147 species. Ing and Spooner (1994) added an additional 16 species from the Kimberley Region of Western Australia, and McHugh *et al.* (2003) added a further 28 species from the Australian mainland and Tasmania. Other authors have added to this inventory with new records from specific habitats or locations (Jordan *et al*. 2006, Rosing *et al.* 2007, Stephenson *et al.* 2007).

The Simpson Desert covers about 200 000 km^2 in the south east of the Northern Territory (NT), the south west of Queensland and the north east of South Australia. The desert is classed as a hot desert and lies in the driest part of Australia (Purdie 1984). The region is renowned for its extensive dunefields but includes other landforms such as gibber plains, sand plains, dissected residuals and floodplains. The central part of the desert has mean annual rainfall of less than 150 mm. This rainfall is very erratic, both in seasonal occurrence and between years. Surface water is ephemeral.

During the late nineteenth and early twentieth centuries, grazing licences and leases were taken out over much of the Simpson Desert, although the frequent fluctuations in these grazing lease boundaries indicate the uncertainty of the pastoral industry in this area. These leases and licences were mainly in the west, south and east of the Simpson Desert; the northern part was generally free of pastoral activity and has been only lightly grazed (Gibson & Cole 1988).

The Northern Simpson Desert, in the vicinity of the Hay River, is not well known scientifically. This region was visited by the Winneke Expedition in 1883 and the Madigan Expedition in 1939 (Madigan 1945). A biological survey of this area was conducted by Gibson and Cole (1988) to assess the biological resources of the region and to recommend its potential for conservation. A description of the vegetation, and a plant list were published from the

Madigan expedition (Crocker 1946, Eardley 1946) and additional plant lists were published by Purdie (1984) and Gibson and Cole (1988). These lists do not include any myxomycetes from this region. In July 2007 the Australian Geographic Society organized an expedition to the Hay River region. One of us (EMD) took part, with the aim of collecting substrates for myxomycetes, as well as making collections of other fungi. The results of the myxomycete collections are presented in this paper.

Materials and Methods

Collection area

The collection area covered floodplains, dunefields and sand plains in the vicinity of the Hay River, between 23° 0′ S to 24° 17′ S and 136° 51′ E to 137° 28′ E. The vegetation types follow Purdie (1984). The vegetation of the flood plains on the Hay River consisted of fringing woodland of *Eucalyptus camaldulensis* Dehnh. in the river bed and along the bank, with occasional *Erythrina vespertilio* Benth.also present and with *Eucalyptus microtheca* F. Muell. low open woodland, with occasional *Corymbia opaca* (D.J.Carr & S.G.M.Carr) K.D.Hill & L.A.S.Johnson on the adjacent alluvial plain. The dunefields were characterized by low open woodland of *E. microtheca* with occasional *Hakea eyreana* (S.Moore) McGill*., H. lorea* (R.Br.) R.Br. and *Atalaya hemiglauca* (F.Muell.) Benth. in the swales, and *Grevillea stenobotrya* F.Muell. on the dunes. The sand plains in the north of the collection area, around the dissected residuals of the western part of the Adam Range, included open woodland of *Acacia cambagei* R.T.Baker*,* with occasional *C. papuana* (F.Muell.) K.D.Hill & L.A.S.Johnson and *E. pachyphylla* F. Muell. All collections were made between 2 and 13 July 2007.

The collecting area lies between the 300 mm and 200 mm isohyets on the Bureau of Meteorology mean rainfall chart; the estimated rainfall in this region in the previous 6 months was between 200 and 300 mm (Australian Bureau of Meteorology 2007).

Collections, moist chamber preparation and identifications

Substrates suitable for moist chamber incubation (see below) were collected from the outer bark of living and dead trees and shrubs, herbivore dung and leaves (aerial litter) washed into fringing shrubs along the Hay River following previous rain. Each collection is indicated by the prefix SD. Collections were from substrates separated by at least 200 m. The substrates were placed in new paper bags and returned to Perth. Field collections were opportunistic.

Moist chamber cultures were prepared as described by Stephenson and Stempen (1994). The chamber cultures were plastic containers with lids, 9.5 cm in diameter and 4 cm deep, lined with absorbent paper towel. At least three replicate chamber cultures were prepared from each bark sample; a single chamber was prepared from each dung or litter sample. The samples were placed on the paper towel and flooded with deionised water. After 24 hr. the water was drained off and either the pH measured with a pHTestr 20 pH meter (Eutech Instruments PTE Ltd, Singapore), or the water was discarded. Moist chamber cultures were maintained at room temperature (20–25°C) in diffuse light, and examined frequently with a stereo microscope.

Fruiting bodies and plasmodia were recorded whenever the chamber cultures were checked. Slides of sporocarps were mounted in either Hoyers gum chloral or polyvinyl alcohol. Herbarium specimens were made by removing the sporocarps together with a portion of the substrate and gluing the substrate onto a card. The myxomycetes were identified using standard European and North American keys (Whitney 1980, Nannenga-Bremekamp 1991, Ing 1999, Mitchell 2003). The colour descriptions are from the Flora of British Fungi (1969). The names used in this paper follow those in Index Fungorum (2008).

Representative samples have been deposited at DARWIN, others have been deposited in PERTH, and some samples have been retained in a private collection (PJN&EMD).

Results

Annotated list of species

The moist chamber cultures, together with field collections, resulted in 35 species of myxomycetes. Nine of these are new records for Australia and 13 are new records for the NT. Six taxa could not be assigned to a species, either because of the small numbers of sporocarps or possibly aberrant material. Where cf. is used it indicates that the specimen representing the source of the record could not be identified with certainty. One specimen appears to be similar to an

undescribed species of *Arcyria* reported by McHugh *et al.* (2003), whilst another specimen could not be assigned to a genus.

All species are from moist chamber cultures unless otherwise indicated.

ECHINOSTELIALES

Echinostelium apitectum K.D. Whitney (= *E. vanderpoelii* Nann.-Bremek., D.W. Mitch., T.N. Lakh. & R.K. Chopra)

Bark from living *G. stenobotrya* (pH 5.3) PJN&EMD 528 (SD 21). Bark from living *H. eyreana* (pH 5.9) PJN&EMD 511 (SD 27). Bark from living *C. opaca* (pH 4.5, 4.8) PJN&EMD 535, 537 (SD 28). Bark from living *E. vespertilio* (pH 7.0) PJN&EMD 480 (SD 75). Bark from dead *A. cambagei* (pH 5.8, 6.1) PJN&EMD 485, 486 (SD 94).

First reported as *E. vanderpoelii* from Australia by Mitchell (1995) but not previously recorded from the NT.

Echinostelium arboreum H.W. Keller & T.E. Brooks

Bark from living *E. microtheca* (pH 6.4, 6.7) PJN&EMD 520, 522 (SD 10). Bark from living *E. microtheca* (pH 6.7) PJN&EMD 542 (SD 54).

Not previously recorded from Australia.

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

Bark from dead fallen unidentified shrub (pH 5.4) PJN&EMD 524 (SD 12). Bark from living *G. stenobotrya* (pH 5.3) PJN&EMD 528 (SD 21). Bark from living *G. stenobotrya* (pH 5.6) PJN&EMD 530 (SD 22).

Not previously recorded from Australia.

Echinostelium fragile Nann.-Bremek.

Bark from living *H. eyreana* (pH 5.5) PJN&EMD 512 (SD 27).

Previously reported from the NT by McHugh *et al.* (2003).

Echinostelium minutum de Bary

Bark from living *H. lorea* (pH 6.2) PJN&EMD 539 (SD 30). Bark from dead *A. cambagei* (pH 5.8) PJN&EMD 486-D (SD 94).

Reported in Mitchell (1995). Not previously recorded from the NT.

LICEALES

Licea biforis Morgan

Bark from dead fallen *A. hemiglauca* (pH 6.4) PJN&EMD 515-A (SD 2). Bark from living *E. microtheca* (pH 6.7) PJN&EMD 521 (SD 10). Bark from living *G. stenobotrya* (pH 5.8) PJN&EMD 531 (SD 22). Bark from living *E. microtheca* (pH 6.4, 6.7) PJN&EMD 541, 542, 543 (SD 54).

Previously reported from the NT by McHugh *et al.* (2003).

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

Bark from living *E. microtheca* (pH 6.4, 6.7) PJN&EMD 520, 521, 522 (SD 10). Bark from living *E. microtheca* (pH 6.1, 6.3) PJN&EMD 533, 534 (SD 26). Bark from living *E. microtheca* (pH 6.7) PJN&EMD 542 (SD 54).

These specimens have larger spores (11.2–14.0 µm) than the published description (Keller & Brooks 1977).

Reported from Australia by McHugh *et al.* (2003), but not previously recorded from the NT.

Licea kleistobolus G.W. Martin

Bark from dead fallen shrub (pH 4.8, 5.4) PJN&EMD 523, 524 (SD 12). Bark from living *G. stenobotrya* (pH 5.4) PJN&EMD 528 (SD 21). Bark from living *G. stenobotrya* (pH 5 6, 5.8) PJN&EMD 529, 530 (SD 22). Bark from living *C. opaca* (pH 5.5, 5.6) PJN&EMD 495-A, 496-A (SD 56). Bark from living *A. cambagei* (pH 6.4) PJN&EMD 493 (SD 76). Bark from dead *A. cambagei* (pH 5.8, 6.1) PJN&EMD 485-B, 486-A, MHB (SD 94).

Previously reported from the NT by McHugh *et al.* (2003).

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

Bark from dead *A. cambagei* (pH 5.8, 6.1) PJN&EMD 485-E, 486-C (SD 94).

This specimen is similar to *L. perexigua* with respect to its size and form, spore size and lack of spore ornamentation; however the sporotheca is not iridescent.

Not previously recorded from Australia.

Licea species 1

Bark from living *G. stenobotrya* (pH 5.6) PJN&EMD 530 (SD 22).

This could not be assigned to a species. Sporocarp sessile, pulvinate, solitary, black, 150 µm diameter, peridium indehiscent, gelatinous, spores black in the mass, purplish black in transmitted light, 12.8 µm diameter, uniformly warty.

Licea species 2

Bark from living *E. microtheca* (pH 6.7) PJN&EMD 520 (SD 10).

This could not be assigned to a species. Sporocarp sessile, elongated, iridescent, 200 x 400 µm, peridium persistent, single, membranous, hyaline, papillose on the inner surface, spores cinnamon in the mass, yellowish in transmitted light, 11.5 µm diameter, densely verrucose.

TRICHIALES

Arcyria cinerea (Bull.) Pers.

On fallen bark from living *E. microtheca* MHB (SD 124).

Reported in Mitchell (1995). Not previously recorded from the NT.

Arcyria sp.

Bark from living *C. opaca* (pH 5.5) PJN&EMD 496 (SD 56).

This could not be assigned to a species. A group of six, short stalked, ovate, olivaceous buff sporothecae; capillitium firmly attached to the calyculus, capillitium brown, about 5 µm wide (excluding ornamentation) and decorated with rings; calyculus pleated and coarsely reticulate; spores slightly brownish in transmitted light, 9.9–10.2 µm. This is similar to *Arcyria* sp. DWM6506 in McHugh *et al*. (2003), which was obtained in moist chamber culture from *C. opaca* bark from the NT.

Perichaena corticalis (Batsch) Rostaf.

Bark from dead fallen *A. hemiglauca* MHB (SD2). Bark from base of living *E. microtheca* MHB (SD 10). Aerial litter washed down by past floods MHB (SD17). Bark from living *E. microtheca* (pH 6.7) PJN&EMD 424 (SD 54).

Reported in Mitchell (1995). Not previously recorded from the NT.

Perichaena vermicularis (Schwein.) Rostaf.

Bark from dead fallen *A. hemiglauca* MHB (SD2).

Reported in Mitchell (1995). Not previously recorded from the NT.

PHYSARALES

Badhamia melanospora Speg.

Euro (*Macropus robustus* Gould) dung MHB SD 128.

Not previously recorded from Australia. Known from New Zealand (Stephenson 2003).

Badhamia sp.

Bark from dead *A. cambagei* (pH 5.8) PJN&EMD 486-E (SD 94).

This could not be assigned to a species. Sporocarps were stipitate, gregarious, about 600 µm diameter, iridescent, with a short, flaccid chestnut stalk, capillitium a coarse three dimensional network of white lime tubules, spores very dark brown in the mass, purplish brown in transmitted light, 11.6 µm diameter, uniformly covered with short spines.

Didymium difforme (Pers.) Gray

Bark from living *E. microtheca* (pH 6.4, 6.7) PJN&EMD 520, 521, 522 (SD 10).

Reported in Mitchell (1995). Not previously recorded in the NT.

Didymium dubium Rostaf.

Bark from dead fallen *Atalaya hemiglauca* (pH 5.9) PJN&EMD 513 (SD 2). Field collection, on fallen bark *E. microtheca* PJN&EMD 545 (SD 66).

Not previously recorded from Australia. Known from New Zealand (Stephenson 2003).

Didymium squamulosum Fuckel

Field collection, on bark from fallen dead tree PJN&EMD 546 (SD 116).

Reported in Mitchell (1995). Not previously recorded from the NT.

Didymium sp.

Camel (*Camelus dromedarius* Linnaeus) dung MHB (SD 13).

This could not be assigned to a species. There were only three sessile sporocarps, about 400 µm diameter, 150 µm high, covered in white granular lime, no capillitium seen, spores 12.2 µm in diameter, purplish brown in transmitted light, uniformly spinose, no germ pore seen.

Physarum cinereum (Batsch) Pers.

Field collection, on fallen bark from living *E. papuana* PJN&EMD 544 (SD 37).

Reported in Mitchell (1995). Not previously recorded from the NT.

Physarum decipiens M.A. Curtis

Bark from living *E. microtheca* (pH 6.7) PJN&EMD 520, 521 (SD 10). Bark from living *A. cambagei* (pH 6.4, 6.7) PJN&EMD 492, 493-B (SD 76). Bark from dead *A. cambagei* (pH 6.1) PJN&EMD 485-A, MHB (SD 94).

Reported in Mitchell (1995) although the location is not specified.

Physarum ovisporum G. Lister

Bark from living *E. vespertilio* (pH 7.0) PJN&EMD 480-B, MHB (SD 75). Bark from living *A. cambagei* (pH 6.4, 6.7) PJN&EMD 491-A, 492-B, 493-A (SD 76).

Not previously recorded from Australia.

'Plasmodiocarps'

Bark from living *E. microtheca* MHB (SD 26). Bark from living *E. microtheca* (pH 6.7) PJN&EMD 542, 543 (SD 54).

These could not be assigned to a genus. Sessile sporangia or short plasmodiocarps up to 5 mm long, covered with large plates of crystalline lime or areas of white granular lime, both were present on large sporocarps giving them a piebald appearance, no capillitium seen, spores straw coloured in mass, hyaline in transmitted light, smooth.

STEMONITALES

Colloderma robustum Meyl.

Bark from dead *A. cambagei* (pH 6.3) PJN&EMD 487 (SD 94).

Reported in Mitchell (1995). Not previously recorded from the NT.

Comatricha elegans (Racib.) Lister

Bark from dead fallen shrub (pH 4.8) PJN&EMD 523 (SD 12). Bark from living *G. stenobotrya* (pH 5.3) PJN&EMD 528 (SD 21). Bark from living *G. stenobotrya* (pH 5.8) PJN&EMD 529 (SD 22). Bark from living *C. opaca* (pH 4.8, 4.9) PJN&EMD 535, 536 (SD 28). Bark from living *E. microtheca* (pH 5.2, 5.3) PJN&EMD 502, 503 (SD 35). Bark from living *C. opaca* (pH 4.6, 5.5) PJN&EMD 494, 496-B (SD 56).

Previously reported from the NT by McHugh *et al.* (2003).

Comatricha laxa Rostaf.

Bark from living *E. camaldulensis* (pH 5.8) PJN&EMD 507 (SD 8). Bark from living *E. microtheca* (pH 6.4) PJN&EMD 522 (SD 10). Bark from dead, fallen unidentified shrub (pH 5.4) PJN&EMD 525 (SD 12). Bark from living *G. stenobotrya* (pH 5.6) PJN&EMD 526 (SD 21). Bark from living *H. eyreana* (pH 5.5, 5.8) PJN&EMD 510, 512-A, (SD 27). Bark from living *H. lorea* (pH 6.2) PJN&EMD 538 MHB (SD 30). Fallen bark from living *E. pachyphylla* (pH 5.1) PJN&EMD 505 (SD 40). Bark from living *A. cambagei* (pH 6.4) PJN&EMD 491 (SD 76). Bark from dead *A. cambagei* (pH 5.8, 6.3) PJN&EMD 486-H, 487-A (SD 94).

Previously reported from the NT by McHugh *et al.* (2003).

Comatricha vineatilis Nann.-Bremek.

Bark from living *C. opaca* (pH 4.5, 4.8) PJN&EMD 535, 537 (SD 28).

Not previously recorded from Australia. Known from New Zealand (Stephenson 2003).

Comatricha sp.

Bark from living *H. lorea* (pH 6.3) PJN&EMD 540 (SD 30).

Only a single ellipsoidal sporocarp, total height 750 µm, stalk 60 % of the total height, peridium fugacious, columella extending almost to the top of the sporotheca, capillitium forming an internal net, small branches nodulose, no surface net, free ends numerous, pale, spores 10.5 µm diameter, purplish brown

in transmitted light, covered with coarse warts, no germ pore seen.

Macbrideola cornea (G. Lister & Cran) Alexop.

Bark from living *E. microtheca* (pH 6.7) PJN&EMD 520, 521 (SD 10).

Spores 7.5–7.6 µm diameter, slightly smaller than in published descriptions (Nannenga-Bremekamp 1991, Neubert, Nowotny & Baumann 2000).

Reported in Mitchell (1995). Not previously recorded from the NT.

Macbrideola oblonga Pando & Ladó

Bark from living *C. opaca* (pH 5.6) PJN&EMD 495 (SD 56). Bark from living *A. cambagei* (pH 6.4) PJN&EMD 491-B, 492-A (SD 76). Bark from dead *A. cambagei* (pH 5.8, 6.1, 6.3) PJN&EMD 485-D, 486-G, 487-C MHB (SD 94).

Not previously recorded from Australia.

Paradiacheopsis fimbriata (G. Lister & Cran) Hertel

Bark from dead fallen shrub (pH 4.8, 5.2) PJN&EMD 523, 525 (SD 12).

Reported in Mitchell (1995). Not previously recorded from the NT.

Stemonitis laxifila Nann.-Bremek. & Y. Yamam.

Bark from living *E. microtheca* (pH 5.2) PJN&EMD 501 (SD 35).

Not previously recorded from Australia.

Stemonitopsis amoena (Nann.-Bremek.) Nann.-Bremek.

Bark from living *E. microtheca* (pH 5.8) PJN&EMD 517 (SD 5). Bark from living *G. stenobotrya* (pH 5.5) PJN&EMD 527 (SD 21).

Reported in Jordan *et al*. (2006). Not previously recorded from the NT.

Discussion

The Hay River region of the northern Simpson Desert is one of the driest areas of Australia, yet our work has shown that it supports a diverse and abundant myxomycete flora, given the appropriate conditions that allow these organisms to develop. The most common species, in terms of numbers of SD collections, were *Comatricha laxa, Licea kleistobolus* and *C. elegans,* followed by *Echinostelium apitectum* and *Macbrideola oblonga*. The latter is a species that is considered rare, but was commonly found in moist chamber cultures of bark from the desert of Western Kazakhstan by Schnittler and Novozhilov (2000). They suggest that deserts have a limited, but distinctive myxomycete flora. Of the 27 species that they recorded, 41 % are common to both Western Kazakhstan and the northern Simpson Desert.

Stephenson (1989) drew attention to the importance of pH in determining the distribution patterns of myxomycetes. Our study yielded only a small number of common species that allow comparisons, but it does show that *Comatricha elegans* occurs on bark of significantly ($P<0.005$) lower pH (pH 5.1) than that on which *C. laxa* occurs (pH 5.8).

Our new records increase the number published records of corticolous myxomycetes known from Australia to at least 70. As the myxomycete flora of Australia is poorly known, it is likely that this number will increase as further surveys are undertaken.

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A NEW RECORD OF *APODOSPORA* FROM AUSTRALIA, A RARELY COLLECTED COPROPHILOUS ASCOMYCETE.

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Abstract

Apodospora peruviana from Australia is described. It was also grown in culture (CBS 118394) and the ribosomal internal transcribed spacer (ITS) region has been sequenced (Genbank EU573703).

Key words: Lasiosphaeriaceae, fungi, systematics.

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Introduction

During continued observation of macropod dung collected from Australia (Bell 2005), a further interesting and seldom seen species of *Apodospora* was found.

Materials and Methods

The Australian sample of *Apodospora peruviana* first developed on incubated wombat dung (*Vombatus ursinus*), collected in Bolaro State Forest, NSW by R. Corringham in 1997 (PDD 83066). This dung sample was kept in a refrigerator in a dried state until it was incubated on damp filter paper in a glass-lidded container in January 2005. Although the age of the collected dung was unknown, we can deduce from this that *A. peruviana* ascospores can remain viable in a dried state for at least eight years. Once incubated, *A. peruviana* took two months of incubation before mature perithecia were observed. Initial microscopic examination of the fungus was made in water mounts and several semi-permanent slides were made using Shear's mounting medium. A second collection of *A. peruviana* was obtained from a sample of unidentified dung in the Deva River area, NSW, collected by P. Cormack in 1997 and incubated by us in March 2006 (PDD 90052). Ascospore sizes were determined by measuring at least 50 ascospores from each collection. Colour references below follow the notation of Kornerup & Wanscher (1989).

A few mature perithecia from the original collection (PDD 83066), were surface sterilized in a 3% solution of hydrogen peroxide for ten minutes after which their contents and fragments of the perithecial walls were spread on to the surface of Difco Corn Meal Agar (CMA) and incubated at 25°C under a daily cycle of 12 hr light/12 hr dark. After seven days, a scrap of pink mycelium growing from a portion of perithecial fragment was plated on to fresh CMA agar where it continued to produce a pink mycelium. After a further 38 days mature perithecia had formed on the agar. Many were submerged in the agar and lay on their sides similar to their habit on the original dung sample. The mycelium was mostly submerged with a few aerial floccose hyphae producing a distinctive pink colour (11A8) in the agar. No anamorph was seen. This culture was inoculated on to further CMA plates augmented with autoclave-sterilized rabbit droppings. Here the fungus grew well, producing many perithecia especially on the rabbit pellets. These axenic cultures were later freeze dried to provide further herbarium samples (PDD 83102, PDD 83103 & PDD 83104). The original culture has been deposited with the Centraalbureau voor

Schimmelcultures, Utrecht, Netherlands (CBS 118394).

In order to sequence the ITS, one of us (Robert Debuchy), grew *Apodospora peruviana* on M2 media (Esser 1974) covered with a cellophane membrane. After three days, a tiny bit of *A. peruviana* mycelium was taken from the cellophane membrane and transferred to a 0.2 mL tube filled with 100 µL of a Taq PCR mixture according to Q-BIOgen instructions (Strasbourg, France) with primers PN3 (5'-ttggtgaaccagcggaggatc-3') and PN10 (5'-tccgcttattgatatgcttaag-3') (Neuvéglise *et al.* 1994). The tube containing the mycelium and the PCR reaction was then frozen at -20°C to disrupt the mycelium. After freezing, the PCR reaction tube was directly submitted to an initial denaturation for 2 min at 94°C, and then to 40 cycles of amplification (1 min at 94°C, 1 min at 60°C, 1 min at 72°C). The reaction ended with a final elongation step of 5 min at 72°C. The success of amplification was checked by depositing 5 µL of the PCR reaction on an agarose gel. The PCR reaction was sent for sequencing with primers PN3 and PN10 to Genome Express (Meylan, France). Sequence files were compared with the electrophoregrams to correct any nucleotide miscalling and the 532 base pairs of the *A. peruviana* ITS were assembled with CAP3 (Huang & Madan 1999). The ITS sequence was deposited at GenBank (accession number EU573703).

Taxonomy

Apodospora peruviana Muroi & Udagawa. (Figures 1A–E & 2A–C).

Perithecia relatively large (approx. 0.5 mm diam), scattered, superficial to slightly submerged, many reclining with a reddish-brown colour (11F6-7) (Fig. 1A). A squash of the perithecial wall shows that a pink colouration (11A7-8) resided in the cells of the interlocking hyphal mat forming a network over the brown pseudoparenchymatous peridial tissue (Fig. 1B). The pink pigment in the hyphae remains after the material was mounted in Shear's mounting medium (at least in the short term). The pink colouration also stains the dung immediately surrounding the perithecia (Fig. 1A). Perithecial necks were black and without vestiture. Paraphyses numerous, hyaline, unbranched, uniform in diameter throughout their length, septate, with rounded apices (Figs 1C & 2A). Asci spore-containing portion cylindrical with long stalk, each containing 8 ascospores (Figs 1C & 2A). Asci approx. 300 µ m long, but difficult to measure accurately due to their elastic nature and to their tapering non-ascospore portions which were not easily released from the hymenial layer where they were obscured by the paraphyses. Ascus ring prominent, approx. 3 µm in diam and remaining as a prominent rigid ring even in discharged asci (Fig. 1E). Ascospores initially uniseriate but quickly becoming irregularly biseriate in water mounts, dark at maturity, single celled, symmetrical, ellipsoidal to ovoid, each surrounded by a gelatinous sheath 5–6 µm wide, which is invaginated over the (usually) apically placed germ pore (Figs 1C & 2B). Ascospore measurements (minus their sheath), 27–38 x 16–21 µm.

Herbarium material: On wombat dung (*Vombatus ursinus*), Bolaro State Forest, west of Bateman's Bay, south west of Nelligen, NSW, lat. 35° 40' 32" S, long. 150° 04' 30" E. Habitat: forest with creek. Vegetation type: mixed *Eucalyptus* with creek community scrub. Collector: R. Corringham, 4 November 1997 (PDD 83066). Axenic freeze dried cultures produced from specimen above: (PDD 83102, PDD 83103 & PDD 83104). On unidentified dung, 17 km W. of Morua, Deva River, NSW, Collector P. Cormack, 25 May 1997 (PDD 90052).

Discussion

Apodospora was described as a genus within the Sordariaceae by Cain & Mirza (1970). Characters for the genus included filiform and abundant paraphyses, a continuous gelatinous sheath around the ascospores and apical germ pores. Cain & Mirza described, illustrated and produced a key to three species: *Apodospora simulans* (type species), *A. viridis* and *A. thescelina*, differing in perithecial colour ("greenish" or "reddish-brown") and ascospore size. They also described *A. simulans* as having a phialidic anamorph state in culture. Their cultures failed to produce the teleomorph even though several unspecified types of agar were used. *Apodospora viridis* also produced a floccose, green, phialidic anamorph on the surface of the dung. The three species of *Apodospora* were variously found on the dung of moose, rabbit, cow or sheep collected in North America, Canada and Mexico. Cain & Mirza (1970) listed 25 collections, the most commonly collected species being *A. simulans*, most of which developed on incubated moose dung. Lundqvist (1972) provided a further key

Table 1. List of main characters separating five species of *Apodospora*.

Species	Peridium colour	Neck	Ascospore size & shape
A. simulans	reddish/brown	glabrous	20–25 x 9–11 µm, oblong/ellipsoid
A. thescelina	dark brown	glabrous	24–32 x 15–19 µm, ovoid/ellipsoid
A. viridis	yellow/green	papillae	48–53 x 29–31 µm (av.), ellipsoid
A. gotlandica	brown	glabrous	30–41 x 15–18 µm, ellipsoidal
A. bulgarica	olive/brown	rigid hairs	22–30 x 13.7–16 µm, ovoid/ellipsoid
A. peruviana	brown/pinkish	glabrous	33–43 x 17–23 µm, oblong/ellipsoid

to the known species including a new one, *A. gotlandica*, collected on horse dung in Sweden. He listed many other collections of *A. simulans* on a variety of dung substrates. He also suggested that *Apodospora*, although looking "very sordarioid", would be better placed in the Lasiosphaeriaceae, since the peridium was vinaceous in colour and there was the occasional appearance of a subapical globule in the asci. He also recorded the invagination in the ascospore sheath at the position of the germ pore. Fakirova (1973) also provided a key to *Apodospora* including a new species, *A. bulgarica*, from cow dung. Muroi *et al.* (1987) described a further new species, *A. peruviana*, from llama dung collected in Peru. They stated that their species is close to *A. simulans*, but the ascospores were larger and the perithecia bare rather than hairy. These four publications represent the only records of this genus to date, which is puzzling, since Cain & Mirza (1970) reported a fairly substantial collection of 25 records in their initial paper, and Lundqvist listed further collections made on a variety of dung substrates. One might thus expect *Apodospora* records to be reasonably common. The main differences attributed to the described species are listed (Table 1).

Although it has been necessary to précis the descriptions of some of the authors in Table 1, due to the non-uniform nature of descriptions, its construction reveals some questions and overlaps. For example, in his general description of *Apodospora*, Lundqvist (1972) mentioned the vinaceous peridial colour common to the genus, stating that Swedish collections of *A. simulans* mostly exhibited a wine-red colour to the peridium, although this colour was sometimes absent. But he described *A. gotlandica* as having a brown peridium and there is no mention of red or pink pigments as being present in this species. There is some overlap/contiguity between the ascospore sizes of *A. gotlandica*, *A. thescelina*, *A. bulgarica* and *A. peruviana* and a certain amount of similarity in the shape of the ascospores as they are illustrated. It seems that what one author considers to be ovoid could very well be described by another as ellipsoid. For example, compare the illustrations of *A. thescelina* by Cain & Mirza (1970, Figs 10–14), with those of *A. gotlandica* by Lundqvist (1972, Fig. 68). The oddly shaped "drop like" ascospores sometimes present in *A. bulgarica* (Fakirova 1973, Fig. 2) could be a reflection of the fact that this collection also exhibited asci containing abnormal numbers of ascospores. We have observed this phenomenon in *Podospora curvuloides*, which also exhibited abnormal numbers of ascospores in the asci. Also, the "rigid brown septate hairs" described for the neck of *A. bulgarica* frustratingly do not match the illustration of same (Fakirova 1973). Instead they resemble the hairy neck characteristic of the young perithecia of *A. simulans* and *A. peruviana*, as described by Cain & Mirza (1970), Lundqvist (1972) and Muroi *et al*. (1987). *A. viridis* stands quite apart from the other five described species insofar as it exhibits green pigmentation and larger ascospores.

Vacillation when matching fungi to published descriptions is familiar to and bedevils all fungal taxonomists, but it is made especially problematical in these days when temporary importation of fumigated, dried and thoroughly dead type material is made prohibitively expensive for mycologists who are independent of large, publically funded organisations. Thus we have to rely on published descriptions alone when comparing our Australian collection of *Apodospora* described above. However, as evidenced from the descriptions of all known species (Table 1), the morphological features of ascospores of *A. thescelina*, *A. gotlandica*, *A. bulgarica*, and to a lesser extent *A. simulans*, show considerable overlap with *A. peruviana*. Until such time as

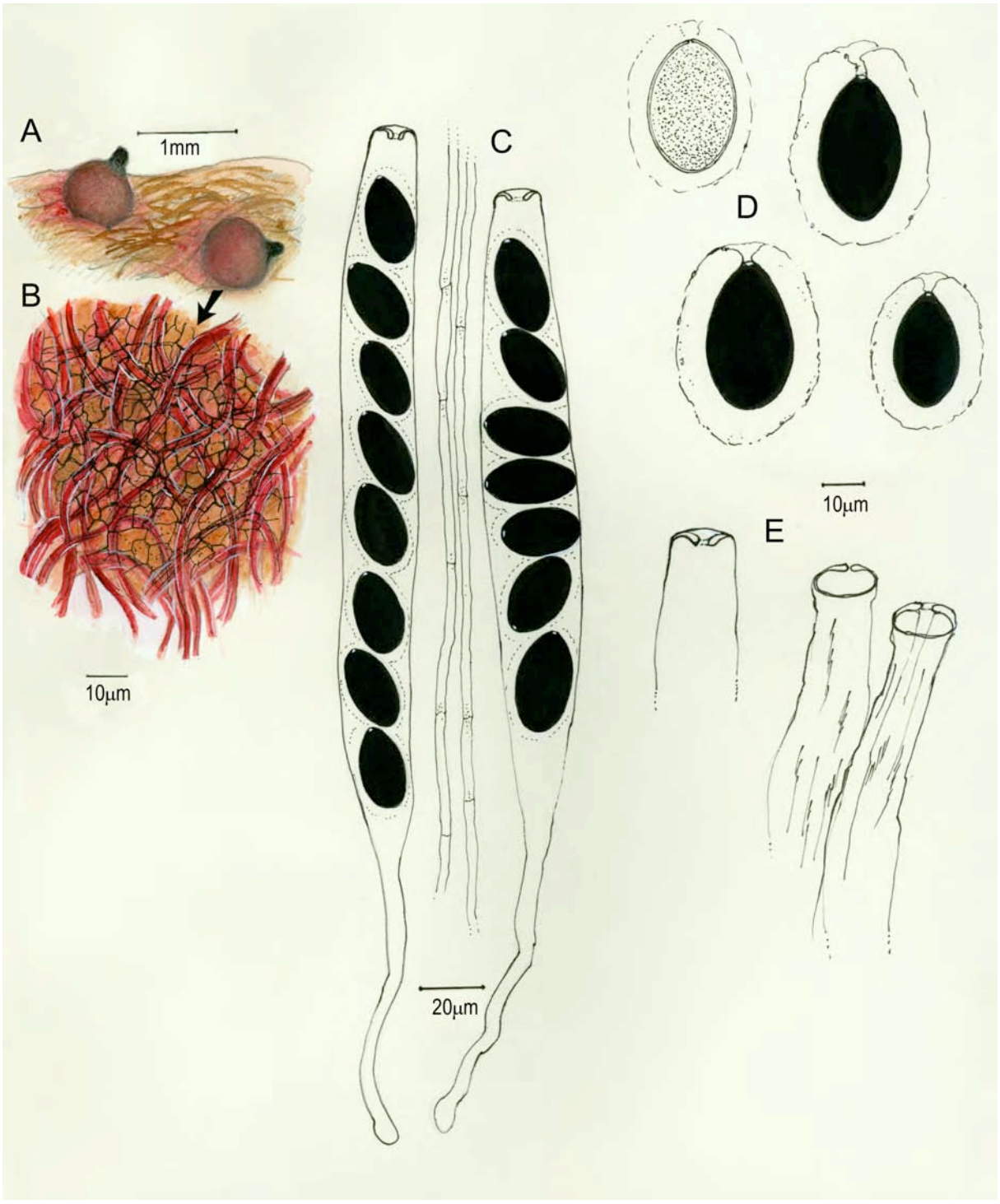

Figure 1. *Apodospora peruviana* A–E. A. Perithecia in situ on dung substrate. B. Detail of peridium showing pink hyphal mat covering perithecial wall. C. Mature asci and paraphyses. D. Immature and mature ascospores. E. Discharged asci showing prominent apical rings.

these other named species are obtained in culture, sequenced and verified against type material, there is no way of ascertaining their validity.

Acknowledgements

We wish to sincerely thank R. Corringham and P. Cormack for making the initial collections of marsupial dung in Australia, Dr Shaun Pennycook, Landcare Research, Auckland for obtaining two of the references for us and Mr Gerry Keating, Image Services, Victoria University, Wellington for reproducing our art work and photographs to a publishable form.

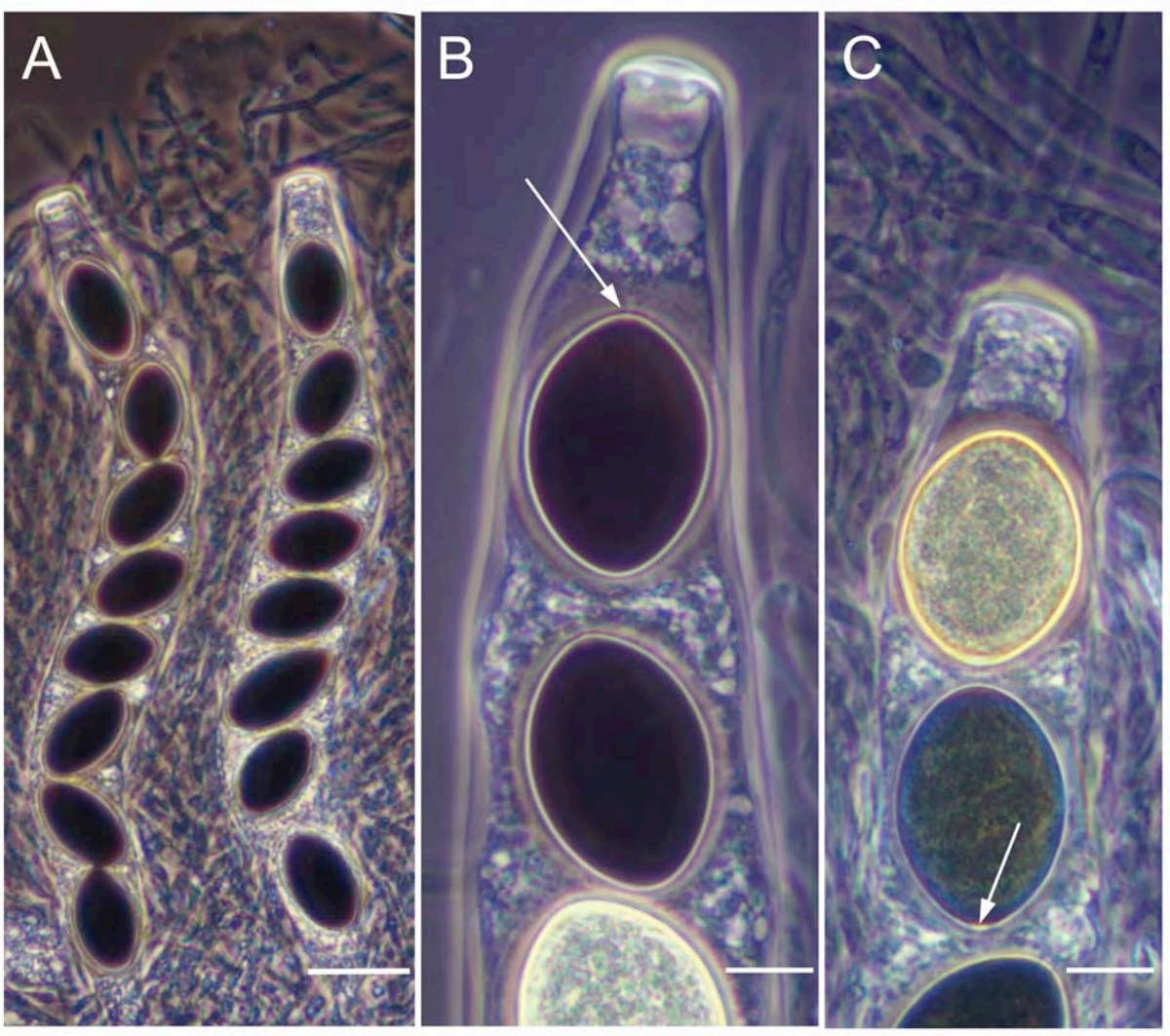

Figure 2. *Apodospora peruviana* CBS 118394. A–C. Photos taken in water mounts of fertile perithecia from a 38 day old axenic Difco CMA culture (incubated at 25°C). A. Asci containing uniseriate ascospores surrounded by paraphyses. B. Ascospores showing the apical germ pores (arrow on one of these) and gelatinous sheaths. C. Illustrating the occasional ascospore with a basal germ pore (arrowed). Scale bars: A. 30 µm, B&C. 10 µm.

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ECHINOSPHAERIA MEDUSA, A NEW SPECIES FROM NEW ZEALAND, WITH NOTES ON RELATED SPECIES.

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Abstract

This paper describes a new species of the ascomycete genus *Echinosphaeria*, which was found in New Zealand on dead wet wood. It is compared with existing species of the genus and with closely related species of the genus *Lasiosphaeria*.

Key words: Helminthosphaeriaceae, Lasiosphaeriaceae, systematics.

A. Bell & D. Mahoney (2008). *Echinosphaeria medusa*, a new species from New Zealand, with notes on related species. *Australasian Mycologist* 27 (3): 141–148.

Introduction

An undescribed species of *Echinosphaeria* was collected on unidentified dead wood in the Woodside Glen reserve during the course of the 22nd New Zealand Fungal foray held at Dunedin, Otago, New Zealand.

Materials and Methods

Morphological and microscopic details were studied in water mounts after which a number of semi-permanent slides were made using Shear's mounting fluid (Bell 2005). Due to the morphological similarities with *Echinosphaeria canescens*, a species with which we are familiar, both line drawings and photographs were undertaken of this species too in order that the reader might more readily discriminate the differences between them. The ascospore size ranges for each species were determined by measuring at least 50 ascospores. Colour references below follow the notation of Kornerup & Wanscher (1989).

Echinosphaeria medusa A. Bell & D.P. Mahoney *sp. nov*. (Figures 1A–F, 2A–C, 3A–B).

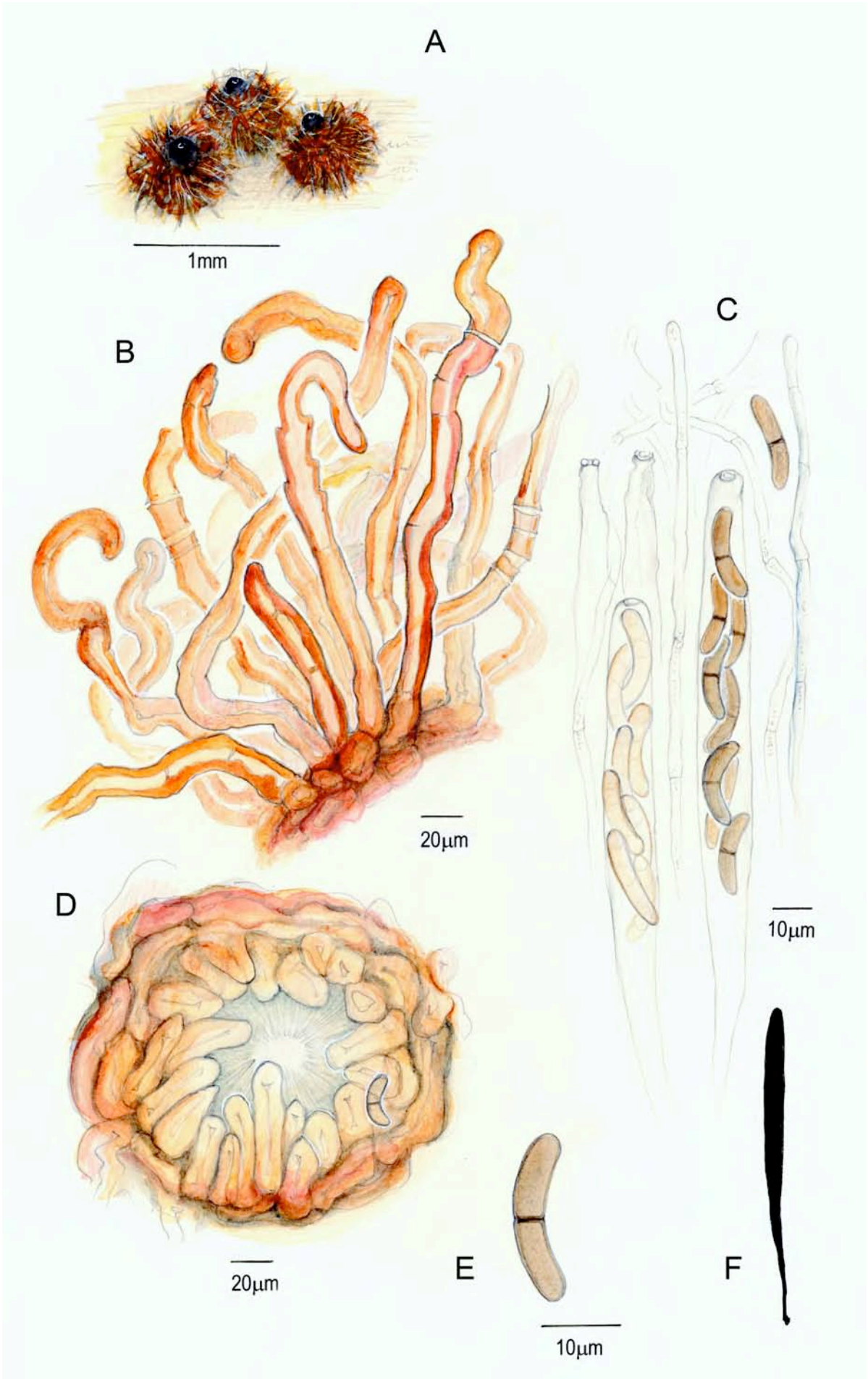
Etymology: *medusa* = resembling the entangled snake hair of the mythical Greek goddess Medusa.

Ascomata aggregata, superficialia. Ventre globosus, 0.5–0.75 mm diam, capillatura. Pili copiosus, rigide crispatus, brunneo-aurantiacus vel brunneo-bubalinus, crassitunicatus, ad 550 µm longi, 20 µm latae. Paraphyses hyalinae, septatae, circa 3 µm latae, longitudine indeterminata. Asci qua cylindracei qua clavati, circa 165 x 12 µm, longulus stipitati, octospori. Ascosporae biseriatae, transeuns uniseptatae, brunneolus, (19–) 20–24 (–27) x 4–5 µm. Fungus lignicolous.

Holotypus: On dead decorticated wet wood, Woodside Glen, near Outram, Otago, New Zealand, collected 15/5/08 by D.P. Mahoney, PDD 94222 (= Bell & Mahoney 1043).

Ascomata superficial and densely crowded on decorticated very wet wood, approx. 0.5–0.75 mm diam, enveloped in a radiating entanglement of thick-walled, brownish-orange to brownish-buff (7C7/D7) stiff hairs of variable thickness, but many as wide as 20 µm (Figs 1A, 2A). Hairs difficult to measure accurately due to their curly nature, but can reach at least 550 µm. Central canal in the hairs may be trabeculate or completely occluded. Some hairs also exhibit annular cracking (Figs 1B, 2C). The underlying perithecial wall is composed of thick-walled

Figure 1 (page 142). *Echinosphaeria medusa*. (A) Fresh ascomata as they appear on dead wood. (B) Detail of ascomal appendages. (C) Asci, ascospores & paraphyses. (D) Ostiolar region. (E) Mature ascospore. (F) Silhouette of ascus.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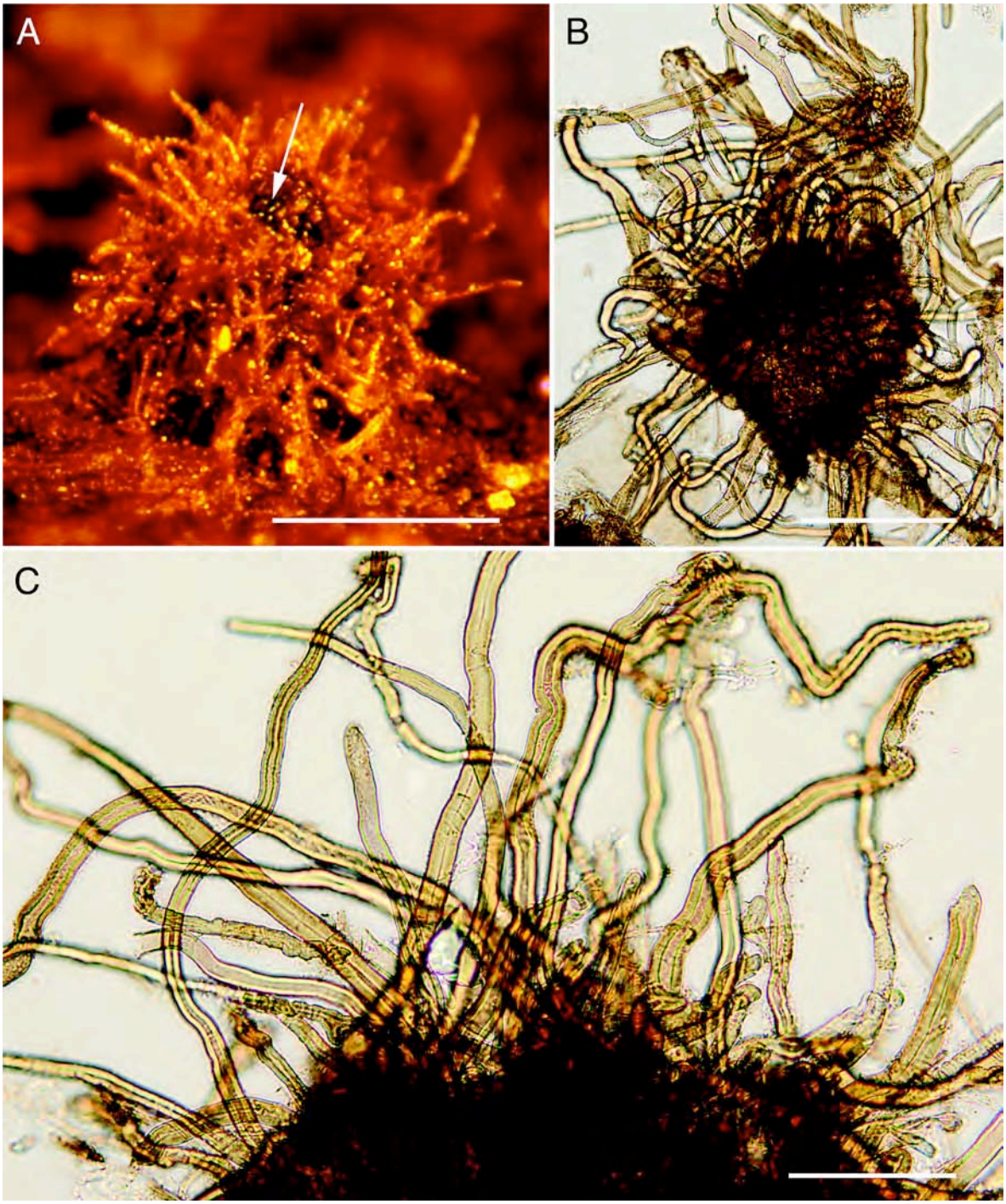


Figure 2. *Echinosphaeria medusa*. (A) In situ view of a fresh ascoma on dead wood. Arrow on ostiole. Bar = 400 µm. (B–C) Peridial fragments with medusoid appendages mounted in Shear's mounting fluid. Bars = 140 and 80 µm, respectively.

cells (Figs 1B, 2B). Due to the density of the vestiture, it is unclear if each of the perithecial cells produces a hair. Young ostioles are surrounded by shorter thick-walled hairs and the periphyses can be seen beneath (Fig. 1D). In mature perithecia the neck appears as a small black dome emerging from the hairs (Figs 1A, 2A). *Paraphyses* hyaline, septate, unbranched, approx. 3 µm diam, free-ended, longer than the asci. *Asci* cylindrical to slightly clavate with elongated stalk, difficult to separate from the centrum material, approx. 165 µm long, 12 µm at their widest point with a distinct non-amyloid apical ring, but no subapical globulus (Figs 1C, 3A). *Ascospores* biseriately arranged within ascus, allantoid, initially hyaline but becoming brown with maturity with a single thickened central septum, (19–) 20–24 (–27) x 4–5 µm (Figs 1C, 1E, 3A–B).

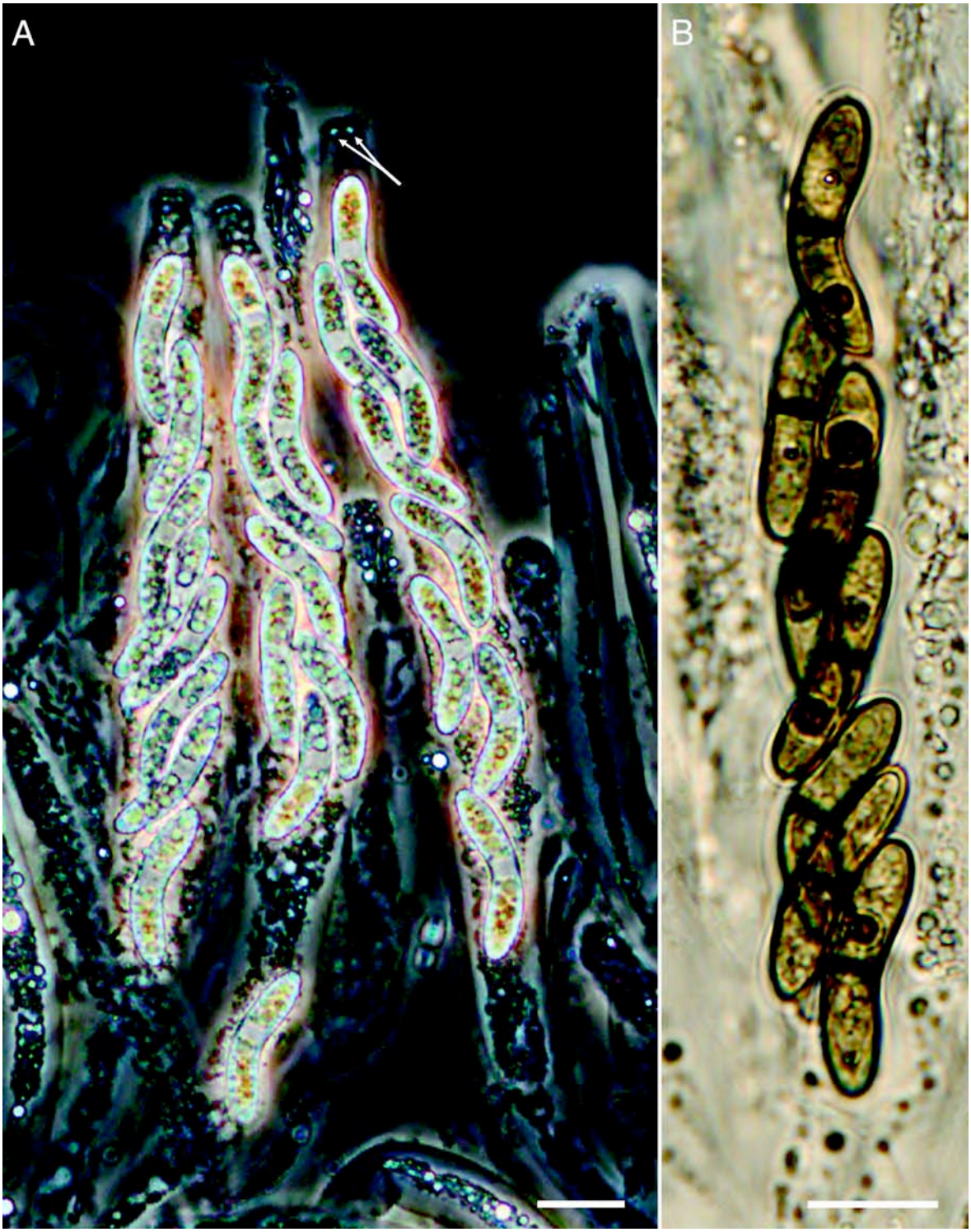
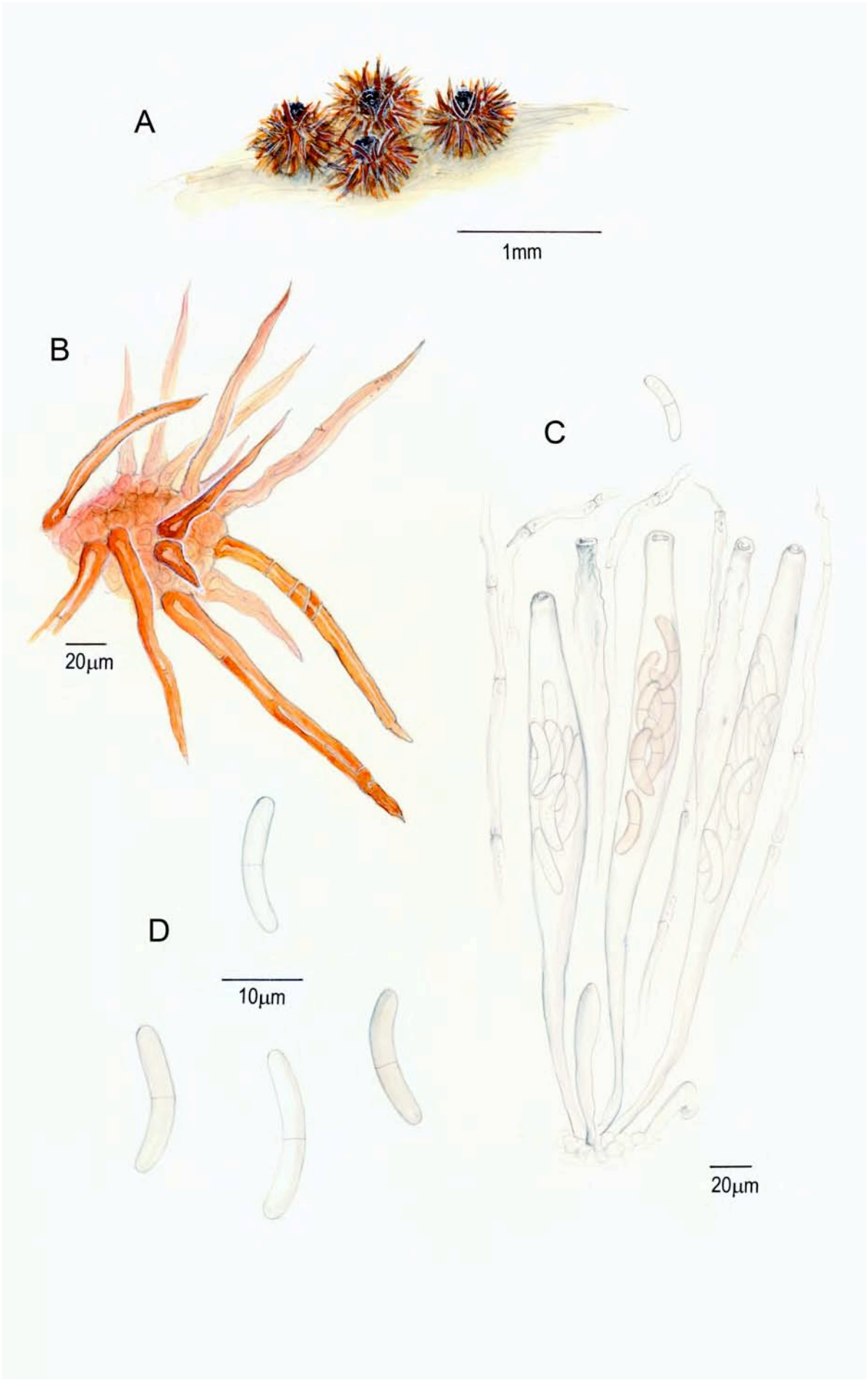


Figure 3. *Echinosphaeria medusa*. (A) Asci with apical rings and 8 nonseptate hyaline ascospores. Arrows on apical ring in optical section. Water mount. (B) Eight brown 2-celled ascospores. Shear's mounting fluid preparation. (A–B) Bars = 12 µm.

Echinosphaeria canescens (Pers.) A.N. Mill. & Huhndorf (Figs 4A–D, 5A–D).

Ascomata superficial and densely crowded on decorticated very wet wood, approx. 0.5–0.75 mm diam, enveloped in radiating thick-walled brownish-orange to brownish-buff (7C7/D7), stiff, straight to slightly curved spines averaging 8–12 µm wide at base and up to 350 µm long (Figs 4A, 5A). Central canal in the hairs may be trabeculate or completely occluded. A number of hairs also exhibit annular cracking (Fig. 4B). The underlying perithecial wall is composed of thick-walled cells (Fig. 4B). A black slightly roughened glabrous domed neck is particularly visible in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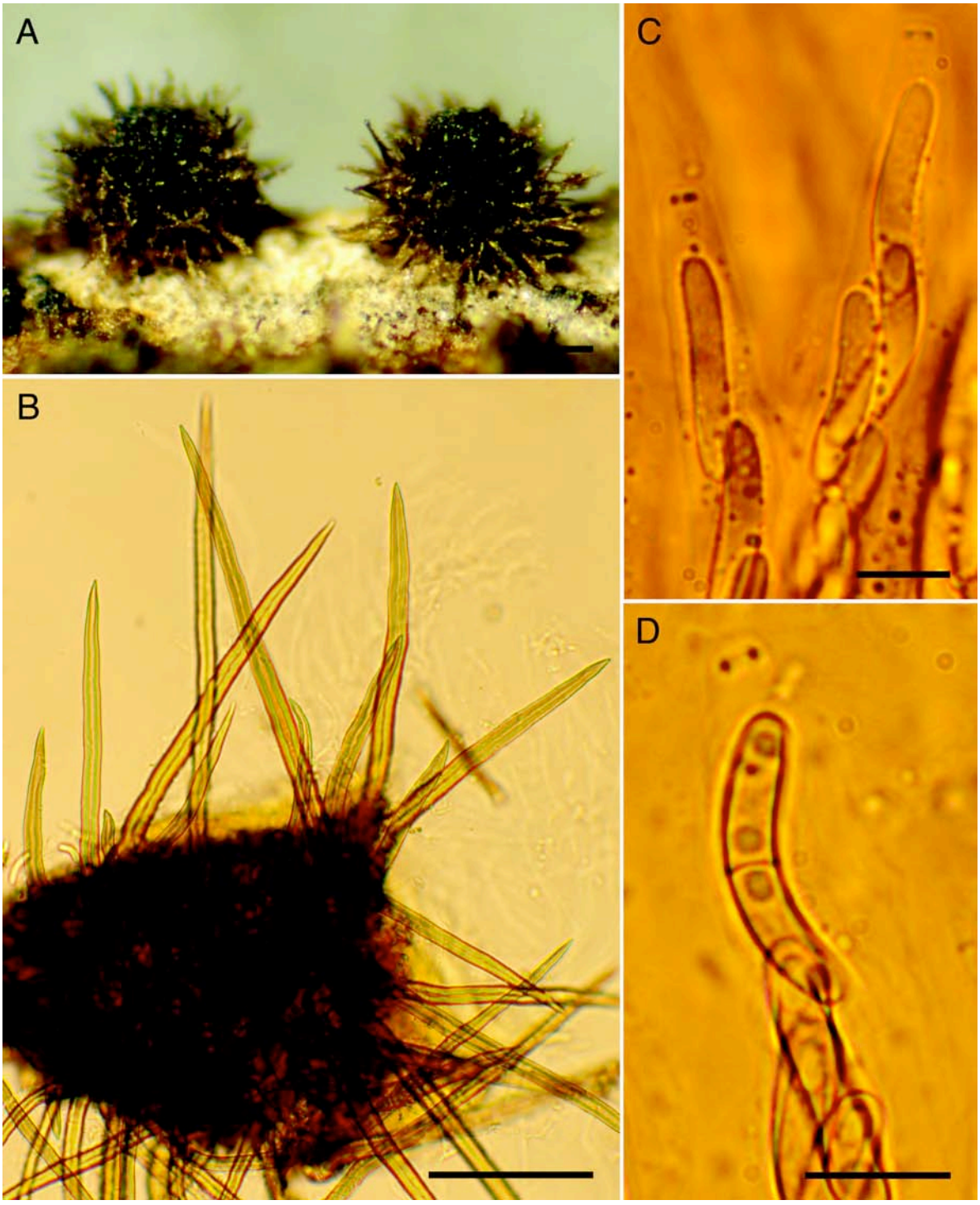

Figure 5. *Echinosphaeria canescens*. (A) In situ view of fresh ascomata on dead wood. Bar = 250 µm. (B) Peridial fragment with spines. Bar = 80 µm. (C) Asci with apical rings and nonseptate ascospores. (D) Ascus with apical ring and 2-celled ascospore. (C–D) Bars = 10 µm. (B–D) water mounts irrigated with Melzer's reagent.

dried specimens (Fig. 4A). Ostioles of young perithecia are surrounded by short thick-walled hairs very similar to those of *E. medusa* in Fig. 1D. *Paraphyses* hyaline, septate, unbranched, approx. 3 µm diam, free-ended, longer than the asci. *Asci* cylindric to clavate, crowded and not detaching therefore difficult to measure lengths accurately, width 8–10 µm at the widest point with distinct non-amyloid apical ring, subapical globulus absent (Figs 4C, 5C–D). *Ascospores* biseriately arranged within

Figure 4 (page 145)**.** *Echinosphaeria canescens*. (A) Fresh ascomata as they appear on dead wood. (B) Detail of ascomal appendages. (C) Asci, ascospores & paraphyses. (D) Mature ascospores.

ascus, allantoid, initially hyaline becoming a very dilute brown with maturity with a single thin central septum, 17–24 x 3–4 µm (Figs 4C–D, 5C–D).

Specimen examined: On dead decorticated wood, Snowbank Lake, near Ely, Lake County, Minnesota, USA, collected 15/9/04 by D.P. Mahoney & A. E. Bell, PDD 82112 (= Bell & Mahoney 890). A duplicate of this material is also held at the Bell Museum, University of Minnesota (= MIN 882059).

Discussion

Viewed under low magnification (X10), *Echinosphaeria medusa* and *E. canescens* are more or less indistinguishable when both species are turgid and water soaked. The domed neck region of *E. canescens* is more obvious especially in dried material. The differences are only manifest upon greater magnification and in subsequent slide mounts. The perithecial hairs are much larger and form an unruly entanglement in *E. medusa* and the individual hairs are much more variable in both length and width as compared with the stiffer, pointed, more slender hairs of *E. canescens* (compare Figs 1B & 2C with Figs 4B & 5B). The ascospores of *E. medusa* are slightly larger and a darker brown and the central septum is much more prominent, appearing as twice the thickness of the lateral walls (compare Figs 1C, 1E & 3B with Figs 4D & 5D).

Miller & Huhndorf (2004) erected the genus *Echinosphaeria* (Pers.) A.N. Mill. & Huhndorf to accommodate a species formerly known as *Lasiosphaeria canescens* (Pers.) Karst. based upon their sequencing data which placed it in a different clade to their new and restricted definition of *Lasiosphaeria*. Thus, *Echinosphaeria* was further defined as possessing perithecia clothed in brown setae having a black glabrous papillate neck, unitunicate cylindrical asci bearing an apical ring (but no subapical globulus) and allantoid ascospores without appendages that are initially hyaline but become pale brown with age. Furthermore *Echinosphaeria canescens* was removed from the *Lasiosphaeriaceae* and placed in the *Helminthosphaeriaceae*. Miller & Huhndorf corroborate that *Echinosphaeria* exhibits ascospores that conform to the Group A morphology as defined by Candoussau *et al*. (2001). Group A ascospores are shared by a number of other species including *Lasiosphaeria strigosa* (Alb. & Schw.) Sacc. and *L. stuppea* Ellis & Everh., both of which have perithecia which superficially appear identical to the perithecia of *E. canescens* and *E. medusa*. It is only by close examination of the asci and ascospores that differences are readily seen. *L. stuppea* has much broader uniseptate ascospores (23–34 x 6.8–11 µ m). Although we have not seen *L. stuppea*, there are excellent photographs of both perithecia and ascospores of this species available on the Internet site www.ascofrance.fr. by Alain Gardiennet. We have examined material of *L. strigosa* (PDD 14975, originally collected in England) and confirm that in this collection at least, the ascospore measurements fall within the described range for that species (34–40 x 6–7 µm). However, Candoussau *et al.* (2001) stated that although they temporarily keep the usual distinction between *L. strigosa* and *L. canescens* "*intermediate forms may be encountered*". Much earlier, Berlese (1893) illustrated *L. strigosa* and *L. strigosa* var. *canescens*, indicating that he considered them to belong to the same species. Seaver (1912) also considered that *L. canescens* Karst. may be synonymous with *L. strigosa* (Alb. & Schw.) Sacc. However, these two specific names remain in the literature until more conclusive evidence should suggest otherwise.

In summary, it is impossible to know which of these four species one has collected in the field simply armed with a hand lens. As yet we do not know if any of them are restricted geographically. Since they reside on very decayed wet wood and wood has been transported to all parts of the world over some considerable time, it seems unlikely that this question will ever be satisfactorily answered. To date *E. canescens, L. stuppea* & *L. strigosa* have been found in Europe and the USA on a variety of woody substrates, but not recorded in New Zealand and *E. medusa* has been found only in New Zealand. In our view it is far too early to pronounce *E. medusa* as endemic, since there are so few mycologists studying these fungi, and vast areas of the world remain mycologically uninvestigated. Even when one is specifically looking, a certain amount of serendipity is involved in finding them because of their small size.

Anamorphs associated with *Echinosphaeria canescens* include *Endophragmiella* and *Selenosporella* (Hughes 1979, Samuels *et al.* 1987), but there is a lack of information on cultural characteristics and anamorphs in general within the *Lasiosphaeriaceae sensu lat.* Candoussau *et al.* (2001) were of the opinion

that: "*scanty information about lasiosphaeriaceous anamorphs does not yet allow further subgeneric splitting of the genus Lasiosphaeria"*. Subsequent sequencing work by Miller & Huhndorf (2004) indicated that based principally on evidence provided by analyses of partial nuclear large subunit (LSU) rDNA sequences, the genus should be split into a number of new genera including *Echinosphaeria*, which was additionally placed in a new family *Helminthosphaeriaceae*. At present many unanswered questions surround these fungi including whether or not *L. strigosa* and *E. canescens* are separate species and whether or not future sequencing of the additional taxa *L. strigosa*, *L. stuppea* and *E. medusa* will add further support to the existence of *Echinosphaeria* as a genus. However, what is clear is that the two fungi illustrated herein with the specific epithets *canescens* and *medusa* are clearly distinguishable on morphological grounds, although the genus to which they are assigned may change with time.

An additional species *Echinosphaeria macrospora* Puja, Bhat & K.D. Hyde was described by Puja *et al*. (2006). It developed in culture during the isolation of endophytes from living stems and leaves of *Centella asiatica*. Its anamorph is reported to be the new setose sporodochial species *Vermiculariopsiella endophytica* Puja, Bhat & K.D. Hyde. Although its asci and ascospores resemble those of other *Echinosphaeria* species, its perithecia lack appendages and its anamorph is distinctly different than those attributed to *E. canescens*. Thus this species remains distinct from other known species of *Echinosphaeria* and their *Lasiosphaeria* relatives described herein.

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A LIST OF HYPHOMYCETES (AND AGONOMYCETES) IN BURMA

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Abstract

Hyphomycetes collected in lowland central Burma are listed following a traditional taxonomic approach. Over 200 taxa in 85 genera are recorded on various substrates including 70 plant families. *Alternaria*, *Cercospora* and *Fusarium* are common fungal genera. Arecaceae, Leguminosae, Poaceae, Asteraceae, Brassicaceae, Cucurbitaceae, Euphorbiaceae, Malvaceae, and Solanaceae are common host plant families. A host index is included. A fungus-host distribution frequency table is also appended. Collections are held in Herb. IMI and UC (= LAM).

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Introduction

This article updates and integrates earlier records to present a contemporary inventory of hyphomycetes in Burma. *Sclerotium oryzae* Catt. is probably the first record of an anamorphic fungus from Burma (Butler 1918). Other records include those of Butler & Bisby (1931), Mason (1928), Rhind (1928), Rhind & Seth (1945), and Thaung (1984). Hyphomycetes total well over 400 taxa including some 200 species of *Cercospora* complex reported by Thaung (1984) from 68 plant families; these *Cercospora*-like fungi are not repeated in the current list. *Alternaria*, *Cercospora* (Thaung 1984), and *Pyricularia* spp. are pathogenic on a wide range of plants. Hyphomycetes are moulds with fertile mycelia providing asexual states or anamorphs of ascomycetes and occasionally of basidiomycetes. Fertile mycelia produce asexual (mitotic) spores (conidia) on conidiophores without the formation of sporocarps. Sterile mycelia, also referred to as agnomycetes or *mycelia sterilia*, do not produce conidia, but rather may form sterile hyphal structures such as sclerotia, which occur in genera like *Rhizoctonia* and *Sclerotium*.

Materials and Methods

Specimens studied were identified consulting CABI database (http://www.cababstractsplus.org/dfb/index.asp) and the references herein cited. All specimens are listed under each species. They were first examined *in situ* through a binocular dissecting microscope for gross morphological characters, and then freehand sections were prepared and examined intact or teased or squashed in water, under a binocular light microscope. Lactic acid clearing medium was used, followed by warming to remove air bubbles and to hasten clearing action. Over 10 spores were measured to obtain a median of size in range. Specimens deposited in Herb. IMI and LAM (=UC) are also included.

Herbarium acronyms are taken from the Index Herbariorum database (http://sciweb.nybg.org/science2/IndexHerbariorum.asp), author abbreviations for plant names from the IPNI database (http://www.ipni.org/ipni/query_ipni.html) standardised according to the Brummitt & Powell rules of 1992, and fungus names from Index Fungorum database (http://www.indexfungorum.org/Names/Names.asp). Names on the old records being updated and integrated are retained enclosed, within brackets with equals (=) signs in front, after the current, accepted epithets, for historic links. Vernacular names, though not

specific are sometimes descriptive; these are given when available to help deficiencies in host nomenclature.

The inventory below is alphabetical by fungal genus together with details such as hosts, collection locations, date of collection, and herbarium accession numbers. This is followed by a host index and a fungus-host distribution frequency table (Table 1).

Hyphomycetes (and Agonomycetes)

1. ***Acremonium*** sp. on *Thyrsostachys siamensis* (= *Bambusa siamensis*), Rangoon Zoo, 19-viii-1972 (IMI 169365b). Note: probably a new sp. because of differences in shape and size of conidia from those of known spp.

2. ***Acroconidiellina arecae*** (Berk. & Broome) M.B. Ellis (Anamorphic ***Zeuctomorpha arecae*** Sivan., P.M. Kirk & Govindu, =*Helminthosporium arecae* Berk. & Broome) on living leaves of *Areca catechu*, Sinthawt village near Yezin, Pyinmana, 14-x-1977 (IMI 217594) with hyperbiotroph ***Parachionomyces acroconidiellinae*** Thaung, Burma (Sivanesan 1984); *Salacca wallichiana*, Mergui, 7-v-1980 (LAM 220922e).

3. ***Alternaria alternata*** (Fr.) Keissl. (= *Alternaria tenuis* Nees) on *Beta vulgaris*, Vegetable Bazaar, Rangoon, 29-ii-1980 (LAM 220904a); *Calotropis gigantea*, Mandalay, 12-x-1979 (LAM 220731d); *Cassia siamea*, Mandalay, 23-v-1973 (IMI 177250); *Gossypium* sp., Patheingyi, Mandalay District, 10-vi-1973 (IMI 177239a); Semegon, 5-xii-1977 (LAM220345). Cf. *Alternaria gossypii* (Jacz.) Y. Nisik., K. Kimura & Miyaw., *A. gossypina* (Thüm.) J.C.F. Hopkins and *A. macrospora* (Sacc.) Mussat recorded on *Gossypium* spp.

4. ***Alternaria bataticola*** Ikata ex W. Yamam. on *Ipomoea bona-nox*, Pyinmana, 28-xii-1977 (LAM 220890b).

5. ***Alternaria bauhiniae*** Hansf. on *Bauhinia acuminata*, Mandalay, 28-xii-1977 (LAM220346a). Cf. *Alternaria cassiae* Jurair & A. Khan on *Bauhinia purpurea*.

6. ***Alternaria brassicae*** (Berk.) Sacc. (= *Alternaria macrospora* (Sacc.) Mussat) on *Brassica alba*, Indaw, 01-i-1978 (LAM 220344); *B. campestris* and *B. campestris* var. *rapa* (Vernacular = *Mon-la-oo-ah-phyu*), Amarapura (Rhind & Seth 1945); *B. oleracea* var. *botrytis*, Rangoon, 12-i-1980 (LAM 220826); *B. oleracea* var. *capitata*, Vegetable Bazaar, Rangoon, 18-xi-1979 (LAM 220739); *B. oleracea* var. *caulorapa*, Rangoon, 26-i-1980 (LAM 220818).

7. ***Alternaria brassicicola*** (Schwein.) Wiltshire (= *Alternaria circinans* (Berk. & M.A. Curtis) P.C. Bolle) on *Brassica oleracea*, Mandalay (Rhind & Seth 1945); Burma (Ellis 1968, 1971b).

8. ***Alternaria chrysanthemi*** E.G. Simmons & Crosier on *Chrysanthemum* sp., Aungban, S.S.S., 27-xii-1979 (LAM 220827).

9. ***Alternaria citri*** Ellis & N. Pierce on *Citrus* spp., Burma (Ellis 1971b).

10. ***Alternaria crassa*** (Sacc.) Rands on *Datura stramonium*, Amarapura, 24-i-1978 (LAM 220414); Mandalay, 2-x-1979 (LAM 220738).

11. ***Alternaria crotalariicola*** V. Rao on *Crotalaria juncea*, Yezin, 14-i-1977 (LAM 220534).

12. ***Alternaria cucumerina*** (Ellis & Everh.) J.A. Elliott on *Citrullus vulgaris*, Hlegu, 14-ii-1980 (LAM 220851b); *Cucumis melo*, Hlegu, 14-ii-1980 (LAM 220850); *Lagenaria vulgaris*, Insein, 29-ix-1979 (LAM 220593c). Cf. *Ulocladium cucurbitae* (Letendre & Roum.) E.G. Simmons (= *Alternaria cucurbitae* Letendre & Roum.) on *Cucurbita melo* (?*melopepo*) and *Alternaria alternata* ?f. sp. *cucurbitae* Vakal.

13. ***Alternaria dianthi*** F. Stevens & J.G. Hall on *Jasminum* sp., Mandalay, 12-x-1979 (LAM 220734b).

14. ***Alternaria eichhorniae*** Nag Raj & Ponnappa on *Eichhornia crassipes*, Rangoon, 14-i-1980 (LAM 220825).

15. ***Alternaria ficinae*** Rak. Kumar, A.N. Rai & K.M. Vyas on *Ficus* sp., Yezin campus, 28-xi-1977 (LAM 220257e).

16. ***Alternaria helianthi*** (Hansf.) Tubaki & Nishih. on *Helianthus annuus*, Mandalay, 11-i-1974 (IMI 181621); Myar village, Meiktila Dist., 24-xii-1979 (LAM 220816a); Burma (Anahosur 1978).

17. ***Alternaria japonica*** Yoshii on *Raphanus sativus*, Aungban, S.S.S., 27-xii-1979 (LAM 220823). Cf. *Alternaria raphani* J.W.Groves & Skolko on the same host species.

18. ***Alternaria longissima*** Deighton & MacGarvie on *Imperata cylindrica*, Rangoon, 18-vii-1979 (LAM 220559g); *Sorghum vulgare*, Ta-da-u, 17-xii-1977 (LAM 220439c); *Sorghum* spp.; Taungtha, 20-xii-1977 (LAM 220329b); *Zea mays*, Myitkyina, 18-vi-1980 (LAM 220936c).

19. ***Alternaria macrospora*** Zimm. on *Sida rhombifolia*, Mandalay, 28-xi-1971 (IMI 172446).

20. ***Alternaria padwickii*** (Ganguly) M.B. Ellis (= *Trichoconis padwickii* Ganguly) on leaf, grains, and roots of *Oryza sativa*, Burma (Ou 1972, Thaung 1970).

21. ***Alternaria porri*** (Ellis) Cif. on *Allium cepa*, Mandaly, 12-x-1979 (LAM 220741a); *A. sativum*, Aungban, S.S.S., 27-xii-1979 (LAM 220819a). Cf. *Alternaria palandui* Ayyangar on cultivated spp. of *Allium* from India.

22. ***Alternaria putrefaciens*** (Fuckel) E.G. Simmons (Anamorphic ***Pleospora herbarum*** (Pers.) Rabenh.; = *Macrosporium parasiticum* Thüm.) on *Allium* sp., Myittha (Rhind & Seth 1945).

23. ***Alternaria solani*** (Ellis & G. Martin) L.R. Jones & Grout (= *Alternaria allii* Nolla) on leaves of *Solanum tuberosum*, Amarapura (Rhind & Seth 1945). Cf. *Alternaria grandis* E.G. Simmons on the same host species.

24. ***Alternaria tenuissima*** (Kunze ex Pers.) Wiltshire on *Adhatoda* sp., Mandalay, 6-x-1974 (IMI 188945a); *Althaea rosea*, Mandalay, 28-i-1973 (IMI 172875c); Rangoon, 8-iv-1979 (LAM 220471); *Brunfelsia pauciflora*, Botanical Garden, Maymyo, 18-v-1975 (IMI 194476a); *Carum carvi*, Mandalay, 28-i-1972 (IMI 163857b); *Centaurea* sp., Botanical Garden, Maymyo, 19-v-1975 (IMI 194475); *Euphorbia* sp., Myar village, Meiktila, 24-xii-1979 (LAM 220832); *Glycine hispida*, Shangale-kyun, near Amarapura, 4-iv-1971 (IMI 156319a); *Lilium sulphureum*, Botanical Garden, Maymyo, 19-v-1975 (IMI 194474a); *Livistona speciosa*, Pyinmana, 12-xii-1973 (IMI 181646c); *Momordica charantia*, Rangoon, 16-xi-1979 (LAM 220694c); *Rauvolfia serpentina*, School of Indigenous Medicine, Mandalay, 10-v-1975 (IMI 194465b); Mandalay, 16-v-1975 (LAM 220409b); *Solanum melongena*, Mandalay, 4-iv-1971 (IMI 156317a); *Tamarindus indica*, Rangoon, 11-xi-1979 (LAM 220727e).

25. ***Alternaria violae*** L.D. Galloway & Dorsett on *Viola* sp., Botanical Garden, Maymyo, 18-v-1975 (IMI 194473a).

26. ***Alternaria zinniae*** on *Calendula officinalis*, Kyetmauk village, Thazi, 26-xii-1979 (LAM 220821); *Callistephus chinensis*, Rangoon, 7-iii-1980 (LAM 220910*)*; *Coreopsis tinctoria*, Rangoon, 24-ix-1979 (LAM 220669a); Rangoon, 7-iii-1980 (LAM 220905b); *Cosmos bipinnatus*, Rangoon, 7-iii-1980 (LAM 220907a); *Cosmos* sp., Rangoon, 20-iv-1978 (LAM 220416a); *Eclipta alba*, Mandalay, 2-x-1979 (LAM 220742); *Xanthium* s*trumarium*, Mandalay, 2-ii-1973.

27. ***Alternaria*** sp. on *Andrographis paniculata* (Vernacular = *Sega-gyi*), School of Indigenous Medicine, Mandalay, 8-i-1978 (LAM220347).

28. ***Alternaria*** sp. on Araceae (Vernacular = *Se-bwa-gamon*), Mandalay, 28-ix-1972 (IMI 170076b).

29. ***Alternaria*** sp. on *Azima* ?*tetracantha*, Thazi, 26-xii-1979 (LAM 220834a).

30. ***Alternaria*** sp. on *Balanites* ?*triflorus*, Thazi, 25-xii-1979 (LAM 220829a).

31. ***Alternaria*** sp. on *Bougainvillea spectabilis*, Mandalay, 28-ix-1973 (IMI 180197a); 19-xi-1974 (LAM 220828a).

32. ***Alternaria*** sp. on *Cinnamomum camphora*, Myay-Pade-Tha Kyun, Rangoon, 26-iv-1975 (IMI 194461a) together with ***Cladosporium*** and ***Nigrospora*** spp.

33. ***Alternaria*** sp. on *Curcuma aromatica*, Rangoon, 11-x-1979 (LAM 220624b).

34. ***Alternaria*** sp. on *Gilnus oppositifolius* (= *Mollugo spergula*), pink- red variety, Vegetable Bazaar, Rangoon, 7-i-1980 (LAM 220831).

35. ***Alternaria*** sp. on *Leucas aspera* (greyish leafspots), Amarapura, 12-x-1979 (LAM 220740a).

36. ***Alternaria*** sp. on *Lycopersicum esculentum*, Myar village, Meiktila Dist., 24-xii-1979 (LAM 220815a). Cf. *Alternaria cretica* E.G. Simmons & Vakal., *A. elegans* E.G. Simmons & J.C. David, *A. subcylindrica* E.G. Simmons & R.G. Roberts, *A. subtropica* E.G. Simmons, *A. tomato* (Cooke) L.R. Jones, and *A. tomatophila* E.G. Simmons recorded on the same host species.

37. ***Alternaria*** sp. on *Musa sapientum* var. *arakanensis*, Kyaukthanbut village, east of Yezin campus, 25-vii-1977 (LAM 220137b). Cf. *Alternaria alternata* (Fr.) Keissl., *A. dianthicola* Neerg., and *A. musae* Bouriquet & Bataille recorded on *Musa* spp.

38. ***Alternaria*** sp. on *Pastanica sativa* (Vernacular = *Ywetsa-monla*), Rangoon, 7-iii-1980 (LAM 220906). Cf. *Alternaria conjuncta* E.G. Simmons on the same host species.

39. ***Alternaria*** sp. on *Phlox* sp. (Vernacular = *Tha-yet-hte-pan*), Aungban, S.S.S., 27-xii-1979 (LAM 220819).

40. ***Alternaria*** sp. on *Pimpinella anisum*, Myar Village, Meiktila, 24-xii-1979 (LAM 220833a).

41. ***Alternaria*** sp. on *Prunus communis*, Aungban, S.S.S., 10-vii-1977 (LAM 220141a).

42. ***Alternaria*** sp. on *Ranunculus* sp. (a herb), Botanical Garden (near a small pond), Maymyo, 16-iv-1980 (LAM 220920).

43. ***Alternaria*** sp. on *Solanum melongena*, Shangale-kyun (near Amarapura), 19-i-1973 (IMI 172876a); *S. trilobatum*, Thazi, 26-xii-1979 (LAM 220817). Note: conidia on specimen IMI 172876a are larger than those of ***Alternaria melongenae*** Rangaswami & Samb. Cf. *Alternaria africana* E.G. Simmons, *A. beringelae* E.G. Simmons, and *A. polytricha* (Cooke) E.G. Simmons reported on *Solanum melongena*.

44. ***Alternaria*** sp. on *Spondias pinnata*, Monywe village, Monywa, 2-i-1978 (LAM 220566c).

45 ***Alternaria*** sp. on *Tribulus terrestris*, Kyetmauk village, Thazi, 26-xii-1979 (LAM 220822).

46. ***Alternaria*** sp. on *Valeriana hardwickii*, Rangoon, 18-ivi-1980 (LAM 220921a).

47. ***Alternaria*** sp. on an unknown herb (Vernacular = *tauk-te-let-wa*), Kyetmauk village, Thazi, 25-xii-1979 (LAM 220813b).

48. ***Annellophora phoenicis*** M.B. Ellis on *Phoenix* sp., Yezin campus, Pyinmana, 12-xii-1973 (IMI 185219); Rangoon, 7-viii-1977 (LAM 220165a).

49. ***Annellophragmia coonoorensis*** (Subram.) Subram. on *Thysanolaena maxima*, Sandoway, 10-iv-1974 (LAM 220047), (IMI 187224).

50. ***Arthrinium arundinis*** (Corda) Dyko & B. Sutton (Anamorphic ***Apiospora montagnei*** Sacc.) hypophyllous on *Bambusa* sp., Moulmein, 6-viii-1972 (IMI 170087b) with its teleomorph ***Apiospora montagnei*** (IMI 170087a) on the upper side; Bamboo, Moulmein, 31-xii-1973 (LAM 220074); Kyaikhtiyo Range, 6-xi-1978 (LAM 220478b); *Thysanolaena maxima*, Mergui, 8-v-1980 (LAM 220923); Burma (Kirk 1991a). Cf. *Apiospora indica* Theiss. & Syd. on culms of *Bambusa* sp. from India.

51. ***Arthrinium curvatum*** var. ***curvatum*** Kunze & J.C. Schmidt on *Gladiolus* sp., Maymyo, 15-ix-1977 (LAM 220532).

52. ***Arthrinium phaeospermum*** (Corda) M.B. Ellis on bamboo, Htonbo near Mandalay, 28-x-1973 (IMI 180766); Myitkyina, 29-xii-1977 (LAM 220490b) with ***Tetranacrium gramineum*** H.J. Huds. & B. Sutton (LAM 220490a); *Dendrocalamus strictus*, near Kyaukchaw village, Mandalay, 14-i-1975 (IMI 192814b) with ***Dasturella divina*** (Syd.) Mund. & Khesw. (IMI 192814a).

53. ***Arthrinium sacchari*** (Speg.) M.B. Ellis on *Saccharum* sp. (Vernacular = *Kaing*), Kyaunggon, 2-xii-1977 (LAM 220531a).

54. ***Arthrinium*** sp. on *Calamus* sp., Mergui, 6-v-1980 (LAM 220928).

55. ***Aspergillus aculeatus*** Iizuka on rice cakes, Yankin, 0-vii-1973 (IMI 205484).

56. ***Aspergillus chevalieri*** Thom & Church, a white colony on an unknown convolvulaceous plant, Rangoon, 22-vi-1979.

57. ***Aspergillus clavatus*** Desm. on bread, Yankin, 0-vii-1973 (IMI 205482).

58. ***Aspergillus flavus*** Link, a sclerotial strain isolated from paddy soil, Mandalay, 0-viii-1927 (Mason 1928, Rhind & Seth 1945); from field soils, seeds of *Arachis hypogea*, and peanut cake from oil expellers, Central Burma, 0-iv-1973 and 0-v-1973, represented by 19 specimens (IMI 176168a to IMI 176186a); rice bran, Rangoon, 0-vii-1973 (IMI 205485).

59. ***Aspergillus fumigatus*** Fresen. on match stick, Mandalay (Rhind & Seth 1945).

60. ***Aspergillus glaucus*** (L.) Link (Anamorphic ***Eurotium herbariorum*** (F.H. Wigg.) Link) common on various substrates as laboratory mould, Burma (Butler & Bisby 1931).

61. ***Aspergillus niger*** var. ***niger*** Tiegh. isolated from paddy soil, Mandalay, 0-viii-1927 (Mason 1928, Rhind & Seth 1945); on scales of *Allium* sp., Mandalay (Rhind & Seth 1945); molasses, Insein, 0-vii-1973 (IMI 205486); *Citrus* fruit, Insein, 0-vii-1973 (IMI 205487); rice bran, Yankin, 0-viii-1973 (IMI 205488); and culture (IMI 193704).

62. ***Aspergillus tamarii*** Kita isolated from paddy soils, Mandalay, 0-viii-1927 (Mason 1928, Rhind & Seth 1945); rice bran, Insein, 0-vii-1973 (IMI 205483); cooked rice, Rangoon, 0-viii-1973 (IMI 205489) — this strain is more bronze than (IMI 205483).

63. ***Aspergillus terreus*** Thom isolated from paddy soils, Mandalay, 0-viii-1927 (Mason 1928, Rhind & Seth 1945).

64. ***Aspergillus*** spp. with ***Streptomyces*** spp. on stored rice grains from Burma (Iizuka 1958).

65. ***Bahusakala*** sp. on *Pentacme siamensis* (Vernacular = *In-gyin*) Maymyo, 28-i-1974 (IMI 182581a) and (IMI 187237); *Roystonea elata*, Rangoon, 25-xi-1979 (LAM 220763d) manifesting brown, verrucose, subglobose to globose, 0-1(-2)-septate, cylindric arthroconidia with truncate ends, developing from fragmenting hyphae forming mycelial mats.

66. ***Bipolaris crustacea*** (Henn.) Alcorn (= *Helminthosporium crustaceum* Henn.) on inflorescences of *Sporobolus* sp. in Burma, forming black, crustose fungal masses which completely or partly envelop the inflorescences (Alcorn 1982, Sivanesan 1986b, 1987).

67. ***Bipolaris cynodontis*** (Marignoni) Shoemaker (Anamorphic ***Cochliobolus cynodontis*** R.R. Nelson; = *Drechslera cynodontis* (Marignoni) Subram. & B.L. Jain, *Helminthosporium cynodontis* Marignoni) on *Cynodon dactylon*, Mandalay, (Rhind & Seth 1945); 12-x-1979 (LAM 220750c).

68. ***Bipolaris hawaiiensis*** (M.B. Ellis) J.Y. Uchida & Aragaki (Anamorphic ***Cochliobolus hawaiiensis*** Alcorn; = *Drechslera hawaiiensis* (Bugnic.) Subram. & B.L. Jain**,** *D. hawaiiensis* M.B. Ellis) on *Artocarpus integra*, Madaya, 9-iv-1972 (IMI 169352b); *Bauhinia* sp., Rangoon, 27 Mar 1975 (IMI 192815e); *Rauvolfia serpentina.*, School of Indigenous Medicine, Mandalay, 10-v-1975 (IMI 194465c).

69. ***Bipolaris heveae*** (Petch) B.A. Khasanov (= *Drechslera heveae* (Petch.) M.B. Ellis, *Helminthosporium heveae* Petch) on leaves of *Hevea brasiliensis* in plant nursery; Mingaladon, 25-xi-1979 (LAM 220737d); Tenasserim Division (Turner & Myint 1980); Burma (Rhind 1926).

70. ***Bipolaris maydis*** (Y. Nisik. & C. Miyake) Shoemaker (Anamorphic ***Cochliobolus heterostrophus*** (Drechsler) Drechsler; = *Helminthosporium maydis* Y. Nisik. & C. Miyake, *Drechslera maydis* (Y. Nisik. & C. Miyake) Subram. & B.L. Jain) on *Oryza sativa*, Bassein, 23-xii-1977 (LAM 220348); dead portion of leaf of *Salacca wallichiana*, Mandalay, 4 Nov 1972 (IMI 171324a).

71. ***Bipolaris oryzae*** (Breda de Haan) Shoemaker (Anamorphic ***Cochliobolus miyabeanus*** (S. Ito & Kurib.) Drechsler ex Dastur; = *Drechslera oryzae* (Breda de Haan) Subram. & B.L. Jain, *Helminthosporium oryzae* Breda de Haan) as brown spots on leaves and grains of *Oryza sativa*, all over Burma (Rhind & Seth

1945), and presumably also on *Panicum colonum*, and additionally on *Leersia hexandra* as an alternative host in nature (Ou 1972, Su 1936).

72. ***Bipolaris ravenelii*** (M.A. Curtis) Shoemaker (Anamorphic ***Cochliobolus ravenelii*** Alcorn; = *Drechslera ravenelli* (M.A. Curtis) Subram. & B.L. Jain, *Helminthosporium ravenelli* M.A. Curtis ex Berk.) on *Sporobolus* sp. in Burma (Ellis 1971b, Sivanesan 1986a), causing a false smut.

73. ***Bipolaris sacchari*** (E.J. Butler) Shoemaker (= *Drechslera sacchari* (E.J. Butler) Subram. & Jain, *Helminthosporium sacchari* E.J. Butler) on *Saccharum* sp. (Vernacular = *Kaing*), Kyaunggon, 2-xii-1977 (LAM 220531b); *Imperata cylindrica*., Mingaladon (near Shwenyaungbin area), 25-xi-1979 (LAM 220764d**)**.

74. ***Bipolaris sorokiniana*** (Sacc.) Shoemaker (Anamorphic ***Cochliobolus sativus*** (S. Ito & Kurib.) Drechsler ex Dastur; = *Helminthosporium sativum* Pammel, C.M. King & Bakke) on *Triticum aestivum*, all over Upper Burma (Rhind & Seth 1945).

75. ***Candida saitoana*** Nakase & M. Suzuki (= *Torulopsis candida* (Saito) Lodder) from fermented rice, Rangoon, i-1973.

76. ***Camptomeris albiziae*** (Petch) E.W. Mason on *Acacia concinna*, Anesakhan near Maymyo, 20-i-1974 (IMI 182579a); *A. pennata*, 60A Golden Valley, Rangoon, 31-xii-1973 (IMI 181624).

77. ***Cercospora erigeronicola*** U. Braun & Rogersonn on *Erigeron asteroides* (Vernacular = *Byaing-chi*), Mandalay.

78. ***Cercospora leucosticta*** Ellis & Everh. on leaves of *Melia azedarach* and *M. azadirachta*., Bassein (Mundkur 1938). Note: ***Pseudocercospora subsessilis*** (Syd. & P. Syd.) Deighton was also reported on *M. azadirachta* from Burma (Thaung 1984).

79. ***Cercospora longipes*** E.J. Butler on leaves of *Saccharum officinarum* throughout Burma (Butler & Bisby 1931).

80. ***Cercospora tridacis-procumbentis*** Thirum. & Govindu on *Tridax procumbens* (Vernacular = *Ne-gya-gale*), Mandalay (Anonymous 1961).

81. ***Cercospora*** sp. on *Congea tomentosa* (Vernacular = *Hmwe-zok*), Mandalay (Anonymous 1961).

82. ***Cercospora*** sp. on *Cordia dichotoma* (in dark spots on upper side of the leaf), Mandalay, 7-xii-1971 (IMI 163014b), manifesting characters similar to ***C. apii***.

83. ***Cercosporella*** sp. on *Mangifera indica*, Maymyo, 10-v-1972 (IMI 166372). Note: not ***Cercospora mangiferae*** Koord. 1907 (= *Stigmina mangiferae* (Koord.) M.B. Ellis), temporarily disposed herein.

84. ***Chlamydomyces palmarum*** (Cooke) Mason on *Litsea* sp., Bassein, 15-iv-1973 (LAM 220848).

85. ***Cordana musae*** (Zimm.) Höhn. on *Musa paradisiaca* var. *arakanensis*, Sinthawt village, east of Yezin, 17-v-1977 (LAM 220101).

86. ***Coronospora dendrocalami*** M.B. Ellis on *Dendrocalamus strictus*, Sedaw-gyi, near Mandalay, Collector U Thet Su, 20-i-1929 (IMI 79773, typus), Burma (Ellis 1971a).

87. ***Cladosporium colocasiae*** Sawada on *Colocasia* sp., Rangoon, 4-viii-1977 (LAM 220140).

88. ***Cladosporium eriolobi*** Thaung on *Eriolobus indica*, Botanical Garden, Maymyo, 28-xii-1972 (IMI 175732, holotype). Note: *Stenella eriolobi* (Thaung) K. Schub. & U. Braun is probably sometimes present on the same host specimen They may be mistaken for each other, see under ***Stenella***.

89. ***Cladosporium miyakei*** Sacc. & Trotter on *Oryza sativa*, causing grain discolouration (Thaung 1970).

90. ***Cladosporium*** sp. on *Momordica charantia*, Rangoon, 16-xi-1979 (LAM 220694b).

91. ***Coniosporium bambusae*** (Thüm. & P.C. Bolle) Sacc. on culms of *Bambusa* sp., Insein (Rhind & Seth 1945).

92. ***Cordella johnstonii*** M.B. Ellis (Anamorphic ***Apiospora setosa*** Samuels, McKenzie & D.E. Buchanan) on *Bambusa siamensis* (Vernacular = *Htee-yo-wah*), on the way to Maymyo, 20-i-1973 (IMI 172862), (IMI 175729b); Burma (Dyko & Sutton 1979). Note: on *Bambusa blumeana* in Malaysia and *Bambusa* sp. in Great Britain.

93. ***Corynespora cassiicola*** (Berk. & M.A. Curtis) C.T. Wei (Anamorphic ***Corynesporasca*** sp.) on *Agave sisalana*, Rangoon, 25-vii-1979 (LAM 220548c); *Annona squamosa*, Pyinmana, 12-xii-1973 (IMI 181629); Ava, 24-xii-1977 (LAM 220341); Kanbalu, 3-i-1978 (LAM 220915); Kyaukme, N.S.S., 20-i-1978 (LAM 220418d); *Butea monosperma*, Shwebo, 1-i-1978; *Cassia* ?*fistula*/*renigera*, Kyanggon, 20-xii-1977 (LAM 220340); *Ceiba pentandra* on Little Sisters Road, Rangoon, 7-xi-1973 (IMI 180765); *Clerodendrum macrosiphon*, Mandalay, 5-ii-1970 (IMI 146679b); *Clerodendrum serratum*, Hmawbi Farm, 26-x-1979 (LAM 220652a); *Croton calcoccus*, Mandalay, 7-xii-1971 (IMI 163073); *Duranta plumeri*, Rangoon, 28-ix-1979 (LAM 220654); *Garcinia mangostana*, Mergui, 7-v-1980 (LAM 220924); *Hydrangea macrophylla*, Rangoon, 1-v-1974 (IMI 187223), 23-ix-1979 (LAM 220653); *Leucas aspera* (greyish leafspots), Amarapura, 12-x-1979 (LAM 220740c); *Ocimum basilicum*, Aithabyu village, Henzada Dist., 8-xi-1979 (LAM 220746b); *Phyllanthus* ?*niruri*/*leschenaultii*, Lashio, N.S.S., 12-xii-1977 (LAM 220342); *Plumeria acutifolia*, Rangoon, 29-ix-1979 (LAM 220588c); *Saccharum* sp., Rangoon, 12-viii-1979 (LAM 220557c); *Sapium* ?*beccatum*, Kyaunggon village, Pauk Township, 6-xii-1977 (LAM 220898); *Sesamum indicum*, Yezin near Pyinmana, 11-xii-1973 (IMI 181628); *Sida rhombifolia*, Sedawgalay, near Mandalay, 21-x-1973 (IMI 180198); Myitkyina, 17-viii-1972 (LAM 220841); *Solanum melongena*, Mandalay, 12-i-1974 (IMI 181635b); *Streptocaulon tomentosum*, North of Kyaukchaw en route Maymyo, 21-ii-1974 (IMI 182587a); wild bean plant (Papilionaceae), near Melamu Pagoda, Rangoon, 23-ix-1979 (LAM 220649c); Burma (Ellis & Holliday 1971).

94. ***Curvularia affinis*** Boedijn on *Clinogyne dichotoma*, Rangoon, 13-i-1980 (LAM 220856a).

95. ***Curvularia andropogonis*** (Zimm.) Boedijn on Rubiaceae (*Spermacoce* or *Hedyotis* sp.), Mingaladon, 25-xi-1979 (LAM 220751a).

96. ***Curvularia borreriae*** (Viégas) M.B. Ellis on Rubiaceae (*Spermacoce* or *Hedyotis* sp.), Taikkyi Farm, 25-x-1979 (LAM 220648a).

97. ***Curvularia eragrostidis*** (Henn.) J.A. Mey. (Anamorphic ***Cochliobolus eragrostidis*** (Tsuda & Ueyama) Sivan.; = *Pseudocochliobolus eragrostidis* Tsuda & Ueyama) on *Areca catechu*, Rangoon, 5-iv-1973 (IMI 175731); Burma (Sivanesan 1990a).

98. ***Curvularia geniculata*** (Tracy & Earle) Boedijn (Anamorphic ***Cochliobolus geniculatus*** R.R. Nelson) on *Amomum corynostachyum*, Rangoon, 21-x-1979 (LAM 220625c); *Axonopus compressus*, 60A Golden Valley, Rangoon, 14-xi-1975 (IMI 200323), 14-x-1979 (LAM 220650b); *Hedyotis*/*Spermacoce* sp., Mingaladon, 25-xi-1979 (LAM 220751b); grains of *Oryza sativa*, causing grain discolouration (Ou 1972, Thaung 1970); on dead portion of leaf of *Salacca wallichiana*, Mandalay, 4-xi-1972 (IMI 171324c).

99. ***Curvularia intermedia*** Boedijn on *Cynodon dactylon*, Rangoon, 4-vii-1979 (LAM 220553b); Mandalay, 12-x-1979 (LAM 220750a).

100. ***Curvularia lunatus*** (Wakker) Boedijn (Anamorphic ***Cochliobolus lunatus*** R.R. Nelson & Haasis; = *Acrothecium lunatum* Wakker) on *Adhatoda* sp., Mandalay, 6-x-1974 (IMI 188945b); *Agave sisalana*, Rangoon, 25-vii-1979 (LAM 220548b); *Artocarpus integra*, Madaya, 9-iv-1972 (IMI 169352d); *Axonopus compressus*, Rangoon, 14-x-1979 (LAM 220650a); *Calotropis gigantea*, Mandalay, 12-x-1979 (LAM 220731c); *Celosia argentea* var. *cristata*, Rangoon, 8-iv-1979 (LAM 220472a); *Clinogyne dichotoma*, Rangoon, 13-i-1980 (LAM 220856b); *Cynodon dactylon*, Mandalay, 12-x-1979 (LAM 220750b); on flowers of *Dichanthium annulatum*, Mandalay (Rhind & Seth 1945); *Helianthus annuus*, Mandalay, 2-x-1979 (LAM 220747b); *Imperata cylindrica*, Rangoon, 18-vii-1979 (LAM 220559c); *Leucas aspera* in greyish leafspots, Amarapura, 12-x-1979

(LAM 220740b); *Oryza sativa*, Burma (Ou 1972, Thaung 1970), causing grain discolouration; on wild bean plant, near Melamu Pagoda, Rangoon, 23-ix-1979 (LAM 220649a); *Saccharum* sp., Rangoon, 12-viii-1979 (LAM 220557d); on dead portion of leaf of *Salacca wallichiana*, Mandalay, 4-xi-1972 (IMI 171324b); *Tamarindus indica*, Rangoon, 11-xi-1979 (LAM 220727c); isolated from paddy soils, Mandalay in ?0-viii-1927 (Mason 1928).

101. ***Curvularia pallescens*** Boedijn 1933 (Anamorphic ***Cochliobolus pallescens*** (Tsuda & Ueyama) Sivan.; = *Pseudocochliobolus pallescens* Tsuda & Ueyama) on *Bauhinia* sp., Rangoon, 27-iii-1975 (IMI 192815b*)*; *Bougainvillaea spectabilis*, Mandalay, 4-i-1974 (IMI 185668a); wild bean plant, near Melamu Pagoda, Rangoon, 23-ix-1979 (LAM 220649b); Burma (Sivanesan 1990b).

102. ***Curvularia senegalensis*** (Speg.) Subram. on *Tamarindus indica*, Rangoon, 11-xi-1979 (LAM 220727d).

103. ***Curvularia trifolii*** (Kauffman) Boedijn on *Eurycles amboinensis* in pot near Convocation Bldg., University of Rangoon, 28-vii-1975 (IMI 197643a).

104. ***Curvularia verruculosa*** Tandon & Bilgrami ex M.B. Ellis (Anamorphic ***Cochliobolus verruculosus*** (Tsuda & Ueyama) Sivan.; = *Pseudocochliobolus verruculosus* Tsuda & Ueyama) on Poaceae in Burma (Sivanesan 1990c).

105. ***Curvularia*** spp. on *Cosmos* sp., Rangoon, 20-iv-1978 (LAM 220416b); *Hevea brasiliensis*, Mingaladon, 25-xi-1979 (LAM 220737b); *Lagenaria vulgaris*, Insein, 29-ix-1979 (LAM 220593b); Liliaceae (*Dracaena* or *Pleomele* sp.), Rangoon, 28-ix-1979 (LAM 220635b); *Piper nigrum*, Taikkyi Farm, 25-x-1979 (LAM 220638b).

106. ***Cylindrocarpon luteoviride*** Deighton & Piroz. with sooty molds on *Nephelium* ?*litchi* (Siamese variety), Maymyo, 14-xii-1977 (LAM 220398c).

107. ***Cylindrocarpon ukolayii*** Thaung (anamorphic ***Calonectria ukolayii*** Thaung) in colonies of *Meliola tabernaemontanicola* Hansf. & Thirum on living leaves of *Vallaris heynii*, Rangoon, 23-i-1975 (IMI 191468b, holotype).

108. ***Cylindrocarpon*** sp. on *Artocarpus incisus*, Rangoon, 29-x-1979 (LAM 220665c).

109. ***Deightoniella torulosa*** (Syd.) M.B. Ellis on *Musa sapientum*, Do-kwin, near Maymyo, 1-x-1972 (IMI 170082); *Musa sapientum* var. *rubra*, Rangoon, 15-vii-1979 (LAM 220535).

110. ***Dendryphiella vinosa*** (Berk. & M.A. Curtis) Reisinger on *Trichosanthes palmata* (Vernacular = *Kyi-ah* or ?*Kyi-ah-thee*), Rangoon, 20-xi-1979 (LAM 220729b).

111. ***Dictyospiropes*** sp. on *Vitex glabrata*, Botanical Garden, Maymyo, 12-ii-1974 (IMI 183214).

112. ***Dictyosporium heptasporum*** (Garov.) Damon on dead and decaying sprouts of *Cocos nucifera*, Pyinmana, 1-xii-1973 (IMI 181642a).

113. ***Drechslera euphorbiae*** (Hansf.) M.B. Ellis (Anamorphic ***Pyrenophora*** sp.; = *Helminthosporium euphorbiae* Hansford) on *Euphorbia geniculata* (Vernacular = *Say-pa-le*), Mandalay, 27-x-1971 (IMI 161577); 26-i-1974 (LAM 220095).

114. ***Drechslera graminea*** (Rabenh. ex Schltdl.) Ito (Anamorphic ***Pyrenophora graminea*** S. Ito & Kurib.; = *Helminthosporium gramineum* Rabenh. ex Schltdl.) on *Hordeum vulgare*, Amarapura (Rhind & Seth 1945).

115. ***Drechslera musae-sapientium*** (Hansf.) M.B. Ellis on *Musa sapientum* var. *rubra*, Rangoon, 15-vii-1979 (LAM 220536a).

116. ***Drechslera sesami*** (I. Miyake) M.J. Richardson & E.M. Fraser (= *Helminthosporium sesami* I. Miyake) on leaves, stems and capsules of *Sesamum orientale*, Allanmyo (= Aung-lan myo) (Rhind & Seth 1945).

117. ***Drechslera setariae*** (Sawada) Subram. & B.L. Jain (Anamorphic ***Cochliobolus setariae*** (Ito & Kurib.) Drechsler ex Dastur on *Setaria italica*, Mandalay (Anonymous 1961).

118. ***Drechslera teres*** (Sacc.) Shoemaker (Anamorphic ***Pyrenophora teres*** Drechsler; = *Helminthosporium teres* Sacc.) on *Hordeum vulgare*, Amarapura (Rhind & Seth 1945).

119-22. ***Drechslera*** spp. on: (1) *Croton calococcus*, Mandalay, 2-x-1979 (LAM 220773); (2) *Imperata* ?*cylindrica*, Mingaladon (Near Shwenyaungbin area), 25-xi-1979 (LAM 220764d); (3) *Leucas aspera* (greyish leafspots), Amarapura, 12-x-1979 (LAM 220740c); (4) *Salacca wallichiana*, Mergui, 7-v-1980 (LAM 220922e).

123. ***Endocalyx melanoxanthus*** (Berk. & Broome) Petch on *Elaeis guineensis*, Gyogon, 20-x-1979 (LAM 220639b); *Livistonia* ?*speciosa* (on petiole), Rangoon, 9-iv-1979 (LAM 220473).

124. ***Epicoccum nigrum*** Link (= *Epicoccum purpurascens* Ehrenb.) on *Bauhinia* sp., Rangoon, 27-iii-1975 (IMI 192815f); *Citharexylum suberratum*, Botanical Garden, Maymyo, 12-ii-1974 (IMI 183239); *Lilium sulphureum*, Botanical Garden, Maymyo, 19-v-1975 (IMI 194474b).

125. ***Exosporium extensum*** (Petch) M.B. Ellis (= *Helminthosporium extensum* Petch) on *Erythrina* sp., Rangoon, 28-ix-1979 (LAM 220656). Cf. *Stigmina erythrinae* M.B. Ellis on *Erythrina tomeniosa*.

126. ***Exserohilum turcicum*** (Pass.) K.J. Leonard & Suggs (Anamorphic ***Setosphaeria turcica*** (Luttr.) K.J. Leonard & Suggs; = *Helminthosporium turcicum* Pass.) on *Zea mays*, Amarapura (Rhind & Seth 1945).

127. ***Fusarium incarnatum*** (Desm.) Sacc. (= *Fusarium semitectum* Berk. & Ravenel) on *Casimiroa edulis*, Agricultural Experiment Station, Maymyo, 18-v-1975 (IMI 194481c).

128. ***Fusarium lateritium*** Nees (Anamorphic ***Gibberella baccata*** (Wallr.) Sacc.) on *Celosia argentea* var. *cristata*, Rangoon, 8-xi-1973 (IMI 180764).

129. ***Fusarium moniliforme*** J. Sheld. (Anamorphic ***Gibberella moniliformis*** Wineland) on seeds, panicles and foot of *Oryza sativa* in Burma (Ou 1972); *Saccharum officinarum*, causing top rot in Burma, 13-viii-1974 (IMI 187236), (Rhind & Seth 1945, Thaung 1971); *Sorghum dochna*, Mandalay, 26-xii-1973 (IMI 182583).

130. ***Fusarium oxysporum*** f. sp. ***batatas*** W.C. Snyder & H.N. Hansen on *Ipomoea bona-nox*, Pyinmana, 28-xii-1977 (LAM 220890c).

131. ***Fusarium oxysporum*** f. sp. ***callistephi*** W.C. Snyder & H.N. Hansen on *Callistephus chinensis* Nees, causing wilt widespread (Thaung 1970).

132. ***Fusarium oxysporum*** f. sp. ***ciceris*** Matuo & K. Sato on *Cicer arietinum* in Burma (Brayford 1992a).

133. ***Fusarium oxysporum*** f. sp. ***vasinfectum*** W.C. Snyder & H.N. Hansen (= *Fusarium vasinfectum* G.F. Atk.) on roots of *Gossypium neglectum*, Mahlaing (Rhind & Seth 1945), causing cotton wilt in Meiktila, Myingyan, Lower Chindwin, Sagaing, and Thayetmyo; Burma (Booth & Waterston 1964, Brayford 1992b).

134. ***Fusarium subglutinans*** (Wollenw. & Reinking) P.E. Nelson, Toussoun & Marasas (= *Fusarium moniliforme* var. *subglutinans* Wollenw. & Reinking) on *Saccharum officinarum* (Thaung 1971).

135. ***Fusarium udum*** var. ***cajani*** Padwick on roots and stems of *Cajanus cajan*, Tatkon (Rhind & Seth 1945).

136. ***Fusarium*** spp. on *Citrus decumana*, Myitkyina, 28-x-1972 (IMI 171321b) and *Citrus aurantium*, Myitkyina, 28-x-1972 (IMI 171322b) both pinkish in color and associated with ***Septobasidium*** sp.; *Elaeagnus latifolia* (black specks in leafspots), Pyinmana (S.A.I), 26-xii-1977 (LAM 220849) with sporodochia and conidia 22.2 x 2.5 μm; *Momordica charantia*, Rangoon, 16-xi-1979 (LAM 220694d); *Sesamum orientale*, all over Burma (Rhind & Seth 1945); wild legume near Melamu Pagoda, Rangoon, 23-ix-1979 (LAM 220649d).

137. ***Fusicladium carpophilum*** (Thüm.) Oudem. (Anamorphic ***Venturia carpophila*** E.E. Fisher) on *Prunus persica*, Lashio, N.S.S., 10-xii-1977 (LAM 220302).

138. ***Fusicladium virescens*** Bonord (Anamorphic ***Venturia pyrina*** Aderh.) on *Pyrus communis*, Kutkhine, N.S.S., 15-xii-1977 (LAM 220474).

139. ***Gonatophragmium mangiferae*** J.L. Mulder on *Mangifera indica*, Yinmapin near Kalaw, 25-i-1972 (IMI 164831); Burma (Ellis 1976). Note: a comparable taxon on the host is *Cercospora mangiferae-indicae* Munjal, Lall & Chona.

140. ***Gonatophragmium mori*** (Sawada) Deighton on *Ficus carica*, Rangoon, 28-vii-1975 (IMI 197644); *Trichosanthes palmata* (Vernacular = *Kyi-ah* or ?*Kyi-ah-thee*), Rangoon, 20-xi-1979 (LAM 220729c).

141. ***Haplobasidion lelebae*** Sawada ex M.B. Ellis on bamboo, Kyaikhtiyo range, Kyaikhto, 15-v-1971 (IMI 157607a). Note: on *Bambusa vulgaris* in Bangladesh at Chittagong (IMI 292568).

142. ***Hemibeltrania cinnamomi*** (Deighton) Piroz. on *Cinnamomum* ?*inunctum*, Kyaukme, N.S.S., 21-iii-1974 (LAM 220094); Thandaung near Toungoo, 29-ix-1977 (LAM 220235); *Cinnamomum* sp., Pyinmana, 16-vii-1977 (LAM 220541c).

143. ***Hyalostachybotrys*** sp. on *Saccharum* sp., Rangoon, 12-viii-1979 (LAM 220557e).

144. ***Leptoxyphium*** (= *Caldariomyces*) sp. as anamorphic ***Aithaloderma*** on living leaves of an unknown host, Yezin campus, 9-iii-1976, and on bamboo leaves, Rangoon, 27-iii-1976.

145. ***Melanographium citri*** (Frag. & Cif.) M.B. Ellis on Arecaceae sp., Maymyo, 2-xi-1977 (LAM 220225).

146. ***Memnoniella subsimplex*** (Cooke) Deighton (= *Stachybotrys subsimplex* Cooke) on *Dracaena* sp., Rangoon, 29-ix-1979 (LAM 220657).

147. ***Metarhizium anisopliae*** (Metschn.) Sorokīn on grubs of coconut rhinoceros beetle *Oryctes rhinoceros*, Burma (Butler & Bisby 1931); Madaya (Rhind & Seth 1945).

148. ***Microdochium dimerum*** (Penz.) Arx (= *Fusarium dimerum* Penz.) on *Piper betle*, Mandalay (New Civil Lines), 5-ix-1974 (IMI 188962).

149. ***Microxyphium artocarpi*** Bat., Nascim. & Cif., on living leaves of *Cassia siamea*, Mandalay, 8-viii-1973 (IMI 185679). Note: the cylindrical pycnidia are slightly fimbriate at the tip, and the conidia bacillar, non-septate, hyaline, 3–5 x 1–3 µm.

150. ***Microxyphium*** spp. on *Actinodaphne angustifolia* (Vernacular = *Na-lin-kyaw*), Botanical Garden, Maymyo, 7-x-1974 (IMI 188958c, immature); *Ficus religiosa*, Mandalay, 29-i-1976 (IMI 200635); *Trichosanthes palmata* (Vernacular = *Kyi-ah* or ?*Kyi-ah-thee*), Rangoon, 20-xi-1979 (LAM 220729d, pycnidia dry, no conidia seen); unknown host plant (probably *Simarubaceae*), Yezin Campus, 9-iii-1976 (IMI 204817).

151. ***Mitteriella ziziphi-rugosae*** Thaung with ***Clypeolella zizyphina*** Thaung on *Ziziphus rugosa*, Maymyo 15-i-1974 (IMI 181958, holotype).

152. ***Mycoleptodiscus*** spp. on *Calamus* sp., Mandalay, 07-xii-1971(IMI 163015 + 164840); *Carissa carandas*, Mandalay, 30-xii-1972 (IMI 175747); *Citrus medica*, Mandalay, 5-iii-1973 (IMI 175746); *Citrus medica* var. *limonum*, Mandalay, 5-iii-1973 (IMI 175745); *Eugenia* sp., Mandalay campus, 9-iii-1973 (IMI 173554); *Madhuca longifolia*, Mandalay, 9-x-1972 (IMI 173545); *Piper betle*, Tatkon, 1-ix-1973 (IMI 179287).

153. ***Myrothecium gramineum*** Lib. (= *Xepiculopsis graminea* (Lib.) Nag Raj) on dried leaf, leaf sheaths and stems of *Cynodon dactylon*, Mandalay, 25-x-1972 (IMI 170567); *Panicum repens*, Mandalay, 2-x-1979 (LAM 220749b).

154. ***Myrothecium roridum*** (Tode) Fr. on *Althaea rosea*, Pyinmana, 12-x-1971 (IMI 161281); *Calotropis gigantea*, Mandalay, 12-x-1979 (LAM 220731b); Liliaceae (*Dracaena* or *Pleomele* sp.), Rangoon, 28-ix-1979 (LAM 220635c); *Viola* sp., Botanical Garden, Maymyo, 18-v-1975 (IMI 194473b).

155. ***Myrothecium*** state of ***Nectria bactridiodes*** Berk. & Broome on *Eichhornia crassipes*, Myaungmya, 13-xi-1979 (LAM 220770).

156. ***Neojohnstonia colocasiae*** (M.B. Ellis) B. Sutton (= *Johnstonia colocasiae* M.B. Ellis) on *Colocasia* sp. (Vernacular = *Pain bin*/*Pain Oo*), Rangoon, 21-viii-1973 (IMI 179285); Rangoon, 29-ix-1979 (LAM 220659).

157. ***Nigrospora sphaerica*** (Sacc.) E.W. Mason (Anamorphic ***Khuskia oryzae*** H.J. Huds.; plus Anamorph ***N. oryzae*** (Berk. & Broome) Petch) on *Bauhinia* sp., Rangoon, 27-iii-1975 (IMI 192815d); *Imperata cylindrica*, Rangoon, 18-vii-1979 (LAM 220559e); on glumes, culms, and leaves of *Oryza sativa*, Burma (Butler & Bisby 1931, Kirk 1991b, Rhind & Seth 1945).

158. ***Nimbya alternantherae*** (Holcomb & Antonop.) E.G. Simmons & Alcorn (= *Alternaria alternantherae* Holcomb & Antonop.) on *Alternanthera philoxeroides*, Rangoon, 8-xi-1973 (IMI 180768); Rangoon, 21-x-1979 (LAM 220668); *A. sessilis*, Rangoon, 10-vii-1977 (LAM 220159).

159. ***Nimbya gomphrenae*** (Togashi) E.G. Simmons (= *Alternaria gomphrenae* Togashi) on *Gomphrena globosa*, Mandalay, 10-x-1973 (IMI 185674); Yezin near Pyinmana, 18-xii-1973 (IMI 181626); Rangoon, 25-ix-1979 (LAM 220670a); *G.* sp., Thazi, 25-xi-1973 (IMI 180786); Burma (David 1991).

160. ***Nimbya pimpriana*** (V.G. Rao) E.G. Simmons (= *Alternaria pimpriana* V.G. Rao) on *Celosia argentea*, Yezin near Pyinmana, 18-xii-1973 (IMI 181625); Rangoon, 21-x-1979 (LAM 220667); *C. argentea* var. *cristata*, Thazi, 26-xii-1979 (LAM 220830); Rangoon, 8-iv-1979 (LAM 220472b).

161. ***Papilionospora aspergilloides*** (Speg.) V. Rao & B. Sutton (= *Sporocybe aspergilloides* (Speg.) Sacc.) on *Eriolobus indica*, Maymyo, 20-iii-1973 (IMI 177253).

162. ***Parachionomyces acroconidiellinae*** Thaung on *Acroconidiellina arecae* (Berk. & Broome) M.B. Ellis from living leaves of *Areca catechu*, Sinthawt village near Yezin, Pyinmana, 14-x-1977 (IMI 217594, holotype).

163. ***Parapithomyces brideliae*** Thaung on *Bridelia retusa*, Botanical Garden, Maymyo, 15-ii-1974 (IMI 183211, holotype).

164. ***Penicillium digitatum*** (Pers.) Sacc. on fruits of *Citrus aurantium*, Mandalay (Rhind & Seth 1945).

165. ***Penicillium italicum*** Wehmer on fruits of *Citrus aurantium*, Mandalay (Rhind & Seth 1945).

166. ***Penicillium marneffei*** Segretain as human infections (penicillosis) in AIDS patients, probably associated with bamboo rats (*Rhizomys*), endemic in Burma, Cambodia, Southern China, Indonesia, Laos, Malaysia, Thailand and Vietnam (http://en.wikipedia.org/wiki/Penicillium_marneffei).

167. ***Penicillium*** spp. on stored rice grains from Burma (Iizuka 1958).

168. ***Periconia byssoides*** Pers. ex Mérat on *Adhatoda* sp., Mandalay, 6-x-1974 (IMI 188945e); *Althaea rosea*, Mandalay, 28-i-1973 (IMI 172875b); *Bauhinia* sp., Rangoon, 27-iii-1975 (IMI 192815c); *Brassica alba*, Mandalay, 8-iii-1971 (IMI 155748b); *Brunfelsia* ?*pauciflora*, Botanical Garden, Maymyo, 18-v-1975 (IMI 194476c); *Carum carvi*, Mandalay, 28-i-1972 (IMI 163857c); *Cinnamomum inunctum*, Mandalay, 28-i-1972 (IMI 163857c); *Coriandrum sativum* (Burman variety), Shangalekyun near Amarapura, 25-i-1974 (IMI 182576b); *Ipomoea* ?*batatas* or *digitata*, Kyaukse, 3-xii-1977 (LAM 220517b); on flower petals of *Nerium odorum*, Mandalay, 24-xi-1973 (IMI 180779); *Solanum melongena*, Shangalekyun (near Amarapura), 19-i-1973 (IMI 172876c).

169. ***Periconia lateralis*** Ellis. & Everh. on dried leaf sheaths of *Cynodon dactylon*, Mandalay, 25-x-1972 (IMI 170566); grass, Rangoon, 6-viii-1975 (IMI 197642b).

170. ***Periconia manihoticola*** (Vincens) Viégas (= *Periconia heveae* J.A. Stev. & Imle) on *Hevea brasiliensis*, Mergui, 30-xii-1971 (IMI 164834).

171. ***Periconia*** spp. on *Bauhinia acuminata*, Mandalay, 28-xii-1977 (LAM220346b); *Citrullus vulgaris*, Hlegu, 14-ii-1980 (LAM 220851c).

172. ***Periconiella*** sp. (close to ***P. rapaneae*** M.B. Ellis) on *Combretum* sp. (Vernacular =

Nabu-chon-boke, climber*)* Paukkon Village (near Kanbalu), 11-ii-1973 (IMI 173538); *Lygodium flexuosum*, Rangoon, 24-i-1980 (LAM 220852); *Musa sapientum* var. *arakanensis*, Kyaukthanbut village, east of Yezin campus, 25-vii-1977 (LAM 220137a).

173. ***Phaeodactylium alpiniae*** (Sawada) M.B. Ellis (= *Dactylium alpiniae* Sawada) on *Alpinia conchigera*, Rangoon, 23-ix-1979 (LAM 220655); *Amomum corynostachyum*, Rangoon, 21-x-1979 (LAM 220625b); *Passiflora foetida*, Rangoon, 1-viii-1979 (LAM 220549).

174. ***Phaeotrichoconis crotalariae*** (M.A. Salam & P.N. Rao) Subram. on *Curcuma aromatica*, Rangoon, 11-x-1979 (LAM 220624b).

175. ***Pithomyces*** ?***atro-olivaceus*** (Cooke & Harkn.) M.B. Ellis on *Prunus communis*, Mogaung, Kachin State, 16-i-1978 (LAM 220410a).

176. ***Pithomyces chartarum*** (Berk. & M.A. Curtis) M.B. Ellis on *Artocarpus integra*, Madaya, 9-iv-1972 (IMI 169352e); Burma (Sutton & Gibson 1977).

177. ***Pithomyces cupaniae*** (Syd.) M.B. Ellis on *Actinodaphne angustifolia*, Botanical Garden, Maymyo, 7-x-1974 (IMI 188958a).

178. ***Pithomyces maydicus*** (Sacc.) M.B. Ellis on *Tamarindus indica*, Rangoon, 11-xi-1979 (LAM 220727f).

179. ***Pithomyces sacchari*** (Speg.) M.B. Ellis on *Adhatoda* sp., Mandalay, 6-x-1974 (IMI 188945d).

180. ***Pleurophragmium capense*** (Thüm.) S. Hughes (= *Spiropes capensis* (Thüm.) M.B. Ellis) on *Corypha* ?*elata*, near Shwezayan Pagoda, east of Mandalay, 1-iv-1972 (IMI 166346); growing together with ***Spiropes guareicola*** (F. Stevens) Cif. on a *Melioline* on *Citrus medica* var. *acida*, Mandalay, 20-xi-1974 (IMI 200633).

181. ***Prathigada crataevae*** (Syd.) Subram. on *Crateva nurvala* var. *nurvala*, Leway, 11-ii-1973 (IMI 173532); Nyaungdon (Yandon), 13-iv-1975 (LAM 220049); *C. religiosa*, Tutkon, 20-xi-1973 (IMI 182578).

182. ***Pseudocercospora*** ?***hiptages*** (Petch) U. Braun & Crous (= *Cercospora hiptages* Petch) on *Hiptage candicans* (Vernacular = Z*a-ma-ni*), Mandalay (Anonymous 1961).

183. ***Pseudocercospora pterocauli*** (Petr.) Deighton (= *Chaetotrichum pterocauli* Petr. as *pterocaulonis*) on *Pterocaulon cylindrostachyum*, Sagaing, 25-xi-1971 (IMI 162854); Burma (Ellis 1976, Thaung 1984).

184. ***Pteroconium*** sp. (Anamorphic ***Apiospora camptospora*** Penz. & Sacc.) on leaf-sheaths of *Saccharum officinarum*, Belin (Rhind & Seth 1945, Thaung 1971).

185. ***Pyricularia grisea*** (Cooke) Sacc. (Anamorphic ***Magnaporthe grisea*** (T.T. Hebert) M.E. Barr; = *Pyricularia oryzae* Cavara) on leaves of ?*Chloris* sp., Namsan, Loilem District, S.S.S., 1-viii-1972 (IMI 170080); *Costus speciosus*, Rangoon, 23-ix-1979 (LAM 220631), conidia 22-29.5 x 7.5 µm; *Digitaria pruriens*, Amarapura (Rhind and Seth 1945); grass, Rangoon, 16-vii-1979 (LAM 220529); ?*Isachne australis* (Vernacular = *Let-the-kwe* or *Zaung myet*), Hmawbi Farm, 26-x-1979 (LAM 220629a); *Oryza sativa*, throughout Burma (Rhind & Seth 1945), Nyaunglebin, 24-vii-1979 (LAM 220530); *Panicum repens*, Mandalay, 2-x-1979 (LAM 220749a); *Paspalum sanguinale* (Rhind 1928), *Pennisetum* ?*orientale*, Taikkyi Farm, 25-x-1979 (LAM 220630); *Setaria italica*, Mandalay, 17-xii-1970 (IMI 153659b); *Zingiber barbatum*, Gyogon, 14-x-1979 (LAM 220632). Note: conidia 2-septate, 20-22 x 10-12 µm per Saccardo (1892).

186. ***Ramulispora sorghi*** (Ellis & Everh.) L.S. Olive & Lefebvre (= *Cercospora sorghi* Ellis & Everh.) on *Setaria italica*, Mandalay, 17-xii-1970 (IMI 153659a); *Sorghum vulgare*, Kyaukpandaung, 25-xii-1977 (LAM 220460); *Sorghum* sp.; Taungtha, 20-xii-1977 (LAM 220329d).

187. ***Ramularia*** sp. on *Nyctanthes arbor-tritis*, Myay-Padetha, Rangoon, 20-i-1975 (IMI 191515).

188. ***Rhizoctonia bataticola*** (Taubenh.) E.J. Butler (= ***Macrophomina phaseolina*** (Tassi) Goid.; *Sclerotium bataticola* Taubenh) on *Cajanus cajan*, *Dipterocarpus* ?*obtusifolius*, Yezin campus, 11-vi-1977 (LAM 220161); *Dipterocarpus* sp., Salin, 12-

x-1971 (IMI 161268); *Durio zibethinus*, Moulmein, 21-xii-1973 (IMI 188941); *Nerium odorum*, Mandalay, 7-i-1974 (IMI 187212); *Arachis hypogaea*, *Areca catechu*, and *Sesamum orientale* throughout Burma (Rhind & Seth 1945); in rice-based cropping systems in Burma (Than *et al*. 1991). Note: ***Phoma gentianae-sino-ornatae*** Punith. & R. Harling is a similar fungus (Boerema *et al*. 2004).

189. **Rhizoctonia solani** J.G. Kühn (Anamorphic **Thanatephorus cucumeris** (A.B. Frank) Donk) in roots of Cicer arietinum, Gossypium spp., Nicotiana tabacum, Phaseolus acutifolius, P. lunatus, P. vulgaris, and Solanum tuberosum throughout Burma (Rhind & Seth 1945); banded sclerotial disease on leaves of Saccharum officinarum, Myitkyina and Pyinmana (McLean 1935).

190. ***Sclerotium oryzae*** Catt. (Anamorphic ***Magnaporthe salvinii*** (Catt.) R.A. Krause & R.K. Webster) on culms of *Oryza sativa* in Burma, causing '*gwa-bo*' disease or late/extra tillers with unfilled grains, produced black, shining sclerotia inside the hollow culms of *Oryza sativa* in Burma (Butler 1918, Butler & Bisby 1931, Rhind & Seth 1945, Su 1931, Thompstone & Sawyer 1922) thereby rotting the stem through sclerotial stage.

191. ***Sclerotium rolfsii*** Sacc. (Anamorphic ***Athelia rolfsii*** (Curzi) C.C. Tu & Kimbr.) on *Arachis hypogaea*, *Cicer arietinum*, *Lens esculenta*, and *Triticum vulgare*, Burma (Butler & Bisby 1931); *Lycopersicum esculentum*, collar rot at Maymyo and on *Saccharum officinarum* in general in Burma (Thaung 1971).

192. ***Septonema solaninum*** (Sacc. & Syd.) Hughes on *Ixora* sp., Pegu, 18-xii-1974 (IMI 194471b); *Sida humilis*, Nandayan Plantation, Katha, 15-ix-1973 (IMI 179308b).

193. ***Septonema*** sp. on *Dioscorea sativa*, Rangoon, 28-ix-1979 (LAM 220636b). Note: conidia in short chains, brown, 3-septate, smooth, simple, oblong, 29.5 x 7 μm.

194. ***Spegazzinia deightonii*** (Hughes) Subram. on *Imperata* ?*cylindrica*, Mingaladon, 25-xi-1979 (LAM 220764c).

195. ***Spiropes armatellae*** M.B. Ellis 1971 on *Armatella* ?*cinnamomicola* Hansf. on ?*Butea monosperma* (Vernacular = *Pauk-pin*), Thaton, 12-x-1971 (IMI 161265).

196. ***Spiropes clavatus*** (Ellis & G. Martin) M.B. Ellis (= *Bitunicostilbe clavata* (Ellis & G. Martin) M. Morelet) on tall grass (Vernacular = *Kala* or *Kaing* used in brooms), near Hinegyi-kyun (Bassein), 20-vii-1972 (IMI 170085).

197. ***Spiropes davillae*** (Syd.) M.B. Ellis and ***Spiropes shoreae*** M.B. Ellis on living leaves of *Tephrosia purpurea*, Kyauk-pa-daung, 12-xii-1977 (LAM 220842).

198. ***Spiropes dorycarpus*** (Mont.) M.B. Ellis on dead *Meliola* sp. on *Barringtonia* sp. (Vernacular = *Kyi –pin* or *Kye-pin*), Kyaikkaw near Thaton, 12-x-1971 (IMI 161264); on dead *Asterina* sp. on *Eugenia polyanthia* (= *Syzygium polyanthum*), Kyaikkaw, near Thaton, 11-x-1971 (IMI 166347).

199. ***Sporidesmium leptosporum*** (Sacc. & Roum.) S. Hughes on dead and decaying sprouts of *Cocos nucifera*, Pyinmana, 1-xii-1973 (IMI 181642b).

200. ***Sporidesmium*** spp. on *Lagenaria vulgaris*, Insein, 29-ix-1979 (LAM 220593d); *Phrynium capitatum*, Vegetable Bazaar, Rangoon, 10-xii-1979 (LAM 220772a); *Salacca wallichiana*, Pegu, 28-xii-1977 (LAM 220962).

201. ***Stemphylium vesicarium*** (Wallr.) E.G. Simmons on *Allium sativum*, Aungban, S.S.S., 27-xii-1979 (LAM 220819b).

202. ***Stenella vangueriae*** (Thirum. & Mishra) Deighton (= *Biharia vangueriae* Thirum. & Mishra) on *Gardenia turgida*, Botanical Garden, Maymyo, 7-x-1974 (IMI 188951b) with a ***Pseudocercospora*** sp. (IMI 188951a).

203. ***Stenella*** (= *Biharia*) spp. on *Eriolobus hookeriana*, Botanical Garden, Maymyo, 15-ii-1974 (IMI 183213a); *Schleichera oleosa*, Botanical Garden, Maymyo, 15-ii-1974 (IMI 183212). Note: taxon on the first host could probably be called *Stenella eriolobi* K. Schub. & U. Braun, but not *Stenella eriolobi* (Thaung) K. Schub. & U. Braun.

204. ***Stigmina artocarpi*** Thaung on *Artocarpus lakoocha*, Army training Unit, Maymyo, 14-ii-1973 (IMI 173552, holotype).

205. ***Stigmina careyae*** Thaung on *Careya arborea*, Maymyo, 28-i-1974 (IMI 182328, holotype).

206. ***Stigmina erythrinicola*** Thaung on *Erythrina suberosa*, Botanical Garden, Maymyo, 10-xii-1974 (IMI 190422, holotype).

207. ***Stigmina fici*** Pavgi & U.P. Singh on *Ficus obtusifolia*, North of Kyaukchaw en route Maymyo, 20-ii-1974 (IMI 182580).

208. ***Stigmina leptadeniae*** Thaung on *Leptadenia reticulata*, North of Kyaukchaw en route Maymyo, 21-ii-1974 (IMI 182588, holotype); *L.* sp., Myay-Padetha, Rangoon, 20-i-1975 (IMI. 191512).

209. ***Stigmina palmivora*** (Sacc.) S. Hughes (= *Exosporium palmivorum* Sacc.) on *Borassus flabellifer*, Moulmein (Rhind & Seth 1945); Belin, Thaton District, 21-xii-1970 (IMI 170081); Rangoon, 3-ii-1978 (LAM 220338a); *Phoenix acaulis/paludosa*, Kyaukpandaung, 25-xii-1977 (LAM 220505b); Burma (Kirk 1999).

210. ***Stigmina tamarindi*** (Syd.) Morgan-Jones & W.B. Kendr. (= *Exosporium tamarindi* Syd.) on *Tamarindus indica*, Tavoy, 1-v-1972 (IMI 166370b); Rangoon, 11-xi-1979 (LAM 220727b); Burma (Ellis 1976).

211. ***Stigmina*** sp. on *Pergularia minor*, Rangoon, 7-xii-1976 (LAM 220053).

212. ***Stilbella burmensis*** (Mains) Samson & H.C. Evans (= *Stilbum burmense* Mains) on a flying ant from Burma (Mains 1948).

213. ***Tetraploa aristata*** Berk. & Broome on *Amomum corynostachyum*, Rangoon, 21-x-1979 (LAM 220625d); *Areca catechu*, Myitkyina, 19-vi-1980 (LAM 220942a); *Arundo donax* (stem nodes and leaf sheaths), Rangoon, 1-x-1979 (LAM 220658b); *Cocos nucifera*, Nantaung village, Thaton, 15-xii-1977 (LAM 220507a); *Cocos nucifera* (leaf stalk and spathe), Rangoon, 14-xii-1979 (LAM 220781b); *Eurycles amboinensis* in pot near Convocation Building, University of Rangoon, 28-vii-1975 (IMI 197643b); *Imperata cylindrica*, Mingaladon (Near Shwenyaungbin area), 25-xi-1979 (LAM 220764b); *Pandanus foetidus*, Rangoon, 20-viii-1979 (LAM 220533); *Saccharum* sp., Rangoon, 12-viii-1979 (LAM 220557b); *Sesamum indicum*, Kyaunggon, 18-xii-1977 (LAM 220292b); ferns on trees, Rangoon, 27-x-1979 (LAM 220726d).

214. ***Torula herbarum*** (Pers.) Link on *Abrus precatorius*, Rangoon, 9-iii-1980 (LAM 220911); *Imperata cylindrica*, Rangoon, 18-vii-1979 (LAM 220559d).

215. ***Tretospora negrii*** M.B. Ellis (Anamorphic ***Balladynopsis negrii*** (E. Castell.) M.B. Ellis = *Phaeodimeriella negrii* E. Castell.) on *Randia dumetorum*, Maymyo, 2-xi-1977 (LAM 220244); leaves of *R.* sp., Burma (Ellis 1976).

216. ***Trichothecium roseum*** (Pers.) Link on *Annona squamosa*, Kyaukme, N.S.S., 20-i-1978 (LAM 220418b); *Capparis flavicans*, Ava and Tadau, 13-iv-1973 (IMI 180774b); *Glochidion* sp., Popa, 25-viii-1977 (LAM 220339); *Gosssypium* sp. (Cotton), Taungtha, 18-xii-1977 (LAM 220343b); *Ipomoea* ?*bona-nox*, Pyinmana, 28-xii-1977 (LAM 220890e); *Hevea braziliensis*, Mudon, 01-v-1972 (IMI 166353); on dead fruits of *Psidium guajava*, Mandalay (Rhind & Seth 1945).

217. ***Trimmatostroma*** sp. growing in exudate on pods of *Acacia leucophloea*, Mandalay, 18-iii-1972 (IMI 164839).

218. ***Ustilaginoidea ochracea*** Henn. in the flowers of *Panicum auritum*, Hmawbi (Rhind & Seth 1945).

219. ***Ustilaginoidea virens*** (Cooke) Takh. as false smut in the flowers of *Oryza sativa*, Mandalay, Hmawbi, etc. (Rhind & Seth 1945, Seth 1945); Kyaukse, 3-xii-1977 (LAM 220537).

220. ***Verticillium albo-atrum*** on cotton, Aung-pin-le near Mandalay, causing wilt (Thaung 1970).

221. ***Walkeromyces grewiae*** Thaung on leaves of *Grewia macrophylla*, Kyaukchaw near Maymyo, 26-ix-1974 (IMI 188948, holotype). Cf. *Cercospora grewiae* H.C.

Srivast. & P.R. Mehta, *Mycovellosiella grewiae* (H.C. Srivast. & P.R. Mehta) Deighton, *Passalora grewiae* (H.C. Srivast. & P.R. Mehta) U. Braun & Crous, and *Pseudocercospora grewiae* (H.C. Srivast. & P.R. Mehta) X.J. Liu & Y.L. Guo.

222. ***Wiesneriomyces laurinus*** (Tassi) P.M. Kirk (= *Wiesneriomyces javanicus* Koord) on *Carissa carandas*, Pindaya, S.S.S., 28-xii-1979 (LAM 220855); *Psidium guajava*, Kyaukpandaung, 7-xii-1977 (LAM 220482b).

223. ***Zygosporium majus*** Piroz. on *Hygrophila spinosa*, Mandalay, 7-ii-1973 (IMI 172880). Note: conidia measured 13-16 μm.

224. ***Zygosporium masonii*** S. Hughes on *Artabotrys burmanicus*, Monywa, 2-viii-1977 (LAM 220274).

225. ***Zygosporium minus*** S. Hughes on *Galphimia* sp., near Natural History Museum on Kandawgyi Lake, Rangoon, 30-iii-1973 (IMI 176161a); *Rhinacanthus communis*, Thebaw (Hsipaw), N.S.S., 11-x-1973 (IMI 180767).

226. ***Zygosporium oscheoides*** Mont. on *Dracaena angustifolia*, Botanical Garden, Maymyo, 28-12-1972 (IMI 188953a); *Galphimia* sp., near Natural History Museum on Kandawgyi Lake, Rangoon, 30-iii-1973 (IMI 176161b).

227. ***Zygosporium*** sp. on *Heterophragma sulfureum*, Yezin, 6-i-1978 (LAM 220420).

Host Index

Abrus [Leguminosae] ***A. precatorius*** L. — *Torula herbarum*

Abutilon [Malvaceae] ***A. indicum*** (L.) Sweet — *Eremothecium coryli*, *E. gossypii*.

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Adhatoda [Acanthaceae] ***A.*** sp. — *Alternaria tenuissima*, *Curvularia lunata*, *Periconia byssoides*, *Pithomyces sacchari*.

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Brassica [Brassicaceae] ***B. alba*** (L). Rabenh.— *Alternaria brassicae*, *Periconia byssoides*; ***B. campestris*** L. — *Alternaria brassicae*; ***B. campestris*** var. ***rapa*** L. — *Alternaria brassicae*; ***B. oleracea*** L. — *Alternaria brassicicola*; ***B. oleracea*** var. ***botrytis*** L. — *Alternaria brassicae*; ***B. oleracea*** var. ***capitata*** L. — *Alternaria brassicae*; ***B. oleracea*** var. ***caulorapa*** L. — *Alternaria brassicae*

bread — *Aspergillus clavatus*.

Bridelia [Euphorbiaceae] ***B. retusa*** Spreng. — *Parapithomyces brideliae.*

Brunfelsia [Solanaceae] ***B. pauciflora*** Benth. — *Alternaria tenuissima*, *Periconia byssoides*.

Butea [Leguminosae] ***B. monosperma*** Kuntze — *Corynespora cassiicola*, *Spiropes armatellae*.

Cajanus [Fabaceae] ***C. cajan*** (L.) Millsp. — *Fusarium udum*, *Rhizoctonia bataticola*.

Calamus [Arecaceae] ***C.*** sp. — *Arthrinium* sp., *Mycoleptodiscus* sp.

Calendula [Asteraceae] ***C. officinalis*** L. — *Alternaria zinniae*.

Callistephus [Asteraceae] ***C. chinensis*** Nees — *Alternaria zinniae*, *Fusarium oxysporum* f. sp*. callistephi*.

Calotropis [Asclepiadaceae] ***C. gigantea*** (Willd.) R. Br. — *Alternaria alternata*, *Curvularia lunata*, *Myrothecium roridum*.

Capparis [Capparaceae] ***C. flavicans*** Wall. — *Trichothecium roseum*.

Careya [Lecythidaceae] ***C. arborea*** Roxb. — *Stigmina careyae*.

Carissa [Apocynaceae] **C.** ***carandas*** L. — *Mycoleptodiscus* sp., *Wiesneriomyces laurinus.*

Carum [Apiaceae] ***C. carvi*** L. — *Alternaria tenuissima*, *Periconia byssoides*.

Casimiroa [Rutaceae] ***C. edulis*** S. Watson — *Fusarium incarnatum*.

Cassia [Leguminosae] ***C. siamea*** Lam. — *Alternaria alternata*, *Microxyphium artocarpi*, ***C. fistula*** L./***renigera*** Wall.. — *Corynespora cassiicola*.

Ceiba [Bombacaceae] ***C. pentandra*** Gaertn. f. — *Corynespora cassiicola*.

Celosia [Amaranthaceae] ***C***. ***argentea*** var. ***cristata*** (L.) Kuntze — *Curvularia lunata*, *Fusarium lateritium*, *Nimbya pimpriana*.

Centaurea [Asteraceae] ***C***. sp. — *Alternaria tenuissima*.

Chloris sp. [Poaceae] ***C***. sp. — *Pyricularia grisea.*

Chrysanthemum [Asteraceae] ***C***. sp. — *Alternaria chrysanthemi.*

Cicer [Leguminosae] ***C***. ***arietinum*** L. — *Rhizoctonia solani*, *Sclerotium rolfsii*, *Fusarium oxysporum* f. sp. *ciceris*.

Cinnamomum [Lauraceae] ***C***. ***camphora*** (L.) T. Nees & C.H. Eberm. — *Alternaria* sp.; ***C***. ***inunctum*** Meisn. — *Hemibeltrania cinnamomi*, *Periconia byssoides*; ***C***. sp. — *Hemibeltrania cinnamomi.*

Citharexylum [Verbenaceae] ***C***. ***suberratum*** Sw. — *Epicoccum nigrum.*

Citrullus [Cucurbitaceae] ***C***. ***vulgaris*** Schrad. — *Alternaria alternata* f.sp. *cucurbitae*, *Periconia* sp.

Citrus [Rutaceae] ***C***. ***aurantium*** L. — *Fusarium* sp., *Penicillium digitatum*, *P. italicum*; ***C***. ***decumana*** L. — *Fusarium* sp.; ***C***. fruit — *Aspergillus niger* var. *niger*; ***C***. ***medica*** L. — *Mycoleptodiscus* sp.; ***C***. ***medica*** var. ***acida*** (Roxb.) Hook. f. — *Pleurophragmium capense*, *Spiropes guareicola*; ***C***. ***medica*** var. ***limonum*** Ross. — *Mycoleptodiscus* sp.; ***C***. sp. — *Alternaria citri*.

Clerodendrum [Lamiaceae] ***C***. ***macrosiphon*** Hook. f. — *Corynespora cassiicola*; ***C***. ***serratum*** Spreng. — *Corynespora cassiicola*.

Clinogyne [Marantaceae] ***C***. ***dichotoma*** Salisb. — *Curvularia affinis*, *C. lunata*.

Cocos [Arecaceae] ***C***. ***nucifera*** L. — *Dictyosporium heptasporum*, *Sporidesmium leptosporum*, *Tetraploa aristata*.

Colocasia [Araceae] ***C***. sp. — *Cladosporium colocasiae*, *Neojohnstonia colocasiae.*

Combretum [Combretaceae] ***C.*** sp. — *Periconiella* sp.

Congea [Lamiaceae] ***C***. ***tomentosa*** Roxb. — *Cercospora* sp.

Cordia [Boraginaceae] ***C***. ***dichotoma*** G. Forst. — *Cercospora* sp.

Coreopsis [Asteraceae] ***C***. ***tinctoria*** Nutt. — *Alternaria zinniae*.

Coriandrum [Apiaceae] ***C***. ***sativum*** L. — *Periconia byssoides*.

Corypha [Arecaceae] ***C***. ***elata*** Roxb. — *Pleurophragmium capense*.

Cosmos [Asteraceae] ***C***. ***bipinnatus*** Cav. — *Alternaria zinniae*; ***C***. sp. — *Alternaria zinniae*, *Curvularia* sp.

Costus [Costaceae] ***C***. ***specious*** Sm. — *Pyricularia grisea*.

Crateva [Capparaceae] ***C***. ***nurvala*** Buch.-Ham. var. ***nurvala*** — *Prathigada crataevae*; ***C***. ***religiosa*** G. Forst. — *Prathigada crataevae*.

Crotalaria [Leguminosae] ***C***. ***juncea*** L. —*Alternaria crotalariicola*.

Croton [Euphorbiaceae] ***C***. ***calococcus*** Kurz — *Alternaria* sp., *Corynespora cassiicola*, *Drechslera* sp.

Cruciferae — *Alternaria brassicae*.

Cucumis [Cucurbitaceae] ***C***. ***melo*** L. — *Alternaria alternata* f.sp. *cucurbitae*.

Curcuma [Zingeberaceae] ***C***. ***aromatica*** Salisb. — *Alternaria* sp., *Phaeotrichoconis crotalariae*.

Cynodon [Poaceae] ***C***. ***dactylon*** Pers. — *Bipolaris cynodontis*, *Curvularia intermedia*, *C. lunata*, *Myrothecium gramineum*, *Periconia lateralis*.

Datura [Solanaceae] ***D***. ***stramonium*** L. — *Alternaria crassa*.

Dendrocalamus [Poaceae] ***D***. ***strictus*** Nees — *Arthrinium phaeospermum*, *Coronospora dendrocalami*.

Dichanthium [Poaceae] ***D***. ***annulatum*** Stapf — *Curvularia lunata*.

Digitaria [Poaceae] ***D. pruriens*** Buse — *Pyricularia grisea*.

Dioscorea [Dioscoreaceae] ***D. sativa*** L. — *Septonema* sp.

Dipterocarpus [Dipterocarpaceae] ***D. obtusifolius*** Teijsm. ex Miq. — *Rhizoctonia bataticola*; ***D.*** sp. — *Rhizoctonia bataticola*.

Dracaena [Dracaenaceae] ***D. angustifolia*** Roxb. — *Zygosporium oscheoides*; ***D.*** sp. — *Memnoniella subsimplex*.

Duranta [Verbenaceae] ***D. plumeri*** Jacq. — *Corynespora cassiicola*.

Durio [Bombacaceae] ***D. zibethinus*** Murr. — *Rhizoctonia bataticola*.

Eclipta [Asteraceae] ***E. alba*** Hassk. — *Alternaria zinniae*.

Eichhornia [Pontederiaceae] ***E. crassipes*** (Mart.) Solms. — *Alternaria eichhorniae*, *Myrothecium* sp.

Elaeagnus [Elaeagnaceae] ***E. latifolia*** L. — *Fusarium* sp.

Elaeis [Arecaceae] ***E. guineensis*** Jacq. — *Endocalyx melanoxanthus.*

Erigeron [Asteraceae] ***E. asteroides*** Roxb. — *Cercospora erigeronicola*.

Eriolobus [Rosaceae] ***E. hookeriana*** Decne. — *Stenella* sp.; ***E. indica*** Schn. — *Cladosporium eriolobi*, *Papilionospora aspergilloides*.

Erythrina [Fabaceae] ***E. suberosa*** Roxb. — *Stigmina erythrinicola*.

Eugenia [Myrtaceae] ***E. polyanthia*** Wight — *Spiropes dorycarpus*; ***E.*** sp. — *Mycoleptodiscus* sp.

Euphorbia [Euphorbiaceae] ***E. geniculata*** Oretega — *Drechslera euphorbiae*; ***E.*** sp. — *Alternaria tenuissima*.

Eurycles [Amaryllidaceae] ***E. amboinensis*** Loud. — *Curvularia trifolii*, *Tetraploa aristata*.

Ficus [Moraceae] ***F. carica*** L. – *Gonatophragmium mori*; ***F. obtusifolia*** Roxb. – *Stigmina fici*; ***F. religiosa*** L. – *Microxyphium* sp.; ***F.*** sp. – *Alternaria ficinae.*

Galphimia [Malpighiaceae] ***G.*** sp. — *Zygosporium minus*, *Z. oscheoides.*

Garcinia [Clusiaceae] ***G. mangostana*** L. — *Corynespora cassiicola*.

Gardenia [Rubiaceae] ***G. turgida*** Roxb. — *Stenella vangueriae*.

Gilnus [Molluginaceae] ***G. oppositifolius*** (L.) A. DC. (= *Mollugo spergula* L.) — *Alternaria* sp.

Gladiolus [Iridaceae] ***G.*** sp. — *Arthrinium curvatum* var. *curvatum*.

Glochidion [Euphorbiaceae] ***G.*** sp. — *Trichothecium roseum*.

Glycine [Leguminosae] ***G. hispida*** Maxim. — *Alternaria tenuissima*.

Gomphrena [Amaranthaceae] ***G. globosa*** L. — *Nimbya gomphrenae*.

Gossypium [Malvaceae] **G. *neglectum*** Tod. — *Fusarium oxysporum* f. sp. *vasinfectum*; ***G.*** sp. — *Trichothecium roseum*; ***G.*** sp. (cotton) — *Alternaria alternata*, *Rhizoctonia solani*, *Verticillium albo-atrum*.

grass [Poaceae] — *Curvularia verruculosa* , *Pyricularia grisea*, *Spiropes clavatus*.

Grewia [Tiliaceae] ***G. macrophylla*** G. Don — *Walkeromyces grewiae.*

Helianthus [Asteraceae] ***H. annuus*** L. — *Alternaria helianthi*, *Curvularia lunata*.

Heterophragma [Bignoniaceae] ***H. sulfureum*** Kurz. — *Zygosporium* sp.

Hevea [Euphorbiaceae] ***H. braziliensis*** (Willd. ex A. Juss.) Müll.Arg. — *Bipolaris heveae*, *Curvularia* sp., *Periconia manihoticola*, *Trichothecium roseum*.

Hiptage [Malpighiaceae] ***H. candicans*** Hook. f. — *Pseudocercospora ?hiptages*.

Homo [Hominidae] ***H. sapiens*** — *Penicillium marneffei*.

Hordeum [Poaceae] ***H. vulgare*** L. — *Drechslera graminea*, *Drechslera teres*.

Hydrangea [Hydrangeaceae] ***H. macrophylla*** (Thunb.) Ser. — *Corynespora cassiicola*.

Hygrophila [Acanthaceae] ***H. spinosa*** T. Anders — *Zygosporium majus*.

Imperata [Poaceae] ***I. cylindrica*** (L.) P. Beauv.— *Alternaria longissima*, *Bipolaris sacchari*, *Curvularia lunata*, *Drechslera* sp., *Nigrospora sphaerica*, *Spegazzinia deightonii*, *Tetraploa aristata*, *Torula herbarum*.

Ipomoea [Convolvulaceae] ***I. batatas*** (L.) Poir. or ***digitata*** L. — *Periconia byssoides*; ***I. bona-nox*** L. — *Alternaria* ?*bataticola*, *Fusarium oxysporum* f. sp. *batatas*, *Trichothecium roseum*.

Isachne [Poaceae] ***I. australis*** R. Br. — *Pyricularia grisea*.

Ixora [Rubiaceae] ***I. coccinea*** L. — *Septonema solaninum*.

Jasminum [Oleaceae] ***J.*** sp. — *Alternaria dianthi*.

Lagenaria [Cucurbitaceae] ***L. vulgaris*** Ser. — *Alternaria alternata* f.sp. *cucurbitae*, *Curvularia* sp., *Sporidesmium* sp.

Leersia [Poaceae] ***L. hexandra*** Sw. — *Bipolaris oryzae*.

Lens [Leguminosae] ***L. esculenta*** Moench — *Sclerotium rolfsii*.

Leptadenia [Asclepiadaceae] ***L. reticulata*** (Retz.) Wight & Arn. — *Stigmina leptadeniae*; ***L.*** sp. — *Stigmina leptadeniae*.

Leucas [Lamiaceae] ***L. aspera*** Spreng. — *Alternaria* sp., *Corynespora cassiicola*, *Curvularia lunata*, *Drechslera* sp.

Liliaceae (*Dracaena*/*Pleomele* sp.) — *Curvularia* sp., *Myrothecium roridum*.

Lilium [Liliaceae] ***L. sulphureum*** Baker ex Hook. f. — *Alternaria tenuissima*, *Epicoccum nigrum*.

Litsea [Lauraceae] ***L.*** sp. — *Chlamydomyces palmarum*.

Livistona [Arecaceae] ***L. speciosa*** Kurz — *Alternaria tenuissima*, *Endocalyx melanoxanthus*.

Lycopersicum [Solanaceae] ***L. esculentum*** Mill. — *Alternaria* sp., *Sclerotium rolfsii*.

Lygodium [Schizaeaceae] ***L. flexuosum*** (L.) Sw. — *Periconiella* sp.

Madhuca [Sapotaceae] ***M. longifolia*** Macbride — *Mycoleptodiscus* sp.

Mangifera [Anacardiaceae] ***M. indica*** L. — *Cercosporella* sp., *Gonatophragmium mangiferae.*

match stick — *Aspergillus fumigatus*.

Melia [Meliaceae] ***M. azadirachta*** L. — *Cercospora leucosticta*; ***M. azedarach*** L. — *Cercospora leucosticta.*

Molass — *Aspergillus niger* var. *niger*.

Momordica [Cucurbitaceae] ***M. charantia*** L. — *Alternaria tenuissima*, *Cladosporium* sp., *Fusarium* sp.

Musa [Musaceae] ***M. paradisiaca*** var. ***arakanensis*** Ripley — *Cordana musae*; ***M. sapientum*** L. — *Deightoniella torulosa*; ***M. sapientum*** var. ***arakanensis*** Ripley — *Alternaria* sp., *Periconiella* sp.; ***M. sapientum*** var. ***rubra*** Firminger — *Deightoniella torulosa*, *Drechslera musae-sapientium*.

Nephelium [Sapindaceae] ***N. lit-chi*** Cambess. — *Cylindrocarpon luteoviride*.

Nerium [Apocynaceae] ***N. odorum*** Soland — *Periconia byssoides*, *Rhizoctonia bataticola*.

Nicotiana [Solanaceae] ***N. tabacum*** L. — *Rhizoctonia solani*.

Nyctanthes [Oleaceae] ***N. arbor-tritis*** L. — *Ramularia* sp.

Ocimum [Lamiaceae] ***O. basilicum*** L. — *Corynespora cassiicola*.

Oryctes [Insecta, Coleoptera] ***O. rhinoceros*** L. — *Metarhizium anisopliae*.

Oryza [Poaceae] ***O. sativa*** L. — *Alternaria padwickii*, *Bipolaris maydis*, *B. oryzae*, *Cladosporium miyakei*, *Curvularia geniculata*, *C. lunata*, *Fusarium moniliforme*, *Nigrospora sphaerica*, *Pyricularia grisea*, *Rhizoctonia bataticola*, *Sclerotium oryzae*, *Ustilaginoidea virens*.

paddy soils — *Aspergillus flavus*, *A. niger* var. *niger*, *A. tamarii*, *A. terreus*.

Panicum [Poaceae] ***P. auritum*** Hassk. — *Ustilaginoidea ochracea*; ***P. colonum*** L. — *Bipolaris oryzae*; ***P. repens*** L. — *Myrothecium gramineum*, *Pyricularia grisea.*

Paspalum [Poaceae] ***P. sanguinale*** Lamk. — *Pyricularia grisea.*

Passiflora [Passifloraceae] ***P. foetida*** L. — *Phaeodactylium alpiniae*.

Pastanica [Apiaceae] ***P. sativa*** L. — *Alternaria* sp.

peanut cakes — *Aspergillus flavus.*

Pennisetum [Poaceae] ***P.*** ?***orientale*** Rich. — *Pyricularia grisea.*

Pentacme [Dipterocarpaceae] ***P. siamensis*** Kurz. — *Bahusakala* sp.

Pergularia [Asclepiadaceae] ***P. minor*** Andr. — *Stigmina* sp.

Phaseolus [Leguminosae] ***P. acutifolius*** A. Gray — *Rhizoctonia solani*; ***P. lunatus*** L. — *Rhizoctonia solani*; ***P. vulgaris*** L. — *Rhizoctonia solani*.

Phlox [Polemoniaceae] ***P.*** sp. — *Alternaria* sp.

Phoenix [Arecaceae] ***P. acaulis*** Buch-Ham (?***paludosa*** Roxb.) — *Stigmina palmivora.*; ***P.*** sp. — *Annellophora phoenicis*.

Phrynium [Marantaceae] ***P. capitatum*** Willd. — *Sporidesmium* sp.

Phyllanthus [Euphorbiaceae] ***P. niruri*** L./***leschenaultii*** Müll.Arg. — *Corynespora cassiicola*.

Pimpinella [Apiaceae] ***P. anisum*** L. — *Alternaria* sp.

Piper [Piperaceae] ***P. betle*** L. — *Microdochium dimerum*, *Mycoleptodiscus* sp.; ***P. nigrum*** L. — *Curvularia* sp.

Plumeria [Apocynaceae] ***P. acutifolia*** Poir. — *Corynespora cassiicola*.

Prunus [Rosaceaee] ***P. communis*** Hud. — *Alternaria* sp., *Pithomyces* ?*atro-olivaceus*; ***P. persica*** Benth. & Hook. f. — *Fusicladium carpophilum*.

Psidium [Myrtaceae] ***P. guajava*** L. — *Trichothecium roseum*, *Wiesneriomyces laurinus*.

Pterocaulon [Asteraceae] ***P. cylindrostachyum*** C.B. Clarke — *Pseudocercospora pterocauli*.

Pyrus [Rosaceae] ***P. communis*** L. — *Fusicladium virescens*.

Ranunculus [Ranunculaceae] ***R.*** sp — *Alternaria* sp.

Raphanus [Brassicaceae] ***R. sativus*** L. — *Alternaria japonica*.

Rauvolfia [Apocynaceae] ***R. serpentina*** Benth. ex Kurz – *Alternaria tenuissima*, *Bipolaris hawaiiensis*.

Rhinacanthus [Acanthaceae] ***R. communis*** Nees — *Zygosporium minus.*

rice, bran — *Aspergillus flavus*, *A. niger* var. *niger*, *A. tamarii*.

rice, cake — *Aspergillus aculeatus*.

rice, cooked — *Aspergillus tamarii*.

rice, fermented — *Candida saitoa.*

rice, grains — *Aspergillus* sp. with *Streptomyces* sp., *Penicillium* sp.

Roystonea [Arecaceae] ***R. elata*** (W. Bartram) F. Harper — *Bahusakala* sp.

Rubiaceae (***Hedyotis***/***Spermacoce*** sp.) — *Curvularia andropogonis*, *C.* ?*borreriae*, *C. geniculata.*

Saccharum [Poaceae] ***S. officinarum*** L. — *Cercospora longipes*, *Fusarium moniliforme*, *F. subglutinans*, *Pteroconium* sp.,

Rhizoctonia solani, *Sclerotium rolfsii*; ***S***. sp. — *Arthrinium sacchari*, *Bipolaris sacchari*, *Corynespora cassiicola*, *Curvularia lunata*, *Hyalostachybotrys* sp., *Tetraploa aristata*.

Salacca [Arecaceae] ***S***. ***wallichiana*** Mart. — *Acroconidiellina arecae*, *Bipolaris maydis*, *Curvularia geniculata*, *C. lunata*, *Drechslera* sp., *Sporidesmium* sp.

Sapium [Euphorbiaceae] ***S***. ***beccatum*** Roxb. — *Corynespora cassiicola*.

Schleichera [Sapindaceae] ***S***. ***oleosa*** (Lour.) Merr. — *Stenella* sp.

Sesamum [Pedaliaceae] ***S***. ***indicum*** DC. (= ***S***. ***orientale*** L.) — *Corynespora cassiicola*, *Drechslera sesami*, *Fusarium* sp., *Rhizoctonia bataticola*, *Tetraploa aristata*.

Setaria [Poaceae] ***S***. ***italica*** (L.) P. Beauv. — *Drechslera setariae*, *Pyricularia grisea, Ramulispora sorghi*.

Sida [Malvaceae] ***S***. ***humilis*** Cav. — *Septonema solaninum*; ***S***. ***rhombifolia*** L. — *Alternaria macrospora*, *Corynespora cassiicola*.

Solanum [Solanaceae] ***S***. ***melongena*** L. — *Alternaria tenuissima*, *Alternaria* sp., *Corynespora cassiicola*, *Periconia byssoides*; ***S***. ?***trilobatum*** L. — *Alternaria* sp.; ***S***. ***tuberosum*** L. — *Alternaria solani*, *Rhizoctonia solani*.

Sorghum [Poaceae] ***S***. ***dochna*** (Forssk.) Snowden — *Fusarium moniliforme*; ***S***. ***vulgare*** Pers. — *Alternaria* ?*longissima*, *Ramulispora sorghi*; ***S***. sp. — *Alternaria* ?*longissima*, *Ramulispora sorghi*.

Spondias [Anacardiaceae] ***S***. ***pinnata*** (L.) Kurz — *Alternaria* sp.

Sporobolus [Poaceae] ***S***. sp. — *Bipolaris crustacea*, *B. ravenelii*.

Streptocaulon [Asclepiadaceae] ***S***. ***tomentosum*** Wight — *Corynespora cassiicola*.

substrates, **various** — *Aspergillus glaucus*.

Tamarindus [Leguminosae] ***T***. ***indica*** L. — *Alternaria tenuissima*, *Curvularia lunata*, *C. senegalensis*, *Pithomyces maydicus*, *Stigmina tamarindi.*

Tephrosia [Leguminosae] ***T***. ***purpurea*** Pers. — *Spiropes davillae*, *S. shoreae*.

Thysanolaena [Poaceae] ***T***. ***maxima*** Kuntze — *Annellophragmia coonoorensis*, *Arthrinium arundinis.*

Tribulus [Zygophyllaceae] ***T***. ***terrestris*** L. — *Alternaria* sp.

Trichosanthes [Cucurbitaceae] ***T***. ***palmata*** Roxb. — *Dendryphiella vinosa*, *Gonatophragmium mori*, *Microxyphium* sp.

Tridax [Asteraceae] ***T***. ***procumbens*** L. — *Cercospora tridacis-procumbentis*.

Triticum [Poaceae] ***T***. ***vulgare*** L. — *Bipolaris sorokiniana*, *Sclerotium rolfsii*.

unknown plant (probably *Simarubaceae*) — *Microxyphium* sp.

unknown herb (Vernacular = *tauk-te-let-wa*) — *Alternaria* sp.

Valeriana [Valerianaceae] ***V***. ***hardwickii*** Wall. — *Alternaria* sp.

Vallaris [Apocynaceae] ***V***. ***heynii*** Spreng. — *Cylindrocarpon ukolayii*.

Viola [Violaceae] ***V***. sp. — *Alternaria violae*, *Myrothecium roridum.*

Vitex [Lamiaceae] ***V***. ***glabrata*** R. Br. — *Dictyospiropes* sp.

Xanthium [Asteraceae] ***X***. ***strumarium*** L. — *Alternaria zinniae*.

Zea [Poaceae] ***Z***. ***mays*** L. — *Alternaria* ?*longissima*, *Exserohilum turcicum*.

Zingiber [Zingeberaceae] ***Z***. ***barbatum*** Wall. — *Pyricularia grisea*.

Ziziphus [Rhamnaceae] ***Z***. ***rugosa*** Lam. — *Mitteriella ziziphi-rugosae.*

Table 1. Summary of hyphomycete/agonomycete distribution frequencies among their host plant families.

Host family	+H	*I	Host family	+H	*I	Host family	+H	*I
1. Acanthaceae	4	7	25. Cucurbitaceae	5	12	49. Pedaliaceae	1	5
2. Agavaceae	1	2	26. Dioscoreaceae	1	1	50. Piperaceae	2	3
3. Alliaceae	3	5	27. Dipterocarpaceae	3	3	51. Poaceae	32	81
4. Amaranthaceae	4	6	28. Dracaenaceae	2	2	52. Polemoniaceae	1	1
5. Amaryllidaceae	1	2	29. Elaeagnaceae	1	1	53. Pontederiaceae	1	2
6. Anacardiaceae	2	3	30. Euphorbiaceae	7	13	54. Ranunculaceae	1	1
7. Annonaceae	3	4	31. Hydrangeaceae	1	1	55. Rhamnaceae	1	1
8. Apiaceae	4	5	32. Iridaceae	1	1	56. Rosaceae	5	7
9. Apocynaceae	5	8	33. Lamiaceae	6	9	57. Rubiaceae	3	5
10. Araceae	2	3	34. Lauraceae	5	8	58. Rutaceae	7	7
11. Arecaceae	12	25	35. Lecythidaceae	2	2	59. Salvadoraceae	1	1
12. Asclepiadaceae	5	7	36. Leguminosae	21	38	60. Sapindaceae	2	2
13. Asteraceae	13	16	37. Liliaceae	2	4	61. Sapotaceae	1	1
14. Balanitaceae	1	1	38. Malpighiaceae	2	3	62. Schizaeaceae	1	1
15. Bignoniaceae	1	1	39. Malvaceae	7	13	63. Solanaceae	7	13
16. Bombacaceae	2	2	40. Marantaceae	2	3	64. Tiliaceae	1	1
17. Brassicaceae	8	9	41. Meliaceae	1	1	65. Valerianaceae	1	1
18. Capparaceae	3	3	42. Molluginaceae	1	1	66. Verbenaceae	2	2
19. Chenopodiaceae	1	1	43. Moraceae	7	9	67. Violaceae	1	2
20. Clusiaceae	1	1	44. Musaceae	4	6	68. Zingiberaceae	4	7
21. Combretaceae	1	1	45. Myrtaceae	2	4	69. Zygophyllaceae	1	1
22. Convolvulaceae	2	4	46. Nyctaginaceae	1	2	70. Unknown host	2	2
23. Costaceae	1	1	47. Oleaceae	2	2			
24. Cruciferae	1	1	48. Passifloraceae	1	1			

+H= No. of host species infected. *I = No. of hyphomycetes/agonomycetes causing infection on host species.

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CONTRIBUTION TO THE KNOWLEDGE OF *CORTINARIUS* [AGARICALES, CORTINARIACEAE] OF TASMANIA (AUSTRALIA) AND NEW ZEALAND.

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Abstract

The authors have been studying the mycological flora of New Zealand and Tasmania over many years with the aim of discovering phylogenetic links between *Cortinarius* occurring in the Southern and Northern Hemispheres. Based on morphological and molecular phylogenetic studies, which will be published elsewhere, we describe here ten new species of *Cortinarius* (*C. ardesiacus*, *C. austrotorvus*, *C. controversus*, *C. laetelamellatus*, *C. leucanthemium*, *C. mastoideus*, *C. pseudorotundisporus*, *C. rozites*, *C. tasmacamphoratus*, *C. veronicoides*) plus another interesting one (*C. austrocinnabarinus*) from Tasmania, and eleven (*C. dulciorum*, *C. elaiops*, *C. gymnocephalus*, *C. malosinae*, *C. myxenosma*, *C. orixanthus*, *C. pectochelis*, *C. pselioticton*, *C. rattinoides*, *C. rhipiduranus*, *C. vernicifer*) from New Zealand. Further we rename two taxa, *Dermocybe purpurata* and *Cortinarius rotundisporus* ssp. *nothofagi*, from New Zealand to *C. rubripurpuratus* and *C. tessiae*.

Key Words: Agaricales, Cortinariaceae, *Cortinarius*, Tasmania, New Zealand.

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Introduction

Cortinarius is a large and complex genus within the Agaricales. If we include genera synonymised with *Cortinarius* by Peintner *et al*., 2001b, 2002b, the total number of the species hitherto described in the world is close to 3000.

Cortinarius species deserve particular attention as they are ectomycorrhizal and therefore constitute a noteworthy element in natural and commercial forests. In the past two centuries, the level taxonomy of *Cortinarius* relied almost exclusively on morphological and – partly – macrochemical traits. However, rDNA sequence data have suggested hypotheses about the phylogeography of the ancestors of these agarics during their early dispersion over the globe, and thereby contribute to the knowledge of their relationships (Frøslev *et al*. 2005, 2006a,b, 2007, Garnica & Oberwinkler 2003, Garnica *et al*. 2003, 2005, Høiland & Holst-Jensen 2000, Kytövuori *et al*. 2005, Liu *et al*. 1995, 1997, Peintner *et al*. 2001, 2002, 2004, Sawyer *et al*. 1999, Seidl 2000).

A considerable number of species occur in the temperate areas of the Southern Hemisphere. Subsequent to the important work reported by M. M. Moser and E. Horak from Patagonia (1975; 278 taxa), comparatively few species have been described from Australia and New Zealand. Only 61 species are reported (including the genus *Dermocybe*) in Fungi of Australia 2A (May & Wood 1997), of which at least 16 according to our view are doubtfully determined. According to Segedin & Pennycook (2001), 98 species are reported from New Zealand (including the genera *Dermocybe*, *Cuphocybe*, *Rapacea*, *Rozites* and *Thaxterogaster*, now generally considered as *Cortinarius*). Since these checklists were published, 32 *Cortinarius* taxa have been published from Australia (Gasparini 2001, 2004, 2007a) and 24 from New Zealand (Soop 2002, 2005). The number of described and validly published species is still modest with respect to the diversity of *Cortinarius* species

present in Australia and New Zealand (pers. obs.). It is our firm belief that only through chorology a cogent universal hierarchic system can be produced.

In this article we propose a number of new species of *Cortinarius* from Tasmania and New Zealand. In addition, a few taxa are renamed. Samples of all our taxa have been investigated for DNA at Tübingen University by the team of S. Garnica. A separate report on this molecular investigation is in preparation. Although all the species reported in this article were investigated by ITS sequencing and the results taken into account to award possible taxonomic positions, we have refrained from reporting individual results, waiting for a comprehensive phylogeny to be published.

The species proposed here belong to several infrageneric taxa. While some species appear to be grouped into known infrageneric taxa, either by morphologic or phylogenetic markers or both, others occupy unresolved positions. Hence, we do not consider it advisable to propose a new infrageneric structure until more is known from ongoing phylogenetic work within *Cortinarius*. Therefore, in the present study, the order between the species only reflects an approximate taxonomy.

Materials and methods

Taxonomic descriptions are essentially based on the material studied by the authors. Macro-measures of all species were taken from fresh basidiomes. Most of the species examined were dried and stored as exsiccata, and the micro-measures were taken later from revived parts of the dry material.

All holotype material has been deposited either in the Tasmanian State Herbarium (HO), Hobart, Tasmania, or in the New Zealand herbarium (PDD), Auckland. Other specimens are held in the personal herbaria of B. Gasparini (referred to here as PHN), or D. A. Ratkowsky (referred to here as RHN) in Hobart. Unless otherwise specified, collections reported from New Zealand were made by the second author (KS), and the descriptor "KS" then indicates the collection number.

For microscopical study, portions of the dried basidiomes were revived in 2% KOH mounts. Drawings and measures were drawn using a light microscope Zenith BK1000 with phase contrast. The spore measurements are the average of at least 25 readings per collection taken at random, the total number being indicated in brackets at the end of each spore measure item. The measurements account for the minimum maximum (in brackets) and the standard deviation from the average. For macrochemical reactions and reagents used, see Azema (1986). For the description of colours the Colour Identification Chart of Flora of Royal Botanic Garden Edinburgh (1969) was used.

In the descriptions the measures of the basidiocarp were taken from adult specimens; these are the diameter of the pileus, the length of the stipe, and the diameter of the upper part of the stipe. The designation "L" means the number of lamellae reaching the stipe, possibly followed by "l", the number of lamellulae between two lamellae. Q is the average ratio of spore measurements. The term veil refers to a universal veil, while cortina means a partial veil. Veil hyphae (where applicable) were measured from the lower part of the stipe, unless otherwise specified. The term cheilocystidia is reserved for marginal, sterile cells that are conspicuously differentiated from the basidia in either size, shape, or both; trivial, non differentiated cells are designated as marginal (or sterile) elements. TLC is the acronym of thin layer chromatography.

In all drawings the scale–bar is 1:2000 for spores, 1:1000 for any parts of the hymenium, 1:500 for pileal and any other structural parts. A refers to spores; B, basidia; C, cystidia/marginal cells where applies; D, pileal surface; D1 and D2, respectively cortex and veil, if any. In the ecological descriptions, it was sometimes not possible to ascertain the suggested mycorrhizal partner down to species level, although the likely host genus is indicated. For the species collected in Tasmania, environmental sites are described by Gasparini (2001), and for New Zealand, see, e.g., Horak (1970).

TAXONOMY

Key to species described in this study

The key encompasses taxa from both regions, since past analyses have shown that several species occur both in Tasmania and in New Zealand.

1 basidiocarp entirely dry or, if weakly viscous, with bright colours and habit of *Dermocybe* **2**

basidiocarp partly or totally viscid/glutinous **17**

2 habit of *Dermocybe*, basidiocarp colourful, often bright reaction to alkalis **3**

different habit **10**

3 lamellae yellow with or without olive tones **4**

lamellae brighter red or orange **6**

4 lamellae olive yellow, cap 15–50 mm, hygrophanous mustard-yellow, stipe lemon yellow, spores 6.2–5.7 x 5.2–5.5 µm, subglobose *C. elaiops* p. 177

lamellae of different colour (at least when young) **5**

5 lamellae grey-yellow, cap 30–60 mm, yellow-brown with a faint orange tinge, margin yellow, stipe encircled by the yellow veil; spores elliptical 7.7–8.4 x 4.5–5 µm *C. orixanthus* p. 177

cap umbonate with umbo resembling a nipple, sulphur yellow, alternate with brownish circles, lamellae sulphur yellow, then orange olivaceous *C. mastoideus* p. 179

6 overall colour yellowish with orange tones **7**

colour brigher or purple **8**

7 lamellae vividly orange-yellow, cap dry, fibrillose, often cracked in circles, with an orange aspect, reaction pink with formaldehyde *C. laetelamellatus* p. 182

cap conical, hygrophanous, wax or straw yellow, lamellae orange, margin yellow *C. leucanthemium* p. 184

8 whole basidiocarp orange red, or cinnabar; spores amygdaliform or elliptical 5.9–7.2 x 4.1–5.2 µm *C. austrocinnabarinus* p. 185

Overall colour scarlet or purple **9**

9 cap scarlet or vermillon, stipe orange zoned by the scarlet veil, lamellae brown, margin cinnabar red, spores amygdaliform 5.9–7.2 x 4.1–5.2. *C. veronicoides* p. 187

cap and stipe red purple to dark blood red, lamellae blood red, spores elliptical, 5.5–6 x 3.5 µm *C. rubripurpuratus* p. 189

10 habit telamonioid, hygrophanous **11**

habit different, basidiocarps partly or entirely dry **15**

11 colour yellow or orange **12**

colour grey or bluish or brown drying slate colour **13**

12 cap yellow orange, darker at the disc and the margin with marks of hygrophaneity, veil orange, fluorescence blue *C. controversus* p. 190

part of stipe, context and mycelium bright orange, cap 10–30 mm, dull yellow *C. malosinae* p. 191

13 cap lilac or flesh coloured, margin pale lilac, becoming darker, stipe circled with white veil *C. austrotorvus* p. 191

different characters **14**

14 aspect of *C. camphoratus* Fr., equally unpleasant smell (acetylene or the like), cap pale blue, stipe lilac, veil yellow ochraceous submembranous *C. tasmacamphoratus* p. 192

cap pale to medium brown somewhat slate grey, appearing mottled, lamellae brown to sienna, stipe whitish *C. ardesiacus* p. 193

15 habit of *Rozites*, cap 60 mm. hygrophanous, brownish-yellow with a darker disk, lamellae grey-white, spores elliptical to subamygdaliform, 12.4–13.5 x 7.5–8.2 µm *C. pselioticton* p. 196

different habit **16**

16 entire fruiting body dry, some violet present in the fruit body **17**

viscidity present in some parts **18**

17 cap lilac or livid vinaceous, lamellae concolorous, stipe white with mauve velar zonings *C. rozites* p. 194

cap 15–40, fragile, mouse grey to grey-brown, lamellae violet, stipe with reddish to wine-brown girdles and tufts reminiscent of *C. spilomeus* *C. rattinoides* p. 195

18 only cap viscid or glutinous **19**

whole basidiocarp glutinaous **22**

19 stipe conpicuously turquoise-blue, cap 20–35 mm, blackish brown, lamellae blue-grey *C. rhipiduranus* p. 197

characters different **20**

20 cap red-brown tinged apricot, stipe cylindrical to clavate *C. dulciorum* p. 197

characters different **21**

21 cap not hygrophanous, mahogany brown, stipe with a marginate bulb *C. myxenosma* p. 198

cap hygrophanous, deeply orange to orange-brown, with a lacquered aspect, lamellae and stipe yellow, not bulbous, spores elliptical, 8–8.7 x 4.4–4.7 µm *C. vernicifer* p. 199

22 clamp connections absent, habit of Cuphocybe. Cap 30–50 mm grey-brown to yellow-brown, margin greyish with a violet tinge, lamellae and stipe violet, spores 12.4–14 x 6.8–7.3–8 µm, elliptic to amygdaloid *C. gymnocephalus* p. 199

clamps connections present **23**

23 spores subglobose 6.5–8.5 x 6–7.5 µm, cap 20–50 mm, yellow to blue-green, lamellae with an olivaceous hue *C. tessiae* p. 200

spores different **24**

24 species reminiscent of *C. rotundisporus*, but taste mild and spores amygdaliform 7.6–9.4 x 4.8–5.7 µm, cap greyish blue, disc reddish brown *C. pseudorotundisporus* p. 200

cap 15–40 mm dark yellow-brown to mahogany, lamellae greyish to pale brown, spores amygdaliform 9.8–10.4 x 5.2–6 µm *C. pectochelis* p. 201

Cortinarius elaiops Soop sp. nov.

Figures 3B, 5A

Pileo 15-50 mm diam., primo obtuso-globoso, deinde convexo-conico, sicco, hygrophano, helvello, ad discum olivaceobadio, interdum aurantio-lavato, minute vel impolite innato-fibrilloso, margine pallidior, olivaceolutea, striata. Lamellis primo ex olivaceoluteis pallide cinnamomeis, distantibus. Stipite aequali, procero, ad basem interdum incrassato, pallide citrino-luteo, minute fulvo-fibrilloso. Velo helvello, aurantio-rubescens, sparso. Carne pilei olivaceobadia, stipite pugnante olivaceo-fulva; odore saporeque raphanoideis. Sporis subglobosis 5.5–7 x 4.5–5.5 µm, moderate verrucosis. Reactionem ope NaOH badio rufam.

Holotypus hic designatus PDD 88271: Nova Zelandia, Southland, Milford Road, Mackay Creek, in silvis cum Nothofagete, 29th April 2006, K. Soop.

Pileus 15–50 mm diam., obtusely rounded, later convex-conical, dry, finely to rather coarsely innate fibrillose, hygrophanous, brownish-yellow with an olive-brown to olive-black disk, sometimes with an orange tinge; margin contrastingly brighter, olive-yellow, striate with darker, yellow-brown fibrils. *Lamellae* adnate, distant (L=28, l=2), olive-yellow to pale cinnamon when young, edge concolorous. *Stipe* 35–80 x 3–9 mm, tall, slender, cylindrical, often somewhat expanded at base; pale yellow to citrinous from an absorbing sheen, with sparse, thin, brownish to orange fibrils and bands. *Veil* yellow-brown, turning orange-red, sparse. *Context* olive-brown in pileus, contrastingly yellow-brown to olive yellow in stipe. *Macrochemical reactions*: NaOH warmly dark brown to red-brown on pileal surface, weakly purple-brown in context; formalin, guayac, phenol in context nil. *Odour* and *taste* raphanoid.

Spores 5.5–6.2–7(–7.3) x 4.6-5.2–5.5(–5.7) µm, Q=1.19±0.10 (n=26), subglobose, moderately verrucose. *Marginal elements* fairly crowded, clavate to vesiculose, 12–20 x 6–7 µm. *Basidia* 20–25 x 5–7 µm, 4-spored. *Epicutis* thick with parallel hyaline hyphae 7–11 µm diam., lower strata with a (pale) red-brown, vacuolar pigment. *Hypocutis* with irregular, angular, hyphal elements, up to 40 x 20 µm. *Clamp connections* present.

Habitat: Gregarious, fairly common, associated with *Nothofagus* spp.

Collections examined: New Zealand. Southland, Milford Road, Mackay Creek, 29th April 2006, PDD 88271 (holotype), KS-CO1649 (isotype); idem, Te Anau Downs, 4th May 2001, KS-CO1218; Southland, Borland Lodge Track, 25th April 2004, PDD 78777, KS-CO1425; Springs Junction, Palmer Road, 30th April 2004, KS-CO1446.

Etymology: From Greek ελαιον, olive, and -οπς, eye, due to the concentric colour pattern on the pileus.

Comments: This rather common fungus is easily recognised from its round, mustard-yellow pileus with a darker centre, reminiscent of an eye. The colour usually presents a distinct olive component. Despite its telamonioid habit the alkaline reaction of *Cortinarius elaiops* suggests an affinity to subgenus *Dermocybe*. The rather similar *C. indotatus* E. Horak yields a stronger red alkaline reaction and produces differently shaped spores. *C. paraxanthus* Soop is also similar to this species, but it has a darker and more uniformly coloured pileus, no alkaline reaction, and significantly larger spores.

Cortinarius orixanthus Soop sp. nov.

Figures 3E, 5B

Pileo 30–60 mm diam., globoso, deinde conico-convexo, viscido, hygrophano, luteo-ochraceo subtiliter aurantio-umbrato, disco obscuriore, glabro vel innato-fibrilloso, margine luteo. Lamellis primo luteo-cinereis, subconfertis. Stipite aequali vel clavato, sordide albo, luteo-cingulato. Velo luteo subviscido. Carne fusco-ochracea, interdum rubro-tacta; odore subraphanico; sapore debile. Sporis ellipsoideis, 6.5–8 x 4–5 µm, paulo verrucosis. Reactionem ope NaOH splendide aurantiam vel aurantiorufam praebet.

Holotypus hic designatus PDD 88253: Nova Zelandia, Te Anau, Totara Rest Area, in silvis cum Nothofagete, 23rd April 2006, K. Soop.

Pileus 30-60 mm diam., hemispherical, later conical-convex, viscid, glabrous to innate fibrillose, hygrophanous, warmly yellow-brown with a faint orange tinge, disk darker, weakly red-brown; margin greyish-yellow with a yellow rim, not striate. *Lamellae* moderately

Figure 1 A *Cortinarius ardesiacus*, B *Cortinarius austrotorvus*, C *Cortinarius austrocinnabarinus*, D *Cortinarius controversus*, E *Cortinarius laetelamellatus*, F *Cortinarius leucanthemium.*

crowded, yellow-grey when young. *Stipe* 40-85 x 6-8 mm, cylindrical to fusoid or clavate, dry; dirty white with yellow girdles on lower part. *Veil* yellow, fairly copious to sparse, more or less viscid. *Context* rather dark yellow-brown, sometimes with a red-brown tinge. *Macrochemical reactions*: NaOH strongly orange to orange-red on stipital veil, weaker on gills and context, dark brown on pileal surface; guayac green in context. *Odour* faintly raphanoid. *Taste* nil or slightly fetid.

Spores (6.2–)6.8–7.7–8.4(–8.7) x 4–4.5–5 µm, Q=1.70±0.16 (n=29), elliptical, weakly verrucose. *Marginal elements* crowded, clavate, 17–22 x 6–7 µm. *Basidia* 20–25 x 6–8 µm, 4-spored. *Pileipellis* with gelified hyaline hyphae 4–5 µm diam. *Epicutis* of erected hyphae 5–7 µm diam. with a yellow, epimembranal pigment. *Hypocutis* with oval, hyaline hyphal elements 20–40 x 11–20 µm. *Veil* hyphae (from stipe) gelified, saturated yellow, 4–6 µm diam. *Clamp connections* present.

Habitat: Gregarious, uncommon, associated with *Nothofagus* spp.

Collections examined: New Zealand. Te Anau, Totara Rest Area, 23rd April 2006, PDD 88253

Figure 2 A *Cortinarius mastoideus*, B *Cortinarius pseudorotundisporus*, C *Cortinarius rozites*, D *Cortinarius tasmacamphoratus*, E *Cortinarius veronicoides*, F *Cortinarius ripiduranus* (PDD 88269).

(holotype), KS-CO1614 (isotype); Taupo, Cascade Hut Track, 14th May 2001, KS-CO1262; Karamea River Track, leg. G. Gates, 9th May 2006, KS-CO1675.

Etymology: From Greek ορος, margin, and ξανθος, yellow, from the colouration of the pileus.

Comments: This species is recognised by a remarkable yellow rim on the pileus, often paired by yellow veil girdles on the stipe. It recalls *Cortinarius thaumastus* Soop in the same habitat, but it is larger and displays brighter hues. The alkaline reaction indicates an affinity to subg. *Dermocybe*.

Cortinarius mastoideus Gasparini, sp. nov.

Figures 2A, 5C

Pileo usque 25 mm lato, e conico applanato, acute umbonato, cuticola viscida, squamosa, e luteo margine infracto fimbriatoque, alternis vicibus sulphureo vel brunneo urbiculata. Lamellis haud confertis, annexis, ventricosis, sulphureis, deinde aurantio olivaceis e margine homogeneo integroque. Stipite 50 mm longo, 2 mm lato, ligneo, vix incurvato, apice e lutea pulvere asperso, aurantio olivaceo e carminei veli fibrillis ornato, basi sulphureo myceliata. Carne vitellina. Odore haud notabile, gusto amaro. Ope KOH supra cuticula coccineam reactionem, lamellis subnullam, stipite nullam,

Figure 3 A *Cortinarius dulciorum* (PDD 78797), B *Cortinarius elaiops* (PDD 88271), C *Cortinarius malosinae* (PDD 88279), D *Cortinarius gymnocephalus* (PDD 88292), E *Cortinarius orixanthus* (PDD 88253), F *Cortinarius myxenosma* (PDD 88282).

carne brunneolam praebent. Sporis ovatis, verrucosis (4.7–)6–7.4(–8.8) x (3.4–)4.1–5.4(–7.7) µm; Q = 1.2–1.6. Basidiis bi- vel tri-sporigenis 33–38 x 7–8 µm; cystidiis clavatis. Epicute haud crassa e pauce gelatinosis haud confusis hyphis 5–13 µm crassis, e terminalibus hyphis lanceolatis. Hypodermio subcellulare. Pigmento intracellulare luteo.

Holotypus hic designatus HO 522353: Australia: Tasmania, Gordon Valley, Little Florentine River, Timbs Road, B. Gasparini & D. Ratkowsky, 23rd May 2002.

Pileus diam. < 25 mm, conical, then flat, with a tiny, acute umbo on the disk. *Cuticle* viscid or tacky, scaly, umbo pink red resembling a nipple, concentrically zoned with sulphur yellow, alternate with brownish circles, margin infracted, fimbriate, yellow. *Lamellae* distant, L = 24, l = 2, annexed, 4 mm deep, obese, sulphur yellow, then orange olivaceous, margin homogeneous, entire. *Stipe* 50 x 2 mm, tough, fibrous, slightly incurved, apex (5 mm) covered by a yellow powder, yellow orange with remains of a pinkish (carmine red) veil and the base thickly enveloped in a sulphur yellow

Figure 4 A *Cortinarius pectochelis* (PDD 88278), B *Cortinarius pselioticton* (PDD 88277), C *Cortinarius rattinoides* (PDD 88283), D *Cortinarius vernicifer* (PDD 88273).

mycelium. *Context* yellow orange, in stipe medullose wax yellow. *Macrochemical reactions*: KOH dark red on pileus, subnil on lamellae, nil on stipe, brownish on flesh. A yellow pigment leaches out in solvents. *Veil* reddish. *Cortina* evanescent. *Smell*, weak, *taste* bitter.

Spores ovoid medium warty, warts rather small, densely distributed but comparatively tall and well visible over the profile, more so at the distal end (4.7–)6–7.4(–8.8) x (3.4–)4.1–5.4(–7.7) µm; Q = 1.2–1.6 (n=201). *Hymenium* margin partly fertile, *basidia* mostly 2 spored cylindraceous or clavate, 33–38 x 7–8 µm; presence of numerous sterile cells, cylindraceous or clavate; an intracellular yellow pigment lays among the hyphae of the trama becoming flame red in KOH. *Pileipellis*: epicutis cylindric hyphae, 5–13 µm diam. with some gelatinisation, slightly interwoven, often with erected terminal lanceolate cells. *Hypodermium* subcellular of broadly ellipsoid hyphae 15–30 µm broad.

Habitat: Gregarious in rain forest, *Nothofagus cunninghamii* dominant.

Collections examined: Australia: Tasmania, Gordon Valley, Little Forentine River: Timbs Road, B, Gasparini & D. Ratkowsky, 23rd May 2002, HO 522353 (holotype), PHN A20523B4 (isotype); Growling Swollett, Genevieve Gates, B. Gasparini & D. Ratkowsky, 6th June 2002, PHN A20606A8.

Etymology: From Greek μαστός, bosom, because of the nipple-like umbo.

Comments: This species is characterised by the very acute reddish nipple like umbo on an otherwise yellow, usually concentrically zoned pileus, by the sulphur yellow lamellae with an olivaceous hint, by the yellow, powdery veil, the yellow mycelium, and the bright red chemical reaction with KOH under the microscope. The strongly warted ovoid spores also characterize this species. This character is rather unusual in *Dermocybe*, whereas it is one of the distinctive characters for *Splendidi*. Further, a yellow powder stains the paper where exsiccata are kept.

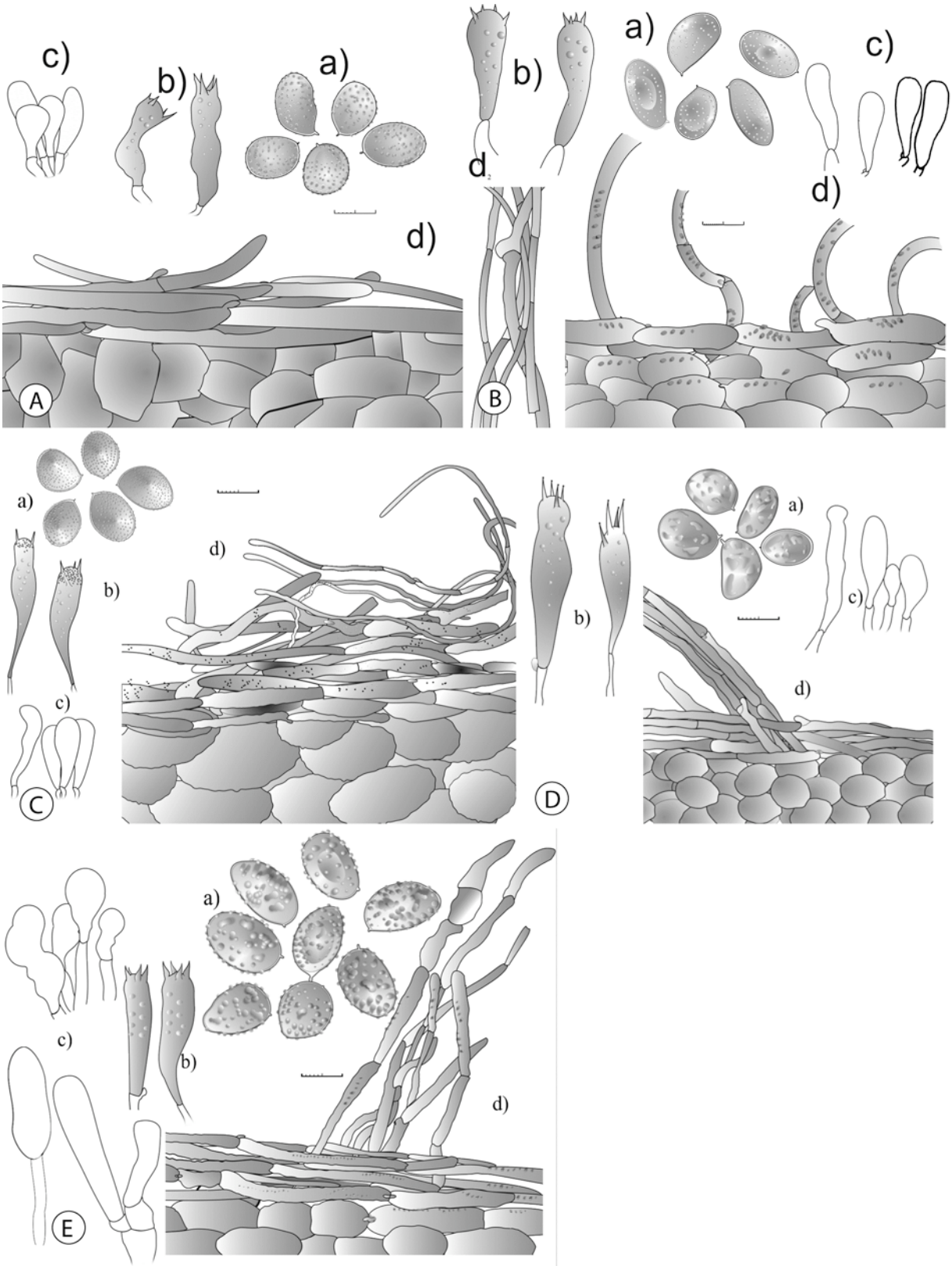

Figure 5 A *Cortinarius elaiops* PDD 88271, B *Cortinarius orixanthus* PDD 88253, C *Cortinarius mastoideus* HO 522353, D *Cortinarius leucanthemium* HO 526399, E *Cortinarius laetelamellatus* HO 544582. a) spores, b) basidia, c) cystidia and/or marginal cells, d) pileal structure, d_1) cortex, d_2) veil. Scale bars a) = 2000:1; b), c) = 1000:1; d), d_1), d_2) = 500:1.

Cortinarius laetelamellatus Gasparini, sp. nov.

Figures 1E, 5E

Pileo usque 16 mm lato acute umbonato epicute sicca, fibrillosa, saepe circiter fissa, rubra e luteis fibrillis obtecta, disco fusciore, subrunneus. Lamellis haud confertis,

ventricosis, annexis, aurantiacis, e margine denticulato. Stipite 60–70 mm longo, 3–4 mm lato, clavato, aurantiaco e crocea pruina obtecto. Carne aurantiaca, fistolosa. Velo pruinoso croceo. KOH griseam reactionem, formaldehyde purpuream praebet. Sporis ellipticis, verrucosis, (6.4–)7.3–8.6(–10.1) x (4.1–)5.4–6.3(–6.9) µm.; Q= 1.2–1.5. Hymenii margine e copiosissimis sterilibus cellulis praedito, basidiis tetrasporigenis 35–39 µ m longis, 8–10 µm crassis. Epicute e cylindraceis hyphis 4–8 µm crassis.

Holotypus hic designatus HO526399: Australia, Tasmania, Gordon Valley: Little Florentine River, Five Road, B. Gasparini & D. Ratkowsky 23rd May 2002.

Pileus diam. 16 mm, conical, acute umbonate. *Cuticle* dry, fibrillose, often cracked in circles, background reddish, covered by a thread like yellowish veil to give it an orange overall colouration, disc darker, dark brown, margin regular sometimes fimbriate with the yellow veil. *Lamellae* distant, L = 26, l=1, < 6 mm deep, ventricose, annexed to sub free, orange yellow or saffron, margin very finely denticulate. *Stipe* 60–70 x 3–4 mm, clavate, base 5 mm diam., orange, but covered by the intense pruinosity of the saffron yellow veil. *Context* orange, stipe hollow. *Macrochemical reactions*: KOH black grey on all parts, formaldehyde mauve. *Veil* saffron yellow, pruinose. *Cortina* evanescent.

Spores (6.4–)7.3–8.6(–10.1) x (4.1–)5.4–6.3(–6.9) µm.; Q = 1.2–1.5, (n=286) ellipsoid, warts somewhat irregular, sublabyrinthiform, or medium, protruding. *Hymenium*, margin almost sterile due to numerous clavate, vesiculose or cylindrical, sterile cells; *basidia* 4-spored, 35–39 x 8–10 µm. *Pileipellis*: a medium size cutis of parallel cylindrical hyphae 4–8 µm diam. *Hypodermium* indistinct, hyphae becoming broader to 20 µm. clamp connections present. The hyphae are encrusted by a yellow-brown pigment.

Habitat: Very mature eucalypt and *Nothofagus* forest.

Collections examined: Australia, Tasmania, Gordon Valley: Little Florentine River, Five Road, B. Gasparini & S. McMullen-Fisher, 23rd May 2002. HO 526399 (holotype), PHN A20523B1 (isotype); Creepy Crawly, B. Gasparini & S. McMullen-Fisher, same date, PHN A20523B5.

Etymology: from Latin, *laete*, pretty and *lamellatus*, gilled because of the gill's colour.

Comments: This *Cortinarius* is well recognised in the field by the pretty orange lamellae reminiscent of those of the northern *C. malicorius* Fr:Fr. and *C. luteostriatulus* M. M. Moser from South America, *C. aurantiellus* (E. Horak) G. Garnier and *C. egmontianus* (E. Horak) G. Garnier from New Zealand. However, *C. malicorius* has green context, orange veil and smaller spores, as well as a different habitat (Pinaceae). *C. luteostriatulus* has an orange cap with olive hues. *Cortinarius aurantiellus* has a similar size and colour to *C. laetelamellatus*, but does not show the pruinose veil, and the spores are much larger. *C. egmontianus* has a brown black cap, no evident veil and smaller spores. Another distinguishing character is the pruinose saffron coloured veil.

In the same habitat one can find *C. mastoideus* with similar colour and cracked cuticle (yet with presence of olivaceous hues), and characterised by a nipple-like umbo. Its similar spores, are, however, larger [(4.7–) 6.3–7.7(–8.8) x (3.4–)4.4–5.3(–6.1) µm]. Distinct are also the macrochemical reactions: *C. mastoideus* has a red reaction with alkalis (KOH) on its cap and no reaction with formaldehyde, while *C. laetelamellatus* reacts grey with alkalis and pink with formaldehyde.

A TLC performed by A. Gerault has shown a strong blue fluorescence at Rf 0.20 plus a red fluorescence at RF 0.45. Mass spectrography to detect the presence of orellanine was also performed, but presence of this metabolite — which could not be excluded — was not definitely detected.

The very strong blue fluorescence detected from the extract of a dry specimen shows a molecular weight of 235 amu. As orellanine and its derivatives always have an even number of nitrogen ions, the odd number seems to exclude orellanine and derivatives, but would rather suggest the presence of some nucleoside, this not being uncommon in extracts from fungi. The red fluorescence is likely to be an unidentified anthraquinonic pigment.

The morphological traits, presence of anthraquinonic metabolites, and unpublished rDNA sequence analysis places this *Cortinarius* in subgenus *Dermocybe*.

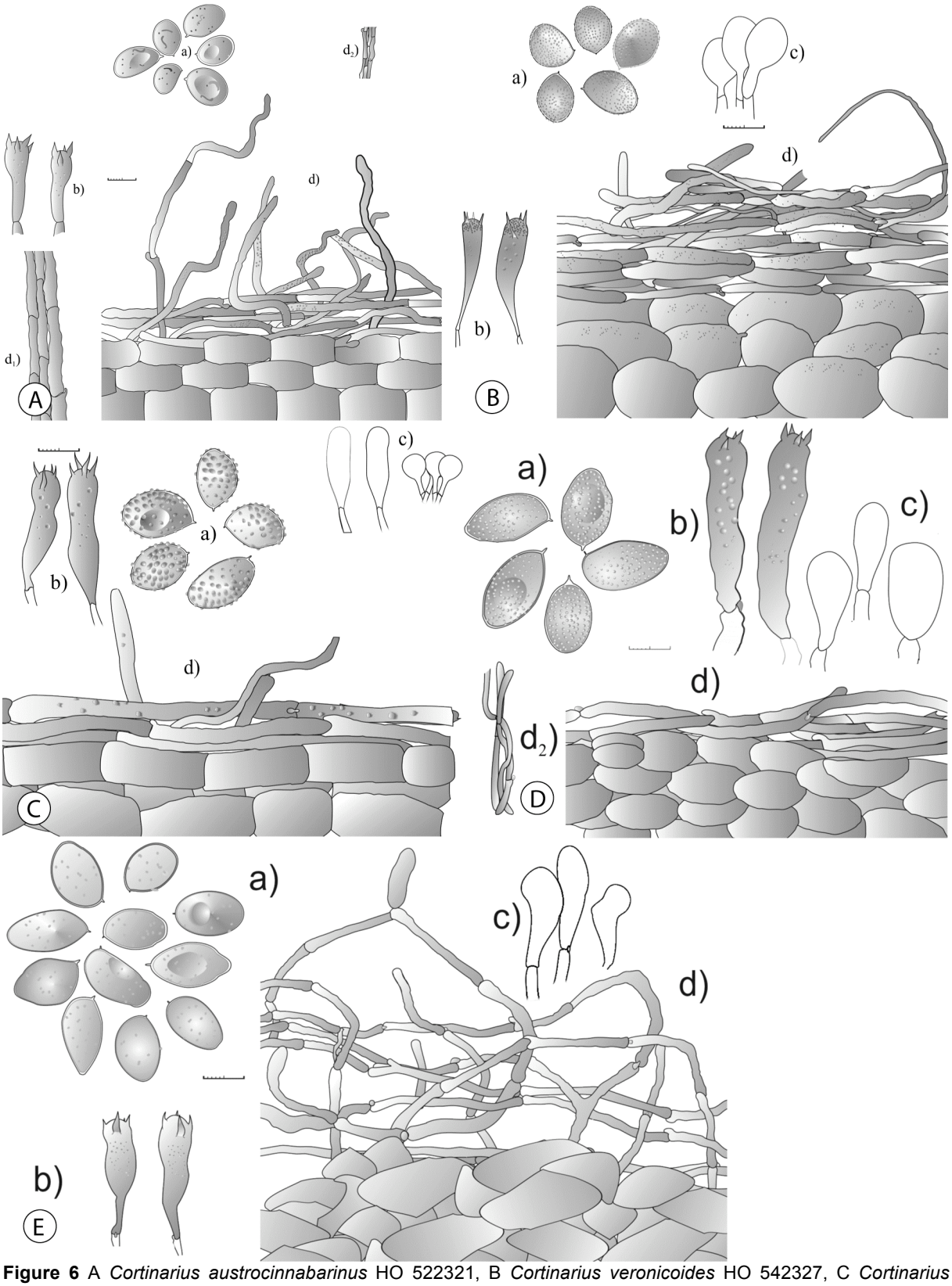

Figure 6 A *Cortinarius austrocinnabarinus* HO 522321, B *Cortinarius veronicoides* HO 542327, C *Cortinarius controversus* HO 522441, D *Cortinarius malosinae* PDD 88279, E *Cortinarius.austrotorvus* HO 526401. a) spores, b) basidia, c) cystidia and/or marginal cells, d) pileal structure, d_1) cortex, d_2) veil. Scale bars a) = 2000:1; b), c) = 1000:1; d), d_1), d_2) = 500:1.

Cortinarius leucanthemium Gasparini sp. nov.

Figures 1F, 5D

Pileo usque 18 mm lato, conico vel campanulato, e cuticola sicca, vere fibrillosa, hygrophana, cerea, aut straminea, e brunneis fibrillis striata. Lamellis distantibus, ventricosis,

annexis, aurantiacis margine luteo. Stipite 40 mm longo, 2 mm lato, e base crassiuscula, interdum fasciculato, straminea. Carne quam exteriore concolore. KOH supra cuticola brunneolam reactionem praebet. Sporis ellipticis (5.9–)6.3–7.3(–7.9) x (3.7–)4.5–5.4(–6) µm; Q = 1.3–1.5, verruculosis. Hymenii margine substerile, e copiosissimis sterilibus cellulis praedito. Basidiis 30–40 µm longis 8–9 µm crassis. Pileipelle e epicute haud crassa, hyphis cylindraceis 5–10 µm crassis.

Holotypus hic designatus HO544582: Australia, Tasmania, Mt. Wellington: Silver falls, Service Track, G. Gates, 11th May 2002.

Pileus diam. < 18 mm, conical campanulate, cuticle dry, very fibrillose, hygrophanous, wax yellow or straw yellow with pale brown striations. *Lamellae* conspicuously distant, L = 21, 2 mm deep, slightly ventricose, annexed, orange with yellow margin. *Stipe* 40 x 2 mm, terete, sometimes slightly swollen at the base, sometimes fasciculate, fibrillose, straw yellow. *Context* concolorous to the outer stipe. *Macrochemical reactions*: KOH brownish, a yellow pigment leaches out in alcoholic solution: *Veil* straw yellow. *Cortina* evanescent. *Smell* not distinctive.

Spores ellipsoid, warts very shallow and irregular (5.9–)6.3–7.3(–7.9) x (3.7–)4.5–5.4(–6) µm; Q = 1.3–1.5 (n=50). *Hymenium*: margin partly fertile with numerous sterile cells, clavate or cylindrical 9–25 µm. *Basidia* 30–40 x 8–9 µm, with long sterigmata < 7 µm and with yellowish granular contents. *Pileipellis*: thin surface layer of cylindrical or slightly inflate hyphae, 5–10 µm diam., parallel with some erected tufts. *Hypodermium* not clearly distinct, hyphae getting broader and more elliptical, 15–20 µm diam.

Habitat: wet sclerophyll with *Eucalyptus obliqua* prevailing

Collections examined: Australia, Tasmania, Gordon Valley, Little Florentine, A. Mills & D. Ratkowsky, 24th July 1997, PHN 970724A1, River Mt. Wellington: Silver falls, Service Track, G. Gates, 11th May 2002, HO544522 (holotype), PHN A20511C8.

Etymology: From λευκοϛανθεμον = daisy, from its aspect.

Comments: This is a small and pretty *Cortinarius*, resembling a yellow daisy. Distinctive are its yellow veil, the orange gills with a yellow margin, and the sterile margin of the lamellae. Its size and the type of spores suggest a position in subgenus *Dermocybe*. The size and colour suggest affinity with *C. mastoideus*, which differs by the nipple like umbo, lack of hygrophaneity, the sulphur-yellow colour of the lamellae, the straw-yellow mycelium, and the coarsely verrucose spores. It also resembles *C. laetelamellatus*, which, however, lacks the yellow margin of the otherwise orange lamellae and has larger spores [(6.4–)7.3–8.6(–10.1) x (4.1–)5.4–6.3(–6.9) µm].

Cortinarius austrocinnabarinus R.H. Jones & T.W. May *Muelleria* **26**, 81.

Figures 1C, 6A

Name misapplied: *Cortinarius cramesinus* (E. Horak) Garnier ss. Fuhrer.

Pileus diam. 30–40(–60) mm conical at first, then convex to irregularly plane. *Cuticle* dry, not hygrophanous, fibrillose, orange red, or cinnabar (vermillion), sometimes paler and then egg yolk, but always with cinnabar fibrils covering the whole of the cap, while the margin tends to a paler colour. *Lamellae* emarginated, subdistant, L = 38, l=3, 6 mm, deep, pale brown or medium brown or medium brown but cinnabar red at the margin. *Stipe* 40–70 x 8–15 mm, enlarging to a clavate base, orange with some yellow throughout or white or pale orangey yellow, the entire stalk covered with bands of cinnabar streaked velar remains. *Veil* red, zoning the stipe. *Cortina* cinnabar/orange red. *Context* concolorous to the outer side of the stipe, yellowish in the core. *Macrochemical reactions*: KOH on cap black then purplish, on context purple. NH_4OH on cap purple, on gills ink pink. In water a cinnabar pigment leaches out. *Smell* and *taste* raphanoid.

Spores very variable, amygdaliform, ellipsoid sometimes sub cylindrical, almost smooth, warts very shallow and irregular (4.8–)5.9–7.2(–9.7) x (3.3–)4.1–5.2(–6) µm; Q = 1.2–1.6, (n=246). *Hymenium* trama regular with hyphae cylindrical, parallel 4–7 µm diam., presence of a great quantity of intracellular red pigment dissolving in KOH, margin fertile, no noteworthy cystidia seen; *basidia* 4-spored 20–25 x 6–7 µm, containing yellow granules and in many cases a red pigment in the bottom half. *Epicutis* yellowish, a thin layer partly of

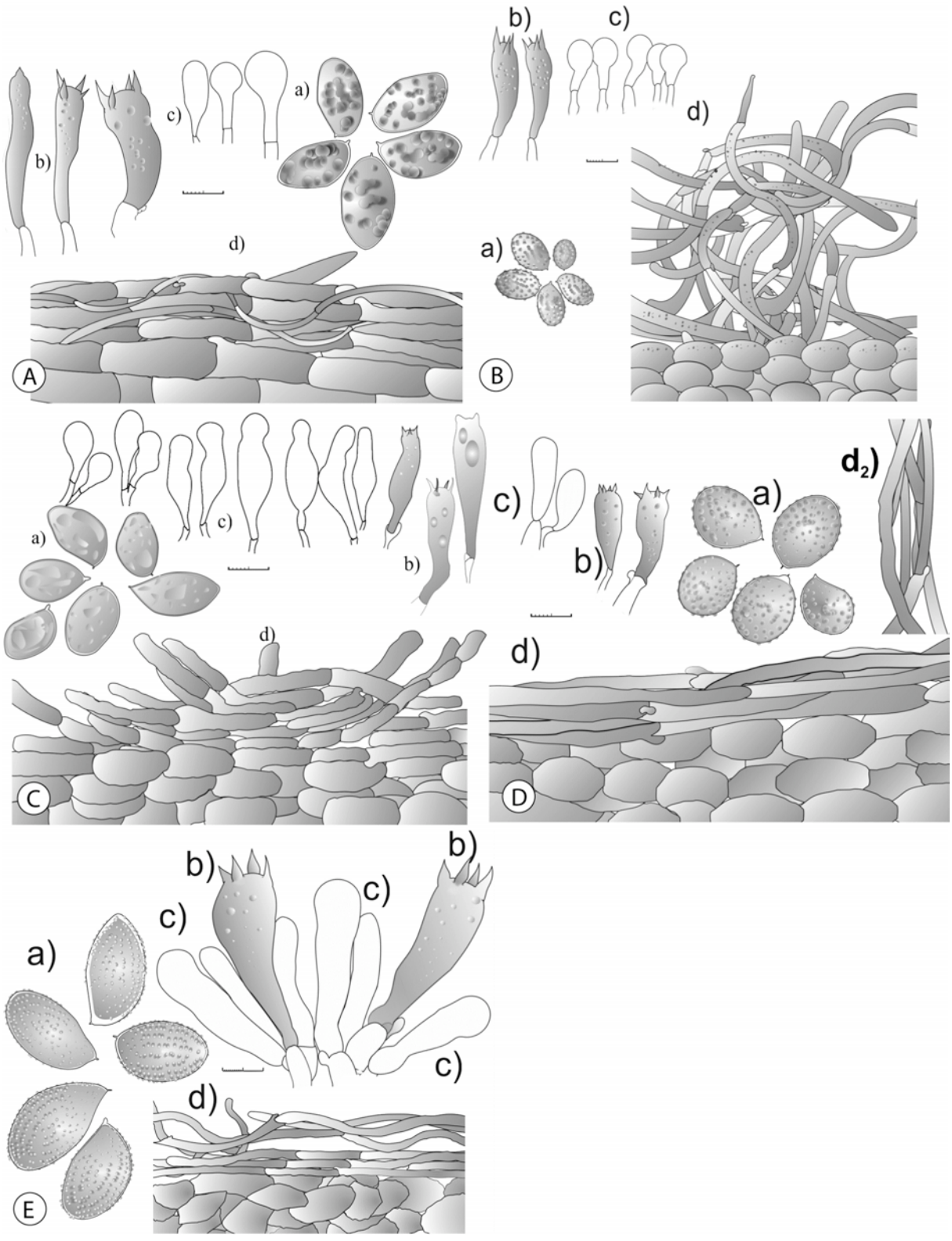

Figure 7 A *Cortinarius tasmacamphoratus* HO 522416, B *Cortinarius ardesacus* HO 542373, C *Cortinarius rozites* HO 542318, D *Cortinarius rattinoides* PDD 88283, E *Cortinarius pselioticton* PDD 88277. a) spores, b) basidia, c) cystidia and/or marginal cells, d) pileal structure, d_1) cortex, d_2) veil. Scale bars a) = 2000:1; b), c) = 1000:1; d), d_1), d_2) = 500:1.

parallel and partly of erected hyphae in tufts with round terminal cells, 4–12 µm diam., strongly encrusted with a bright yellow pigment. *Subcutis* subcellular with ovoid or barrel-shaped hyphae 15–30 µm diam.; masses of cinnabar pigment among the tissue, in KOH black purple, then soon dissolved. *Clamp connections* present throughout,

sometimes very large. *Cortex* parallel, cylindrical hyphae 6–15 µm diam. *Veil* cylindrical yellow/orange hyphae 2–2.5 µ m diam., with masses of golden or minium coloured pigment.

Habitat: Gregarious in *Eucalyptus* forests.

Collections examined: Australia: Tasmania, Lake Skinner Track, G. Gates & D. Ratkowsky, 11th April 1999, HO522321; same date, locality and legit HO522322, HO522323, PHN 990413A5 and PHN 990413A5/B; Mt. Wellington, Old Farm Trail, G. Gates, D, Ratkowsky, G. Collins & S. McMullen-Fisher, 13th April 1999, PHN 990413A4; Mt Wellington, Pelverata Falls, G. Gates & L. Cusack, 23rd May 1999, PHN 990523A1; Timbs Track¸ G. Gates & D. Ratkowsky, 18th April 2002, RPN 20020418A0.

Comments: As noted by Jones & May (2008), the description fits pro-parte *Cortinarius cramesinus* (E. Horak) Garnier, which is apparently smaller than the present species (30 mm). However the basidiocarp size is not necessarily a relevant character, as the species appears to have been found by Horak only once. It has, however, been found by the second co-author (KS) at its type locality with larger caps. The other character is the habitat of *C. cramesinus* under *Nothofagus* while the present collections were found with *Eucalyptus*. Other anatomical characters, though, conform to Horak's: particularly the cinnabar colour of the cap, the ochraceous gills and the yellow stipe, encircled with crimson belts, that are all very conspicuous characters. Even the spores (246 spores measured from our collections) seem to have the same size, shape and ornaments. Scanning electron microscopy clearly indicates a different type of spore ornamentation (Jones & May 2008). The chemical reaction (applied on dry collections with *Cortinarius austrocinnabarinus*) is similar.

This species was photographed and published by Gill (1995, p. 2), and by Fuhrer (2005, p. 61). As Gill mentioned the collection by Watling under accession number WAT 19352 at Royal Botanic Garden of Edinburgh, the voucher was obtained from the herbarium. The spores matched closely the present species and it can be concluded that it is the same taxon.

Gill (1995, p. 8–9) examined *C. cramesinus*, and WAT 19352 and found an entirely different pigmentation. The main pigment found in WAT 19352 (Gill & Giménez (1988), Gill (1990), Cotterill *et al*. (1994), Gill (1995)) is austrocorticin (orange), accompanied by austrocorticinic acid, austrocorticone and its 4-hydroxy derivatives. *Cortinarius cramesinus* pigments are cinnarubin, cinnarubinglucosyde, an unspecified violet pigment, a weak presence of physcion and doubtful presence of endocrocin. These pigments place *C. cramesinus* in the core of *Dermocybe*, sect. *Sanguinei* (Keller 1979).

The internal transcribed spacer region of the present species was also sequenced (unpublished data). Analysis suggested a taxonomic position in the core of the *Dermocybe* clade close to *C. walkeri* Cooke & Massee ss Gasparini (2007b). *C. cinnabarinus* appears to be exclusive to the Northern Hemisphere and belongs to *Telamonia*. Several other red *Dermocybe*-like *Cortinarius* found in Tasmania (i.e., *C. kula* (Grgurinovic) Gasparini, *C. persplendidus* Gasparini) appear to occupy a totally different taxonomic position (cf. Garnica *et al*. 2005) and should be included in the said article for the time being named *Splendidi*.

The conclusion is that the collections examined by Gill represent two separate species with one of them (WAT 19352) corresponding to the Tasmanian material described above and named *C. austrocinnabarinus*.

Cortinarius veronicoides Gasparini, sp. nov.

Figures 2E, 6B

Pileo usque 50 mm lato, applanato, subumbonato, cuticola sicca, hygrophana, tomentosa, coccinea vel purpurea e pallide rubro velo obtecta. Lamellis fere confertis, ventricosis, annexis, aurantiacis, e margine praeter regulare denticolato. Stipite 70 mm longo 5 mm lato, clavato vel sub bulboso e basi 8 mm crassa, armeniaco, e rubris fibrillis veli decorato. Carne stipitis concolore. Velo rubro. KOH sanguineam, ope cuticola, lamellis brunneam, purpureo violascentem stipite carneque reactionem praebet. Sporis subglobosis, 5.7–6.5–(–6.9) x 4.5(–5) µm; Q = 1.2–1.4. µm; L/Q = 1.6–2 valde verrucosis. Basidiis clavatis, tetrasporigenis, 30–32 µm longis 5–7 µm crassis. Pileipelle, parallelis cylindraceis hyphis 15–30 µm crassis. Hypodermio subcellulare e ellipticis vel subglobosis hyphis 40–80 µm longis, 18–25 µm latis. Pigmentatione e rubris crustis hyphas operente.

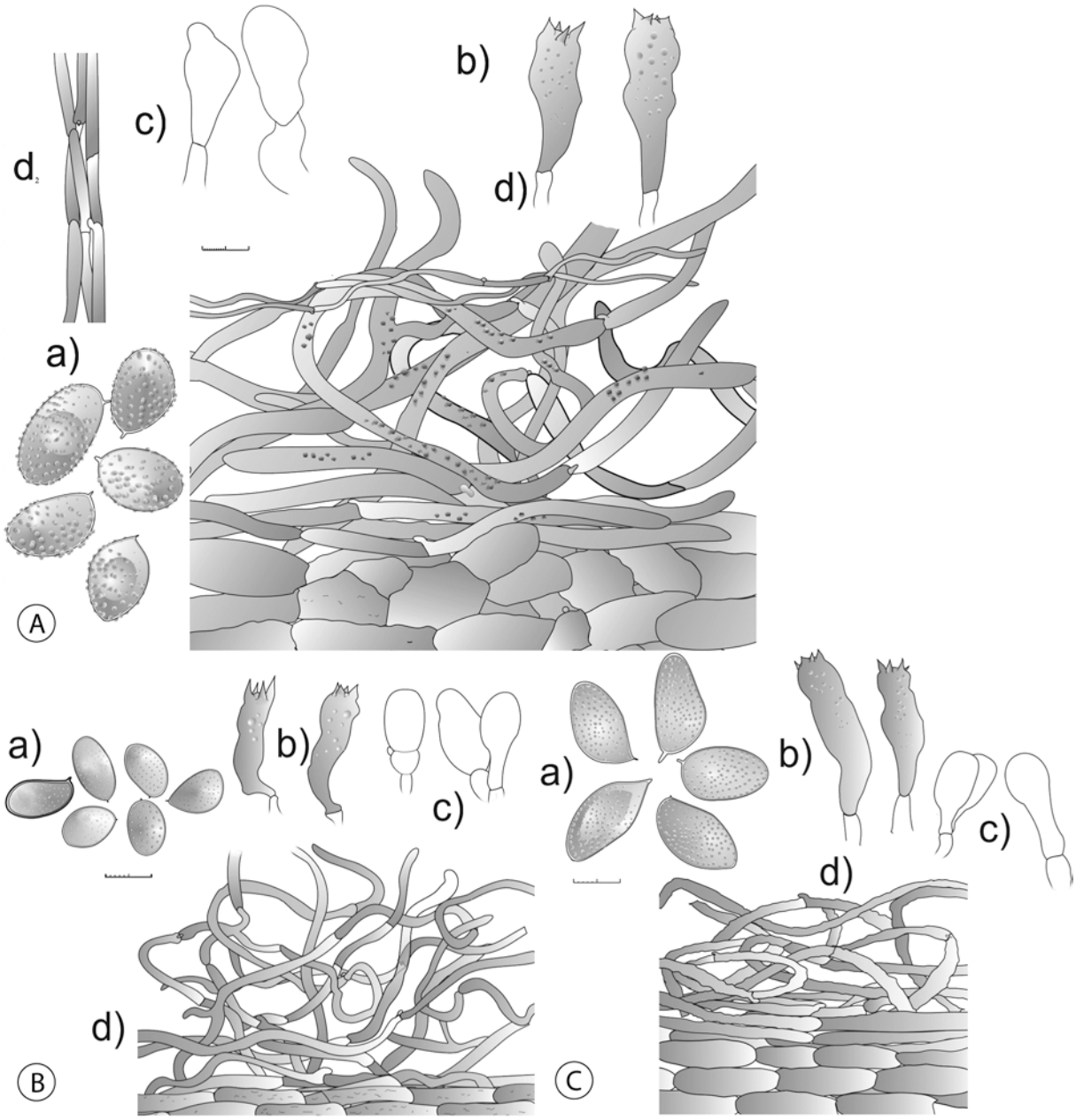

Figure 8 A *Cortinarius rhipiduranus* PDD 88269, B *Cortinarius dulciorum* PDD 78797, C *Cortinarius myxenosma* PDD 88282. a) spores, b) basidia, c) cystidia and/or marginal cells, d) pileal structure, d_1) cortex, d_2) veil. Scale bars a) = 2000:1; b), c) = 1000:1; d), d_1), d_2) = 500:1.

Holotypus hic designatus HO542327: Australia, Tasmania, Gordon Valley, Growling Swallett, G. Gates, B. Gasparini & D. Ratkowsky, 4th June 2002.

Pileus diam. < 50 mm, plane at the time of collection, slightly umbonate. *Cuticle* dry, hygrophanous, tomentose, scarlet or vermilion, decorated wit a pale hairy veil, some other times paler carmine red. *Lamellae* normally distributed, L = 47, l=1, 6 mm deep, annexed, ventricose, orange or cinnabar, margin entire. *Stipe* 70 x 5 mm, clavate, sub bulbous, base 8 mm wide, yellow or pale orange, with fibrils of the red veil, *Context* almost inexistent in cap, fibrous in stipe, concolorous with the outer part. *Macrochemical reactions*: KOH blood red on cap, brownish on gills, mauve or pale violet on context and at the base of the stipe. Fluorescence not tested. *Veil* red, fibrillose. *Cortina* evanescent. *Smell*, none, *taste* slightly bitter.

Spores almost subglobose warts very showy, medium-sized, well distributed, conspicuous in profile particularly at the distal end, 5.7–6.5–(–6.9) x 4.5(–5) µm; Q=1.2–1.4 (n=144). *Hymenium* margin fertile; *basidia* 4-spored, 30–32 x 5–7 µm, containing a lemon yellow pigment; *sterile cells* clavate. *Pileipellis*:

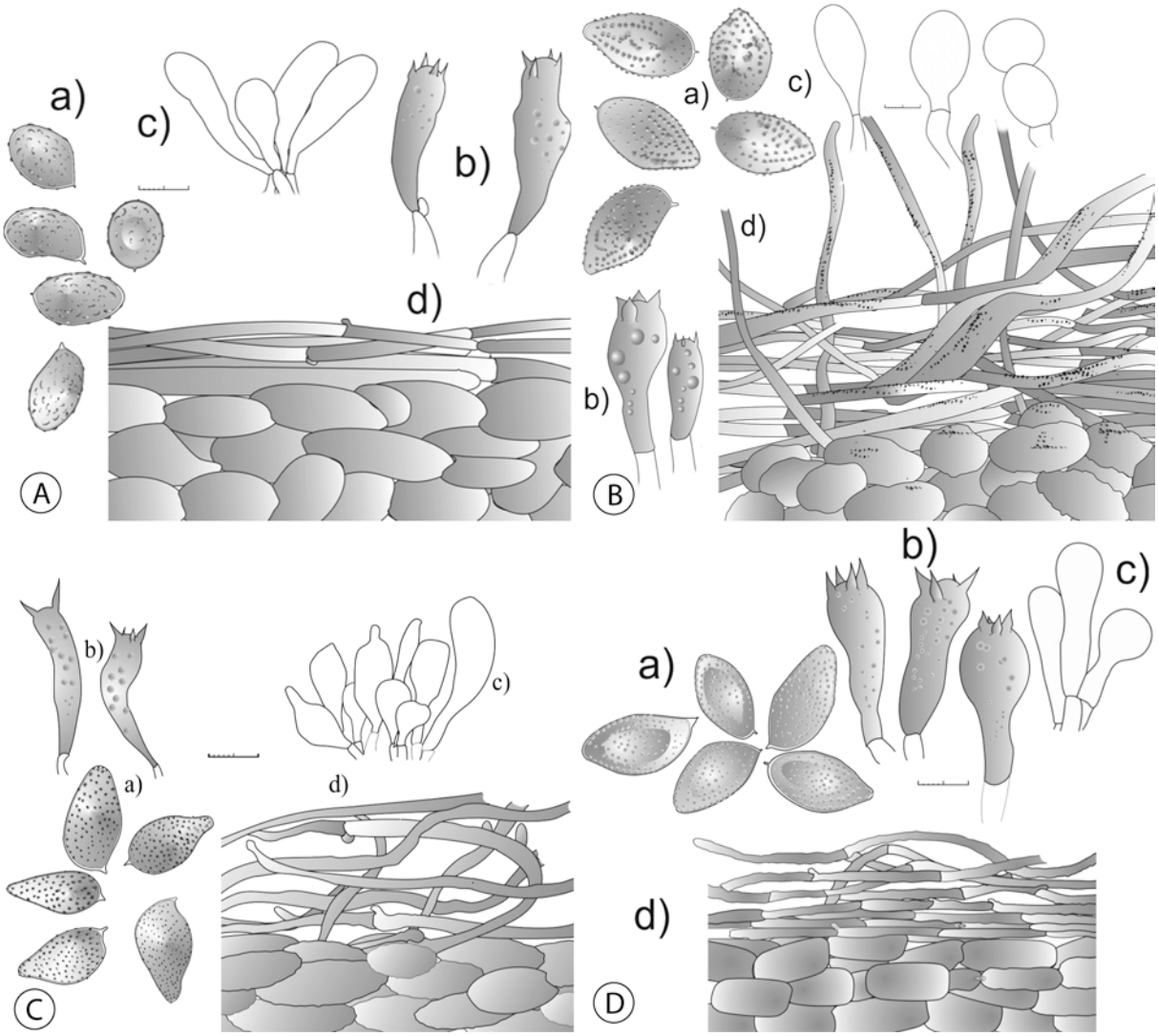

Figure 9 A *Cortinarius vernicifer* PDD 88273, B *Cortinarius gymnocephalus* PDD 88292, C *Cortinarius pseudorotundisporus* HO 522433, D *Cortinarius pectochelis* PDD 88278. a) spores, b) basidia, c) cystidia and/or marginal cells, d) pileal structure, d_1) cortex, d_2) veil. Scale bars a) = 2000:1; b), c) = 1000:1; d), d_1), d_2) = 500:1.

Epicutis, a very thin, yellow upper layer, hyphae cylindrical 5–7 µm diam., parallel often erected on the surface, surmounted by the filamentous veil hyphae 1–2.5 µm diam. *Hypodermium* subcellular; hyphae ellipsoid to subglobose 15–30 µm diam. Pigment reddish olivaceous, encrusting the hyphae. *Clamp connections* present.

Habitat: Solitary or gregarious in rain forest with *Nothofagus cunninghamii* dominant; also presence of *Eucalyptus obliqua* L'Hér.

Specimens examined: Australia: Tasmania, Mt. Wellington, Myrtle Gully, G. Gates & D. Ratkowsky, 9th June 2001, RHN 10609A0; Gordon Valley, Growling Swallett, G. Gates, B. Gasparini & D. Ratkowsky, 4th Jun 2002, HO 542327 (holotype).

Etymology: Latin *veronicae*, Greek –οειδης, of similar aspect, in reference to its likeness to *Cortinarius veronicae* Soop.

Comments: *C. veronicoides* is a brilliant, scarlet dermocyboid *Cortinarius*. In the field it is recognised by its hygrophaneity, by the tomentose red veil, the brilliant scarlet or carmine colour of the pileus, the specific chemical reaction with KOH, the small, round spores and the two layered pileipellis. The chemical reactions obtained by applying a KOH solution (blood red on cap, mauve or pale violet on context and at the base of the stipe) is similar to that of *Cortinarius veronicae*.

Cortinarius rubripurpuratus Soop nom. nov.

Basionymon: *Dermocybe purpurata* E. Horak & Gerw. Keller, in Horak, E. (1988). New species

of *Dermocybe* (Agaricales) from New Zealand, *Sydowia* **40**, p. 83; the name *Cortinarius purpuratus* R. Henry, 1985 being preoccupied.

Cortinarius controversus Gasparini, sp. nov.

Figures 1D, Plate 6C

Pileo 20–40 mm lato, e globuloso convexo, cuticola viscidula, hygrophana, fulvo aurantiaca, disco margineque fuscioribus, margine obscure radiato. Lamellis subdistantibus, 6 mm latis, annexis, cerae coloratis deinde tenue ochraceis. Stipite 80 mm longo, 5 mm crasso clavato luteo ochraceo e aurantiaci veli frustulis obtecto. Carne cerea colorata, stipite vacuo. Odore fructato vel crustuli instar, gusto mite. KOH ope cuticola sanguineam, lamellis stipiteque roseam reactionem praebet. Sporis ovatis, etiam interdum subglobosis, amydgaliformibus vel fusiformibus, (5.2–)6.2–7.3(–8.8) x (3.5–)4.5–5.5(–6.4) µm. Q = 1.2–1.5, vere verrucosis. Hymenii margine substerile e clavatis sterilibus cellulis ornato 18–21 µm longis, 7 µm crassis. Basidiis 28–32 µ m longis, 7–11 µ m crassis. Pileipelle, epicute haud crassa e cylindraceis parallelis hyphis 5–10 µm crassis. Hypodermio subcellulare e ellipticis el subglobosis hyphis 15–30 µm crassis. Intracellulare pigmentatione e vitellinis globulis.

Holotypus hic designatus HO522441: Australia: Tasmania, Gordon Valley, Little Florentine River, Timbs Road, B. Gasparini & D. Ratkowsky, 11th May 2002.

Pileus diam. 20–49 mm subglobose, then convex, cuticle dry or sticky, hygrophanous, yellow-orange darker at the disc and the margin where there are dark striations of hygrophaneity. *Lamellae* rather distant, L = 27, 6 mm deep, annexed, wax yellow, becoming light ochre. *Stipe* < 80 x 5 mm, base slightly enlarged, otherwise terete clavate, pale ochre yellow, with fibrils of the orange veil. *Context* concolorous with stipe (straw yellow). Stipe empty. *Macrochemical reactions*: KOH blood red, on cap, pinkish on gills and stipe. *Fluorescence* blue. *Veil* orange, fibrillose. *Cortina* yellowish, evanescent. *Smell* strong, sweet pastry or fruit, *taste* mild.

Spores (5.2–)6.2–7.3(–8.8) x (3.5–)4.5–5.5(–6.4) µm; Q = 1.2 1.5, (n=193) ovoid, ellipsoid or subglobose, but also fusiform or occasionally amygdaliform, warts rather coarse, sometimes subcalyptrate, evenly distributed and well showing over the profile. *Hymenium* almost sterile due to the presence of clavate or vesiculose sterile cells, 18–21 x 7 µm with occasional presence of 4-spored basidia. *Basidia* 25–32 x 7 µm. *Lamellar trama* regular hyphae cylindrical 12–14 µm. *Pileipellis*, somewhat thin layer of cylindrical hyphae 5–10 µm diam., parallel with rare round-headed terminal cells; masses of intracellular bright yellow (fulvous yellow in the deepest strata) coloured pigments among the hyphae, which are also heavily encrusted with yellow brown pigment. *Hypodermium* subcellular with hyphae cylindrical, becoming ellipsoid to subcellular in the deepest strata, 20–30 µm diam. *Clamp connections* present.

Habitat: Very abundant, gregarious to subfasciculate in wet forest with *Nothofagus cunninghamii*.

Collections examined: Australia: Tasmania, Tasman Peninsula, Duckhole Lake Track, G. Gates & D. Ratkowsky, 9th March 2002, RPN 20020309A0; Gordon Valley: Little Florentine River, Timbs Road, B. Gasparini & D. Ratkowsky, 11th May 2002, HO522441 (holotype); Growling Swallett, G. Gates, D. Ratkowsky & B. Gasparini, 11th May 2002 HO526391; Timbs Road 23rd May 2002, PHN A20523A0.

Etymology: From Latin *controversus*, controversially sharing partly telamonioid and partly dermocyboid characters

Comments: *Cortinarius controversus* is a very distinctive species with a compact basidiome, growing gregariously and abundantly along tracks in wet forests, possibly symbiotic with *Nothofagus*. The cap has a remarkable bright orange colour, while the lower parts of the basidiome are yellow. The cap is strongly hygrophanous and has a pleasant odour evocative of pastry. Also the spores are unusually small and their shape may be subglobose but also amygdaliform, coarsely or lightly verrucose. Its shape and hygrophaneity at first suggest a *Telamonia*. However, the bright colour and the chemical reaction to alkali cast some doubts. TLC performed in two different laboratories (data unpublished) arrived at the same conclusion. The extractible stock of pigments is very scarce and does not suggest the presence of anthraquinones. The presence of a blue fluorescence is not distinctive, being probably due to different

molecules, for instance nucleosides, frequently found in fungal extracts.

Cortinarius malosinae Soop sp. nov.

Figures 3C, 6D

Pileo 15–30 mm diam., conico, deinde convexo, sicco, hygrophano, helvello, juvento luteopruinato, minute innato-fibrilloso, margine substriata. Lamellis primo e cinnamomeis aurantiobadiis, distantibus et crassis. Stipite aequali, pallide luteo, subdense fibrillis aurantiis vestito. Velo aurantio vel aurantiorubro, subcopioso. Carne saturate aurantia vel aurantiolutea; odore saporeque nullis. Sporis ex ellipsoideis subamygdaloideis 8.5–10.5 x 4.5–5.5 µm, moderate vel subminute verrucosis. Reactionem ope NaOH nullam.

Holotypus hic designatus PDD88279: Nova Zelandia, Haast Pass, Blue Pools, in silvis cum Nothofagete, 4th May 2006, K. Soop.

Pileus 10–30 mm diam., conical, later convex, dry, finely innate fibrillose, young coated with a yellow frost, hygrophanous, yellow-brown, margin somewhat striate, sulcate when older. *Lamellae* notched, distant (L=14, l=2–3), thick but not veined, tan to orange-brown. *Stipe* 30–50 x 2–4 mm, cylindrical; pale yellow, coated orange with orange fibrils, sometimes densely so, base and often apex strikingly red-orange. *Veil* orange to red-orange, fairly copious; *cortina* dark yellow. *Context* saturated orange to orange-yellow. *Macrochemical reactions*: NaOH discolours the orange pigment on the stipe, turning it olive-grey, elsewhere trivial; guayac weakly green in context. *Odour* and *taste* nil.

Spores (8–)8.5–9.2–10.5 x 4.6–5.2–5.5(–6) µm, Q=1.76±0.13 (n=24), elliptic to subamygdaloid, moderately to rather weakly verrucose. *Cheilocystidia* clavate, 30-40 x 5-7 µm interspersed by smaller (20-30 µm), crowded marginal elements. *Basidia* 32–45 x 8–10 µm, 4-spored. *Epicutis* of hyaline entangled hyphae, 6–10 µm diam., lower strata with a yellow pigment. *Hypocutis* with hyphal oval elements, 30–45 x 15–25 µm. *Veil* hyphae (from stipe) yellowish 2–4 µm diam. *Clamp connections* present.

Habitat: Gregarious, fairly common, associated with *Nothofagus* spp.

Collections examined: New Zealand. Haast Pass, Blue Pools, 4th May 2006, PDD 88279 (holotype), KS-CO1664 (isotype); Te Anau, Kepler Track, 6th May 2001, KS-CO1231; Hawkes Bay, Tuai, Lake Waikareiti Track, 9th May 2001, PDD 73155, KS-CO1237.

Etymology: From Latin *malum*, apple and *sinae*, of China; that is, orange fruit, due to its conspicuous colouration.

Comments: A small telamonioid fungus easily recognised by its spectacularly orange-coloured stipe, at least at the base, and a contrastingly dull-coloured pileus. Also the context and mycelium are orange. Specimens with a duller coloured stipe resemble *Cortinarius luteinus* Soop, but may be separated by spore size.

Cortinarius austrotorvus Gasparini sp. nov.

Figures 1B, 6E

Pileo 30–40 mm lato, campanulato vel convexo, cuticola rugulosa, hygrophana, incarnata e margine lilaceo pallidescente, deinde vinoso-incarnata, lamellis confertis annexis, lilacinis, deinde brunneo-purpureis e margine vere serrato, heterogeneo (niveo) stipite < 50 mm x 5–7 mm, clavato, base crassiuscula 11 mm crassa, lilaceo apice vehementiore e copioso niveo velo circellato, carne firma, in pileo nitente, stipitis apice lilaacea, odore gustoque raphanoidibus, sporis ellipticis vel amygdaliformibus (7.8–)8–9.4(–10.3) x (4.4–)4.7–5.4(–6.9) µm; Q = 1.6–1.9, verruculosis. Hymenii margine substerile e copiosissimis cheilocystidiis versiformibus 20–35 x 6–8 µm; pleurcystidiis similibus sed parvioribus, basidiis cylindraceis 30 50 x 7 9 µm pileipelle e haud crassa epicute intextis brevibus hyphis x 4–10 µm crassis. Hypodemio subcellulare e polygonalibus vel ellipticis hyphis 18–30 µm crassis.

Holotypus hic designatus: HO526401. Australia: Tasmania, Mt. Field National Park, Tall Trees Track, 28th May 2002, G. Gates, D. Ratkowsky & B. Gasparini.

Pileus diam. 30–40 mm, campanulate then convex to plano convex, cuticle rugulose, lilac or flesh coloured, gradually lighter towards the pale lilac margin, becoming darker (livid vinaceous) due to hygrophaneity on drying. *Lamellae* crowded, L = 65, 15 mm deep, annexed, pale lilaceous, soon purple brown, margin heterogeneous, white very serrate.

Stipe < 50 x 5–7 mm, clavate, base 11 mm wide, pale lilac slightly more intense at the apex, covered by a sheath of the cottony veil. *Context* solid, off white in cap and at the base, lilac in the stipe. *Macrochemical reactions*: KOH and all other usual reagents nil. *Veil* white, zoning the stipe with ringlets, woolly. *Cortina* white, permanent. *Smell* and *taste* raphanoid.

Spores ellipsoid, very faintly ornamented (7.8 –)8–9.4(–10.3) x (4.4–)4.7–5.4(–6.9) µm; Q = 1.6–1.9, (n=50). *Hymenium* margin almost sterile due to the presence of numerous *cheilocystidia* mostly clavate or cylindrical, sometimes also pluriseptate 20–35 x 6–8 µm protruding for c. 20 µm; *pleurocystidia* similar, but generally smaller, *basidia* cylindrical, 2- or 4-spored 30–50 x 7–9 µm. *Pileipellis* a cutis formed by subentangled, cylindrical hyphae 4–10 µm diam., somewhat short, clamped elements, often forked or diverticulated with terminal cells often erected and round headed. *Hypodermium* formed by a tessellated structure of versiform (ellipsoid, polygonal) hyphae 18–30 µm diam. *Pigment* encrusting the hyphae pale brownish olivaceous.

Habitat: Gregarious in wet mixed sclerophyll, possibly in association with *Eucalyptus*

Collections examined: Australia: Tasmania, Mt. Field National Park, Tall Trees Track, 28th May 2002, G. Gates, D. Ratkowsky & B. Gasparini, HO526401 (holotype); 28th May 2002 same locality and legit, HO 526402.

Etymology: In reference to its resemblance to *C. torvus* Fr. because of the very abundant veil.

Comments: This telamoniod *Cortinarius* belongs to a group evocative of the subsection *Lilaceofolii* M.M. Moser with colours that range between lilac/blue to pink in the whole basidiocarp. This species is characterised by an incarnate (flesh colour) hue of the cap and a peronate stipe with a very strongly developed, white veil, and by the substerile margin of the lamellae occupied by abundant cystidia. Other *Cortinarius* apparently similar are commonly found in Tasmanian forests. However they exhibit some differences, like a glabrous stipe or subglobose spores. In the field they resemble *C. saturninus* Fr.

Cortinarius tasmacamphoratus Gasparini, sp. nov.

Figures 2D, 7A

Pileo 30–80 mm lato, e convexo subplano, cuticola sicca, nitente, squamosa, griseo-rosea, lilaceo tincta e cremeis vel dilute luteis squamis obtecta. Lamellis confertis saepe furcatis vel anastomatis, adnatis, dilute lilacinis. Stipite 50 mm longo, 13 mm crasso, cylindrico, vel clavato vel subbulboso, fibroso, fibrilloso, lilaceo e luteis frustulis veli obtecto. Carne firma, in pileo nitida, lilacina in stipite. Odore peculiare, molesto, Gusto amarescente. KOH ope cuticola griseam reactionem praebet. Sporis 8.6–9.6 µm longis, 5–5.8 µm latis, Q = 1.6–1.8 e superficie rugosa. Hymenii margine fertile basidiis tetrasporigenis, nonnunquam monosporigenis 30–40 µm longis 7–8 µm crassis. Copiosissimis sterilibus cellulis vesiculosis vel cylindraceis. Pileipelle haud crassa e cylidraceis parallelis hyphis 5–8(–10) µm crassis, veli 1 –2 µm crassis permixtis.

Holotypus hic designatus HO522416: Australia, Tasmanian Peninsula, Tiranna Forest Walk, G. Gates, D. Ratkowsky & B. Gasparini, 1st June 2002.

Pileus diam. 30–80 mm, convex. *Cuticle* dry, glistening, not hygrophanous, scaly, clay pink in C.I.C. colour chart, immature having the appearance of *C. alboviolaceus* Fr. i.e., micaceous, pale lilac or bluish, then pale potato peel in the middle retaining the lilac colour at the margin, or hazel nut with many appressed off white or pale yellow membranous strips of the veil scattered on the whole cap similarly to that of some *Amanita*. *Lamellae* crowded, L = 70, l = 1, 10 mm deep, often forked by the stipe or even anastomised, adnate, slightly rugulose, pale lilac, soon purple brown. *Stipe* 50 x 13 mm, almost terete, often slightly clavate bulbous, a little incurved when adult, fibrous, fibrillose, lilac all the way through, girdled with a clear yellow ochraceous submembranous veil. *Context* solid, off white in cap, lilac in stipe, centre of stipe medullose. *Macrochemical reactions*: KOH grey on cutis. *Veil* pale yellow, scaly. *Cortina* submembranous, pale yellow to whitish, abundant and persistent. *Smell* very strong and unpleasant, typical of *C. camphoratus*, may be defined as similar to goat cheese, potato peel left to ferment, acetylene, gas, or cooking turnips. *Taste* slightly bitter.

Spores ellipsoid, warts broad irregular, shallow 8.6–9.6 x 5–5.8 µm. Q= 1.6–1.8 (n=50). Hymenium margin fertile, *basidia* generally 4-spored, occasionally 1-spored, clavate, 30–40 x 7–8 µm, sterile cells clavate, vesiculose or cylindrical rarely showing over the profile. *Pileipellis*: thin layer of sub parallel, cylindrical or slightly inflated hyphae 5–8(–10) µm diam., parallel or slightly interwoven mixed with the hyphae of the veil, 1–2 µm diam. Some terminal hyphae lanceolate. *Hypodermium* indistinct the hyphae gradually getting shorter and broader < 25 µm. *Clamp connections* present.

Habitat: Solitary or gregarious in very wet forests, *Nothofagus cunninghami* (Hook.) Oersted, Vidensk being dominant.

Specimens examined: Australia: Tasmania, Wedge, G. Gates & D. Ratkowsky, 3rd July 2001, RPN 2001070301; Tasman Peninsula, Tiranna Forest Walk, G. Gates, D. Ratkowsky & B. Gasparini, 1st Jun 2002, HO522416 (holotype); Duckhole Lake Track, G. Gates, D. Ratkowsky & B. Gasparini, 6th Jun 2002, HO522405.

Etymology: In reference to its resemblance to *Cortinarius camphoratus* Fr. and to its growing in Tasmania.

Comments: A true "*Sericeocybe*" of the Southern Hemisphere, this species possesses a remarkable likeness to *Cortinarius camphoratus* Fr., which grows in the conifers of the Northern Hemisphere — another example of homomorphism. On collection it exhibits the same colour (albeit a little duller), the same veil, the same odour, very similar spores and equally single pileipellis. The lamellae are pale lilac at the beginning, but, unlike *C. camphoratus*, soon turn brown. Other distinctive characters are the dull grey lilac colour all over and the yellowish veil. Unmistakable is the strong, unpleasant smell shared by very few other species of *Cortinarius*. It shares this odour with the New Zealand species *C. dysodes* Soop, which is also macroscopically similar.

Cortinarius ardesiacus Gasparini, sp. nov.

Figures 1A, 7B

Pileo 60–90(–120) mm lato, e convexo applanato, cuticola sicca, hygrophana, brunneola, sicca ardesiaca, e obscuris fibillis insitis ornata. Lamellis confertis, adnatis vel emarginatis, brunneolis vel ochraceis, senescentibus brunneis. Stipite 30–70 mm longo 15–18 mm lato, clavato vel subbulboso, basi < 30 mm lata, niveo vel lacteo. Carne in stipite sordida, in pileo brunneola. Sporis ellipticis vel ovi instar (5.6–)6.7–8.3(–9.8) x (3.6–)4.3–5.4(–6.4) µm; Q = 1.4–1.7. Basidiis tetrasporigenis 32–40 µm longis; cystidiis vesicculosis vel cylindraceis. Pilipelle, epicute gelatinosa e confusis hyphis 4–6 µm crassis e luteo pigmento incrustatis. Hypodermio subgloboso, e ellipticis hyphys 20 µm crassis.

Holotypus hic designatus HO542373. Australia, Tasmania, Mt. Wellington, Fern Glade, D. Ratkowsky, 27th April 1996.

Pileus diam. 60–90(–120) mm convex, then becoming flattened or irregularly plane, sometimes retaining a broad central umbo into maturity. *Cuticle* dry, fibrillose, hygrophanous, pale to medium brown with some slate grey hues with dark narrow fibres, appearing mottled due to irregularly embedded darker fibres, radiating towards the margin, which appears concolorous to the rest of the cap, sometimes fimbriate due to the veil remnants. Soon smooth with a lead colour, which it retains on drying. *Lamellae* adnate to emarginate, crowded, L = 90, l = 2, pale brown to sienna when young, later deep chocolate brown. *Stipe* 30–70 x 15–18 mm narrower at the apex, clavate to sub bulbous, with base < 30 mm, smooth or with brownish fibrils of the veil, in patches along the whole length, whitish to cream. *Veil* brownish, cortina white fugacious. *Context* brownish in cap, white to watery in stipe. *Macrochemical tests*: KOH nil (blackish) on all parts. *Smell* and *taste* inconspicuous.

Spores (5.6–)6.7–8.3(–9.8)x (3.6–)4.3–5.4(–6.4) µm; Q = 1.4–1.7 (n=280), ellipsoid to ovoid with warts medium, well distributed and conspicuous in profile. *Hymenium* margin fertile, sterile cells and *cystidia* present, spheropedunculate or cylindrical 35–40 x 7–8 µm. *Pileipellis* slightly gelatinised upper stratum of cylindrical hyphae 4–6(–9) µm diam., strongly interwoven, encrusted by a yellow pigment. *Hypodermium* subcellular or tessellated, hyphae polygonal, ellipsoidal to subglobose 20 µm broad. *Clamp connections* abundant.

Habitat: Large, telamoniod, gregarious, sometimes fasciculate in dry and wet

sclerophyll presumably associated with *Eucalyptus* sp.; common.

Collections examined: Australia, Tasmania, Mt. Wellington, Road between Waterworks Reserve and Ridgeway, A. V. Ratkowsky, 18th April 1994, PHN 940418A0; Knoklofty, D. Ratkowsky, 24th July 1994, PHN 940724A0; between Waterwork Reserve and Ridgeway, A. May Ratkowsky, 27th April 1996, HO542373 (holotype), PHN 960427A1 (isotype); Fern Glade, D. Ratkowsky, 19th April 1997, PHN 970419A0; Pillinger Drive to Fern Glade Track, D. Ratkowsky, 25th April 1997, PHN 970425A5; nr. Junction of Betts Vale Track and Circle Track, D. Ratkowsky, 24th April 1998, PHN 980424A0; Tasman Peninsula, Kermandie Falls, G. Gates, P. Pratt, F. Lewis, L. Bishop & D. Ratkowsky, 30th March 1999, PHN 990330A0.

Etymology: from Latin *ardesia*, slate, because of the colour it acquires when drying.

Comments: The species is fairly common in dry and wet sclerophyll forest and it is characterised by the medium size, the mottled brown cap, becoming a peculiar slate colour upon drying and finally leaden grey, vaguely suffused in pink. The ochraceous, crowded gills and the fairly small, ovate, well ornate spores are further distinguishing characters. The description partly fits *Cortinarius areolato-imbricatus* Clel., but the cap of the latter does not dry to a leaden colour. Further its spores are much larger [8.6–9.7(–10.5) x (3.6–)4.6–5.6 µm; Q = 1.8] with a more slender profile and the cheilocystidia have a different profile (fusoid to fusoid ventricose, cylindrical or subcapitate).

Cortinarius rozites Gasparini, sp. nov.

Figures 2C, 7C

Pileo usque 60 mm lato, convexo, obtuse umbonato, margine recurvato. Cuticola in juventute viscidula, deinde sicca, squamosa, lilacea vel purpurea, deinde brunneo-ochracea, margine lilaceo. Lamellis tenuibus, 5 mm latis, subconfertis, adnatis vel emarginatis, quam pileo concoloribus vel pallidioribus, in aetate griseo-ochraceis. Stipite 90–100 mm longo, 13–15 mm crasso, basi crassiore usque 25 mm, clavato, niveo, e viperae corio reminiscente azureo velo peronato. Carne in pileo stipiteque nivea caerulescente. KOH ope cute pileoque aurantiacam reactionem praebet. Sporis ellipticis, haud verrucosis (5.6–)7.1–9(–11.2) x (3.8–)4.8–5.7(–7.2) µm, Q = 1.3–1.7. Hymenii margine substerile, copiosissimis variiformibus cystidiis (18–)20–35 µm longis, 7–10 µm latis, basidiis cylindraceis, tetrasporigenis 25–35 µm longis, 7–8 µm latis. Pileipellis, epicute media e breviseptatis cylindraceis hyphis 7.5–12 µm crassis, parallelelis frequentibus pilis erectis. Hypodermio haud distincto.

Holotypus hic designatus HO542318: Australia: Tasmania, Kermandie Falls, Lower Track, G. Gates & D. Ratkowsky, 30th May 2000.

Pileus diam. < 60 mm, convex, in age with a round dome on the disc, margins slightly incurved, *Cuticle* tacky in the young collections, intensely shaggy, squamose, the elongated fibrils coalescing to form pyramids, which extend from the disc to the margin, lilac or livid vinaceous, red purple or magenta, later ochre brown with mauve showing at the margin. *Lamellae* thin, 15 mm deep, fairly crowded, adnate/emarginate, margin almost plane, concolorous with cap or slightly paler, later greyish ochre for maturing of the spores. *Stipe* 90–100 x 13–15 mm near the apex the narrowest point, 20 mm broad near the central area, 25 mm broad at the expanded, claviform base, white, peronate below the cortinal ring with snake skin like markings of the veil. *Veil* lilac, peronating the stipe, *cortina* abundant and permanent leaving a pseudoannulus c. ⅔ up the stipe. This annulus though — not very infrequent in *Cortinarius* — has a webby texture, not being membranous as typical in *Rozites*. *Context* in pileus white with a faint lilac hue, in stipe white with lilac imbued. *Macrochemical reactions*: KOH orange on cap and stipe. *Smell* insignificant. *Taste* mild.

Spores (5.6–)7.1–9(–11.2) x (3.8–)4.8–5.7(–7.2) µm, Q = 1.3–1.7 (n=322) ellipsoid, sometimes ovate or pip-shaped, warts shallow, smallish irregularly distributed. *Hymenium* margin substerile, due to the presence of claviform or cylindrical, sub lageniform, subcapitate sometimes even vesiculose *cystidia*, (18–)20–35 x 7–10 µm, *basidia* cylindraceous, 4-spored, 25–35 x 7–8 µm. *Pileipellis*, *epicutis* a medium deep layer of short hyphae 7.5–12 µm diam., cylindrical or slightly inflate, often arquate; frequent erected hairs, ending on round or pointed terminal cells. *Hypodermium* indistinct formed by broadly ellipsoid or polygonal hyphae 15–30 µm diam. Masses of a chrome yellow pigment present among the tissues. *Cortex*, cylindrical

hyphae 8–15 µm diam., parallel. *Veil* hyphae filamentous 3–5 µm diam., clamped.

Habitat: Gregarious in very wet forests or rain forests, possibly associated with *Nothofagus*.

Collections examined: Australia: Tasmania, Kermandie Falls, Lower Track, G. Gates, S. McMullen-Fisher & D. Ratkowsky, 12th May 1999, PHN 990512A1; G. Gates & D. Ratkowsky, 30th May 2000, HO542318 (holotype); G. Gates & D. Ratkowsky, 29th May 2001, PHN A10529A0.

Etymology: in reference to the aspect of a *Rozites* at first glance.

Comments: An extraordinary *Cortinarius*, which has the aspect of fungi formerly placed in the genus *Rozites*. This genus was described as distinct from *Cortinarius* mainly by the presence of both veils being membranous. In our view, however, there are other aspects of this group, which makes them recognisable in the field. The habit is gymnopiloid or pholiotoid rather than tricholomoid, collyboid or galerinoid, and the cap is typically shaped as a dome or a parson's hat or a Chinese farmer's hat. These characters are however only useful for an informal identification, since they have proved to be convergent in fungi that do not possess a close affinity (Peintner *et al*. 2002a, 2002b). The partial veil of *C. rozites* is, however, cortinate. This *Cortinarius* has a beautiful purple cap and a white stipe. Distinctive is the blue veil zoning the stipe and splitting into an armilla at the level of the cortinal annulus. This feature evokes the genus *Stephanopus* M.M. Moser & E. Horak, which, however, has otherwise different characters both macroscopically — *Stephanopus* has a stropharoid habit, membranous partial veil and gelatinised cap — and, microscopically, citriform spores as well as the presence of both cheilo- and pleurocystidia.

In common parlance we should say that *C. rozites* is an *Inoloma*. This taxon is illegitimate as it is considered a superfluous synonym of *Cortinarius*, which is the autonym (McNeill *et al*. 2006, art. 22.1 and 22.3) of the genus. Further, being characterised by a dry, non-hygrophanous basidiocarp, it includes a number of species reciprocally unrelated. The species is in no way related to subgenus *Cortinarius* nor with subgenus *Sericeocybe* P.D.Orton. The latter has been questioned both by taxonomists and by geneticists and its type (*C. alboviolaceus* Pers.:Fr.)Fr. allegedly belongs to subgenus *Telamonia* (Fr.) Trog. (Melot 1990, Peinter 2004).

Without a DNA study, awarding this species a taxonomic position is merely guess work.

Cortinarius rattinoides Soop sp. nov.

Figures 4C, 7D

Pileo 15–40 mm diam., conico vel globoso, deinde campanulato-plano, sicco, hygrophano, fragile, cinereo-brunneo, ad discum subrufo, impolito, e irregularibus rubris fibrillis ornato, margine testaceo-fimbriato, aetate lacerato. Lamellis primo intense at fugaciter obscure violaceis, subdistantibus. Stipite aequali, subgracile, iuveni argenteo-violaceo, demum sordide albo, rufo vel vinaceo-cincto e margine fimbriata. Velo testaceo, mox rufo, subcopioso; cortina grisea. Carne saturate et obscuriter violacea, mox griseo-brunnea, fragile; odore saporeque debilibus. Sporis subglobosis, 6.5–8.5 x 5.5–6.5 µm, moderate usque subgrosse verrucosis. Reactionem ope NaOH nullam.

Holotypus hic designatus PDD 88283: Nova Zelandia, Canterbury, near Klondyke Rest Area, in silvis cum Nothofagete, 7th May 2006, K. Soop.

Pileus 15–40 mm diam., hood-shaped to subglobose, later campanulate to plane, dry, irregularly and coarsely reddish fibrillose, hygrophanous, fragile, mouse-grey to grey-brown, more red-brown on disk, young with a violet tinge around it; margin with brick-red tufts or brown fibrils, strongly fimbriate, when old lacerate. *Lamellae* rather distant, sinuate but not thick, intensely dark violet, soon evanescent. *Stipe* 40–75 x 2–5 mm, cylindrical, slender; young silvery violaceus, later dirty white with reddish to wine-brown girdles and tufts, apex white. *Veil* brick-red, soon brownish-red, fairly copious; *cortina* grey, rudimentary. *Context* deeply dark violet, soon grey-brown, brittle. *Macrochemical reactions*: NaOH nil in all parts. *Odour* nil to vaguely raphanoid. *Taste* nil to somewhat bitter.

Spores (6–)7–7.5–8.4(–8.7) x 5.5–6–6.5(–6.8) µm, Q=1.24±0.10 (n=27), subglobose, moderately to rather coarsely verrucose. *Marginal elements* scattered, clavate, 15–25 x 5–7 µm. *Basidia* 20–25 x 7 µm, 4-spored. *Epicutis* of rather thin, repent, hyaline hyphae 7–11 µm diam. *Hypocutis* with rounded-cylindrical hyphal elements 35–55 x 20–27 µm.

Veil hyphae (from stipe) pale yellow-brown to greyish-pink, 6–10 µm diam. *Clamp connections* present.

Habitat: Gregarious, uncommon, associated with *Nothofagus* spp.

Collections examined: New Zealand. Canterbury, near Klondyke Rest Area, 7th May 2006, PDD 88283 (holotype), KS-CO1673 (isotype); Hawkes Bay, Tuai, Lake Waikareiti Track, 11th May 2001, KS-CO1248; idem leg. P. Marstad, 10th May 2001, KS-CO1220, PM90-01; Taupo, Kiko Track, 6th May 2004, PDD 78799, KS-CO1462.

Etymology: From its resemblance to *C. rattinus*, growing in the same habitat.

Comments: A greyish, fragile fungus with a pileus that rapidly gets furrowed and torn at the margin ("scare-crow look"). Very young collections display an evanescent, dark violet colour in the context and gills. The veil is distinctly reddish similar to that of the boreal species *Cortinarius spilomeus* (Fr.:Fr.) Fr. in section *Anomali* Konrad & Maubl., characterised by subglobose spores and a coloured veil. In this section *C. rattinoides* is also close to several South-Pacific taxa, notably *C. suecicolor* Soop, described from New Zealand, and to the Tasmanian species *C. sclerophyllarum* Gasparini, which also occurs in New Zealand.

Cortinarius pselioticton Soop sp. nov.

Figures 4B, 7E

Pileo 30–60 mm diam., globoso, deinde convexo-plano, viscido, hygrophano, helvello, disco obscurior, aetate griseobrunneo, subgrosse innato-fibrilloso, margine cano-vergente, leviter striato-sulcata. Lamellis primo griseo-albis, subconfertis. Stipite aequali vel leviter clavato, albo, fulvescente; e tenui, pendente, striato anulo. Velo ochraceo, subcopioso. Carne luteoalba, ad stipitis basem obscurior; odore saporeque nullis. Sporis ex ellipsoideis vel amygdaloideis 11.5–13.5 x 7–8.2 µm, moderate verrucosis. Reactionem ope NaOH supra cute veloque distincte at leviter rufam.

Holotypus hic designatus PDD 88277: Nova Zelandia, Southland, Borland Lodge Track, in silvis cum Nothofagete, 1st May 2006, K. Soop.

Pileus 30–60 mm diam., hemispherical, later convex to plane, viscid, rather coarsely innate fibrillose, hygrophanous, brownish-yellow with a darker disk, grey-brown when older; margin more greyish, weakly striate to sulcate. *Lamellae* moderately crowded (L = 50, l = 2–3), free, greyish-white when young, edge concolorous. *Stipe* 55–100 x 6–11 mm, cylindrical to weakly clavate, dry; white, flushing yellow-brown from base with time, provided with a thin, pendulous, grey-white, striate collar that flushes brown. *Veil* yellow-brown, rather copious. *Context* yellowish-white, darker in stipe-base. *Macrochemical reactions*: NaOH weakly but distinctly red to brownish-red on pileal surface and stipital veil, elsewhere nil; guayac strongly blue-green in context. *Odour* and *taste* nil.

Spores (11–)11.5–12.4–13.5(–13.8) x (6.8–)7–7.5–8.2 µm, Q=1.67±0.12 (n=27), obtusely elliptic to subamygdaloid, moderately verrucose, weakly dextrinoid. *Marginal elements* crowded, clavate, many of which may be qualified as cheilocystidia, 40–50 x 10–15 µm, often subcapitate. *Basidia* 40–50 x 13–15 µm, 4-spored. *Pileipellis* with a thin layer of gelified hyaline hyphae 2–3 µm diam. *Epicutis* of irregular hyphae 3–4 µm diam., lower strata with a greyish-yellow, vacuolar and granular pigment. *Hypocutis* with ovoid, sometimes more angular, hyphal elements, 20–40 x 12–15 µm, with a greysh-yellow pigment. *Veil* hyphae (from stipe) 4–6 µm diam. *Clamp connections* present.

Habitat: Gregarious, uncommon, associated with *Nothofagus* spp.

Collections examined: New Zealand. Southland, Borland Lodge Track, 1st May 2006, PDD 88277 (holotype), KS-CO1660 (isotype); Taupo, Te Iringa Track, 12th May 2001, KS-CO1252; Lewis Pass, Lake Daniel Track, 1st May 2006, KS-CO1686; Lake Gunn Track, 25th April 2008, PDD 94008, KS-CO1750.

Etymology: From Greek ψελιον, bracelet, and τικτω, create, due to the conspicuous collar on the stipe.

Comments: A rather colourless *Cortinarius* with a stipital collar, in habit and hue somewhat recalling an *Armillaria*. It somewhat resembles *C. submeleagris* Gasparini from Tasmania, another species of *Rozites* morphology, but this is darker with smaller spores. The rather similar *C. elacatipus* E. Horak *et al*. (= *Rozites*

fusipes E. Horak) displays warmer orange-fulvous tints on the pileus, and produces no alkaline reaction, while *C. rugosiceps* (E. Horak & Taylor) E. Horak *et al*. is darker with orange-coloured lamellae.

Cortinarius rhipiduranus Soop sp. nov.

Figures 2F, 8A

Pileo 20–35 mm diam., obtuse globoso, deinde convexo, viscido, haud hygrophano, atro-brunneo olivaceo-umbrato, iuveni ochropallido maculato, fimbriato fibrillosoque. Lamellis primo griseo-caesiis, subdistantibus. Stipite aequali, splendide caeruleo, deorsum pallide luteo-fimbriato. Velo pallide ochraceo, subcopioso; cortina alba. Carne ex obscuriter caerulea atroviride; odore saporeque debilibus. Sporis ellipsoideis, 8.2–9.3 x 5.2–6 µm, moderate verrucosis. Reactionem ope NaOH supra cute carneque rubram.

Holotypus hic designatus PDD 88269: Nova Zelandia, Te Anau, Kepler Track, in silvis cum Nothofagete, 28th April 2006, K. Soop.

Pileus 20–35 mm diam., obtusely rounded, later convex to plano-convex, viscid, when young partly covered by pale ochre spots, tufts and fibrils from the universal veil, otherwise glabrous to finely innate fibrillose, not hygrophanous; disk blackish-brown with an olive tinge, margin concolorous with pale-ochre tufts, not striate. *Lamellae* narrowly emarginate, rather distant (L = 4, l = 2), blue-grey when young, edge slightly paler. *Stipe* 25–50 x 2–8 mm, cylindrical to slightly clavate, surface dry, partly hollow deeply turquoise-blue, somewhat shimmering on upper half, flushing brown below with pale yellow tufts, apex pale blue. *Veil* pale ochraceous, often copious; cortina white to yellowish grey. *Context* dark blue-green to blackish green, more violaceous in stipe-base. *Macrochemical reactions*: NaOH red on pileus surface and context, else trivial; lugol brownish to reddish-violet; guayac weakly yellow-green in context. *Odour* faint. *Taste* nil.

Spores (7.3–)7.6–8.4–9.3(–9.8) x 5–5.6–6(–6.2) µm, Q=1.52±0.11 (n=29), elliptic, moderately verrucose. *Marginal elements* clavate, 20–30 x 5–8 µm. *Basidia* 25–35 x 6–8 µm, 4-spored. *Pileipellis* with gelified hyaline hyphae 2–3 µm diam. *Epicutis* of entangled hyphae 2–5 µm diam., often brownish-yellow granulose and encrusted. *Hypocutis* with ovoid to rectangular hyaline hyphal elements 12–35 x 8–15 µm. *Veil* hyphae (from stipe) hyaline, 5–6 µm diam. *Clamp connections* present.

Habitat: Gregarious, rare, growing associated with *Nothofagus* spp.

Collections examined: New Zealand. Te Anau, Kepler Track, PDD 88269 (holotype), 28th April 2006, KS-CO1645 (isotype); Te Anau, Totara Rest Area, 4th May 2001, KS-CO1217; St Arnaud Range, 3rd May 2008, PDD 94033, KS-CO1781.

Etymology: In honour of *Rhipidura fuliginosa*, the fantail bird with a similar colouration; a loyal companion in the New Zealand forest.

Comments: A striking but uncommon *Phlegmacium* in section *Purpurascentes* with a spectacular turquoise or steel-blue tint in the context and on the stipe. *Cortinarius rhipiduranus* is morphologically close to *C. kaimanawa* Soop, the two species sharing a violaceous context but differing in pileus colour and spore size. Other macroscopically similar species, such as *C. chalybaeus* Soop, can be separated from *C. rhipiduranus* by the colour of the context, smell, and alkaline reaction.

Cortinarius dulciorum Soop sp. nov.

Figures 3A, 8B

Pileo 40–65 mm diam., globoso, deinde convexo, viscido, haud vel parum hygrophano, armeniaco-rufo, glabro vel minuter innato-fibrilloso, margine pallidior, subfulva. Lamellis primo albis, subconfertis. Stipite ex aequale clavato, albo, juvento subdense alboperonato. Velo albo, sparso vel subcopioso; cortina alba. Carne subalba, molli; odore subforte melleo; sapore debile grato. Sporis ellipsoideis, 5.5–7 x 3.5–4.5 µm, parum verrucosis. Reactionem ope NaOH rosatam rufam.

Holotypus hic desigatus PDD 78797: Nova Zelandia, Taupo, Kiko Track, in silvis cum Nothofagete, 6th May 2004, K. Soop.

Pileus 40–65 mm diam., hemispherical, later convex, viscid, glabrous to very finely innate fibrillose, not or weakly hygrophanous, warmly red-brown with a mahogany or dark apricot hue; margin paler, more yellow-brown. *Lamellae* moderately crowded (L = 68), white when young. *Stipe* 40–70 x 6–15 mm, cylindrical to clavate (–20 mm diam.); white, young peronate from a rather thick white coating, sometimes terminating in an

adpressed collar. *Veil* white, sparse to fairly copious; *cortina* white. *Context* soft, white, vaguely brown in pileus. *Macrochemical reactions*: NaOH pink with a yellow tinge in context, brownish-red on pileal surface, else nil; guayac weakly grey-green. *Odour* rather strong, melleous. *Taste* faint, rather pleasant.

Spores (5.2–)5.5–6.2–7(–7.3) x 3.5–3.9–4.5 µm, Q=1.58±0.15 (n=27), elliptic, weakly verrucose. *Marginal elements* clavate, 14–20 x 5–7 µm, the shorter ones often with a wide base, more or less trapezoid. *Basidia* 18–28 x 8 µm, 4-spored. *Pileipellis* with gelified hyaline hyphae 3–5 µm diam. *Epicutis* of a few layers of repent hyphae 3 µm diam. with brownish contents. *Hypocutis* with hyphal elements up to 45 x 12 µm. *Veil* hyphae (from pileus) hyaline, 4–5 µm diam. *Clamp connections* present.

Habitat: Gregarious, uncommon, associated with *Nothofagus* spp.

Collections examined: New Zealand. Taupo, Kiko Track, 6th May 2004, PDD 78797 (holotype), KS-CO1460 (isotype); Te Anau, Kepler Track, 24th April 2006, KS-CO1623; Lewis Pass, Lake Daniel Track, 12th May 2006, KS-CO1689.

Etymology: From Latin *dulcis*, sweet, due to the distinctive odour.

Comments: This is a handsome, phlegmacioid fungus with a warmly apricot-coloured pileus, a white stipe, and a distinctly sweet odour. *Cortinarius dulciorum* appears related to *C. cremeolina* Soop, also found in New Zealand, which is a pale fungus with a more marginate bulb. It somewhat resembles *C. albobrunneus* M.M. Moser, described from Patagonia (Moser & Horak 1975), but the latter produces larger spores, and its odour is insignificant.

Cortinarius myxenosma Soop sp. nov.

Figures 3F, 8C

Pileo 25–45 mm diam., globoso, deinde plano-convexo, viscido, haud hygrophano, rubido, disco obscurior subatro, innato-fibrilloso, veli albomaculato, margine pallidior. Lamellis primo albis, subconfertis. Stipite marginato-bulboso, albo vel pallide helvello, ad basem rubescente. Velo albo subrubescente, subcopioso; cortina alba. Carne leviter cano-fulva; odore subdulci; sapore raphanico, subamaro. Sporis amygdaloideis vel subellipsoideis, 7.5–9.5 x 4.5–5.5 µm, moderate verrucosis. Reactionem ope NaOH ad velum rubram.

Holotypus hic designatus PDD 88282: Nova Zelandia, Canterbury, Waimakariri Valley Track, in silvis cum Nothofagete, 7th May 2006, K. Soop.

Pileus 25–45 mm diam., hemispherical, later convex to plane, viscid, innate fibrillose with white veil tufts and patches, not hygrophanous, warmly mahogany brown to red-brown with a darker almost black disk, paler red-brown towards margin. *Lamellae* rather crowded (L = 68, l = 2–3), adnate, white when young. *Stipe* 30–75 x 6–10 mm with a marginate to rounded bulb (–22 mm diam.) white to pale yellow-brown, reddening red-brown from base, with a white coating on bulb. *Veil* white somewhat blushing to brownish-red, fairly copious; *cortina* white. *Context* greyish tan to white, marbled pale brown. *Taste* raphanoid to bitter. *Macrochemical reactions*: NaOH red on stipital veil and on pale areas of the pileal surface, weakly red in context; guayac greyish-green in context. *Odour* faintly phlegmacioid or sweetish.

Spores (7.3–)7.5–8.6–9.5(–9.8) x 4.4–5.4 µm, Q=1.79±0.13 (n=25), amygdaloid to subelliptic, moderately to rather weakly verrucose. *Marginal elements* clavate, often with a wide base, 12–20 x 7–8 µm. *Basidia* c. 22 x 7 µm, 4-spored. *Epicutis* rather thick with poorly gelified hyphae 4–7 µm diam. with a brownish vacuolar pigment loosely arranged in a slightly gelatinised hyaline matrix. *Hypocutis* with with subcylindrical hyphal elements 30–45 x 10–15 µm with a plasmatic brownish-yellow pigment. *Veil* hyphae (from stipe) hyaline, 3–6 µm diam. *Clamp connections* present.

Habitat: Gregarious, uncommon, associated with *Nothofagus* spp.

Collections examined: New Zealand. Canterbury, Waimakariri Valley Track, 7th May 2006, PDD 88282 (holotype), KS-CO1672 (isotype); Reefton, Murray Creek Track, 11th April 2006, KS-CO1682; Lewis Pass, Boyle River, 12th May 2006, KS-CO1698.

Etymology: From Greek μυξος, viscid, and *C. xenosma*, a similar species.

Comments: This *Phlegmacium* is characterised by the red-brown pileus decorated with white

veil remnants and a stipe with a marginate, sometimes wide, bulb. It recalls *Cortinarius xenosma* Soop, but the latter possesses a dry pileus and a bulbless cylindrical stipe. *C. myxenosma* differs from *C. dulciorum* mainly by the persistent veil on the pileus, and by larger spores.

Cortinarius vernicifer Soop sp. nov.

Figures 4D, 9A

Pileo 20–55 mm diam., obtuso-conico, deinde expanso vel campanulato, sicco, hygrophano, saturate aurantio vel aurantiorufo, uniforme laevigato cera illitus viso, glabro vel minute innato-fibrilloso, margine prima aetate minute luteofibrillosa. Lamellis primo luteogriseis, subconfertis. Stipite aequali, primo pallide luteo, demum obscurior. Velo pallide luteo, sparso. Carne pallida, sublutea; odore saporeque debilibus. Sporis ellipsoideis 7.5–8.7 x 4.5–5.2 µm, subminute verrucosis. Reactionem ope NaOH vix ullam.

Holotypus hic designatus PDD 88273: Nova Zelandia, Southland, Milford Road, Te Anau Downs, in silvis cum Leptospermate, 30th April 2006, K. Soop.

Pileus 20–55 mm diam., obtusely conical, later expanded to campanulate, dry, glabrous to very finely innate fibrillose, hygrophanous, deeply orange to orange-brown, evenly coloured like varnish; margin young with thin yellow fibrils. *Lamellae* moderately crowded (L=48, l=2–3), free, yellowish-grey when young, edge concolorous. *Stipe* 40–80 x 3–8 mm, cylindrical; young pale yellow, later darker with a pale-yellow coating towards base, apex almost white. *Veil* pale yellow, sparse; cortina greyish-yellow. *Context* rather pale yellow. *Macrochemical reactions*: NaOH more or less trivial, dark brown on pileal surface; guayac weakly green in context. *Odour* faint, agaricoid. *Taste* nil.

Spores (6.8–)7.1–8–8.7(–9.3) x 4.4–4.7–5.1 µm, Q=1.70±0.12 (n=26), elliptic, rather weakly verrucose. *Marginal elements* crowded, mostly clavate, some vesiculose, 15–25 x 6–7 µm. *Basidia* 25–30 x 7 µm, 4-spored. *Epicutis* with parallel hyphal elements, 5–8 µm diam. with a yellow-brown pigment. *Hypocutis* with oblong, oval, pale yellow hyphal elements, 50–85 x 15–20 µm. *Clamp connections* present.

Habitat: Gregarious, rare, associated with *Leptospermum scoparium*.

Collections examined: New Zealand. Southland, Milford Road, Te Anau Downs, 30th April 2006, PDD 88273 (holotype), KS-CO1654 (isotype); idem 23rd April 2006, KS-CO1617; Canterbury, Kowai Bush, 21st April 1997, KS-CO815.

Etymology: From Latin *vernicium*, varnish, and *-fer*, carries, due to the remarkable sheen of the pileus.

Comments: This species looks macroscopically as though it were a *Leptospermum* vicariant of the similar *C. collybianus* Soop. Its pileus displays a handsome orange-brown tint with a remarkable varnished sheen, hardly ever seen in other *Cortinarius*.

Cortinarius gymnocephalus Soop sp. nov.

Figures 3D, 9B

Pileo 30–50 mm diam., globoso, deinde convexo, glutinoso, haud vel parum hygrophano, ex ochraceo griseo-brunneo, glabro, margine pallida, juveni violaceo-lavata. Lamellis primo saturate violaceis, confertis. Stipite aequali, interdum bulboso pistone instar, viscido, pallide violaceo, squamulis albo-vestito. Velo albo vel etiam pallide violaceo; cortina absente. Carne albocanescente, violaceo-marmorata; odore subdulce; sapore debile ingrato. Sporis ex ellipsoideis amygdaloideis 10.5–14 x 6.8–8 µm, e vere crassis verrucis obtectis. Cheilocystidiis confertis, clavato-vesiculosis, 25–40 x 10–12 µm. Reactionem ope NaOH vix ullam.

Holotypus hic designatus: PDD 88292. Nova Zelandia, Taupo, Te Iringa Track, in silvis cum Nothofagete, 3rd May 2003, K. Soop.

Pileus 30–50 mm diam., hemispherical, later convex, glutinous, glabrous, not or weakly hygrophanous towards margin, grey-brown to yellow-brown, margin greyish with a violet tinge when young. *Lamellae* free, crowded, narrow, saturated violet when young, sometimes more pale reddish-violet with a marked violet edge. *Stipe* 30–55 x c. 8 mm, cylindrical, occasionally with a small piston-like bulb, viscid; pale violet with whitish squamules over the whole length. *Veil* white to pale violaceous, rather sparse; *cortina* absent. *Context* greyish-white to pale tan, marbled violet. *Macrochemical reactions*: NaOH trivial on all parts. *Odour* faintly sweetish. Taste *faint*, rather unpleasant.

Spores (10.5–)11–12.4–14(–15.8) x 6.8–7.3–8(–9) µm, Q=1.70±0.13 (n=26), broadly amygdaloid to citriform, sometimes papillate, coarsely verrucose. *Cheilocystidia* crowded, clavate to vesiculose, sometimes flattened on top or on side, 25–40 x 10–12 µm. *Basidia* 30–36 x 12–15 µm, 4-spored. *Pileipellis* with a thick gelatinous layer of hyphae 4–6 µm diam., lower strata strongly pigmented with granules, 7–8 µm diam. *Hypocutis* with hyaline, oval hyphal elements, 10–25 x 7–10 µm. *Clamp connections* absent.

Habitat: Scattered to solitary, rare, associated with *Nothofagus* spp.

Collections examined: New Zealand. Taupo, Te Iringa Track, 3rd May 2003, PDD 88292 (holotype), KS-CO1334 (isotype); Southland, Borland Lodge Track, 25th April 2004, KS-CO1424.

Etymology: From Greek γυμνος, naked, and κεφαλος, head, this being in contrast to similar fungi with a *Cuphocybe* habit.

Comments: This species has the morphology of a *Cuphocybe* (notably the absence of a cortina), but is distinguished from the known *Cuphocybe* species by an almost naked pileus where conspicuous veil remnants are scarce. Its gills (sometimes only their edges) are beautifully violet-blue. *Cortinarius gymnocephalus* evokes *C. dulciolens* E. Horak *et al*. (synonym *Cuphocybe melliolens* Soop) but displays different veil and gill colours and possesses a viscid stipe. Because of the lack of clamp connections its taxonomic place is in subg. *Myxacium*, sect. *Defibulati*. It is also one of the first species in this section to be described from the Southern Hemisphere (only *C. basipurpureus* (Bougher) Peintner & M.M. Moser is known to us; cf. Garnica *et al.* 2005), a position shared by a second, so far undescribed species from New Zealand (data not shown). Therefore their combined presence in both hemispheres indicates an ancient origin of sect. *Defibulati*.

Cortinarius tessiae Soop nom. nov.

Basionymon: *Cortinarius rotundisporus* Cleland & Cheel subsp. *nothofagi* Soop 2001, in Contribution à l'étude de la mycoflore cortinarioïde de Nouvelle-Zélande, *Bull. Soc. Mycol. France* **117** (2), p. 115.

Etymology: In honour of the author's daughter Tessi, on her graduation as a PhD in Molecular Biology.

Comments: The species may be considered a *Nothofagus* vicariant of *Cortinarius rotundisporus*, found under *Leptospermum* in New Zealand. It differs from the latter mainly by more pronounced yellow hues, often predominant also when young.

According to Sawyer *et al*. (1999) *C. rotundisporus* forms a complex of taxa. This is corroborated by collections from Tasmania (unpubl.) of species that appear close to *C. rotundisporus*.

Cortinarius pseudorotundisporus Gasparini sp. nov.

Figures 2B, 9C

Pileo 25–40 mm lato, subgloboso vel conico, deinde convexo vel praeter regula applanato, solito acute umbonato. Cuticola vere glutinosa, griseo-caerulea disco rubro brunneo. Lamellis haud confertis, L = 35, 6 mm latis, annexis, roseolis in aetate incarnatis. Stipite vere glutinoso, vacuo, 60 mm longo, 3–4 mm lato, basi usque 10 mm crassa, clavato vel sub-bulboso, nitido, apice coeruleo, e glutinoso coeruleo velo obtecto atque supero annulo ornato. Carne nivea e apice caeruleo. Odore e sapore nullis. Ope cuticola TL4 auream reactionem praebet. Sporis amygdaliformibus vel subcitriformibus, verrucolosis. Hymenii margine substerile e copiosis sterilibus cellulis; basidiis mono-, bi- vel tetrasporigenis, 26–30 µm longis, 8–9 µm crassis. Pileipelle, ixocute e filamentosis hyphis 3–5 µm crassis veli permixtis 1.5–3 µm crassis. Hypodermio ex ellipticis hyphys 15–22 µm.

Holotypus: hic designatus HO522433: Australia: Tasmania, Mt. Wellington, Reuben Falls, G. Gates, 15th May 1999.

Pileus diam. 25–40 mm, hemispherical or conical, then convex to irregularly plane, generally with a pointed conical umbo, margin striate. *Cuticle* very glutinous and slippery, hygrophanous, greyish blue similar to vinaceous buff in CIC, except on the disk which is reddish brown or ochraceous brown. *Lamellae* rather distant, L = 35, l=3, 6 mm deep, annexed, plane, very pale rose, becoming incarnate (=flesh colour), margin undulate. *Stipe* very glutinous, 30–60 x 3–6 mm hollow, clavate to sub-bulbous, base up to

10 mm, basically white, apex a very pale blue, covered in youth by the very glutinous greyish blue veil and in age by the ochraceous cortinal annulus. *Veil* glutinous, blue-grey, *cortina* persistent. *Context* whitish, except in the conjunction of the cap with the stipe, where it has an ash grey colour. *Macrochemical reactions*: KOH nil, TL4 old gold yellow. *Smell* inconspicuous. *Taste* none.

Spores (6.4–)7.6–9.4(–10.8) x (3.9–)4.8–5.7 µm; Q = 1.5–1.8 (n=100), amygdaliform, often broadly mucronate, or pyriform, warts irregular, generally rather small more concentrated at the apex. *Hymenium* margin substerile due to the presence of numerous vesiculate or subcapitate *cystidia* 19 x 7.5 µm; *basidia* narrow, 1-, 2- or 4 spored, 26–30 x 8–9 µm, *clamp connections* very rare. *Pileipellis* hyaline or slightly grey. *Epicutis* an ixocutis, hyphae 3–4 µm diam., thickly interwoven, clamped. *Veil* hyphae filamentous 1.5–3 µm diam. *Hypodermium*: pseudoparenchemous of cylindric or ellipsoid parallel hyphae 15–22 diam. Light greenish or yellow olivaceous, cytoplasmatic pigment; hyphae encrusted by a yellowish pigment. clamp connections present in the epicutis.

Habitat: Gregarious in numerous collections, in very wet *Nothofagus* forests.

Collections examined: Australia: Tasmania, Mt. Wellington, near Lone cabin. G. Gates & D. Ratkowsky, 20th May 1998, PHN 980520A6; Reuben Falls, G. Gates, 15th May 1999, HO522433 (holotype); Tasman Peninsula, Duckhole Lake Track. G. Gates, B. Gasparini & D. Ratkowsky, 16th May 2002, PHN A20518A7.

Etymology: From Greek ψευδής, false, due to its resemblance to *C. rotundisporus*.

Comments: The basidiocarps of this species resemble those of *C. rotundisporus*, but the two species differ microscopically by *C. rotundisporus* having relatively large, subglobose spores, while in *C. pseudorotundisporus* they are small and amygdaliform. The presence of vesiculose cystidia, sub citriform spores and the lack of clamp connections in the hymenium suggest an affinity with *Defibulati*, which are, however devoid of clamp connections in all tissues including in the pileipellis. The latter consists of a single well-developed gelatinous layer. Interesting is also the bright yellow reaction to thallium salts, which is otherwise known only for *Cortinarius infractus* (Fr.)Fr.

Cortinarius pectochelis Soop sp. nov.

Figures 4A, 9D

Pileo 15–40 mm diam., globoso, deinde obtuse conico, glutinoso, haud vel parum hygrophano, saturate fuscoochraceo, ad discum subbadio, impolito innato-fibrilloso, margine striatula, interdum badio-fimbriato. Lamellis primo griseis vel pallide brunneis, subconfertis. Stipite aequali, viscido, pallide luteo, fimbrias aurantio-gelatinoseis cingulato, interdum collariato. Velo aurantio-rufo, gelatinoso, copioso; cortina canolutea, gelatinosa. Carne luteocanescente; odore saporeque debilibus. Sporis amygdaloideis 9–11 x 5–6 µm, moderate vel subminute verrucosis. Reactionem ope NaOH ubique rubram vel rufam.

Holotypus hic designatus PDD 88278: Nova Zelandia, Haast Pass, Blue Pools, in silvis cum Nothofagete, 4th May 2006, K. Soop.

Pileus 15–40 mm diam., hemispherical, later obtusely conical, viscid to glutinous, rather coarsely innate fibrillose, not or weakly hygrophanous, saturated dark yellow-brown to mahogany, disk almost blackish-brown; margin weakly striate, occasionally with brownish fringes. *Lamellae* moderately crowded, free, greyish to pale brown when young, edge concolorous. *Stipe* 35–70 x 4–7 mm, cylindrical, viscid; pale yellow with numerous gelatinous, thick, pale orange to orange-brown tufts or stair-like girdles, sometimes terminating in a small collar. *Veil* copious, gelatinous, orange-brown to pale orange-yellow; *cortina* gelatinous greyish-yellow. *Context* yellow-grey to pale yellow. *Macrochemical reactions*: NaOH red to orange-red or brownish-red on all parts; guayac green in context. *Odour* weak, possibly like "lubricant". *Taste* nil.

Spores (8.4–)8.7–9.8–10.4(–11) x (4.5–)5–5.2–6(–6.5) µm, Q=1.89±0.15 (n=26), amygdaloid, moderately to rather weakly verrucose. *Marginal elements* crowded, clavate, a few vesiculose, 15–30 x 7–12 µm, many filled with a yellowish pigment. *Basidia* c. 23 x 8 µm, 4-spored. *Pileipellis* with gelified, hyaline hyphae 2–4 µm diam. *Epicutis* hyphae erected 4-6 µm diam. with a scattered yellow-brown, partly encrusted pigment. *Hypocutis*

with oblong, irregular hyphal elements, 40–50 x 15–20 µm. *Clamp connections* present.

Habitat: Gregarious, uncommon, associated with *Nothofagus* spp.

Collections examined: New Zealand. Haast Pass, Blue Pools, 4th May 2006, PDD 88278 (holotype), KS-CO1662 (isotype); Haast Pass, Davis Creek, 28th April 2004, PDD 78783, KS-CO1439; idem 5th May 2006, KS-CO1667.

Etymology: From Greek πηκτος, jelly, and χελις, girdle, due to the special quality of the stipital veil.

Comments: A yellow-brown, sticky fungus with a remarkable veil, not really glutinous as with most *Myxacia* but thick, gelatinous (cf. basidiocarps of the genus *Tremella*). The stipe often presents stair-like girdles and a small gelatinous collar. *Cortinarius pectochelis* resembles *C. phaeomyxa* (E. Horak) E. Horak *et al.*, a taxon with similar colours and a similar alkaline reaction, but the latter possesses a dry veil and lacks a cortina.

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