BIODIVERSITY OF PHYLLOPLANE ASCOMYCETES IN BURMA

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Abstract

Phylloplane ascomycetes and their associates are reported with notes including 24 species in nine genera of sooty moulds (*sensu lato*), 98 species and four varieties in 27 genera of black mildews and similar surface fungi, and six species in four genera (*incertae sedis*) collected from Burma. Their phylogeny, pleomorphy, taxonomy, and ecology are also discussed. Old and recent collections are held in Herb. IMI, UC (= LAM) and BPI. An orthographic emendment is made, the correct name being *Parachionomyces*, not *Parachinomyces*. A novel taxon *Echidnodes quercina* var. *burmensis* is described.

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Introduction

Phylloplane ascomycetes, their anamorphs, and associates are ecologically circumscribed fungi occupying a specialised microhabitat, the living leaf surface within the environment offered by the tree canopy. Their colour and colonies are not only intriguing, but have inspired an interest in their community, identity, and mycophyllae in mixed ecoregions.

The objective of this study was to determine their biodiversity, ecology and distribution by collecting and conducting morphologic-taxonomic analysis of specimens. The study features sooty moulds, black mildews, similar surface ascomycetes and associated fungi. In general, these fungi form pale to brown or black, sparse to hairy or velvety, effused colonies without spots or necrotic rings, unlike leaf spot pathogens. The study was based mainly on newly collected specimens, records of Rhind and Seth (1945), and records from SBML fungus-host datasets (http://int.ars-grin.gov/fungaldatabases/). Early records/reports are, however, not easily verifiable for the most part consequent upon loss of the herbarium and files in Burma during World War II. Hence, only references could be made thereto without the support of voucher specimens. Incidentally, a hyperbiotroph genus *Parachinomyces* Thaung 1979 found on one of the specimens is herein corrected to *Parachionomyces* Thaung 2006 on account of a printing mistake. Additionally, a new taxon *Echidnodes quercina* var. *burmensis* is also described later in the list.

An overview of the current status of their molecular phylogeny, pleomorphy and taxonomy is presented as a prelude. Sooty moulds (*sensu stricto*) are either capnodiaceous or chaetothyriaceous fungi (see glossary complied by Grgurinovic http://www.deh.gov.au/biodiversity/abrs/online-resources/glossaries/fungi/).

Molecular studies have confirmed that four families: *Antennulariellaceae*, *Capnodiaceae*, *Coccodiniaceae* and *Metacapnodiaceae* are a monophyletic capnodiaceous group in the *Capnodiales* (Reynolds 1998, Winka and Eriksson 2000). Two other families, *Chaetothyriaceae* and *Herpotrichiellaceae*, are also monophyletic and placed in the *Chaetothyriales*, of which the former is chaetothyriaceous (Winka *et al.* 1998). It also reveals that the concept of *Chaetothyriales* based on presence of periphysoids is inaccurate. The family *Euantennariaceae* is grouped with *Capnodiales*; however, this family is not included in the study. Connections exist between capnodiaceous and chaetothyriaceous fungi through generally hyaline hyphae of some species of *Chaetothyrium* and *Phaeosaccardinula* becoming brownish, and thereby often leading to erroneous classification in *Aithaloderma*, *Limacinula* and

other genera of the *Capnodiaceae* (Arx and Müller 1975).

Numerical taxonomic analysis indicates that the sooty mould taxa *Leptoxyphium* and *Caldariomyces* are apparently congeneric (Olejnik *et al.* 1999) also with *Ciferrioxyphium*, although arguably different in mitosporic structures (Faull *et al.* 2002). The differences between *Caldariomyces/Leptoxyphium* group and *Aithaloderma* are, however, numerically strong and clear to keep them still separate (Faull *et al.* 2002). All three mitosporic taxa are now listed as anamorphic *Aithaloderma*. Proposals by Reynolds and Faull (2001) to conserve *Caldariomyces* Woron. against *Leptoxyphium* Speg., and *Caldariomyces fumago* Woron. with a conserved type, did not receive a recommendation (Gams 2005).

Sooty moulds and the epifoliar hyphopodiate ascomycete genera *Clypeolella* and *Schiffnerula* are pleomorphic. Anamorph-teleomorph correlations in sooty moulds have been reported, e.g. between hyphomycete synanamorphs *Antennatula* and *Hormisciomyces* and the teleomorph *Euantennaria mucronata* (Sugiyama *et al.* 1984). Several, small hyphal morph families were erected for some sooty moulds with uniformity of hyphal morphology and presumed pleomorphy (Hughes 1976). Four anamorphic genera, *Questieriella*, *Sarcinella*, *Mittieriella* and *Digitosarcinella*, independently or in combination, correlate with teleomorphs *Schiffnerula* and/or *Clypeollela* in colonies on leaves (Hughes 1987, Thaung 1974b). This correlation is used to connect an anamorph or a particular combination of synanamorphs with a corresponding teleomorph in a two-way prediction. Such pleomorphic connection is unacceptable and unconvincing owing to lack of positive, demonstrable, biological proof of experimental evidence deriving one morph from the other or direct observation of organic connection between two morphs on a hyphal strand at the same time. Thus, it only provides circumstantial evidence at best and remains questionable (Reynolds 1987).

Black mildews *Meliola* and *Meliolina* are not only different in morphology, but also distant in phylogeny as indicated by the results of their nuclear small subunit ribosomal RNA gene sequences and cladistic analyses. The former finds its molecular phylogenetic position among the unitunicate pyrenomycetes consistent with the morphologic conclusion of Luttrell (1989), the latter amongst bitunicate ascomycetes (Saenz and Taylor 1999). Molecular data from both non-phialidic, meliolaceous genera *Armatella* and *Diporotheca* are needed for analysis with data from *Meliola* to infer their phylogenetic relationships and accommodation or otherwise of their families *Armatellaceae* Hosag. 2003 and *Diporothecaceae* Mibey & D. Hawksw. 1995 in the order *Meliolales*.

Between *Meliolaceae* and *Chaetothyriaceae*, the ascomata are different in origin and habit, and so are their asci in shape and wall layer (Batista and Ciferri 1957, Luttrell 1989, Pohlad 1989, Pohlad and Reynolds 1974). Moreover, *Chaetothyriaceae* lacks haustoriate hyphopodia unlike *Meliola*. Morphologically closely similar taxa from Dothidiomycetes orders of uncertain position supply subjects for molecular phylogenetic analysis as, for example, genera *Asterina* (*Asterinaceae*) and *Englerula* (*Englerulaceae*).

It is fitting to treat *Cladosporium* here, for it often occurs alone on leaves as a smudge or in combination with other fungi as a sooty scurf, thereby projecting and appearing as sooty moulds (*sensu lato*).

This report is a ramification of the study of Burman fungi by random collections from diverse substrata, landscapes and climates, and includes a host index.

Materials and Methods

Specimens studied are listed under each species. Colonies on substrata were vertically sectioned freehand for slide study of immersed hyphae under a light microscope. They were also lifted off the leaves for *in situ* examination of superficial hyphae characteristics. Lactic acid clearing medium was used, followed by warming to remove air bubbles and to speed up clearing action. Over 10 spores were measured to obtain a median of size in range. For identification, the works of Arnaud (1918), Arx and Müller (1975), Batista (1959), Batista and Ciferri (1962, 1963a, 1963b), Doidge (1942), Ellis (1971, 1976), Hansford (1946, 1961, 1962, 1963), Hughes (1976, 1993), Müller and Arx (1962), Stevens (1927, 1928), Stevens and Ryan (1939) and Yamamoto (1957) were consulted. Specimens deposited in Herb. IMI are also included.

Herbarium codes 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 and Powell rules of 1992, and fungul names are taken from the Index Fungorum database (http://www.indexfungorum.org/Names/Names.asp). After each author citation, the

year of publication is given if available. Vernacular names, although not specific but sometimes descriptive, are provided when available to help resolve deficiencies in host nomenclature. Notes are sometimes supplied on specimens, or their fungal parasites, and host-range and distribution.

The classification used here is mainly that of Eriksson (http://www.umu.se/myconet/M_outline.html) and is largely based on results from rDNA phylogenies. Taxa are enumerated in alphabetical and hierarchical order.

Taxonomy

Species determined and/or recorded as present in Burma

Class *DOTHIDEOMYCETES sensu* O.E. Erikss & Winka 1997

Order *CAPNODIALES* Woron. 1925
Family ***CAPNODIACEAE*** (Sacc.) Höhn. ex Theiss. 1916

1. ***Aithaloderma setosum*** (Zimm.) Boedijn 1931 on living leaves of *Ixora coccinea* L., Mudon, 1-x-1971 (IMI 160465); Rangoon, 21-iv-1972 (IMI 166369). Note: the mycelium monilioid or constricted at septa and dark, perithecia with a few knobs or very short setae around their upper halves, and long, black, cylindrical pycnidia producing minute hyaline pycnidiospores at the apex in moist condition.
2. Anamorphic ***Aithaloderma*** as ***Leptoxyphium*** (≡ *Caldariomyces*) sp. on living leaves of an unknown host, Yezin campus, 9-iii-1976 and on bamboo leaves, Rangoon, 27-iii-1976 (S.J. Hughes, pers. comm. 1976).
3. ***Capnodium*** spp. on living leaves of *Eriobotrya japonica* Lindl., Maymyo; *Euphoria longana* Lam., Mandalay; *Gossypium* spp. and *Mangifera indica* L., Mandalay; *Saccharum officinarum* L., Pyinmana (Rhind and Seth 1945); capnodiaceous mycelium without fructifications on *Careya arborea* Roxb., Mudon, 1-x-1971 (IMI 160470).
4. ***Phragmocapnias betle*** (Syd., P. Syd. & E.J. Butler) Theiss. & Syd. 1918 on living leaves of *Piper betle* L., Mudon (Rhind and Seth 1945).
5. ***Scorias paulensis*** Henn. on living leaves of *Duranta repens* L., Burma, 1-x-1971 (IMI 160468). Note: many of the asci seem to be 4-spored as usual and the measurements fit the species.
6. ***Scorias*** sp. on living leaves of *Camellia thea* Link, Namsan, N.S.S., 31-v-1971 (IMI 157831) with cylindrical pycnidia of a ***Podoxyphium*** sp. ***Scorias phillipensis*** Mendoza ? 1932 has this type of pycnidium, but this specimen has a much longer and wider stipe to the perithecial state.
7. ***Trichomerium crinoporum*** Bat. & Cif. 1963 on living leaves of *Solanum melongena* L., Rangoon, 27-x-1975 (IMI 200627).
8. ***Trichomerium*** sp., close to ***T. didymopanacis*** Bat. & Cif. 1963, on living leaves of *Phyllanthus distichus* Müell. Arg., Mandalay, 18-x-1975 (IMI 199750) with ***Tripospermum*** anamorph state present.
9. ***Trichomerium*** sp. with several pycnidial forms on living leaves of *Ixora coccinea* L., Rangoon, 27-x-1975 (IMI 200628); 15-ii-1976 (S.J. Hughes, pers. comm. 1976).
10. Anamorphic ***Trichomerium*** as ***Tripospermum gardneri*** (Berk.) Speg. ex Hendr. 1918 on living leaves of *Quercus mespilifolia* Wall. (Vernacular name = *Yint-shu-a-thay*), Botanical Garden, Maymyo, 28-ii-1972 (IMI 175737) together with a hairy, globose, pycnidial fungus.
11. Anamorphic ***Trichomerium*** on living leaves of *Helicteres elongata* Wall., north of Kyaukchaw Village, near Mandalay, 12-xi-1974 (IMI 190423b — as ***Tripospermum myrti*** (Lind.) S. Hughes 1951), and with immature ***Aschersonia*** sp. (IMI 190423a).
12. Anamorphic ***Trichomerium*** as ***Tripospermum*** species on living leaves of *Phyllanthus distichus* Müell. Arg., Mandalay, 24-x-1975 (S.J. Hughes, pers. comm. 1976); *Cocos nucifera* L., Rangoon, 1-iii-1976 (IMI 204818).

Order *PLEOSPORALES* Luttrell ex M.E. Barr 1987 (syn. *Melanommatales*)
Family ***MELANOMMATACEAE*** G. Winter 1885

1. ***Byssosphaeria schiedermayeriana*** (Fuckel) M.E. Barr 1984 on leaf stalk and spathe of *Cocos nucifera* L., Rangoon, 14-xii-1979 (LAM 220781a) Note: ascomata: superficial, densely aggregated in small to large groups, spinose with dark, outer wall (20 µm) and pale yellow inner wall (11 µm) in thickness; asci clavate, long-stalked, 8-spored, 130–141 × 11 µm; ascospores, 1–3 septate, yellowish brown, spindle-shaped, constricted at the middle septum, with small, hyaline, mucilage appendage at both ends, (24–) 29.5–33.5 (–37) × 6.5 µm, 4–6 guttulate.

Family ***PLEOSPORACEAE*** Nitschke 1869

1. Anamorphic ***Zeuctomorpha arecae*** Sivan., P.M. Kirk & Govindu 1984 as ***Acroconidiellina arecae*** (Berk. & Broome) M.B. Ellis 1971 on living leaves of *Areca catechu* L., Sinthawt village near Yezin, Pyinmana, 14-x-1977 (IMI 217594) with hyperbiotroph ***Parachionomyces*** [as *Parachinomyces*] ***acroconidiellinae*** Thaung 2006, and (Sivanesan 1984). Distribution: (tropical China) India/Sri Lanka, Malaysia, Singapore, Philippines, Solomon Islands, Papua New Guinea.
2. ***Parachionomyces*** Thaung 1979 emend. Thaung 2006 gen. nom. nov. Em. ob err. typogr. (basionym: *Parachinomyces acroconidiellinae* Thaung, *Transactions of the British Mycological Society* 72: 333–337, 1979). ***Parachionomyces acroconidiellinae*** sp. nom. nov. *Parachinomyces* being corrected to *Parachionomyces* because of printing error. Etymology: close to *Chionomyces*.

Family ***VENTURIACEAE*** E. Müll. & Arx ex M.E. Barr 1979

1. ***Acantharia sinensis*** (Petr.) Arx 1954 on *Castanopsis argyrophylla* King ex Hook. f., Mindat, 21-iv-1972 (IMI 166368). Note: ascomata external, globose, glabrous, with paraphysoids inside; asci cylindro-clavate, stipitate, hyaline, 4-spored; asci almost equally uniseptate, broadly ellipsoidal, yellowish brown.

Order *Incertae sedis* (*Dothideomycetes*)
Family ***ASTERINACEAE*** Hansf. 1946

1. ***Asterina cansjerae*** R.W. Ryan 1928 on living leaves of *Olacaceae* probably *Cansjera rheedii* J.F. Gmel. (Vernacular name = *Taw-hingyo-ywet*), Tavoy, 15-xi-1973 (IMI 185223). Cf. ***A. crebra*** Syd. 1913 on *Opilia amentacea* Roxb. from India, and ***A. opiliae*** Mibey 1997 on leaves and petioles of *Opilia* from Kenya.
2. ***Asterina cappariicola*** Doidge 1942 [as *capparadicola*] on living leaves of *Capparis flavicans* Wall. (Vernacular name = *Zaung-gyan-bin*), Ava and Tadau, 13-iv-1973 (IMI 180774a) with ***Trichothecium roseum*** (Pers. : Fr.) Link (IMI 180774b). Note: hyphopodia are mostly in opposite pairs and the head cell is entire. However, the conidia are rounder and have no light median bands as described by Doidge. Hence, this specimen is most likely to be a variety of *A. cappariicola.*
3. ***Asterina capparis*** Syd., P. Syd. & E.J. Butler 1911 [as *capparidis*] with ***Asterostomella*** state on living leaves of *Capparis horrida* L.f., Mandalay, 10-x-1972 (IMI 170572b), and with ***Melanops phyllachoroides*** Syd. (IMI 170572a) which bears ascomata 160–180 × 196–220 µm; asci stipitate, clavato-cylindric, 84–148 × 12–20 µm; ascospores 8, ovoid, biseriate, hyaline, one-celled, 18–32 × 10–18 µm.
4. ***Asterina congesta*** Cooke 1880 with its ***Asterostomella*** state on living leaves of *Santalum album* L., Mount Popa Plantation, Popa, 11-ii-1973 (IMI 173524). Note: on the same host species in India, but on the same host genus in Hawaii.
5. ***Asterina diplocarpa*** Cooke 1882 on living leaves of *Sida humilis* Cav., Nandayan Plantation, Katha, 15-ix-1973 (IMI 179308a) with ***Septonema solaninum*** (Sacc. & Syd.) Hughes (IMI 179308b).
6. ***Asterina echinospora*** Höhn 1910 on living leaves of Olacaceae (?*Lepionurus* sp./?*L. oblongifolius* Mast. Vernacular name = *Taw-hingyo-ywet*), Tavoy, 15-xi-1973 (IMI 185223).
7. ***Asterina escharoides*** Syd. & P. Syd. 1911 on living leaves of *Quisqualis indica* L., Rangoon, 1-xii-1975 (IMI 199748). Note: mycelium reticulate, sparsely and distantly hyphopodiate with 1-septate hyphopodia; ascospores verruculose. On the same host species in the Philippines.
8. ***Asterina grewiae*** Cooke 1882 on living leaves of Flacourtiaceae (Vernacular name = *Na-ywe*, probably *Flacourtia* sp.), Kyaikhtiyo Range, 23-xi-1975 (IMI 199747) Note: the conidia are smaller than those of var. ***granulosa***, with scattered germ pores, and the hyphopodia less lobed. Also on *Scolopia* and *Trimeria* species in the Philippines.
9. ***Asterina* grewiae** Cooke var. ***granulosa*** Hansf. 1944 (***Asterostomella*** state) on living leaves of ?*Flacourtia cataphracta* Roxb. ex Willd. (Vernacular name = *Na-ywe*), Kyin-ga-naing near Ane-sa-khan, Maymyo, 22-xii-1973 (IMI 194467).
10. ***Asterina grewiae*** var. ***grewiae*** on living leaves of *Grewia hirsuta* Vahl (Vernacular name = *Say-ga-gyi*), Maymyo, 13-ii-1972 (IMI 179296); the ***Asterostomella*** state on *Grewia hirsuta* Vahl (Vernacular name = *Taung ta-yaw/Ta-yaw*), Maymyo, 17-iii-1973 (IMI 179295).
11. ***Asterina lawsoniae*** (***Asterostomella*** state) Henn. & E. Nyman 1900 on living leaves of *Lawsonia inermis* L., Mandalay, 30-i-1972 (IMI 172857); *L. alba* Lam., Gyobingauk (Rhind and Seth 1945). Distribution: (tropical

China), India, Malaysia, Indonesia, Philippines, Papua New Guinea.

12. ***Asterina magnifica*** Syd., P. Syd. & E.J. Butler on living leaves of *Terminalia* sp., Moulmein, E.J. Butler, 07-i-1908 (BPI 690031; BPI 690032); (Rhind and Seth 1945).
13. ***Asterina memecyloniae*** R.W. Ryan 1928 on living leaves of a *Memecylon* species probably *M. edule* Roxb. (Vernacular name = *Thabye-on*), Kyaikkaw near Thaton, 11-x-1971 (IMI 166347) with ***Spiropes dorycarpus*** (Mont.) M.B. Ellis 1968 on the upper surface, and with ***Phaeodimeriella guarapiensis*** (Speg.) Speg. 1908 on the underside, which has 2-celled brown ascospores 10–16 × 3–5 µm and conidia, yellowish 8–12 × 2–2.5 µm from pycnidia with mostly curved appendages.
14. ***Asterina olacicola*** Hansf. 1947 on living leaves of *Olax scandens* Roxb., Moulmein-kyun, 16-iv-1974 (IMI 185681). Note: on *Olax* species and *Olax wightiana* Wall. in India.
15. ***Asterina pemphidioides*** Cooke 1876 on living leaves of a *Eugenia* or *Syzygium* species, Bogalay, 15-v-1971 (IMI 157608); Thuwunna near Rangoon, 20-iv-1974 (IMI 185681). Distribution: India, Philippines.
16. ***Asterina sandowayensis*** Thaung 1976 on living leaves of *Strychnos ?nux-blanda* A.W.Hill (Vernacular name = *Ka-baung*), Sandoway, 10-iv-1974 (IMI 194466, holotype) (Thaung 1976).
17. ***Asterina spissa*** Syd. & P. Syd. 1911 on living leaves of *Jasminum* sp., Myitkyina, 01-x-1972 (IMI 172859c) with ***Dimerium piceum*** (IMI 172859b) growing mainly thereon and sometimes apparently inside the thyrothecia; *Jasminum auriculatum* Vahl, Shwegu near Bhamo, and Myitkyina, 1-i-1973 (IMI 172856); *Jasminum* sp., Pegu, 27-xii-1974 (IMI 200634b). Distribution: India, Indonesia, Philippines.
18. ***Asterina venustula*** Syd. 1922 on living leaves of *Averrhoa carambola* L., Ngaputaw (near Bassein), 20-iv-1973 (IMI 183217). Distribution: Malaysia, Brunei, Indonesia, Philippines.
19. Anamorphic ***Asterina*** species as the ***Asterostomella*** state on living leaves of an unknown plant (Vernacular name = *Mho-auk*? or *Mo-owt*?), B.E. Waterfall Upstream on North Channel bank, Maymyo, 20-ii-1975 (IMI 197657). Note: conidia with a hyaline band near the middle.
20. ***Asterina*** species on an unknown host (?*Dialium indum* L. plant. Vernacular name = *Taung-khaye*), Kyaikhtiyo Range, 23-xi-1975 (LAM 220100); Kyaikhtiyo Pagoda Grounds near waterstand outside the temple, 6-xi-1978 (LAM 220500a) with ***Domingoella asterinarum*** Petr. & Cif. 1932 (LAM 220500b).
21. ***Asterina*** species almost completely epiphyllous on the living leaves of *Eugenia jambolana* Lam. (Vernacular name = *Thabye-phyu*), Syriam, 10-iv-1972 (IMI 169364); *Eugenia* sp., Mandalay (Bawdigone Area), 3-xii-1972 (IMI 172454). Note: a specific name is unavailable as there are about 20 different species of *Asterina* recorded on *Eugenia* species.
22. ***Asterina*** species on living leaves of *Ixora* sp. (Vernacular name = *Sa-gwe- pan*), Pegu, 18-xii-1974 (IMI 194471a) with ***Septonema solaninum*** (Sacc. & Syd.) Hughes 1958 (IMI 194471b). Note: different from other species of *Asterina* reported on hosts in the *Rubiaceae*. No ascospores seen. Hyphopodia are 3-lobed. Probably a new species.
23. ***Cirsosia globulifera*** (Pat.) Arx 1962 (≡ *Lembosia globulifera* Pat. 1890) on living leaves of a *Calamus* sp., Kyaikhtiyo Range, 23-xi-1875 (IMI 199746a) with a ***Trichothyrium*** species (IMI 199746b) on ***Cirsosia***, the *Trichothyrium* does not fit a known species and the conidiophores appear to belong to it but no conidia were seen.
24. ***Cirsosia moulmeinensis*** Thaung 1976 on living leaves of *Dipterocarpus ?tuberculatus* Roxb. (Vernacular name = *In bin*), Moulmein, 2-v-1975 (IMI 194472, holotype) (Thaung 1976).
25. ***Echidnodella*** species on living leaves of *Arundinaria racemosa* Munro (Vernacular name = *Thi* or *Ti* in Chin dialect, Bamboo), Haka, Chin Hills, 10-iv-1974 (IMI 187227).
26. ***Echidnodella*** species on living leaves of an unknown plant (?*Argyreia* species), Botanical Garden, Maymyo, 17-xii-1975 (LAM 220372).
27. ***Echidnodes quercina*** (Ellis & G. Martin) Hansf. 1946 on living leaves of *Quercus* species, Maymyo, 21-xi-1974 (LAM 220157).
28. ***Echidnodes quercina*** var. ***burmensis*** Thaung, *var. nov.* on *Quercus* sp., Maymyo, 18-xii-1977 (LAM 220503, holôtype).

    Ab *Echidnodes liturae* (Cooke) Theiss. & Syd. 1918 et *Echidnodes quercina* (Ellis & G. Martin) Hansf. 1946 on *Quercus* species differt: *ascis* 24–33.5 (–48) × 15–19 µm, late et breviter clavati ad clavato-ellipsoidei, *ascosporae* 11–13 × 4–5 µm, *haustoria* 11–13 µm diam., coralloidea. Habitat in foliis vivis Querci species, Maymyo, 18-xii-1977 (LAM 220503, holotypus).

29. ***Lembosia eugeniae*** Rehm 1913 on living leaves of *Eugenia* sp. (Vernacular name = *Thabye-nyo*), Syriam, 23-iv-1972 (IMI 172449a). Distribution: Malaysia, Philippines.
30. ***Prillieuxina dipterocarpi*** (Syd. & P. Syd.) R.W. Ryan 1939 (≡ *Asterinella dipterocarpi* Syd. & P. Syd.) on living leaves of a *Dipterocarpus* species (Vernacular name = *Ka-nyin bin*), Labutta, 18-iv-1975 (IMI 194314); Bassein, 27-xii-1977 (LAM 220436a) with ***Eriocercospora balladynae*** (Hansf.) Deighton 1969 (LAM 220436b).
31. ***Prillieuxina stuhlmannii*** (Henn.) Arx 1962 (≡ *Asterinella stuhlmannii* (Henn.) Theiss. as *stuhlmanni*) on living leaves of *Ananas sativus* L., Rangoon, 20-viii-1979 (LAM 220555a).

Order *Incertae sedis* (*Dothideomycetes*)
Family ***ENGLERULACEAE*** P. Henn. 1904

1. ***Clypeolella camelliae*** (Syd., P. Syd. & E.J. Butler) Hansf. 1954 on living leaves of *Camellia thea* Link, Kutkhine, N.S.S., 31-v-1971 (IMI 157832a) with ***Eriocercospora balladynae*** (Hansf.) Deighton (IMI 157832b) and ***Cicinnobella*** sp. (≡ *Perisporiopsis* Henn. 1904) (IMI 157832c) with setose pycnidia and pale brown conidia; Theinni (= Hseinni), N.S.S., 01-i-1977 with anamorph ***Mitteriella*** and ***Phaeodimeriella cantareirensis*** (Henn.) Hansf. 1946 with ***Cicinnobella*** species (H.A. van der Aa, pers. comm. 1977). Note: the ascospores of the ***Phaeodimeriella*** specimens are rather large in size, but the setae and the pycnidial form agree well with the descriptions thereof.
2. ***Clypeolella ricini*** Racib. 1912 on living leaves of *Ricinus communis* L., Lashio, N.S.S., 10-viii-1973 (IMI 180209). Note: on the same host species in Malaysia and Philippines.
3. ***Clypeolella ziziphina*** Thaung 1974 [as *zizyphina*] on living leaves of *Ziziphus jujuba* Lam., Prome, 02-i-1974 (IMI 181775, holotype) (Thaung 1974a); *Z. rugosa* Lam., Maymyo, 15-i-1974 (IMI 183439a) with ***Mitteriella ziziphi-rugosae*** Thaung 1975 (IMI 183439b) and ***Cicinnobella parodiellicola*** Henn. 1904 (IMI 183439d), and (Sivanesan 1984). Distribution: India, Pakistan.
4. Anamorphic ***Clypeolella*** as ***Mitteriella ziziphi-rugosae*** Thaung 1975 [as *ziziphil-rugosae*] on living leaves of *Ziziphus rugosa* Lam., Maymyo, 15-i-1974 (IMI 181958, holotype) (Thaung 1975c).
5. ***Clypeolella*** species on living leaves of *Rosaceae*, probably *Prunus* sp. (cherry), Botanical Garden, Maymyo, 17-xii-1975 (IMI 200312) with conidia of the ***Mitteriella*** and the ***Sarcinella*** states and thyriothecia with immature ascospores.
6. ***Linotexis burmanica*** Thaung 1979 on living leaves of an unknown host plant, Bassein, 20-iv-1972 (IMI 172450, holotype) (Thaung 1979).
7. ***Linotexis philippinensis*** Syd. & P. Syd. 1917 (≡ *Parenglerula philippinensis* (Syd. & P. Syd.) Arx 1962) on living leaves of a ?*Salacia* sp., location unknown, 2-iii-1973 (IMI 179291). Note: hyphopodiate mycelium with setae and ascospores 2-celled, yellowish brown to dark, and constricted at the septum. On *Salacia* and *Sapindaceae* (?) in Philippines.
8. ***Schiffnerula solani*** Hansf. 1949 on living leaves of *Solanum melongena* L., Sintee Village, near Yezin, 12-i-1978 (IMI 229179) with conidia of the ***Mittieriella*** and the ***Sarcinella*** (?***Sarcinella solanicola*** Speg.) states. Distribution: Brunei, Malaysia.
9. Anamorphic ***Schiffnerula*** as ***Sarcinella cassiae*** E.J. Butler ex Munjal & J.N. Kapoor 1963 and ***Cicinnobella*** species on living leaves of *Cassia siamea* Lam., Hsienni, N.S.S., 01-i-1977. Note: ***Cicinnobella*** with pale yellowish to brownish, non-septate, ellipsoidal to roundish conidia, 4–9 × 4–5 µm in pycnidia measuring 56–72 × 60–72 µm. Distribution: India, Sri Lanka.
10. Anamorphic ***Schiffnerula*** as ***Sarcinella fumosa*** Sahni 1964 [as *fumosus*] on living leaves of *Aegle marmelos* Correa, Paukmyo, 14-iii-1974 (IMI 188949). Note: on the same host species in India.
11. Anamorphic ***Schiffnerula*** as ***Sarcinella prunicola*** Pavgi & U.P. Singh 1971 on living leaves of *Prunus cerasoides* D. Don, Botanical Garden, Maymyo, 16-xii-1975 (IMI 199752). Note: on *Prunus persica* (L.) Batsch and *P. domestica* L. in India. No ***Questieriella*** (anamorphic ***Schiffnerula***) spores seen.
12. Anamorphic ***Schiffnerula*** as ***Sarcinella quercina*** R.K. Verma Pavgi & Kamal 1987 on living leaves of *Quercus* sp., Maymyo, 21-xi-1974 (LAM 220158a) with ***Phaeodimeriella plumbea*** Doidge 1924 (LAM 220158b) and ***Cicinnobella*** species (LAM 220158c).
13. Anamorphic ***Schiffnerula*** as ***Sarcinella*** species on *Millingtonia hortensis* L.f., Toungoo, 16-i-1978 (LAM 220427).
14. Anamorphic ***Schiffnerula*** as ***Sarcinella*** species on *Sesamum indicum* DC., Kyaung-kon, Lower Burma, 18-xii-1977 (LAM 220292a) with ***Tetraploa aristata*** Berk. & Broome 1850 (LAM 220292b).

Order *Incertae sedis* (*Dothideomycetes*)
Family ***MELIOLINACEAE*** S. Hughes 1993

1. ***Meliolina burmanica*** S. Hughes on living coriaceous leaves of a *Syzygium* species, Kya-In, Amherst District, E.J. Butler, 9-i-1908 (HCLO 1037, holotype) (Hughes 1993). It was stated that ascospore shape, apparent absence of egress cells, and superficial hyphae production from stomatopodia are the distinguishing characters (Hughes 1993). Cf. ***M. cladotricha*** (Lév.) Syd. & P. Syd.
2. ***Meliolina cladotricha*** (Lév.) Syd. & P. Syd. 1914 (≡ *Meliola cladotricha* Lév. 1846) on living coriaceous leaves of an unknown host plant probably a *Syzygium* species, Kya-In, Amherst District, E.J. Butler, 9-i-1908 (BPI 693351 and 693352 + slide). Note: both ***M. burmanica*** and ***M. cladotricha*** specimens are from one and the same collection by E.J. Butler from Burma. Distribution: Taiwan, Papua New Guinea, Australia.
3. ***Meliolina pulcherrima*** (Syd. & P. Syd) Syd. & P. Syd. 1914 (≡ *Meliolina mollis* (Berk. & M.A. Curtis) Höhn 1919) on living leaves of *Eugenia* or *Syzygium* species, Mudon, 12-x-1971 (IMI 161263) with ***Chlamydomyces palmarum*** (Cooke) E.W. Mason 1928. Note: this disposition of the specimen is tentative per Hughes (1993). Cf. ***M. cladotricha*** (Lév.) Syd. & P. Syd. On *Ficus* and *Eugenia* in the Philippines.

Order *Incertae sedis* (*Dothideomycetes*)
Family ***MICROTHYRIACEAE*** Sacc. 1883

1. ***Microthyrium eucalypticola*** Speg. 1909 on living leaves of *Eucalyptus* species, General Hospital Compound, Mandalay, 10-x-1973 (IMI 180205). Note: also reported from Australia.
2. ***Microthyrium*** species on *Dracaena sanderiana* Hort. Sand., Rangoon, 27-ix-1979 (LAM 220640b) with ***Colletotrichum*** anamorph of ***Glomerella cingulata*** (Stoneman) Spauld. & H. Schrenk 1903 (LAM 220640a). Note: ascospores 1-septate, 7.5–9 × 2.5–3.5 µm, subhyaline or pale, apparently immature, scanty in amount, may ultimately become brown and then, ***Arnaudiella***.
3. ***Trichothyrium asterophorum*** (Berk. & Broome) Höhn. 1908 on a *Meliola* on living leaves of *Ficus* species (Vernacular name = *Nyaung Peinnei*, Fig Tree), Kyaikhtiyo Range, 23-xi-1975 (IMI 199744); probably on a dead *Armatella cinnamomi* Hansf. & Thirum. on living leaves of *Cinnamomum ?inunctum* Meissn., Thandaung near Tounggo, 29-ix-1977 (LAM 220236). Note: conidia (isthmospores) present on (IMI 199744), with some mature thyrothecia and ascospores 1–septate, 14–16 × 5–6 µm. Distribution: India, Malaysia, Philippines, New Zealand.

Order *Incertae sedis* (*Dothideomycetes*)
Family ***MYCOSPHAERELLACEAE*** Lindau 1897

1. ***Euryachora castanopsis*** Thaung 1975 on leaves of *Castanopsis argyrophylla* King ex Hook. f., Haka, Chin Hills, 10-iv-1974 (IMI 187228, holotype) (Thaung 1975a).

Order *Incertae sedis* (*Dothideomycetes*)
Family ***PARMULARIACEAE*** E. Müll. & Arx ex M.E. Barr 1979

1. ***Ferrarisia pamellisiae*** Thaung 1975 on living leaves of *Ziziphus rugosa* Lam., Maymyo, 16-ii-1974 (IMI 183439a, holotype) (Thaung 1975b).
2. ***Parmulina exsculpta*** (Berk.) Theiss. & Syd. 1914 as *exculpta* on living leaves of *Engelhardtia spicata* Blume, Botanical Garden, Maymyo, 14-iv-1972 (IMI 169372).

Order *Incertae sedis* (*Dothideomycetes*)
Family ***PARODIELLACEAE*** Theiss. & H. Syd. ex M.E. Barr 1987

1. ***Parodiella perisporioides*** (Berk. & M.A. Curtis) Speg. 1898 on living leaves of *Indigofera trifoliata* L., Bassein (Butler & Bisby 1931).

Order *Incertae sedis* (*Dothideomycetes*)
Family ***PARODIOPSIDACEAE*** (G. Arnaud) ex Toro 1952

1. ***Balladyna butleri*** Syd. & P. Syd. on Bamboo (Vernacular Name = *Wa-Nwe* or *Kyet-thoung-wa*), Poh-hto-pin and Kyaukthanbut villages near Yezin, 27-vi-1977 (LAM 220117).
2. ***Balladynopsis negrii*** (E. Castell.) M.B. Ellis 1961 (***Clasterosporium*** state) on living leaves of *Gardenia sessiliflora* Wall., Botanical Garden, Maymyo, 23-iii-1974 (IMI 185220); *Randia dumetorum* Lam., Maymyo, 2-xi-1977 (LAM 220244); (Sivanesan 1984). Note: on *Randia dumetorum* Lam. from Eritrea.
3. ***Balladynopsis vanderystii*** (Hansf.) Arx var. ***ferulae-foetidae*** Thaung 1976 (with ***Clasterosporium*** state) on living leaves of *Ferula foetida* Regal, Myay Paday-Tha and ARI estates, Rangoon, 20-i-1975 (IMI 191513, holotype) (Thaung 1976); (Sivanesan 1984).

Note: it was originally described from leaves of *Rubiaceae* from Belgian Congo.

4. ***Dimerium*** species (close to ***D. leonense*** Hansf. 1946) with its pycnidial state, ***Cicinnobella*** species (IMI 173523e), overgrowing (*?Meliola*) on living leaves of *Terminalia* sp. (Vernacular Name = *Bun-da-yaing-bin*), Maing-yin Farm, near Pindaya, S.S.S., 12-ii-1973 (IMI 173523c), and also ***Dimerium*** species probably ***D. minutum*** (Pat.) Sacc. & P. Syd. 1905 overgrowing (*?Meliola*) on living leaves of *Quercus* species, Kyaikhtiyo Range, 6-xi-1978 (LAM 220498c) with its anamorph ***Cicinnobella*** species (LAM 220498d) and ***Spiropes melanoplaca*** (Berk. & M.A. Curtis) M.B. Ellis 1968 (LAM 220498b). Note: *Dimerium* specimen (LAM 220498c) manifests globoid, olivaceous to blackish brown, papillate pseudothecia , 89–118.5 (–129.5) × 74–92.5 (–115) µm, with biseriate, brown, 1-septate, clavulate ascospores (9–11 × 3.5 µm) rounded above and obtuso-truncate at base.
5. ***Leptomeliola*** (≡ *Phaeophragmeriella*) species on living leaves of *Eugenia* species, Bassein, 12-xii-1977 (IMI 229180a) together with ***Spiropes effusus*** (Pat.) M.B. Ellis 1968 (IMI 229180b). Note: ***Leptomeliola*** species has initially hyaline and 1-septate, later becoming brown and 3-septate, ascospores inside saccate to cylindric-clavate asci. Ascospores are much smaller in size than those of the known species of ***Leptomeliola***. There may also be a *Meliola* on *Eugenia* because of presence of its usual hyperparasites/associates, one of which in this case is a ***Leptomeliola***.

Order *Incertae sedis* (*Dothideomycetes*) Family ***PSEUDOPERISPORIACEAE*** Toro 1926

1. ***Lasiostemma erysiphoides*** (Ellis & Everh.) M.L. Farr 1979 as *erysphioides* (≡ *Dimeriella erysiphoides* (Ellis & Everh.) M.L. Farr 1960 as *eryspheoides* ≡ *Dimerosporium erysiphoides* Ellis & Everh. 1892) on living leaves of *Paspalum scrobiculatum* L., Bassein (Butler & Bisby 1931). Note: *Dimerosporium* is a synonym of *Asterina* (Müller & Arx 1962).

Order *Incertae sedis* (*Dothideomycetes*) Family ***SCHIZOTHYRIACEAE*** Höhn. ex Trotter *et al.* 1928

1. ***Schizothyrium*** species on undersides of living leaves of *Salacca wallichiana* Mart., Mergui, 7-v-1980 (LAM 220922a). Note: ascomata dark with epidermoid walls; asci obovoid or clavato-obovoid, 63–67 × 37–41 (–46) µm with walls up to 5 µm thick at the apex; ascospores clavulate, 1-septate near the middle, brownish, 29.5–33.5 × 15–18.5 µm, occasionally with a sheath about 3.5 µm thick, probably from remnants of slimy mass.

Class *EUROTIOMYCETES* SubClass *CHAETOTHYRIOMYCETIDAE* (= Chaetothyriomycetes *sensu* O.E. Erikss. & Winka 1997)

Order *CHAETOTHYRIALES* M.E. Barr 1987 Family ***CHAETOTHYRIACEAE*** Hansf. ex M.E. Barr 1979

1. ***Chaetothyrium griseolum*** L.R. Fraser 1935 on living leaves of *Psidium guajava* L., Rangoon, 31-xii-1973 (IMI 181623).
2. ***Chaetothyrium javanicum*** (Zimm.) Boedijn 1931 (≡ *Phaeosaccardinula javanica* (Zimm.) Yamam. 1940) on living leaves of *Plumeria alba* L., Rangoon, 27-x-1975 (IMI 200631). Note: this has hyaline muriform ascospores.
3. ***Scolecobonaria filiformis*** (W. Yamam.) Bat. 1962 (≡ *Limacinia filiformis* Yamamoto 1956), close to ***Chaetothyrium***, on living leaves of *Jasminum* species, Myitkyina, 01-x-1972 (IMI 172859d).

Class *SORDARIOMYCETES sensu* O.E. Erikss. & Winka 1997

Order *MELIOLALES* Gäum. ex D. Hawksw. & O.E. Erikss. 1986 (*Incertae sedis*) Family ***ARMATELLACEAE*** Hosag. 2003

1. ***Armatella cinnamomi*** Hansf. & Thirum. 1948 on living leaves of an unknown host plant, Thaton, 12-x-1971 with ***Spiropes armatellae*** M.B. Ellis 1971 (IMI 161265); *Cinnamomum obtusifolium* Nees (Vernacular name = *Na-lin-gyaw*), Rangoon, 25-iv-1973 (IMI 179294a) with alga *Cephaleuros virescens* Kunze (IMI 179294b); Maymyo, 23-iii-1974 (IMI 185222).

Family ***MELIOLACEAE*** G.W. Martin ex Hansf. 1946

1. ***Asteridiella longipedicellata*** var. ***major*** Hansf. 1957 on living leaves of *Dillenia pentagyna* Roxb. (Vernacular name = *Ka-lot* in Mon dialect), Moulmein, 20-xii-1973 (IMI 187226a) with ***Calonectria inconspicua*** G. Winter 1885 (IMI 187226b), a member of the *Hypocreales*, often found parasitic on meliolines; *Dillenia* species (Vernacular name = *Zin-byun*), Kyaikhtiyo Range, 23-xi-1975 (IMI 199745).
2. ***Asteridiella pentapterygii*** A.K. Kar & Maity 1971 on living leaves of *Agapetes parishii*

C.B. Clarke, Kyaikhtiyo Range, 23-xi-1975 (IMI 200311). Note: on *Ericaceae* in India.

3. ***Asteridiella ugandensis*** var. ***antiaridis*** (Hansf. & Deighton) Hansf. 1957 on living leaves of *Streblus asper* Lour., probably Mandalay, 28-i-1972 (IMI 163856).
4. ***Asteridiella*** species with ***Meliola*** species on living leaves of ?*Terminalia* species (Vernacular name = *Banda-yaing-bin*), Maing-yin Farm, near Pindaya, S.S.S., 12-ii-1973 (IMI 173523a).
5. ***Irenopsis benguetensis*** F. Stevens & Roldan ex Hansf. 1963 on living leaves of *Ficus* species (Vernacular name = *Taw-tha-phun*), Kyaikhtiyo Range, 23-xi-1975 (IMI 199743a) with ***Spiropes capensis*** (Thüm.) M.B. Ellis 1968 (≡ *Pleurophragmium capense* (Thüm.) S. Hughes 1958) (IMI 199743b) and ***Calonectria erysiphoides*** Berl. & Roum. 1889 (IMI 199743c) hyperparasitising (IMI 199743a). Distribution: (tropical China), India, Malaysia, Philippines.
6. ***Meliola aethipos*** var. ***cassiae*** P.N. Rao 1967 on living leaves of *Cassia* ?*siamea* Lam., Myitkyina, 4-i-1978 (LAM 220369a) with a mucilaginous mass of aseptate, hyaline, filiform conidia (22.5 × 1.25–2 µm), mostly bent like bow or sickle, on a ?cushion-shaped sporodochium (LAM 220369b).
7. ***Meliola arundinis*** Pat. 1897 on living blades of a grass ?*Arundo donax* L. (Vernacular name = *Kyu* or *Kyu-bin*), Bogalay, 29-vi-1972 (IMI 167185); *Thysanolaena maxima* Kuntze, Yezin, 1-vii-1977, with the anamorphic fungus ***Annellophragmia cooncorensis*** (Subram.) Subram. 1963 (IMI 187224), and large conidia of ***Xenosporium*** sp. and ***Tetraploa aristata*** Berk. & Broome 1850 found at the base of the coremia; Rangoon, 1-x-1979 (LAM 220671). Distribution: (tropical China), India, Indonesia, Taiwan, Philippines, Papua New Guinea.
8. ***Meliola*** species ?***bambusicola*** Hansf. 1947 on living leaves of a ?bamboo-like plant, Kyaikhtiyo Range, 6-xi-1978 (LAM 220496).
9. ***Meliola bicornis*** G. Winter 1886 on living leaves of *Desmodium* species, Bassein (Rhind and Seth 1945). Note: all known specimens on *Fabaceae/Leguminosae*, except one from Brazil on *Solanum* species. Distribution: (tropical China), India, Malaysia, Indonesia, Philippines, New Guinea.
10. ***Meliola brideliae*** F. Stevens & Roldan ex Hansf. 1963 on living leaves of ?*Bridelia stipularis* Blume (Vernacular name = *Seik-chi* or *Seik-chi-thee*), Moulmein, 20-iv-1973 (IMI 180207) with ***Spiropes*** species. Note: very densely setose with curved setae, and on the same host species as in the Philippines.
11. ***Meliola butleri*** Syd. & P. Syd. 1911 on living leaves of *Citrus decumana* L., Kya-In, Amherst District, E.J. Butler, 9-i-1908 (BPI 693022), (Rhind and Seth 1945); Moulmein, 30-xii-1972 (IMI 173539). Note: all known specimens on *Rutaceae* except one from China on *Phoenix*. Distribution: (tropical China), India, Malaysia, Taiwan.
12. ***Meliola canarii*** Syd. & P. Syd. 1914 on living leaves of *Protium serratum* Engl., Botanical Garden, Maymyo, 16-xii-1975 (IMI 199751). Distribution: India, Philippines.
13. ***Meliola carissae*** var. ***indica*** Hansf. 1957 on living leaves of *Carissa carandas* L., Bassein (Mundkur 1938).
14. ***Meliola*** ?***carissae*** var. ***spinari*** Hosag. 1989 on living leaves of *Carissa* ?*spinarium* Lodd. ex A. DC., South of Ingon Railway Station, near Yamethin, 7-xii-1975 (IMI 199742). Note: this species does not agree with any described on *Carissa* species. It is close to ***M. tabernaemontanae*** Speg. 1912, but its spores are larger.
15. ***Meliola citricola*** Syd. & P. Syd. 1917 on living leaves of *Citrus medica* L. var. *acida* (Roxb.) Hook. f., Mogok, 23-iii-1971 (IMI 155988) with ***Spiropes guareicola*** (F. Stevens) Cif. 1955; Moulmein, 12-ii-1973 (IMI 177249); Mandalay, 20-xi-1974 (IMI 200633) with ***Pleurophragmium capense*** (Thüm.) S. Hughes 1958 (≡ *Spiropes capensis* (Thüm) M.B. Ellis 1968) and ***S. guareicola*** (F. Stevens) Cif. 1955 growing together. Distribution: (tropical China), India, Thailand, Malaysia, Vietnam, Brunei, Philippines, Japan, Fiji, Papua New Guinea.
16. ***Meliola clerodendricola*** Henn. 1898 on living leaves of *Clerodendron macrosiphon* Hook. f., Mandalay, 12-v-1973 (IMI 177247). Distribution: India, Malaysia, Taiwan, Philippines.
17. ***Meliola garciniae*** H.S. Yates 1918 on living leaves of *Garcinia heterandra* Wall. (Vernacular name = *Taw-min-gut*), Moulmein, 5-ii-1973 (IMI 179292; 179293) with ***Spiropes helleri*** (F. Stevens) M.B. Ellis 1968 growing on it. Distribution: (tropical China), Malaysia, Sarawak, Indonesia, Philippines.
18. ***Meliola holarrhenae*** Hansf. & Thirum. 1948 on living leaves of *Holarrhena antidysenterica* Wall., Myitkyina, 26-xii-1971 (IMI 164836b) with ***Hemileia holarrhenae*** Syd. & P. Syd.

1914 (IMI 164836a). Note: on the same host species as in India.

19. ***Meliola indica*** Syd. & P. Syd. 1911 on living leaves of *Barringtonia acutangula* Gaertn. (Vernacular name = *Kyi* or *Kyi-bin*), Kyaikkaw near Thaton, 12-x-1971 (IMI 161264) with ***Spiropes dorycarpus*** (Mont.) M.B. Ellis 1968 enveloping the *Meliola*. Distribution: India, Bangladesh, Philippines.

20. ***Meliola jasmini*** Hansf. & F. Stevens 1937 on living leaves of *Jasminum* species, Pegu, 23-iii-1971 (IMI 155989a) with conidial ***Trichothyrium asterophorum*** (Berk. & Broome) Höhn 1908 (IMI 155989b) and ***Phaeodimeriella papillifera*** (Syd. & P. Syd.) Trotter 1926 (IMI 155989c) in both conidial and ascospore states; Myitkyina, 01-x-1972 (IMI 172859a) with ***Dimerium piceum*** (Berk. & M.A. Curtis) Theiss. 1912 (IMI 172859b) growing mainly on ***Asterina spissa*** Syd. & P. Syd. 1911 (IMI 172859c), and ***Scolecobonaria filiformis*** (Y. Yamam.) Bat. 1962 (≡ *Limacinia filiformis* Y. Yamam. 1956); *Jasminum auriculatum* Vahl, Rangoon, 28-xii-1972 (IMI 172858); *Jasminum* species, Pegu, 27-xii-1974 (IMI 200634a) with ***Asterina spissa*** Syd. & P. Syd. 1911 (IMI 200634b); Yezin?, 21-x-1977 (IMI 217595) with a hyperparasite bearing a sporodochium and hyaline filiform conidia. Distribution: India, Malaysia, Brunei.

21. ***Meliola jasminicola*** Henn. 1895 on living leaves of *Jasminum* species, Burma, E.J. Butler, 24-xi-1912 (BPI 694423 + slide); Insein, Burma, E.J. Butler, 24-xi-1912 (BPI 694428 + slide); Gyo-bin-gauk (Rhind and Seth 1945). Distribution: (tropical China), India, Burma, Malaysia, Brunei, Philippines.

22. ***Meliola kydiae-calycinae*** Hansf. & Thirum 1948 on living leaves of *Hibiscus rosa-sinensis* L., Tada-u, 26-iii-1973 (IMI 179290) with ***Pleurophragmium capense*** (Thüm.) S. Hughes 1958 (≡ *Spiropes capensis* (Thüm) M.B. Ellis 1968). Distribution: India, Malaysia, Singapore.

23. ***Meliola mangiferae*** Earle 1905 on living leaves of *Mangifera indica* L., Mandalay, 17-ix-1971 (IMI 160355a) with a ***Metasphaeria*** sp. (IMI 160355b); Mergui, 12-vii-1971 (IMI 160361a) with ***Spiropes helleri*** (F. Stevens) M.B. Ellis 1968 (IMI 160361b); Maymyo, 20-ii-1972 (IMI 173541); 14-v-1972 (IMI 173540a) with parasitic ***Leptomeliola cryptocarpa*** (Ellis & G. Martin) S. Hughes 1993 (≡ *Phaeophragmeriella meliolicola* (Syd. & P. Syd.) Hansf. 1944) (IMI 173540c) and ***Spiropes melanoplaca*** (Berk. & M.A. Curtis) M.B. Ellis 1968 (IMI 173540b); Insein (Rhind and Seth 1945). Distribution: (tropical China), India, Andaman/Nicobar islands, Malaysia, Indonesia, Taiwan, Philippines, Papua New Guinea.

24. ***Meliola mucunae*** Hansf. & Deighton 1948 on living leaves of *Mucuna pruriens* DC., Kyaikhtiyo Range, 23-xi-1975 (IMI 199738). Note: hyphopodia 1-septate, and on the same host species as in India.

25. ***Meliola nephelii*** var. ***nephelii*** Sacc. 1921 on living leaves of *Nephelium lappaceum* L., Thandaung near Toungoo, 29-ix-1977 (LAM 220262); *Nephelium lit-chi* Cambess., Mandalay, 20-i-1978 (LAM 220579). Originally on *Nephelium lappaceum* L. (Rambuttan tree) from Singapore.

26. ***Meliola opiliae*** var. ***singalensis*** Hansf. 1955 on living leaves of *Olacaceae* probably *Cansjera rheedii* J.F. Gmel. (Vernacular name = *Taw-hingyo-ywet*), Tavoy, 20-v-1973 (IMI 185224). Note: on leaves of *Cansjera rheedii* J.F. Gmel. in Sri Lanka and India, and on *Lepionurus sylvestris* Blume in India.

27. ***Meliola palmicola*** var. ***africana*** Hansf. 1956 on living leaves of *Phoenix* species, Thabeik-kyin, 21-vii-1972 (IMI 177252). Distribution: (tropical China), India, Taiwan.

28. ***Meliola psychotriae*** Earle 1905 on living leaves of *Knoxia corymbosa* Willd. (Vernacular name = *Pan-Nu*?), Kyaikhtiyo Range, 23-xi-1975 (IMI 199739a) with ***Ashersonia tamurai*** Henn. 1902 (IMI 199739b), and (IMI 199740). Distribution: (tropical China), India, Philippines.

29. ***Meliola pterospermi*** Stevens 1928 on living leaves of *Pterospermum* species, Bassein, E.J. Butler, 30-xi-1912 (BPI 696630, Type).

30. ***Meliola simillima*** Ellis & Everh. 1898 on living leaves of *Wrightia tomentosa* Roem. & Schult., Rangoon, 12-xi-1975 (IMI 199741).

31. ***Meliola tabernaemontanicola*** Hansf. & Thirum 1948 on living leaves of *Vallaris heynii* Spreng., Rangoon, 23-i-1975 (IMI 191468a) together with hyperparasite ***Calonectria ukolayi*** Thaung 1976 [as *Colonectria ukolayii*] and its anamorph ***Cylindrocarpon ukolayi*** Thaung 1976 [as *ukolayii*] (IMI 191468b, holotype). Note: host species is the same as in India.

32. ***Meliola tamarindi*** Petr. & Syd.1912 on living leaves of *Tamarindus indica* L., Tavoy, 1-v-1972 (IMI 166370) with ***Exosporium tamarindi*** Syd. 1913 (IMI 166370b); Myitkyina, 25-xii-1972 (IMI 172860a) with ***Massaria indica*** Punith. 1970 (IMI 172860b).

Distribution: India/Sri Lanka, Indonesia, Brunei, Philippines.

33. ***Meliola tenella*** Pat. 1888 on living leaves of *Murraya paniculata* (L.) Jack., Kyaukmee, N.S.S., 12-xii-1977 (LAM 220433).
34. ***Meliola tenella*** var. ***atalantiae*** (Pat.) Hansf. 1947 on living leaves of *Limonia acidissima* L. (Vernacular name = *Tha-na-kha-bin* for makeup sunscreen), Bhamo, 25-xi-1971 (IMI 162839). Distribution: India/Sri Lanka, Thailand, Vietnam, Taiwan.
35. ***Meliola tenella*** var. ***atalanticola*** Hosag. 1987 on leaves of *Atalantia monophylla* Correa, Bassein, 20-iv-1975 (LAM 220153).
36. ***Meliola*** species on living leaves of *Eugenia* or *Tristaniopsis* species (Vernacular name = *Taung-thabye*), Bassein, 11-iv-1972 (IMI 172456). Note: a very immature *Meliola*. The colonies arise from typical 4-septate ascospores, but the perithecia have not developed beyond the basal plate stage.
37. ***Meliola*** species (heavily parasitised) on living leaves of *Quercus dealbata* Hook. f. & Thomson ex Miq. (Vernacular name = *Kywet-sa-ni*) Htonbo, east of Mandalay, 10-x-1972 with ***Perisporiopsis*** (≡ *Cicinnobella*) species (IMI 179297); *Quercus* species, Botanical Garden, Maymyo, 12-ii-1974 (IMI 185225a) on upper side, with ***Perisporiopsis*** species (IMI 185225b) on the underside; Maymyo, 28-xi-1974 (LAM 220156a) with ***Cylindrocarpon*** species (LAM 220156b). This *Meliola* species does not fit any previously recorded on *Quercus* species.
38. ***Meliola*** species on living leaves of ?*Quercus lanceaefolia* Kurz (Vernacular name = *Siar Sen* or *Se Shing* in Chin dialect), Haka, Chin Hills, Burma, 29-vi-1972 (IMI 167186). Note: this species may be very close to (1) ***M. quercina*** (Hansf.) Cif. 1954 from Nepal and China on *Quercus glauca* Thunb., and from China on *Castanopsis hystrix* A. DC., (2) ***M. castanopsidicola*** J.L. Crane & A.G. Jones 1998 proposed [as *castanopsicola*] to replace ***M. castanopsis*** Budathoki & P.N. Singh 1994 reported [as *castanopsidis*] on *Castanopsis indica* A. DC. from Nepal or (3) ***M. castanopsis*** Hansf. 1948 [as *castanopsidis*] on *Castanopsis tibetana* Hance, from China. This observation is based on the putative host specificity of all *Meliola* species and the geographic proximity of Burma, Tibet and Nepal from where specimens were collected, all on family *Fagaceae*.
39. ***Meliola*** species with ***Asteridiella*** species on living leaves of ?*Terminalia* species (Vernacular name = *Banda-yaing-bin*), Maing-yin Farm, near Pindaya, S.S.S., 12-ii-1973 (IMI 173523a) with ***Pleurophragmium capense*** (Thüm.) S. Hughes 1958 (≡ *Spiropes capensis* (Thüm.) M.B. Ellis 1968) (IMI 173523b) and ***Dimerium*** species (IMI 173523c) in its pycnidial state, close to ***Dimerium leonense*** Hansf. 1946 (IMI 173523e) and alga *Cephaleuros virescens* Kunze (IMI 173523d). Cf. ***Meliola terminaliae*** (Hansf. & Deighton) Cif. 1954, ***M. amphitricha*** var. ***amphitricha*** and ***Asteridiella terminaliae*** (Hansf. & Deighton) Hansf. 1956.

Order *XYLARIALES* Nannf. 1932
Family *HYPONECTRIACEAE* Petr. 1923

1. ***Hyponectria cookeana*** (Auersw.) M.E. Barr 1976 (≡ *Anisostomula cookeana* (Auersw.) Höhn 1918) on *Quercus mespilifolia* Wall., Botanical Garden, Maymyo, 28-ii-1972 (IMI 175737b) manifesting setose, globose ascomata with non-hyphopodiate mycelia.

ANAMORPHIC *ASCOMYCETES* & ASSOCIATES (*INCERTAE SEDIS*)

Order *Incertae sedis* (*Dothideomycetes*) Family *MYCOSPHAERELLACEAE* Lindau 1897

Genus ***Cladosporium*** as Anamorphic ***Mycosphaerella***

1. ***Cladosporium atriellum*** Cooke 1878 on living leaves of *Melia indica* Brand. (Vernacular name = *Tama-kha*), 25-i-1974 (IMI 182577); *Murraya koenigii* Spreng. (Vernacular name = *Pyin-daw-thein*), Mandalay, 19-iv-1973 (IMI 179286); *Triticum aestivum* L., Maymyo, 15-v-1971 (IMI 157612).
2. ***Cladosporium chrysophylli*** Thaung 1974 on living leaves of *Chrysophyllum cainito* L., Sintoung, east of Thazi, 24-v-1973 (IMI 177241, holotype) (Thaung 1974b).
3. ***Cladosporium cladosporioides*** (Fresen.) G.A. de Vries 1952 on living leaves of *Brunfelsia ?pauciflora* Benth., Botanical Garden, Maymyo, 18-v-1975 (IMI 194476b); *Cajanus cajan* (L.) Millsp., Yezin campus, 10-x-1976 (H.A. van der Aa, pers. comm. 1977); *Callistémon lanceolatus* (Sm.) Sweet, Botanical Garden, Maymyo, 17-xii-1975 (IMI 200313); *Chlorophytum ?elatum* R. Br., 60A Golden Valley, Rangoon, 6-xi-1975 (IMI 200325); *Cosmos bipinnatus* Cav. (Vernacular name = *Moulmein* flower), Shangale-kyun, near Amarapura, 25-i-1974 (IMI 182575).

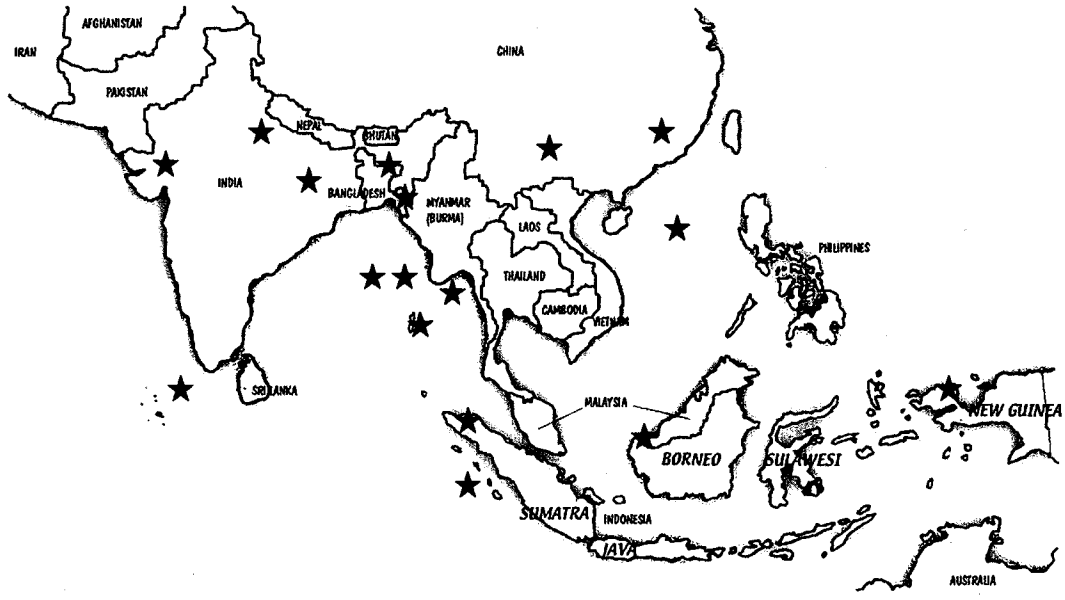

Figure 1. Subtropical to tropical distribution of black mildews and similar Ascomycetes in South and South-East Asia (Indo-Malayan Biogeographic Realm).

4. ***Cladosporium eriolobi*** Thaung 1974 on living leaves of *Eriolobus indica* Schn., Botanical Garden, Maymyo, 28-xii-1972 (IMI 175732, holotype) (Thaung 1974b).
5. ***Cladosporium herbarum*** (Pers.) Link 1816 and ***Aureobasidium pullulans*** (de Bary) G. Arnaud 1918, with the former overgrowing a few pycnidia of a dead sooty mould on living leaves of bamboo hedge, Rangoon, 27-iii-1976 (IMI 202556); *Duranta plumieri* Jacq., Maymyo, 20-x-1974 (IMI 200632); *Eupatorium* species, Rangoon, 27-iii-1976 (IMI 202555) on which a ***Podoxyphium*** species is also present displaying its cylindrical pycnidia with swollen fimbriate apices and unicellular hyaline spores; ***Cladosporium herbarum*** *per se* on capsules of *Sesamum indicum* DC., Tatkon and on grains of *Triticum aestivum* L., Mandalay as per Rhind and Seth (1945).
6. ***Cladosporium oxysporum*** Berk. & M.A. Curtis 1868 on living leaves of *Asparagus* species, North of Kyaukchaw village, near Mandalay, 12-xi-1974 (IMI 190420b); *Bauhinia* species, Rangoon, 27-iii-1975 (IMI 192815a); *Hevea braziliensis* Müll. Arg., Tavoy, 14-iv-1973 (IMI 176159); *Rosa* species, Maymyo, 10-i-973 (IMI 177251); *Viola* species (Vernacular name = *Ye-mhway-pan*), Botanical Garden, Maymyo (IMI 194473c).
7. ***Cladosporium psoraleae*** M.B. Ellis 1972 on living leaves of *Psoralea corylifolia* L., Mandalay, 7-xii-1971 (IMI 163005, holotype), (Ellis 1972).
8. ***Cladosporium tenuissimum*** Cooke 1878 on living leaves of *Bauhinia variegata* L. (Vernacular name = *Bwe-chin*), Botanical Garden, Maymyo, 12-ii-1974 (IMI 183247); *Cichorium intybus* L., Maymyo, 23-iii-1974 (IMI 185221a); *Coriandrum sativum* L. (Vernacular name = *Burmese Nun-nun*), Shangale-kyun, near Amarapura, 25-i-1974 (IMI 182576a) with ***Periconia byssoides*** Pers. ex Mérat (IMI 182576b); *Glycine hispida* Maxim., Shangale-kyun, near Amarapura, 4-iv-1971 (IMI 156319b); *Solanum melongena* L., Shangale-kyun, near Amarapura, 19-i-1973 (IMI 172876b).
9. ***Cladosporium zizyphi*** P. Karst. & Roum. 1890 on living leaves of *Ziziphus jujuba* Lam., Mandalay (Rhind and Seth 1945).
10. ***Cladosporium*** species on living leaves of *Achras sapota* L. (Vernacular name = *Thagya-bin*), Maymyo, 24-v-1973 (IMI 177241) apparently parasitic; *Annona reticulata* L., Maing-yin Farm, Pindaya, S.S.S., 12-ii-1973 (IMI 173550), attacking leaf hairs, Cf. *C. annonae* Nannizzi; *Bauhinia acuminata* L. (Vernacular name = *Sywe-daw*), Mandalay, 4-ii-1974 (IMI 187225); *Brassica alba* (L.) Rabenh., Mandalay, 8-iii-1971 (IMI 155748c); *Cinnamomum camphora* T. Nees & Eberm., Myay-Padetha (Rangoon), 26-iv-1975 (IMI 194461a) with conidia of ***Alternaria*** species and ***Nigrospora*** species; *Elaeocarpus wallichii* Kurz (Vernacular name = *Waso*), Botanical Garden, Maymyo, 12-ii-1974 (IMI 183245b); *Eupatorium* species, Rangoon, 27-iii-1976

(S.J. Hughes, pers. comm. 1976); *Solanum melongena* L., Mandalay, 4-iv-1971 (IMI 156317b); Rangoon, 15-ii-1976 (S.J. Hughes, pers. comm. 1976).

Order *Incertae sedis* (Anamorphic *Ascomycetes*)

Family *Incertae sedis*

1. ***Microxyphium artocarpi*** Bat., Nascim. & Cif. 1963, on living leaves of *Cassia siamea* Lam., 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 × 1–3 µm.
2. ***Microxyphium*** species on living leaves of *Actinodaphne angustifolia* Nees (Vernacular name = *Na-lin-kyaw*), Botanical Garden, Maymyo, 7-x-1974 (IMI 188958c, immature); *Ficus religiosa* L., Mandalay, 29-i-1976 (IMI 200635); on unknown host plant (probably *Simarubaceae*), Yezin Campus, 9-iii-1976 (IMI 204817). Note: pycnidia dry, no conidia seen.
3. ***Pleurophragmium capense*** (Thüm.) S. Hughes 1958 (≡ *Spiropes capensis* (Thüm) M.B. Ellis 1968) on living leaves of *Corypha elata* Roxb., Shwezayan Pagoda, east of Mandalay, 1-iv-1972 (IMI 166346); Htonbo en route Maymyo, 28-i-1973 (IMI 172861).
4. ***Podoxyphium*** species on living leaves of *Coffea arabica* L., Myitkyina, 1-x-1971 (IMI 160467); *Duranta repens* L., Myitkyina, 29-vi-1972 (IMI 167188a) with ***Tripospermum*** species (IMI 167188b). Note: elongate cylindrical pycnidia with a subapical inflation.
5. ***Spiropes clavatus*** (Ellis & Martin) M.B. Ellis 1968 on living leaves of tall grass (Vernacular name = *Ka-la* or *Kaing* = wild *Saccharum/Coelorachis* species), near Hine-gyi-kyun (Bassein), 12-x-1972 (IMI 170085).
6. ***Spiropes davillae*** (Syd.) M.B. Ellis 1968 and ***Spiropes shoreae*** M.B. Ellis 1968 on living leaves of *Tephrosia purpurea* Pers., Kyauk-pa-daung, 12-xii-1977 (LAM 220842).

Results and Discussion

Foliar ascomycetes are presented in Tables 1A and 1B in a fungus-host dataset format at family levels for comparative and distributive analysis. They are found mostly in the cool moist highlands of Kachin State and Northern Shan State or in humid rainfed lowlands in the Irrawaddy Delta and along hilly, rainy coastal area in Tenasserim Division. They form mycophyllae with primarily subtropical moist broadleaf to temperate rainforest in the north and moist deciduous/coastal rainforest in the south (http://www.nationalgeographic.com/wildworld/profiles/terrestrial_im.html). They are most abundant from November to March, which roughly coincides with the cool season when the winds blow from north and north-east. *Meliola jasmini* and *M. mangiferae* appear outside the above area in dry lowland central Burma as well.

Foliar ascomycetes also occur in South and South-East Asia often reaching as far as Melanesia. Some of these widely distributed species are: *Acroconidiellina arecae*, *Asterina lawsoniae*, *Asterina spissa*, *Asterina venustula*, *Clypeolella ricini*, *Irenopsis benguetensis*, *Lembosia eugeniae*, *Meliola arundinis*, *M. bicornis*, *M. citricola*, *M. clerodendricola*, *M. jasminicola*, *M. mangiferae*, *Meliolina cladotricha* and *Trichothyrium asterophorum*. Mycogeography of the distributions is compatible with phytogeography of the region, Indo-Malayan Biogeographic Realm, harbouring tropical rainforests (http://www.mongabay.com/0102.htm). This subtropical to tropical distribution pattern suggests a probability of Indo-Himalayan origin with subsequent dispersal south to warm, wet/dry India/Sri Lanka, and contemporaneous radiation through Burma, Thai-Malaya, Borneo, Indonesia, and Taiwan (as well as tropical China) to Philippines, as illustrated in Figure 1. Moreover, it connotes similarities in space, substratum and selection pressures obtaining and pertaining to them across this terrestrial ecoregion.

These fungi are highly host specific, and differ widely in their known host ranges with a few exceptions of common host selections. Differences in host range indicate phylogenetic divergence as, for instance, between *Meliola* and *Meliolina*. Relative to common host plant families, *Asterinaceae*, *Englerulaceae* and *Meliolaceae* are found mainly on *Rubiaceae*; *Asterinaceae* and *Meliolaceae* on *Combretaceae*, *Malvaceae*, *Myrtaceae*, *Olacaceae*, *Oleaceae* and *Poaceae*; and, *Meliolaceae* and *Englerulaceae* on *Euphorbiaceae*, *Rutaceae* and *Solanaceae*. The *Meliolaceae* and *Asterinaceae* parasitise a wider range of host plants than *Englerulaceae*. Overlapping of host plant families between the first two parasites may indicate that competition is occurring. The structural dissimilarities amongst them in the ascomata character of dry dehiscence or slimy diffluence to release and disperse ascospores may influence their host range and distribution.

Meliolina with its setiform anamorph *Briania* Reyn. 1989 is restricted to old world myrtalean hosts

Table 1A. Fungus and Host Plant Families of Phylloplane Ascomycetes and their Hyperbiotrophs in Burma.

Fungus and host plant families	Species #ID	Fungus and host plant families	Species #ID
Armatellaceae		**Asterinaceae**	
1. Lauraceae	1	1. Arecaceae	23
Meliolaceae		2. Bromeliaceae	31
1. Anacardiaceae	23	3. Capparaceae	2, 3
2. Apocynaceae	13, 14, 18, 30, 31	4. Clusiaceae	5
3. Arecaceae	27	5. Combretaceae	7, 12
4. Burseraceae	12	6. Dipterocarpaceae	24, 30
5. Clusiaceae	17	7. Fagaceae	27, 28
6. Combretaceae	4, 39	8. Flacourtiaceae	8, 9
7. Dilleniaceae	1	9. Loganaceae	16
8. Ericaceae	2	10. Lythraceae	11
9. Euphorbiaceae	10	11. Malvaceae	5
10. Fabaceae	9	12. Melastomataceae	13
11. Fagaceae	37, 38	13. Myrtaceae	15, 21, 29
12. Lecythidaceae (Myrtaceae)	19	14. Olacaceae	1, 6, 14
13. Leguminosae	6, 24, 32	15. Oleaceae	17
14. Malvaceae	22	16. Oxalidaceae	18
15. Moraceae	3, 5	17. Poaceae	25
16. Myrtaceae	36	18. Rubiaceae	22
17. Olacaceae	26	19. Santalaceae	4
18. Oleaceae	20, 21	20. Tiliaceae	5, 8, 10
19. Poaceae	7, 8	21. Unknown	19, 20, 26,
20. Rubiaceae	28	**Englerulaceae**	
21. Rutaceae	11, 15, 33, 34, 35	1. Bignoniaceae	13
22. Sapindaceae	25	2. Caesalpiniaceae	9
23. Sterculiaceae	29	3. Celastraceae	7
24. Verbenaceae	16	4. Euphorbiaceae	2
Melanommataceae		5. Fagaceae	12
1. Arecaceae	1	6. Pedaliaceae	14
Meliolinaceae		7. Rhamnaceae	3, 4
1. Myrtaceae/*Memecyleae*	1, 2, 3	8. Rosaceae	5, 11
Microthyriaceae		9. Rubiaceae	1
1. Dracaenaceae	2	10. Rutaceae	10
2. Moraceae (+ Meliolaceae)	3↓ Hyperbiotroph	11. Solanaceae	8
3. Myrtaceae	1	12. Theaceae	1
Mycosphaerellaceae		13. Unknown	6
1. Fagaceae	1	**Hyponectriaceae**	
Parodiellaceae		1. Fagaceae	1
1. Fabaceae	1	**Parmulariaceae**	
Pleosporaceae		1. Juglandaceae	1
1. Arecaceae	1	2. Rhamnaceae	1

Table 1B. Fungus and Host Plant Families of Phylloplane Ascomycetes and their Hyperbiotrophs in Burma.

Fungus and host plant families	Species #ID	Fungus and host plant families	Species #ID
Pseudoperisporiaceae		**Parodiopsidaceae**	
1. Poaceae	1	1. Apiaceae	3
Schizothyriaceae		2. Bamboo	1
1. Arecaceae	1	3. Combretaceae (+ *Meliola* ?)	4↓ Hyperbiotroph

Fungus and host plant families	Species #ID	Fungus and host plant families	Species #ID
Venturiaceae		4. Fagaceae (+ Meliolaceae?)	4↓ Hyperbiotroph
1. Fagaceae	1	5. Myrtaceae (+ Meliolaceae?)	5↓ Hyperbiotroph
		6. Rubiaceae	2, 3

(*Myrtaceae* and *Melastomataceae* Tribe *Memecyleae*) except for three records one in each of the families *Combretaceae*, *Lythraceae* and *Moraceae* (Hughes 1993). Biodiversity of the genus *Meliolina* is expected to be high in Burma, especially in the Tenasserim coastal strip around Mergui, Tavoy and Amherst where myrtalean hosts abound; for instance, two plant species *Memecylon umbellatum* Burm. f. and *Tristaniopsis merguensis* (Griff) Wils. & Waterh., that are native to Burma, are reported to host ***Meliolina memecylonis*** S. Hughes, Pirozynski & Vaidya 1993 in India, and a ***Meliolina*** species in Malaysia, respectively. Targeted collecting in these areas is likely to be productive.

Besides being generally a taxonomic term for capnodiaceous and/or chaetothyriaceous fungi, sooty mould is also a common name applied collectively to several species of saprobic fungi with dark, superficial, mycelial growth. Some of the common genera often found growing together in sooty mould complexes in apparent harmony are *Aithaloderma* (*Leptoxyphium*), *Aureobasidium*, *Capnodium*, *Cladosporium*, *Microxyphium*, *Podoxyphium*, *Scorias* and *Trichomerium* (*Tripospermum*). They live off the honeydew on plants excreted by sucking insects or exudates produced by glandular trichomes of plants like *Hibiscus*. They are cosmopolitan although some seem to be associated with specific plant insects.

By either use of the term, sooty moulds are ascomycetes and imperfect states of ascomycetous affinity. Sometimes, they are mixed with, or overrun by, the red alga *Cephaleuros mycoidea*, the orange-felt alga *C. virescens*, and the blue-green alga *Scytonema* species especially in hot humid wet tropics. A mixture of *Cladosporium herbarum* and *Aureobasidium pullulans*, generally referred to as *Fumigo vagans* Pers. (= *Caldariomyces fumago*), is common.

Host Index

Achras [Sapotaceae] ***A. sapota*** L. — *Cladosporium* sp.

Actinodaphne [Lauraceae] ***A. angustifolia*** Nees — *Microxyphium* sp.

Aegle [Rutaceae] ***A. marmelos*** Correa — *Sarcinella fumosa.*

Agapetes [Ericaceae] ***A. parishii*** C.B. Clarke — *Asteridiella pentapterygii.*

Ananas [Bromeliaceae] ***A. sativus*** L. — *Prillieuxina stuhlmannii.*

Annona [Annonaceae] ***A. reticulata*** L. — *Cladosporium* sp.

Areca [Arecaceae] ***A. catechu*** L. — *Acroconidiellina arecae* (*Zeuctomorpha arecae*), *Parachionomyces acroconidiellinae.*

Arundinaria [Poaceae] ***A. racemosa*** Munro — *Echidnodella* sp.

?***Arundo*** [Poaceae] ***A. donax*** L. — *Meliola arundinis.*

Asparagus [Asparagaceae] ***A.*** sp. — *Cladosporium oxysporum.*

Atalantia [Rutaceae] ***A. monophylla*** Correa. — *Meliola tenella* var. *atalanticola.*

Averrhoa [Oxalidaceae] ***A. carambola*** L. — *Asterina venustula.*

Bamboo [Poaceae] Bamboo — *Aureobasidium pullulans*, *Balladyna butleri*, *Cladosporium herbarum*, *Leptoxyphium* sp., *Meliola* sp. ?*bambusicola.*

Barringtonia [Lecythidaceae] ***B. acutangula*** Gaertn. — *Meliola indica*, *Spiropes dorycarpus.*

Bauhinia [Leguminosae] ***B. acuminata*** L. — *Cladosporium* sp.; ***B.*** sp. — *Cladosporium oxysporum*; ***B. variegata*** L. — *Cladosporium tenuissimum.*

Brassica [Brassicaceae] ***B. alba*** (L.) Rabenh. — *Cladosporium* sp.

Bridelia [Euphorbiaceae] ***B. stipularis*** Blume — *Meliola brideliae*, *Spiropes* sp.

Brunfelsia [Solanaceae] ***B. ?pauciflora*** Benth. — *Cladosporium cladosporioides.*

Cajanus [Fabaceae] ***C. cajan*** (L.) Millsp. — *Cladosporium cladosporioides.*

Calamus [Arecaceae] ***C.*** sp. — *Cirsosia globulifera*, *Trichothyrium* sp.

Callistemon [Myrtaceae] ***C. lanceolatus*** (Sm.) Sweet — *Cladosporium cladosporioides.*

Camellia [Theaceae] ***C. thea*** Link — *Cicinnobella* sp., *Clypeolella camelliae*, *Eriocercospora*

balladynae, *Mitteriella* sp., *Phaeodimeriella cantareirensis*, *Podoxyphium* sp., *Scorias* sp.

Cansjera [Olacaceae] ***C. rheedii*** J.F. Gmel. — *Asterina cansjerae*, *Meliola opiliae* var. *singalensis*.

Capparis [Capparaceae] ***C. flavicans*** Wall. — *Asterina cappariicola*, *Trichothecium roseum*; ***C. horrida*** L.f. — *Asterina capparis*, *Asterostomella* sp., *Melanops phyllachoroides*.

Careya [Myrtaceae] ***C. arborea*** Roxb. — *Capnodium* spp.

Carissa [Apocynaceae] ***C. carandas*** L. — *Meliola carissae* var. *indica*; ***C. ?spinarium*** — *Meliola ?carissae* var. *spinari*.

Cassia [Leguminosae] ***C. siamea*** Lam. — *Cicinnobella* sp., *Meliola aethipos* var. *cassiae*, *Microxyphium artocarpi*, *Sarcinella cassiae*.

Castanopsis [Fagaceae] ***C. argyrophylla*** King ex Hook. f. — *Acantharia sinensis*.

Chlorophytum [Anthericaceae] ***C. ?elatum***, R. Br. — *Cladosporium cladosporioides*.

Chrysophyllum [Sapotaceae] ***C. cainito*** L. — *Cladosporium chrysophylli*.

Cichorium [Asteraceae] ***C. intybus*** L. — *Cladosporium tenuissimum*.

Cinnamomum [Lauraceae] ***C. camphora*** T. Nees & Eberm. — *Alternaria* sp., *Cladosporium* sp., *Nigrospora* sp.; ***C. ?inunctum*** Meissn. — *Armatella cinnamomi*, *Trichothyrium asterophorum*; ***C. obtusifolium*** Nees — *Armatella cinnamomi*, *Spiropes armatellae*.

Citrus [Rutaceae] ***C. decumana*** L. — *Meliola butleri*; ***C. medica*** var. ***acida*** (Roxb.) Hook. f. — *Meliola citricola*, *Pleurophragmium capense*, *Spiropes guareicola*.

Clerodendron [Verbenaceae] ***C. macrosiphon*** Hook. f. — *Meliola clerodendricola*.

Cocos [Arecaceae] ***C. nucifera*** L. — *Byssosphaeria schiedermayeriana*, *Tripospermum* sp.

Coffea [Rubiaceae] ***C. arabica*** L. — *Podoxyphium* sp.

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

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

Cosmos [Asteraceae] ***C. bipinnatus*** Cav. — *Cladosporium cladosporoides*.

Desmodium [Fabaceae] ***D.*** sp. — *Meliola bicornis*.

Dillenia [Dilleniaceae] ***D. pentagyna*** Roxb. — *Asteridiella longipedicellata* var. *major*, *Calonectria inconspicua*.

Dipterocarpus [Dipterocarpaceae] ***D. ?tuberculatus*** Roxb. — *Cirsosia moulmeinensis*; ***D.*** sp. — *Eriocercospora balladynae*, *Prillieuxina dipterocarpi*.

Dracaena [Dracaenaceae] ***D. sanderiana*** Hort. Sand. ex Mast. — *Colletotrichum* anamorph of *Glomerella cingulata*, *Microthyrium* sp.

Duranta [Verbenaceae] ***D. plumieri*** Jacq. — *Aureobasidium pullulans*, *Cladosporium herbarum*; ***D. repens*** L. — *Podoxyphium* sp., *Scorias paulensis*, *Tripospermum* sp.

Elaeocarpus [Elaeocarpaceae] ***E. wallichii*** Kurz — *Cladosporium* sp.

Engelhardtia [Juglandaceae] ***E. spicata*** Blume — *Parmulina exsculpta*.

Eriobotrya [Rosaceae] ***E. japonica*** Lindl. — *Capnodium* spp.

Eriolobus [Rosaceae] ***E. indica*** Schn. — *Cladosporium eriolobi*.

Eucalyptus [Myrtaceae] ***E.*** sp. — *Microthyrium eucalypticola*.

Eugenia [Myrtaceae] ***E. jambolana*** Lam. — *Asterina* sp.; ***E. polyantha*** Wight — *Phaeodimeriella guarapiensis*.

Eugenia or ***Syzygium*** [Myrtaceae] ***E.*** or ***S.*** sp. — *Asterina pemphidioides*, *Chlamydomyces palmarum*, *Lembosia eugeniae*, *Leptomeliola* sp., *Meliola* sp., *Meliolina pulcherrima*, *Spiropes effusus*.

Eupatorium [Asteraceae] ***E.*** sp. — *Aureobasidium pullulans*, *Cladosporium herbarum*, *Cladosporium* sp., *Podoxyphium* sp.

Euphoria [Sapindaceae] ***E. longana*** Lam. — *Capnodium* sp.

Ferula [Apiaceae] ***F. foetida*** Regal — *Balladynopsis vanderystii* var. *ferulae-foetidae*.

Ficus [Moraceae] ***F. religiosa*** L. — *Microxyphium* sp.; ***F.*** sp. — *Calonectria erysiphoides*, *Irenopsis benguetensis*, *Spiropes capensis*, *Trichothyrium asterophorum* (on a *Meliola*).

Flacourtia [Flacourtiaceae] ***F.*** sp. — *Asterina grewiae*, *Asterina grewiae* var. *granulosa*, *Asterostomella* sp.

Garcinia [Clusiaceae] ***G. heterandra*** Wall. — *Meliola garciniae*, *Spiropes helleri*.

Gardenia [Rubiaceae] ***G. sessiliflora*** Wall. — *Balladynopsis negrii*.

Glycine [Fabaceae] ***G. hispida*** Maxim. — *Cladosporium tenuissimum*.

Gossypium [Malvaceae] ***G.*** sp. — *Capnodium* spp.

Grewia [Tiliaceae] ***G. hirsuta*** Vahl — *Asterina grewiae* var. *grewiae*, *Asterostomella* sp.

Hevea [Euphorbiaceae] ***H. braziliensis*** (Willd. ex A. Juss.) Müll. Arg. — *Cladosporium oxysporum*.

Hibiscus [Malvaceae] ***H. rosa-sinensis*** L. — *Meliola kydiae-calycinae, Pleurophragmium capense.*

Holarrhena [Apocynaceae] ***H. antidysenterica*** Wall. — *Meliola holarrhenae.*

Indigofera [Fabaceae] ***I. trifoliata*** L. — *Parodiella perisporioides.*

Ixora [Rubiaceae] ***I. coccinea*** — *Aithaloderma setosum, Trichomerium* sp.; ***I.*** sp. — *Asterina* sp., *Septonema solaninum.*

Jasminum [Oleaceae] ***J.* auriculatum** *Vahl* — *Asterina spissa*; ***J.*** sp. — *Asterina spissa, Dimerium piceum, Meliola jasmini, M. jasminicola, Phaeodimeriella papillifera, Scolecobonaria filiformis* (close to *Chaetothyrium*), *Trichothyrium asterophorum.*

Knoxia [Rubiaceae] ***K. corymbosa*** Willd. — *Ashersonia tamurai, Meliola psychotriae.*

Lawsonia [Lythraceae] ***L. inermis*** L. — *Asterina lawsoniae, Asterostomella* sp.

Lepionurus [Olacaceae] ***L.*** sp. — *Asterina echinospora.*

Limonia [Rutaceae] ***L. acidissima*** L. — *Meliola tenella* var. *atalantiae.*

Mangifera [Anacardiaceae] ***M. indica*** L. — *Capnodium* spp., *Leptomeliola cryptocarpa, Meliola mangiferae, Metasphaeria* sp., *Spiropes helleri, Spiropes melanoplaca.*

Melia [Meliaceae] ***M. indica*** Brand. — *Cladosporium atriellum.*

Memecylon [Melastomataceae] ***M.*** sp. (*?edule* Roxb). — *Asterina memecyloniae, Phaeodimeriella guarapiensis, Spiropes dorycarpus.*

Millingtonia [Bignoniaceae] ***M. hortensis*** L.f. — *Sarcinella* sp.

Mucuna [Leguminosae] ***M. pruriens*** DC. — *Meliola mucunae.*

Murraya [Rutaceae] ***M. koenigii*** Spreng. — *Cladosporium atriellum*; ***M. paniculata*** (L.) Jack. — *Meliola tenella.*

Nephelium [Sapindaceae] ***N. lappaceum*** L. — *Meliola nephelii* var. *nephelii*; ***N. lit-chi*** Cambess. — *Meliola nephelii* var. *nephelii.*

Olax [Olacaceae] ***O. scandens*** Roxb. — *Asterina olacicola.*

Paspalum [Poaceae] ***P. scrobiculatum*** L — *Lasiostemma erysiphoides.*

Phoenix [Arecaceae] ***P.*** sp. — *Meliola palmicola* var. *africana.*

Phyllanthus [Euphorbiaceae] ***P. distichus*** Müell. Arg. — *Trichomerium* sp. (close to *T. didymopanacis*), *Tripospermum* spp.

Piper [Piperaceae] ***P. betle*** L. — *Phragmocapnias betle.*

Plumeria [Apocynaceae] ***P. alba*** L. — *Chaetothyrium javanicum.*

Poaceae (tall grass) — *Spiropes clavatus.*

Protium [Burseraceae] ***P. serratum*** Engl. — *Meliola canarii.*

Prunus [Rosaceae] ***P. cerasoides*** D. Don — *Sarcinella prunicola.*

Psidium [Myrtaceae] ***P. guajava*** L. — *Chaetothyrium griseolum* (Sooty mould).

Psoralea [Leguminosae] ***P. corylifolia*** L. — *Cladosporium psoraleae.*

Pterospermum [Sterculiaceae] ***P.*** sp. — *Meliola pterospermi.*

Quercus [Fagaceae] ***Q. dealbata*** — *Meliola* sp., *Perisporiopsis* sp.; *?**Q. lanceaefolia*** Kurz — *Meliola* sp.; ***Q. mespilifolia*** Wall. — *Aschersonia* sp., *Hyponectria cookeana, Tripospermum gardneri, T. myrti*; ***Q.*** sp. — *Cicinnobella* sp., *Cylindrocarpon* sp., *Dimerium* sp. probably *minutum, Echidnodes quercina, Meliola* sp., *Sarcinella quercina, Spiropes melanoplaca.*

Quisqualis [Combretaceae] ***Q. indica*** L. — *Asterina escharoides.*

Ricinus [Euphorbiaceae] ***R. communis*** L. — *Clypeolella ricini.*

Rosa [Rosaceae] ***R.*** sp. — *Cladosporium oxysporum.*

Rosaceae (probably ***Prunus*** sp. (cherry) — *Clypeolella* sp., *Sarcinella* sp.

Saccharum [Poaceae] ***S. officinarum*** L. — *Capnodium* spp.

Salacca [Arecaceae] ***S. wallichiana*** Mart. — *Schizothyrium* sp.

*?**Salacia*** [Celastraceae] ***S.*** sp. — *Linotexis philippinensis.*

Santalum [Santalaceae] ***S. album*** L. — *Asterina congesta, Asterostomella* sp.

Sesamum [Pedaliaceae] ***S. indicum*** DC. — *Cladosporium herbarum, Sarcinella* sp.

Sida [Malvaceae] ***S. humilis*** Cav. — *Asterina diplocarpa, Septonema solaninum.*

Solanum [Solanaceae] ***S. melongena*** L. — *Cladosporium* sp., *C. tenuissimum, Clypeolella* sp., *Mittieriella* sp., *Sarcinella* sp., *Schiffnerula solani, Trichomerium crinoporum.*

Streblus [Moraceae] ***S. asper*** Lour. — *Asteridiella ugandensis* var. *antiaridis.*

Strychnos [Loganiaceae] ***S.*** ?***nux-blanda*** A.W. Hill — *Asterina sandowayensis.*

Syzygium [Myrtaceae] ***S.*** sp. — *Chlamydomyces palmarum, Meliolina burmanica, M. cladotricha, M. pulcherrima.*

Tamarindus [Leguminosae] ***T. indica*** L. — *Exosporium tamarindi, Massaria indica, Meliola tamarindi.*

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

Terminalia [Combretaceae] ***T.*** sp. — *Asteridiella* sp., *Asterina magnifica, Dimerium* sp (close to *D. leonense*), *Meliola* sp., *Pleurophragmium capense.*

Thysanolaena [Poaceae] ***T. maxima*** Kuntze — *Annellophragmia cooncorensis, Meliola arundinis, Tetraploa aristata, Xenosporium* sp.

Tristaniopsis [Myrtaceae] ***T.*** sp. — *Meliola* sp.

Triticum [Poaceae] ***T. aestivum*** L. — *Cladosporium atriellum, C. herbarum.*

Unknown plant (?*Argyreia* sp.) — *Echidnodella* sp.

Unknown plant (Vernacular name = *Mho-auk*? or *Mo-owt*?) — *Asterostomella* sp.

Unknown plant — *Linotexis burmanica.*

Unknown plant (Vernacular name = *Taung-khaye*) — *Asterina* sp., *Domingoella asterinarum.*

Vallaris [Apocynaceae] ***V. heynii*** Spreng. — *Calonectria ukolayi, Cylindrocarpon ukolayi, Meliola tabernaemontanicola.*

Viola [Violaceae] ***V.*** sp. — *Cladosporium oxysporum.*

Wrightia [Apocynaceae] ***W. tomentosa*** Roem. & Schult. — *Meliola simillima.*

Ziziphus [Rhamnaceae] ***Z. jujuba*** Lam. — *Cladosporium zizyphi, Clypeolella ziziphina*; ***Z. rugosa*** Lam. — *Cicinnobella parodiellicola, Clypeolella ziziphina, Ferrarisia pamellisiae, Mitteriella ziziphi-rugosae.*

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