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SOME SOOTY MOULDS AND BLACK MILDEWS FROM SINGAPORE AND THE MALAY PENINSULA

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ABSTRACT

In Singapore and the Malay Peninsula sooty moulds and black mildews are common. Colonies of these fungi on plant foliage often consist of several species mixed together and each species may produce more than one type of conidia and other fruiting structures. The specimens collected and examined are described and listed under Ascomycetes (17 species) and Fungi Imperfecti (16 species). The most common species were those of *Meliola* and *Microxyphium.* A host list is provided.

ABSTRAK

Di Singapura dan Semenanjung Malaya jamur jelaga dan jamur embun hitam umum terdapat. Koloni jamur-jamur ini pada dedaunan sering terdiri atas beberapa jenis yang bercampuran dan masing-masing jenis dapat membentuk lebih dari satu macam tubuh buah. Spesimen yang terkumpul dan diteliti dipertelakan dan disusun dalam Ascomycetes (17 jenis) dan Fungi Imperfecti (16 jenis). Jenis yang paling sering dijumpai tergolong marga-marga *Meliola* dan *Microxyphium.* Suatu daftar tumbuhan inang disajikan juga.

INTRODUCTION

Sooty moulds and black mildews occur abundantly and prominently on a wide range of plants in this part of the world, where the temperature and humidity are high all the year around. Many are associated with aphids and scale insects, feeding on the honey dew excretions of these insects.

A sooty mould or black mildew colony on a leaf surface often comprises several species of fungi, and each may produce more than one

type of conidia and other fruiting bodies. The different species may fruit concurrently or otherwise. Therefore much difficulty arises in relating the conidial state to the correct sexual fruiting state of the same fungus. These factors have contributed considerably to the confusion in the study, identity and nomenclature of this group of fungi.

Much information and knowledge on these fungi occurring elsewhere have been published. These include Stevens (1917); Stevens & Tehon (1926) on species of *Meliola* and *Irene* from British Guiana and Trinidad; Mendoza (1932) ; Fraser (1933, 1934, 1935a, 1935b, 1937) on the sooty moulds of New South Wales; Fisher (1939) on Australian sooty moulds; and Miller & Bonar (1941) on the sooty moulds of California. Studies on the fungus flora of Uganda by Hansford (1937; 1945; 1946a), those on West African Meliolineae by Deighton (1944), and Hansford & Deighton (1948), Hansford's contribution (1946b) on foliicolous ascomycetes and his monograph on Meliolineae (1961) are valuable reference works. From North America, Barr (1955) described several species of sooty moulds. Batista and Ciferri's work on the Chaetothyriales (1962) and their taxonomic revision on the sooty moulds of Asbolisiaceae (1963) are well known. Farr (1969) reported on Dominican sooty moulds and Reynolds (1971) on the use of hyphal morphology in the taxonomy of sooty mould ascomycetes. Some sooty moulds from Indonesia have been described by Boedijn (1931) and Hansford (1954). Occurrences of these fungi in the Malay Peninsula have also been recorded by Thompson & Johnston (1953) and Johnston (1960). To add further to information on this group of interesting fungi occurring in this region, some collections and observations carried out are reported herein.

The specimens examined were grouped under the Ascomycetes or the form class Fungi Imperfecti depending on the presence or absence of the perfect state fruiting structures at the time of collection. It is recognised that those arranged under Fungi Imperfecti may never be associated with a sexual state. Identification of the fungi was based on comparisons with published descriptions. For most of those grouped under Fungi Imperfecti, Bastista & Ciferri's (1963) nomenclature and descriptions were closely followed and compared.

In this paper, the fungi are described and presented for convenience in an alphabetical arrangement comprising 17 species under the Ascomycetes and 16 species under the Fungi Imperfecti. The most common ones were found to be species of *Meliola* and *Microxyphium.* A host list with localities is compiled for ease of reference.

ASCOMYCETES

1. ASTERINA LANDOLPHIICOLA Hansf. *in* Proc. Linn. Soc. Lond. 157: 33. 1945.

Colonies amphigenous, black; hyphae brown, hyphopodia 1-celled, globose to lobed, sessile, 5—6.5 X 6—7 µm. Thyriothecia of compact radiating hyphae, 90—130 µm diam. Ascospores 2-eelled, brown with hyaline band, 11—14.5 X 6.5—9 µm (fig. 1).

On *Artocarpus elastica* Reinw. (Moraceae), at Nee Soon, Singapore.

2. ASTERINA LAWSONIAE P. Henn. & Nym. *in* Ann. Mycol. 9: 391. 1911.

Colonies amphigenous, black; hyphae light brown, hyphopodia 1-celled, sessile, lobed 6.5—9.5 X 6.5 µm. Thyriothecia circular, flat, dark brown, 61—109 µm diam. Ascospores 2-celled, pale brown with central, hyaline band, 13—16 X 6.5—7 µm (fig. 2).

On *Lawsonia inerrnis* L. (Lythraceae), at Changi, Singapore.

3. ASTERINA SPONIAE Rac, Parasit. Alg. Pilz. Jav. 3: 34. 1900; Dennis *in* Kew Bull. Additional Series 3: 196.1970.

Colonies epiphyllous, black; hyphae brown, hyphopodia 1-celled, 6.5—8 X 6.5 µm. Thyriothecia dark brown, circular, 53—140 µm diam. Ascospores 2-celled, dark brown, slightly constricted at septum, 16.5—20 X 10 µm.

On *Trema orientalis* Bl. (Ulmaceae), at Gunong Panti, Johore, Malay Peninsula.

4. ASTERINA UVARIICOLA Hansf. *in* Proc. Linn. Soc. Lond. **157**: 34. 1945.

Colonies epiphyllous, confluent, black; hyphae light brown, hyphopodia 1-celled, sessile, globose to lobed, 6—6.5 X 5—6.5 *µm.* Thyriothecia arise laterally from hyphae, 54—90 µm diam. Ascospores 2-celled, brown with hyaline central band, 19—22 X 9.5—13 µm (fig. 3).

On *Dillenia reticulata* King (Dilleniaceae), at Lombong Batu, Johore, Malay Peninsula.

5. BALLADYNA VELUTINA (Berk. & Curt.) Höhnel *in* S.B. Akad. Wiss. Wien Math. Nat. 119: 411. 1910.

Colonies amphigenous, black; hyphae brown with black setae; hyphopodia numerous, sub-clavate to globose to lobed, 1-celled, 7—10 X 6.5—7 *µm.* Hyphal setae erect, black, apex obtuse, 100—250 x 3—6.5 µm at base. Ascostroma stipitate, globose to pyriform, arising laterally from hyphae, 46—57 X 30—52 µm. Ascospores olivaceous brown, 1-septate, 13—19 X 6.5—9.5 µm (fig. 4).

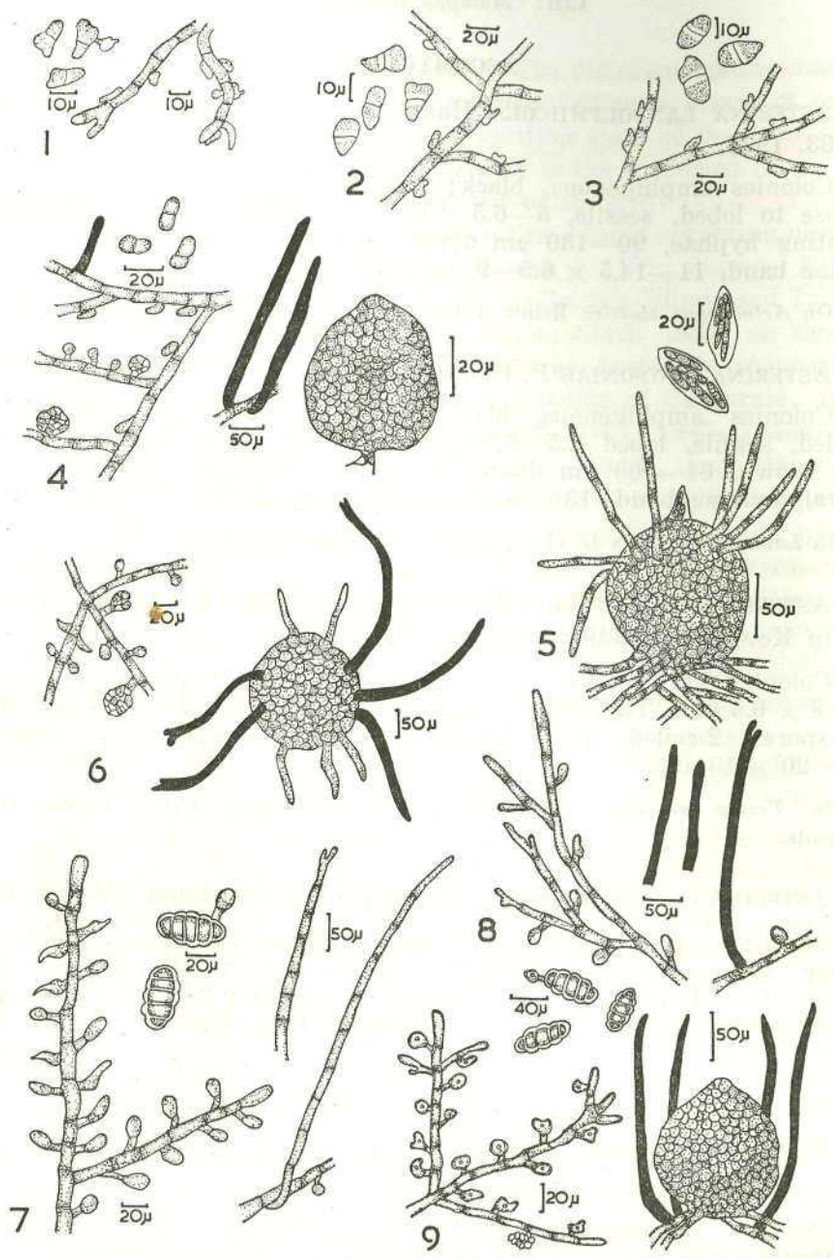


Fig-. 1. *Asterina landolphiicola*, 2. *Asterina lawsoniae*, and 3. *Asterina uvariicola*, all with hyphopodiate hyphae and 2-celled ascospores. 4. *Balladyna velutina* with hyphopodiate hgsphae, black setae, 2-celled ascospores and young ascostroma. 5. *Chaetothyrium javanicum* with ascostroma, young asci with ascospores. 6. *Irenina fid* with hyphopodiate hyphae and globose, setose ascostroma. . 7. *Meliola citricola* with hyphopodiate hyphae, setae and multiseptate ascospores-. 8. *Meliola furcata* with hyphopodiate hyphae and black setae. 9. *Meliola macarangicola* with hyphopodiate hyphae, black setae, ascostroma and 4-septate ascospores.

On *Gardenia jasminoides* Ellis (Rubiaceae), at Taman Negara, Pahang, and Fraser's Hill, Pahang, Malay Peninsula.

Balladyna gardeniae Rac. is a synonym.

6. CHAETOTHYRIUM JAVANICUM (Zimm.) Boedijn *in* Bull. Jard. bot. Buitenz. Ill, 11: 225-227. 1931.

Hyphae brown, of elliptical cells, thick-walled, some of the larger cells constricted slightly at the middle. Ascostroma dark brown, globose, 80—120 µm diam., ostiolate, setae brown, faintly septate. Asci hyaline, 8-spored. Ascospores 3—4 celled, only immature ones observed (fig. 5).

On *Thunbergia laurifolia* Lindl. (Acanthaceae) and *Bridelia tomentosa* Bl. (Euphorbiaceae), at Cluny Road, Singapore.

7. IRENINA FICI Hansf. *in* C.M.I. Mycol. Pap. 23: 37-38. 1948.

Colonies black, hyphae with capitate 2-celled hyphopodia and a few mucronate hyphopodia. Ascostroma dark brown, globose, 160—190 µm diam., setose, setae black, tips dentate, 245—380 X 8—11 µm at base. Ascospores dark brown, 4-septate, constricted at septa, 45—53 X 21—26 am (fig. 6).

On *Ficus pumila* L. (Moraceae), at Fraser's Hill, Pahang, Malay Peninsula.

8. MELIOLA AETHIOPS Sacc. *in* Bol. Orto Bot. Napoli 6: 41. 1921; Hansf. *in* Sydowia, Beiheft 2: 252. 1961.

Colonies black on upper surface of phyllodes. Hyphae mainly with 2-celled capitate hyphopodia, and very few mucronate hyphopodia. Hyphal setae numerous, dark brown with obtuse tips, septate, thick walled. Ascostroma setose, globose, 115—200 µm diam., non-ostiolate, setae much like hyphal setae. Ascospores brown, 5-celled, constricted at septa, 33—43 X 10—16 µm.

On *Acacia auriculiformis* A. Cunn. (Leguminosae), at University of Singapore campus, Bukit Timah, Singapore.

9. MELIOLA CITRICOLA Syd. *in* Ann. Mycol. 15: 183. 1917; Hansf. *in* Sydowia, Beiheft 2: 383. 1961.

Colonies dark brown, hyphae with 2-celled capitate and mucronate hyphopodia, and with dark brown setae which are septate, attenuate or dentate. Ascostroma black, globose, 100—225 *µm* diam., glabrous. Ascospores brown, 4-septate, 38—43 x 16—19 m, constricted at septa (fig. 7).

On *Citrus aurantifolia* Swingle (Rutaccae), at Kuala Sedili, Johore, Malay **Peninsula.**

10. MELIOLA CITEICOLA Syd. var. AMYRIDIS Hansf. *in* Sydowia 9: 40. 1955; Hansf. *in* Sydowia, Beiheft 2: 384. 1961.

Hyphae setose with 2-celled capitate and mucronate hyphopodia, setae dark brown with dentate tips. Ascostroma glabrous, globose;, 195—225 µm diam. Ascospores 4-septate, brown, 41.5—48 X 16—19*µm*.

On *Citrus grandis* Osbeck (Rutaceae) and *Symplocos* ep. (Symplocaceae), at Fraser's Hill, Pahang, Malay Peninsula.

11. MELIOLA FURCATA Lev. var. UGANDENSIS Hansf. *in* Sydowia 9: 65. 1955; Hansf. *in* Sydowia, Beiheft 2: 373. 1961.

Colonies brown, hyphae with 2-celled capitate and mucronate hyphopodia, hyphal setae black. Ascostroma globose, 80—180µm diam. Ascospores 4-septate, 43—53 x 19—22 µm, constricted at septa (fig. 8).

On *Vitis* sp. (Vitaceae), at Fraser's Hill, Pahang, Malay Peninsula.

12. MELIOLA MACARANGICOLA Hansf. *in* Proc. Linn. Soc. Lond. 157: 23. 1945; Hansf. *in* Sydowia, Beiheft 2: 220. 1961.

Colonies black, hyphae with 2-celled capitate and mucronate hyphopodia, numerous black hyphal setae with acute tips. Ascostroma glabrous, slightly pyriform, 140—180 X 140—170 µm. Ascospores brown, 4-septate, 42—54 X 14.5—19 µm, constricted at septa (fig. 9).

On *Macaranga heynei* Johnston (Euphorbiaceae), at Lombong Batu, Johore, Malay Peninsula.

13. MELIOLA MALACOTRICHA Speg. *in* Anal. Soc. Cienc. Argent. 22: 59. 1888; Hansf. *in* Sydowia, Beiheft 2: 647. 1961.

Colonies brown, hyphae with 2-celled, capitate and mucronate hyphopodia, setose. Hyphal setae septate with obtuse tips. Ascostroma globose, 125—180 µm diam. Ascospores 4-septate, pale brown, 34—38 X 13 µm, constricted at septa (fig. 10).

On *Ipomoea carica* (L.) Sweet (Convolvulaceae), at Fraser's Hill, Pahang, Malay Peninsula.

14. MELIOLA RIZALENSIS Syd. var. VITICIS (Hansf.) Hansf. & Deighton *in* C.M.I. Mycol. Pap. 23: 70. 1948.

Colonies black, hyphae with 2-celled capitate hyphopodia and a few mucronate hyphopodia. Hyphal setae numerous, especially at the base of ascostroma, thick-walled, dark brown, septate with obtuse or slightly dentate tips. Ascostroma glabrous, globose, 80—160 µm diam., black. Ascospores pale brown, 4-septate, 29—40 x 11—14 µm, constricted at septa (fig. 11).

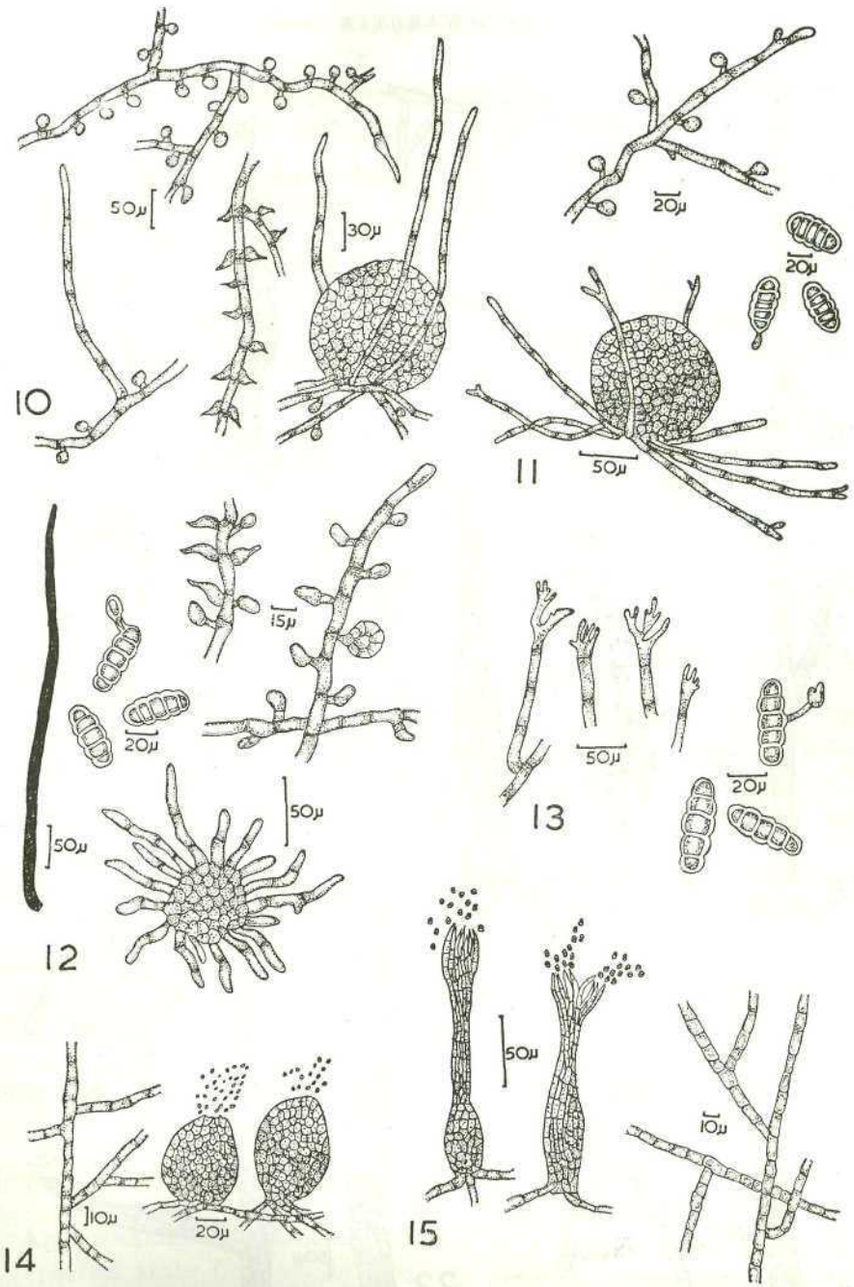


Fig. 10. *Meliola malacotricha* with hyphopodiate hyphae, setae with obtuse tips **and** ascostroma. 11. *Meliola rizalensis* with hyphopodiate hyphae, 4-septate ascospores and ascostroma. 12. *Meliola salaciae* with hyphopodiate hyphae, 4-septate ascospores, black seta and young ascostroma. 13. *Meliola themedae* with 4-septate ascospores and setae with dentate tips. 14. *Antennariella elegans* with hyphae, ostiolate pycnidia and pycnidiospores. 15. *Microxyphiella commista* with hyphae, pycnidia and 1-septate pycnidiospores.

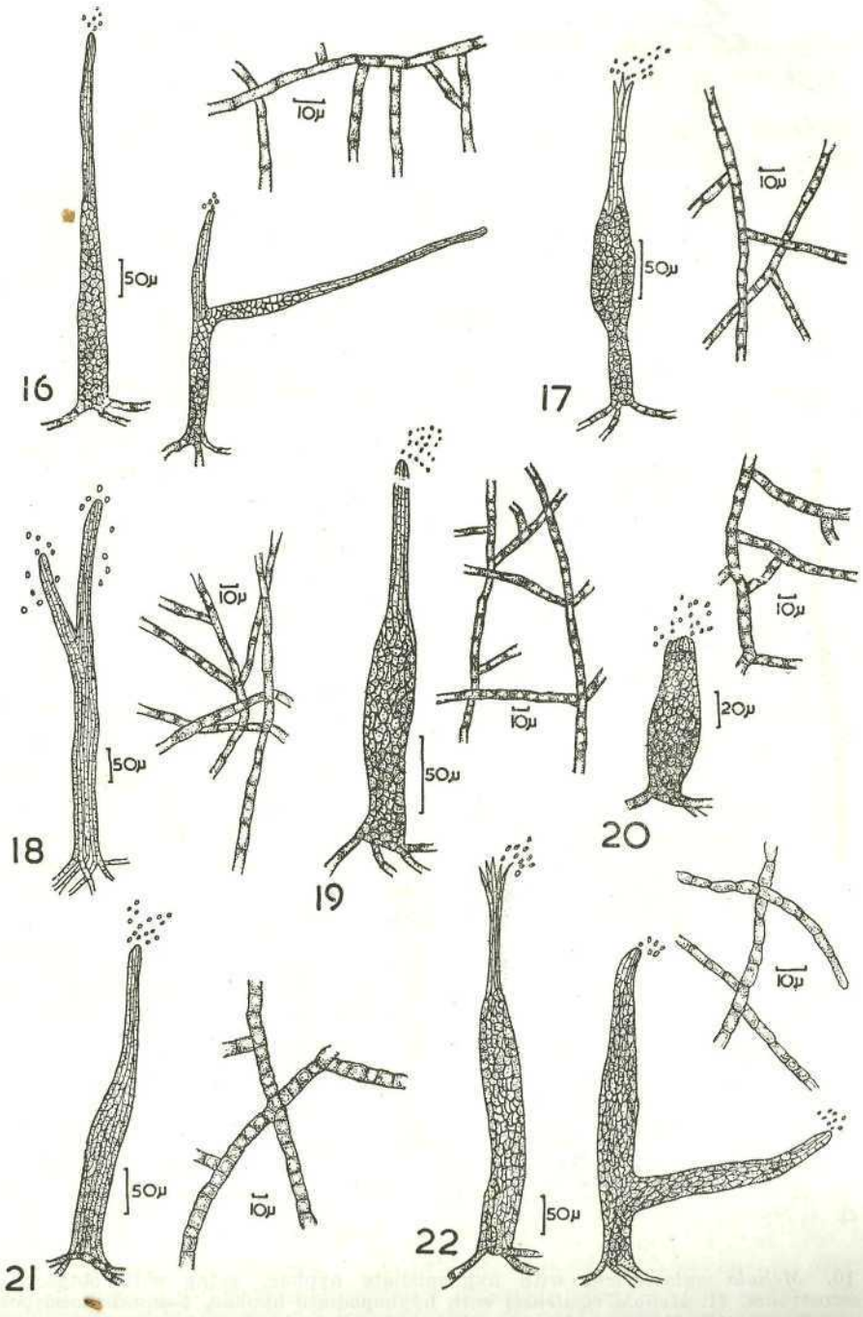


Fig. 16-22. *Microxyphium* species, with various shaped pycnidia, hyphae and pycnidiospores. 16. *Microxyphium aciculiforme.* 17. *Microxypfiium artocarpi.* 18. *Microxyphium cesatii.* 19. *Microxyphium coffeanum.* 20. *Microxyphium columnatum.* 21. *Microxyphium leptospermi.* 22. *Microxyphium secundum.*

On *Clerodendron incisum* **Klotzsch** var. *macrosiphon* (Hook, f.) Baker (Verbenaceae), at Botanic Gardens, Singapore.

15. MELIOLA SALACIAE Hansf. *in* Proc. Linn. Soc. Lond. 157: 182. 1946; Hansf. *in* Sydowia, Beiheft 2: 346. 1961.

Colonies black, hyphae setose, with 2-celled capitate and mucronate hyphopodia. Ascostroma globose, 56—100 *µm* diam. Ascospores 4-septate, constricted at septa, 36—43 X 13—16*µm* (fig. 12).

On *Citrus Union* Burm. f. (Rutaceae), at Taman Negara, Pahang, Malay Peninsula.

16. MELIOLA THEMEDAE Stev. & Rold. *in* Philip. J. Sci. 56: 59. 1935; Hansf. *in* Sydowia, Beiheft 2: 742. 1961.

Colonies black, hyphae with 2-celled capitate and mucronate hyphopodia. Hyphal setae short, numerous, light brown to black, with deeply dentate tips. Ascostroma glabrous, globose, 130—210*µm* diam., brown to black. Ascospores light brown, 4-septate, 48—55 x 16—19 µm, constricted at septa (fig. 13).

On *Themeda villosa* Durand & Jackson (Gramineae), at Fraser's Hill, Pahang, Malay Peninsula.

17. PHAEOCHAETIA SETOSA (Zimm.) Bat. & Cif. *in* Sydowia, Beiheft 3; 75. 1962.

Colonies black, pellicose; hyphae brown, slightly constricted at septa, exhyphopodiate. Ascostroma setose, brown to dark brown, globose to elongate, seated on slightly raised hyphal base, 75—90 X 66—85 *µm*, setae on upper half of ascostroma stiff, septate to non-septate with obtuse ends, 5—6.5 µm wide at base. Ascospores hyaline 4—5 celled, with slight constrictions at septa, 16.5—20 X 5 µm.

On *Acacia auriculiformis* A. Cunn. (Leguminosae), associated with scale insects, at University of Singapore campus, Bukit Timah, Singapore. Also found on leaves of *Murraya paniculata* Jack (Rutaceae), *Tabernaemontana divaricata* R. Br. ex Bl. (Apocynaceae) and *Coffea arabica* L. (Rubiaceae), in Singapore.

FUNGI IMPERFECTI

1. ANTENNARIELLA ELEGANS Bat. & Cif. *in* Quaderno 31: 28. 1963 (perfect state *Capnodium elegans* Fraser).

Hyphae epiphyllous, pycnidia brown, almost globose, 42—70 X 35—56µm, ostiolate. Pycnidiospores hyaline, ovoid, 3 x 1.5 µm (fig. 14).

On *Eugenia javanica* Lam. (Myrtaceae), at Changi, Singapore.

2. MICROXYPHIELLA COMMISTA Bat. & Cif. *in* Quaderno 31: 98. 1963.

Black colonies, forming encrustations on both surfaces of leaves. Hyphae light brown. Pycnidia abundant with upper and lower expanded portions joined by short narrower stipe. Upper end fimbriated and hyaline, lower portion brown, 95—210 X 22—58 µm wide at base and 22—35 µm at upper expanded portion, and 13—16 µm at stipe. Pycnidiospores hyaline, 1-septate, 6—8 X 3µm (fig. 15).

On *Nerium oleander* L. (Apocynaceae), at Kranji, Singapore. Associated with *Tripospermum rnyrti.*

3. MICROXYPHIUM ACICULIFORME Cif., Bat. & Nasc. *in* Quaderno 31: 110. 1963.

Hyphae forming black encrustations which become flaky when dry. Pycnidia abundant, brownish-black, flask-shaped, occasionally branched, ostiole fimbriate, 210—420 X 22—35 µm wide at base and 8—13 µm wide at neck regions. Pycnidiospores bacillar, hyaline, about 4 x 1 - 5 urn (fig. 16).

On *Lantana camara* L. (Verbenaceae), associated with red ants, at University of Singapore campus, Bukit Timah, Singapore. Associated with *Podoxyphium ampullaceum.*

4. MICROXYPHIUM ARTOCARPI Bat., Nasc. & Cif. *in* Quaderno 31: 114. 1963.

Hyphae in greyish patches on leaf surface. Hyphal cells oblong-cylindrical. Pycnidia abundant, pale to dark brown with hyaline fimbriae at ostiole, flask-shaped, 220—335 x 19—42 µm wide at base and 9.5 [xm wide at tip. Pycnidiospores hyaline, bacillar 3—5 X 1.5 jJ.ni (fig. 17).

On *Eugenia javanica* Lam. (Myrtaceae), at Changi, Singapore. Pound associated with *Antennariella elegans.*

5. MICROXYPHIUM CESATII Bat. & Cif. *in* Quaderno 31: 120. 1963 (perfect state *Capnodium cesatii* Mont.).

Hyphae exhyphopodiate. Pycnidia dark brown to black, cylindrical, 290—520 X 13—26 [xm wide at base and 8—11 -xm wide at tip. Pycnidiospores hyaline, 6 X 1-5 *µ.m* (fig. 18).

On *Aglaia odoratissima* BL. (Meliaceae), at Fraser's Hill, Pahang, Malay Peninsula. Associated with *Microxyphium coffeanum.*

6. MICROXYPHIUM COFFEANUM Bat. & Matta *in* Quaderno 31: 122. 1963.

Hyphae epiphyllous, pycnidia flask-shaped, brown, 140—300 X 13—26 µm wide at base and 6 µm wide at tip. Pycnidiospores hyaline, 3 X 1.5 ***µm*** (fig. 19).

On *Cerbera odollam* Gaertn. (Apocynaceae), *Aglaia odoratissima* Bl. (Meliaceae) and *Acalypha* sp. (Euphorbiaceae), at Fraser's Hill, Pahang, Malay Peninsula and Queenstown, Singapore.

7. MICROXYPHIUM COLUMNATUM Bat., Cif. & Nasc. *in* Quaderno 31: 123. 1963.

Epiphyllous colonies. Pycnidia abundant, dark brown, ovoid to cylindrical 85—145 X 17.5—30 µm. Pycnidiospores 4 X 1-5µm (fig. 20).

On *Plumeria rubra* L. (Apocynaceae), associated with scale insects, at Lornie Road, Singapore. Associated with *M. leptospermi* and *Tripospermum acerinum.*

8. MICROXYPHIUM LEPTOSPERMI Fischer *in* Quaderno 31: 133. 1963.

Hyphae forming thick mat on upper leaf surface and extending to petiole. Hyphal cells bead-like. Pycnidia abundant, brown, flask-shaped and sometimes fimbriate at ostiole, 280—450 X 26—42 µm at base, and 6.5—13 µm at tip. Pycnidiospores elliptic and hyaline, 5 X 1-5 µm (fig. 21).

On *Plumeria rubra* L. (Apocynaceae), at Lornie Road, Singapore. Associated with *M. columnatum.*

9. MICROXYPHIUM SECUNDUM Bat. & Cif. *in* Quaderno 31: 136. 1963.

Hyphae forming black encrustations on upper leaf surface. Hyphal cells constricted at septa. Pycnidia in clusters, brown to black, some branching into two, 450—560 X 50—65µm at widest part and 9.5—13 µm at tip. Pycnidiospores ovoid, hyaline, 4—5 X 1.5 µm (fig. 22).

On *Gardenia jasminoides* Ellis (Rubiaceae), at University of Singapore campus, Bukit Timah, Singapore.

10. MICROXYPHIUM SPATHODEAE Bat. & Matta *in* Quaderno 31:137. 1963.

Hyphae forming brown encrustations, constricted at septa. Pycnidia solitary or gregarious with definite hyphal base, dark brown to black, 280—520 X 22—32µm wide at base and 6.5—11 *µm* wide at tip. Pycnidiospores hyaline and bacillar, 2 x 1 µm (fig- 23).

On *Memecylon acuminatum* Sm. (Melastomaceae), at Nee Soon, Singapore.

11. MICROXYPHIUM TENELLUM Sacc. *in* Quaderno 31:138. 1963.

Colonies in thin, black patches. Hyphae beaded in appearance. Pycnidia non-fimbriate, 170—220 X 17.5—22 µm wide at base and 6.5—13 µm at apex. No pycnidiospores observed (fig. 24).

On *Diospyros scortechinii* King (Ebenaceae), at Fraser's Hill, Pahang, Malay Peninsula.

12. PODOXYPHIUM AMPULLACEUM Bat. & Maia *in* Quaderno 31: 164. 1963.

Hyphae forming black encrustations on upper leaf surface. Hyphal cells globose to oblong. Pycnidia occasionally branched with inflated apex and fimbriate ostiole, dark brown to black in neck region, lighter colour in inflated region, 360—570 x 22—30 ^m diam. in inflated area, 19—36 sxm at base. Pycnidiospores hyaline, bacillar, 2—3 X 1-5 µm (fig. 25).

On *Eugenia polyantha* Wight (Myrtaceae), *Gardenia jasminoides, Lantana camara* and *Thunbergia laurifolia,* at University of Singapore campus, Bukit Timah, and Cluny Road, Singapore.

13. PODOXYPHIUM AZEVEDOI Bat., Nasc. & Cif. *in* Quaderno 31:166. 1963.

Hyphae light brown. Pycnidia abundant with narrow black stipe and light brown inflated apex, 210—360 X 13—16 p wide at stipe region and 19—33 µm wide at inflated region. No pycnidiospores observed (fig. 26).

On *Stenolobium stans* Seem. (Bignoniaceae), at Fraser's Hill, Pahang, Malay Peninsula.

14. TRIPOSPERMUM ACERINUM (Syd.) Speg. *in* Physis 4(17): 295. 1918; Hughes *in* C.M.I. Mycol. Pap. 46: 10. 1951.

Hyphae forming brown encrustations on upper leaf surface. Conidia 4-armed, pyriform stalk cell, arms pale brown, hyaline at apex, 20—50 x 6.5—9.5 µm wide at base, up to 7-septate. Two arms and stalk cell attached to one cell, while other two arms attached to another cell laterally to the first (fig. 27).

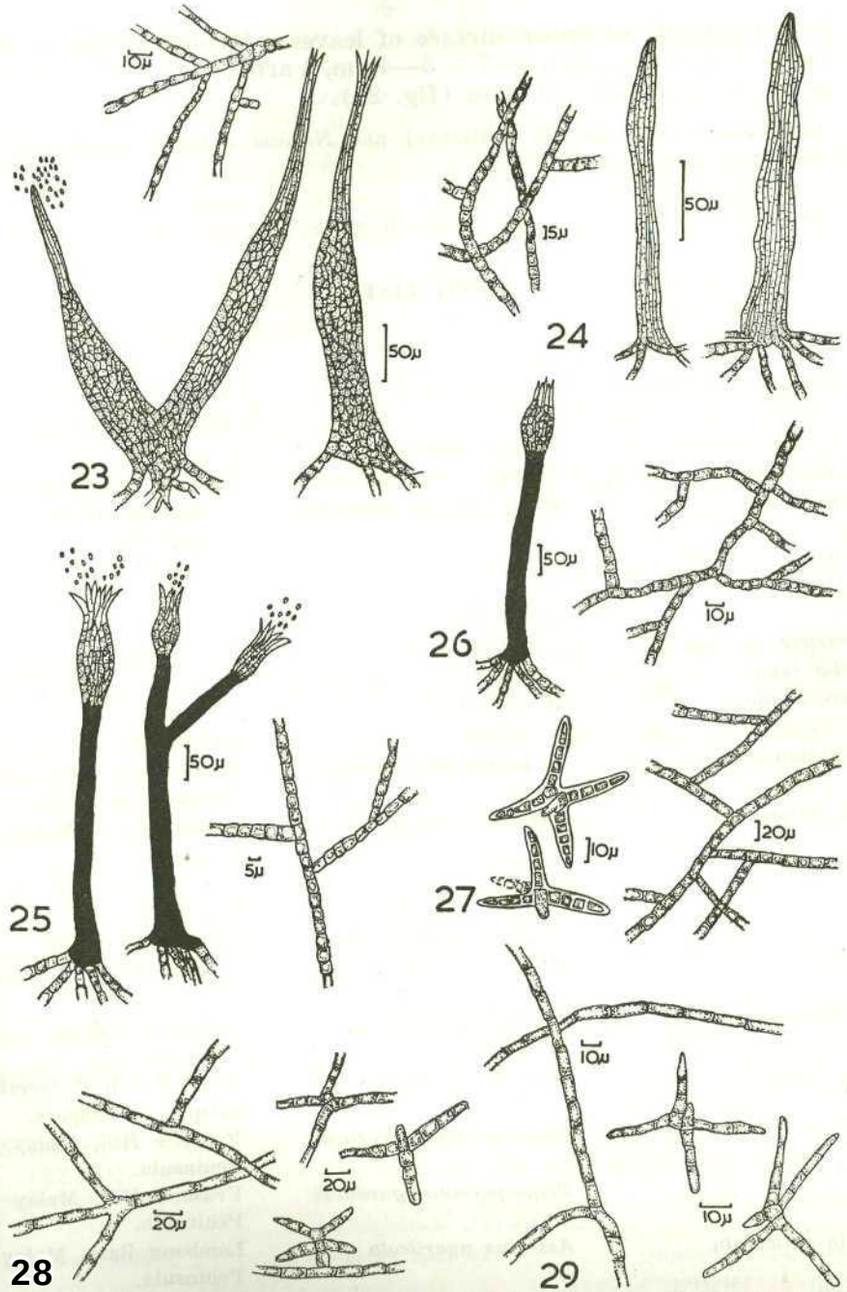
On *Coffea arabica* L. (Rubiaceae), *Achras zapota, Cinnamomum iners* and *Plumeria rubra,* at Fraser's Hill, Pahang, Malay Peninsula; Upper Serangoon, Singapore; University of Singapore campus, Bukit Timah; and Lornie Road, Singapore, respectively. Associated with *T. gardneri* on *C. arabica* leaves.

15. TRIPOSPERMUM GARDNERI (Berk.) Speg. ex Hendrick *in* Publ. Inst. nat. Etud. agron. Congo beige 35: 186. 1948; Hughes *in* C.M.I. Mycol. Pap. 46:12. 1951.

Light brown hyphae and conidia. Latter with 3 to 4 arms, faintly septate and with obtuse tips, 45—83 x 9 *µm* wide at base (fig. 28).

On *Coffea arabica* L. (Rubiaceae), at Fraser's Hill, Pahang, Malay Peninsula. Associated with *T. acerinum.*

16. TRIPOSPERMUM MYRTI (Lind) Hughes *in* C.M.I. Mycol. Pap. 46: 18. 1951.



Fie 23 *Microxyphium spathodeae* and 24. *Microxyphium tenellum,* with various shaped ' pycnidia, hyphae and pycnidiospores. 25. *Podoxyphium ampullaceum* and 26 *Podoxyphium azevedoi* with hyphae and pycnidia. 27. *Tripospermum acerinum,* 28 *Tripospermum gardneri,* and 29. *Tripospermum myrti,* with hyphae and *6* to 4-armed sentate conidia.

Colonies black on upper surface of leaves. Hyphae brown, conidia subhyaline with stalk cell, 6.5—7 x 3—4 *y.m*, 4 arms, each up to 4-septate, 17—26 x 3—4 [xnujwide at base (fig. 29).

On *Citrus grandis* Osbeck (Eutaceae) and *Nerium oleander,* associated with scale insects, at Kranji, Singapore.

HOST LIST

Host	Fungus	Locality
Acacia auriculiformis	*Phaeochaetia setosa*	Bukit Timah, University campus, Singapore.
	Meliola aethiops	
Acalypha sp.	*Microxyphium coffeanum*	Queenstown, Singapore.
Achras zapota	*Tripospermum acerinum*	Serangoon Road, Singapore.
Aglaia odoratissima	*Microxyphium cesatii*	Fraser's Hill, Malay Peninsula.
	Microxyphium coffeanum	
Artocarpus elastica	*Asterina landolphiicola*	Nee Soon, Singapore.
Bridelia tomentosa	*Chaetothyrium javanicum*	Cluny Road, Singapore.
Cerbera odollam	*Microxyphium coffeanum*	Fraser's Hill, Malay Peninsula.
Cinnamomum iners	*Tripospermm acerinum*	Bukit Timah, University campus, Singapore.
Citrus aurantifolia	*Meliola citricola*	Kuala Sedili, Malay Peninsula.
Citrus grandis	*Meliola citricola* var. *amyridis*	Fraser's Hill, Malay Peninsula.
	Tripospermum myrti	Kranji, Singapore.
Citrus limon	*Meliola salaciae*	Taman Negara, Malay Peninsula.
Clerodendron incisum var. *macrosiphon*	*Meliola rizalensis* var. *viticis*	Botanic Gardens, Singapore.
Coffea arabica	*Phaeochaetia setosa*	Bukit Timah, University campus, Singapore.
	Tripospermum acerinum	Fraser's Hill, Malay Peninsula.
	Tripospermum gardneri	Fraser's Hill, Malay Peninsula.
Dillenia reticulata	*Asterina uvariicota*	Lombong Batu, Malay Peninsula.
Diospyros scortechinii	*Microxyphium tenellum*	Fraser's Hill, Malay Peninsula.

Host	Fungus	Locality
Eugenia javanica	*Antennariella elegans*	Changi, Singapore.
	Microxyphium artocarpi	
Eugenia polyantha	*Podoxyphium ampullaceum*	Bukit Timah, University campus, Singapore.
Ficus pumila	*Irenina fid*	Fraser's Hill, Malay Peninsula.
Gardenia jasminoides	*Balladyna velutina*	Fraser's Hill & Taman Negara, Malay Peninsula.
	Microxyphium secundum	Bukit Timah, University campus, Singapore.
	Podoxyphium ampullaceum	Bukit Timah, University campus, Singapore.
Ipovioea carica	*Meliola malacotricha*	Fraser's Hill, Malay Peninsula.
Lantana camara	*Microxyphium aciculiforme*	Bukit Timah, University campus, Singapore.
	Podoxyphium ampullaceum	,,
Lawsonia inermis	*Asterina lawsoniae*	Changi, Singapore.
Macaranga heynei	*Meliola macarangicola*	Lombong Batu, Malay Peninsula.
Memecylon acuminatum	*Microxyphium spathodeae*	Nee Soon, Singapore.
Murraya paniculata	*Phaeochaetia setosa*	Katong, Singapore.
Nerium oleander	*Microxyphiella commista*	Kranji, Singapore.
	Tripospermum myrti	
Plumeria rubra	*Microxyphium columnatum*	Lornie Road, Singapore.
	Microxyphium leptospermi	,,
	Tripospermum acerinum	,,
Stenolobium stans	*Podoxyphium azevedoi*	Fraser's Hill, Malay Peninsula.
Symplocos sp.	*Meliola citricola* var. *amyridis*	Fraser's Hill, Malay Peninsula.
Tabernaemontana divaricata	*Phaeochaetia setosa*	Serangoon Road, Singapore.
Themeda villosa	*Meliola themedae*	Fraser's Hill, Malay Peninsula.
Thunbergia laurifolia	*Chaetothyrium javanicum*	Cluny Road, Singapore.
	Podoxyphium ampullaceum	
Trema orientalis	*Asterina sponiae*	Gunong Panti, Malay Peninsula.
Vitis sp.	*Meliola furcata*	Fraser's Hill, Malay Peninsula.

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