

MELIOLACEOUS FUNGI ON ECONOMICALLY IMPORTANT PLANTS IN INDIA - II: ON PLANTS OF NON-WOOD FOREST PRODUCE

V.B. Hosagoudar

Microbiology Division, Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala 695562, India
Email: vbhosagoudar@rediffmail.com

We have reached a stage to utilize and conserve our natural resources in sustainable and skilful manner. Hence, it is urgent and important to evaluate our biodiversity. Fungi form an object of the present study.

Importance of the study of fungi

1. The documentation of fungi provides a base for monitoring success of conservation and management practices.
2. Effective control measures can be only if we have the knowledge about the plant and animal diseases caused by the fungi
3. Biological control of weeds can be monitored
4. Biological control of arthropods in paddy fields can be implemented
5. Medicinal properties of new, virulent and genetically well established organisms can be brought for the welfare
6. Quarantine will be effective and successful
7. Role of fungi in nutrient cycling and ecosystem management
8. Basic resource for the biotechnology
9. Utility of mycotoxin producing members
10. For the use of pure science.

There are numerous undiscovered fungi that have the genetic potential to produce a multitude of novel compounds. Fungi have acquired different mode of nutritional habitat. The present study has been restricted here only to the meliolaceous fungi on the non-wood forest produce yielding plants and the data is based on Meliolales of India (Hosagoudar, 1996) and the subsequent work. The plants are classified under different categories based on the data provided by Nayar *et al.* (1989) and Nair (2000).

Enumeration of species

1. *Amazonia syzygii* Hosag. in Hosag. & Goos, Mycotaxon 36: 236, 1989; 42:126, 1991; Hosag., Dayal & Goos, Mycotaxon 46: 202, 1993; Hosag., Meliolales of India, p.74, 1996

Materials examined: On leaves of *Syzygium cumini* Skeels (Myrtaceae), Idukki, Kerala, 13.xii.1992, V.B. Hosagoudar HCIO 40469 (type); Shankarankudi, Valparai, Coimbatore, Tamil Nadu, 27.xii.1990, V.B. Hosagoudar HCIO 30514; *Syzygium* sp., Sampaje forest nursery, Sampaje, Kodagu, Karnataka, 22.xii.1991, B.R. Dayal HCIO 30841.

Colonies amphigenous, subdense, crustose to slightly velvety, up to 2mm in diameter, rarely confluent. Hyphae substraight to

slightly undulate, branching mostly opposite at wide angles, closely reticulate, cells 16-20 x 6-8µm. Appressoria alternate, straight, antorse to spreading, 18-20µm long; stalk cells cylindrical to cuneate, 4-8µm long; head cells ovate to subglobose, entire, 10-14 x 8-10µm. Phialides mixed with appressoria, opposite to alternate, conoid to ampulliform, 20-24 x 8-10µm. Perithecia flattened-globose, scattered to grouped, up to 180µm in diam.; ascospores obovate, 4-septate, slightly constricted, 44-48 x 16-20µm.

Host range: *Syzygium* spp.

Distribution: India

2. *Armatella balakrishnanii* Hosag., J. Econ. Taxon. Bot. 15: 196, 1991.

Materials examined: On leaves of *Cinnamomum malabatum* (Burm.f.) Blume (Lauraceae), Idukki, Kerala, India, 18.iv.1982, V.B. Hosagoudar MH 72696; Kombe, Thiruvananthapuram, Kerala, 11.iii.1996, V.B. Hosagoudar HCIO 43982, TBGT 409; Kombe, Thiruvananthapuram, Kerala, 11.iii.1996, V.B. Hosagoudar HCIO 44016, TBGT 410.

Colonies hypophylloous, thin, spreading, up to 8mm in diameter. Hyphae smooth walled, crooked, branching alternate to irregular at acute angles, closely reticulate, cells 9-25 x 4.5-6.5mm. Appressoria alternate, antorse to reflexed, 15.5-115mm long; stalk cells aseptate to several septate, straight to tortuous, 3-102.5mm long; head cells globose, narrowly ovate, angular, entire, 9-12.5 x 10-12mm. Perithecia scattered, globose, verrucose, up to 115mm in diam.; ascospores ellipsoidal, mostly aseptate but few ascospores septate, cells unequal, 43.5-49.5 x 18.5-21.5mm.

Host range: *Cinnamomum malabatum*

Distribution: India

3. *Armatella cinnamomicola* Hansf., Reinwardtia 3: 87, 1954; Hosag. & Goos, Mycotaxon 36: 237, 1989; Hosag., J. Econ. Taxon. Bot. 15: 197, 1991.

Materials examined: On leaves of *Cinnamomum malabatum* (Burm.f.) Blume (Lauraceae), Idukki, Kerala, India, 18.iv.1982, V.B. Hosagoudar MH 72696, HCIO 39302; on *C. macrocrpum* Hook. f., MPCA, Kulamavu, Idukki, Kerala, 5.ix.2001, M. Kamarudeen HCIO 44881, TBGT 572; on *Cinnamomum* sp., Sylven valley Hills, Munnar, Idukki, Kerala, 25.iv.2002, S. Shiburaj HCIO 44548, TBGT 834.

Colonies epiphyllous, thin to subdense, crustose, up to 4 mm in diameter, confluent. Hyphae crenulated, straight to substraight, branching alternate to irregular at acute angles, loosely reticulate, cells 15-40 x 6.5-9mm, outer wall crenulated except the growing tips. Appressoria alternate, antorse to spreading, straight to curved, 16-23mm long; stalk cells cylindrical to cuneate, 4-6mm long; head cells ovate, broadly conoid, rarely globose, 13-20 x 8-13mm, outer wall crenulated. Perithecia seated on tortuous exappressoriate mycelia, scattered, globose, up to 215mm in diameter; ascospores initially hyaline,

Table 1. Meliolaceous fungi on economically important non-wood forest produce plants in India

Host plant	Meliolaceous fungi	Host plant	Meliolaceous fungi
Medicinal Plants			
1. <i>Adenanthera pavonina</i>	<i>Meliola adenanthericola</i> Hosag. et al.	36. <i>Terminalia chebula</i>	<i>Asteridiella combreti</i> (Stev.) Hansf. var. <i>leonis</i> Hansf.
2. <i>Ailanthus triphysia</i>	<i>Meliola ailanthii</i> Sharma et al. emend. Hosag.	37. <i>Toona ciliata</i>	<i>Meliola toonae</i> Hosag. & Sabu
3. <i>Aphanamixis polystachya</i>	<i>Irenopsis indica</i> (Anahosur) Hosag.	38. <i>Vetiveria zizanoides</i>	<i>Meliola panici Earle</i> var. <i>vettivericola</i> Gawande et al.
4. <i>Butea monosperma</i>	<i>Meliola buteae</i> Häfiz et al.	39. <i>Callicarpa tomentosa</i>	<i>Asteridiella formosensis</i> (Yamam.) Hansf.
5. <i>Caesalpinia sappan</i>	<i>Meliola caesalpiniae</i> Hansf. & Deight. var. <i>indica</i> Hosag. & Biju	40. <i>Cinnamomum malabatum</i>	<i>Asteridiella balakrishnanii</i> Hosag.
6. <i>Calliandra tomentosa</i>	<i>Asteridiella formosensis</i> (Yamam.) Hansf.		<i>Armatella cinnamomica</i> Hansf.
7. <i>Canarium strictum</i>	<i>Meliola canarii</i> Sydow		<i>Armatella indica</i> Hosag.
8. <i>Cassia fistula</i>	<i>Meliola aethiopis</i> Sacc.	41. <i>Piper nigrum</i>	<i>Meliola beilschmiediae</i> Yamam. var. <i>cinnamomica</i> Hosag.
9. <i>Cinnamomummalabatum</i>	<i>Armatella balakrishnanii</i> Hosag.		<i>Meliola stenospora</i> Wint.
	<i>Armatella cinnamomica</i> Hansf.		<i>Meliola stenospora</i> Wint. var. <i>major</i> Hansf.
10. <i>Cyclea peltata</i>	<i>Meliola beilschmiediae</i> Yamam. var. <i>cinnamomica</i> Hosag.	Gums and Resins	
11. <i>Cymbopogon flexuosus</i>	<i>Meliola cycloae</i> Hosag.	42. <i>Ailanthus triphysia</i>	<i>Meliola ailanthi</i> Sharma et al. emend. Hosag.
12. <i>Dysoxylum malabaricum</i>	<i>Meliola cymbopogonis</i> Kapoor	43. <i>Butea monosperma</i>	<i>Meliola buteae</i> Häfiz et al.
13. <i>Entada rheedii</i>	<i>Meliola dysoxyli-malabarica</i> Hosag. & Kamar.	44. <i>Caesalpinia sappan</i>	<i>Meliola caesalpiniae</i> Hansf. & Deight. var. <i>indica</i> Hosag. & Biju
14. <i>Gmelina arborea</i>	<i>Meliola entadocarpa</i> Delight.	45. <i>Canarium strictum</i>	<i>Meliola canarii</i> Sydow
15. <i>Helicteres isora</i>	<i>Meliola clerodendricola</i> Hem. var. <i>micromerula</i> (Sydow & Sydow) Hansf.	46. <i>Chukrasia tabularis</i>	<i>Irenopsis chukrasiae</i> Hosag.
16. <i>Hemidesmus indicus</i>	<i>Meliola helicteridis</i> Hosag.	47. <i>Diospyros malabaricus</i>	<i>Meliola diospyri</i> Sydow & Sydow
17. <i>Hydrocarpus pentandrus</i>	<i>Meliola hemidesmi</i> Kamar & Gupta	48. <i>Kingiodendron pinnatum</i>	<i>Meliola kingiodendri</i> Hosag. et al.
18. <i>Ichneocarpus frutescens</i>	<i>Meliola hemidesmica</i> Hosag.	49. <i>Kydia calycina</i>	<i>Irenopsis mudumalaiensis</i> Hosag.
19. <i>Kingiodendron pinnatum</i>	<i>Meliola hydnocarpi</i> Hansf. var. <i>volubilis</i> Hansf.	50. <i>Pterocarpus marsupium</i>	<i>Meliola kydiae-calycinæ</i> Hansf. & Thirum.
20. <i>Kydia calycina</i>	<i>Meliola kingiodendri</i> Hosag. et al.	51. <i>Semicarpus anacardium</i>	<i>Meliola pierocarpi</i> Yates
21. <i>Mucuna pruriens</i>	<i>Irenopsis mucunae-acuminatae</i> Hansf. var. <i>indica</i> Hosag. et al.		<i>Meliola semecarpi-anacardi</i> Hosag. et al.
22. <i>Persea macrantha</i>	<i>Meliola floridensis</i> Hansf.	52. <i>Aderantithera pavonina</i>	<i>Meliola ailanthi</i> Sharma et al. emend. Hosag.
23. <i>Piper nigrum</i>	<i>Meliola floridensis</i> Hansf. var. <i>pudukkadensis</i> Hosag.	53. <i>Ailanthus triphysia</i>	<i>Meliola buteae</i> Häfiz et al.
24. <i>Pongamia pinnata</i>	<i>Meliola machilii</i> Yamam. 46. <i>Meliola ramacharrii</i> Hosag.	54. <i>Butea monosperma</i>	<i>Meliola caesalpiniae</i> Hansf. & Deight. var. <i>indica</i> Hosag. & Biju
25. <i>Pterocarpus marsupium</i>	<i>Meliola stenospora</i> Wint. 54. <i>Meliola stenospora</i> Wint. var. <i>major</i> Hansf.	55. <i>Caesalpinia sappan</i>	<i>Meliola aethiops</i> Sacc.
26. <i>Rauvolfia serpentina</i>	<i>Meliola pongamiae</i> Hosag. & Abraham	56. <i>Cassia fistula</i>	<i>Meliola pierocarpi</i> Yates
27. <i>Samadera indica</i>	<i>Meliola pongamiae</i> Hosag. & Abraham	57. <i>Pterocarpus marsupium</i>	<i>Meliola adenanthericola</i> Hosag. et al.
28. <i>Sarcostigma kleinii</i>	<i>Meliola rauvolfiae</i> Milby	58. <i>Semicarpus anacardium</i>	<i>Meliola semecarpi-anacardi</i> Hosag. et al.
29. <i>Schelechera oleosa</i>	<i>Meliola sarcostigmatis</i> Hosag. et al.	59. <i>Sterculia urens</i>	<i>Meliola amaranthaliana</i> Hosag.
30. <i>Semicarpus anacardium</i>	<i>Meliola capensis</i> (Kalch. & Cooke) Theiss. var. <i>schelecherae</i> Hosag. & Pillai	60. <i>Symplocos cochinchinensis</i>	<i>Asteridiella syzygii</i> Hosag.
31. <i>Sterculia urens</i>	<i>Meliola gamsii</i> Hosag. & Shiburagi	61. <i>Syzygium cumini</i>	<i>Amazonia syzygii</i> Hosag.
32. <i>Stereospermum colais</i>	<i>Meliola petrichii</i> Hansf.	62. <i>Terminalia chebula</i>	<i>Asteridiella combreti</i> (Stev.) Hansf. var. <i>leonis</i> Hansf.
33. <i>Strychnos nux-vomica</i>	<i>Meliola spigeliae</i> Hansf.	63. <i>Toona ciliata</i>	<i>Meliola toonae</i> Hosag. & Sabu
34. <i>Symplocos cochinchinensis</i>	<i>Meliola symplocicola</i> Yamam.	Tanning Materials	
35. <i>Syzygium cumini</i>	<i>Amazonia syzygii</i> Hosag.	64. <i>Acacia sinuata</i>	<i>Meliola melanoxylonis</i> Hosag. & Pillai
		65. <i>Caesalpinia sappan</i>	<i>Meliola caesalpiniae</i> Hansf. & Deight. var. <i>indica</i> Hosag. & Biju
		66. <i>Cassia fistula</i>	<i>Meliola aethiops</i> Sacc.
		67. <i>Pongamia pinnata</i>	<i>Meliola pongamiae</i> Hosag. & Abraham
		68. <i>Sterculia urens</i>	<i>Asteridiella amaranthaliana</i> Hosag.
		69. <i>Terminalia chebula</i>	<i>Asteridiella combreti</i> (Stev.) Hansf. var. <i>leonis</i> Hansf.
Essential Oils		70. <i>Cinnamomum malabatum</i>	<i>Armatella balakrishnanii</i> Hosag. & <i>Armatella cinnamomica</i> Hansf.

Host plant	Meliolaceous fungi	Host plant	Meliolaceous fungi
	<i>Armatella indica</i> Hosag. <i>Meliola belischmidiae</i> Yamam. var. <i>cinnamomica</i> Hosag. <i>Meliola cymbopogonis</i> Kapoor <i>Meliola kingiodendri</i> Hosag., et al. <i>Meliola panicis Earle</i> var. <i>vetericola</i> Hosag. & Shaji.		<i>Ailanthus triphylla</i> 107. <i>Butea monosperma</i> 108. <i>Butea monosperma</i> polystachya 109. <i>Butea monosperma</i> 110. <i>Kingiodendron pinnatum</i> 111. <i>Nothopodtyes nimmoniana</i> 112. <i>Pongamia pinnata</i> 113. <i>Sarcostigma kleinii</i> 114. <i>Schleichera oleosa</i> 115. <i>Semicarpus anacardium</i> 116. <i>Sterculia urens</i> 117. <i>Terminalia chebula</i> 118. <i>Toona ciliata</i>
Detergents, Cosmetics and Perfumes	<i>Meliola melanoxylonis</i> Hosag. & Pillai <i>Meliola adenathericola</i> Hosag., et al. <i>Meliola cymbopogonis</i> Kapoor <i>Meliola entadiocarpa</i> Deight. <i>Meliola kingiodendri</i> Hosag., et al. <i>Asteridiella amanalaiana</i> Hosag. <i>Meliola gamsii</i> Hosag. & Shiburaj <i>Meliola petechii</i> Hansf. <i>Meliola spigeliae</i> Hansf.		<i>Meliola buteae</i> Hafiz, et al. <i>Meliola clerodendricola</i> Henn. var. <i>micromera</i> (Sydow & Sydow) Hansf. <i>Irenopsis helicitidis</i> Hosag. <i>Meliola pongamiae</i> Hosag., & Abraham <i>Meliola pierocarpri</i> Yates <i>Meliola capensis</i> (Kalch. & Cooke) Theiss. var. <i>leonensis</i> Hansf. <i>Meliola toonae</i> Hosag. & Sabu
Paper and Pulp			<i>Meliola buteae</i> Hafiz, et al. <i>Meliola clerodendricola</i> Henn. var. <i>micromera</i> (Sydow & Sydow) Hansf. <i>Irenopsis helicitidis</i> Hosag. <i>Meliola pongamiae</i> Hosag., & Abraham <i>Meliola pierocarpri</i> Yates <i>Meliola capensis</i> (Kalch. & Cooke) Theiss. var. <i>leonensis</i> Hansf. <i>Meliola toonae</i> Hosag. & Sabu
Narcotics and Beverages	<i>Cyclea petiolaria</i> 81. <i>Entada rheedei</i> 82. <i>Piper nigrum</i> 83. <i>Syzygium cumini</i>		<i>Meliola buteae</i> Hafiz, et al. <i>Meliola cycloae</i> Hosag. <i>Meliola entadiocarpa</i> Wint. <i>Meliola stenospora</i> Wint. var. <i>major</i> Hansf. <i>Amazonia syzygii</i> Hosag.
Fibres and Floss	84. <i>Syzygium cumini</i> 85. <i>Butea monosperma</i> 86. <i>Helicteres isora</i> 87. <i>Hemidesmus indicus</i>		<i>Irenopsis helicitidis</i> Hosag. <i>Meliola hemidesmi</i> Kamar & Gupta <i>Meliola hemidesmica</i> Hosag. <i>Irenopsis mudumalaiensis</i> Hosag. <i>Meliola kydiae-calyciniae</i> Hansf. & Thirum. <i>Asteridiella amanalaiana</i> Hosag.
Edible and Fodder Plants	88. <i>Kydia calycina</i> 89. <i>Sterculia urens</i> 90. <i>Acacia sinuata</i> 91. <i>Ailanthes triphylla</i> 92. <i>Cymbopogon flexuosus</i> 93. <i>Entada rheedei</i> 94. <i>Gmelina arborea</i>		<i>Meliola melanoxylonis</i> Hosag. & Pillai <i>Meliola ailanthis</i> Sharma, et al. emend. Hosag. <i>Meliola cymbopogonis</i> Kapoor <i>Meliola entadiocarpa</i> Deight. <i>Meliola clerodendricola</i> Henn. var. <i>micromera</i> (Sydow & Sydow) Hansf. <i>Meliola kingiodendri</i> Hosag., et al. <i>Meliola stenospora</i> Wint. var. <i>major</i> Hansf. <i>Meliola pierocarpri</i> Yates <i>Meliola sarcostigmatica</i> Hosag., et al. <i>Meliola abrahamii</i> Hosag. & Pillai <i>Meliola semecarpri-anacardii</i> Hosag., et al. <i>Meliola gamsii</i> Hosag. & Shiburaj <i>Meliola petechii</i> Hansf. <i>Meliola spigeliae</i> Hansf.
	95. <i>Kingiodendron pinnatum</i> 96. <i>Nothopodtyes nimmoniana</i> 97. <i>Piper nigrum</i>		<i>Cottage Industries</i> 134. <i>Hemidesmus indicus</i> 135. <i>Adenanthera pavonina</i> 136. <i>Cinnamomum malabatum</i>
	98. <i>Pterocarpus marsupium</i> 99. <i>Sarcostigma kleinii</i> 100. <i>Schleichera oleosa</i>		<i>Meliola hemidesmi</i> Kamar & Gupta <i>Meliola adenathericola</i> Hosag., et al. <i>Armatella balakrishnanii</i> Hosag. <i>Armatella cinnamomica</i> Hosag. <i>Meliola belischmidiae</i> Yamam. var. <i>cinnamomica</i> Hosag. <i>Meliola entadiocarpa</i> Deight. <i>Meliola ichnocarpri-volubilii</i> Hansf. <i>Irenopsis mudumalaiensis</i> Hosag. <i>Meliola kydiae-calyciniae</i> Hansf. & Thirum.
Fats and Oils	101. <i>Semicarpus anacardium</i> 102. <i>Sida cordata</i> 103. <i>Sterculia urens</i> 104. <i>Syzygium cumini</i> 105. <i>Terminalia chebula</i>		<i>Other Products</i> 137. <i>Entada rheedei</i> 138. <i>Ichnothecus frutescens</i> 139. <i>Kydia calycina</i>
	106. <i>Adenanthera pavonina</i>		<i>Meliola adenathericola</i> Hosag., et al.

Key to the genera of meliolaceous fungi

1. Perithecia flattened-globose in radiating cells *Amazonia*
Perithecia globose and not in radiating cells 2
2. Ascospores 1-septate *Armatella*
Ascospores 3-4-septate 3
3. Mycelial setae present *Meliola*
Mycelial setae absent 4
4. Perithecial setae present *Irenopsis*
Perithecial setae absent *Asteridiella*

continuous, oblong with rounded ends, dumbbell shaped, mature ascospore 1-septate with mostly equal cells, cinnamon brown to dark brown, 23-30 x 10-13mm, germinating cells enlarge to form appressoria and the other one empties and collapses.

Host range: *Cinnamomum* spp.
Distribution: Asia

4. *Armatella indica* Hosag., J. Econ. Bot. 15: 199, 1991.

Materials examined: On leaves of *Cinnamomum malabatrum* (Burm. f.) Blume, Idukki, Kerala, India, 5.x.1983, V.B. Hosagoudar MH 78160.

Colonies hypophyllous, carbonaceous black, dense, velvety, up to 5mm in diameter. Hyphae smooth walled, crooked, branching alternate to irregular at acute angles, closely reticulate, cells 12.5-31 x 6-9.5mm. Appressoria alternate, about 5% opposite, antrorse to spreading, 15.5-21.5mm long; stalk cells single celled, cylindrical to cuneate, 6-9.5mm long; head cells ovate, globose, angular, rarely lobate, 9-12.5 x 12.5-15.5mm. Perithecia scattered, verrucose, up to 310mm in diam.; ascospores initially aseptate, one septate at maturity, brown, 46.5-52.5 x 18.5-21.5mm.

Host range: *Cinnamomum malabatrum*
Distribution: India

5. *Asteridiella anamalaiana* Hosag., in Hosag. & Goos, Mycotaxon 42: 127, 1991, Hosag., Meliolales of India, p81, 1996

Materials examined: On leaves of *Sterculia urens* Roxb. (Sterculiaceae), Nedungundru, Valparai, Veloniae, Coimbatore, Tamil Nadu, 23.xii.1990, V.B. Hosagoudar HCIO 30529 (type) (as *Meliola anamalaiana*).

Colonies epiphyllous scattered, dense, crustose to velvety, up to 2mm in diameter. Hyphae substraight to crooked, branching opposite to irregular at acute angles, loosely to closely reticulate, cells 24-28 x 6-8µm. Appressoria alternate, mostly antrorse, 21-28µm long; stalk cells cylindrical to cuneate, 6-9.5µm long; head cells globose, angular to rarely sublobate, 15-18 x 18-22µm. Phialides numerous, mixed with appressoria, opposite to alternate, ampulliform, 18-22 x 6-9.5µm. Perithecia scattered, up to 140µm in diameter; perithecial cells protruded, conoid, curved at the apex, up to 15µm long; ascospores obovoidal to cylindrical, 4-septate, slightly constricted at the septa, 43-53 x

18-22µm.

Host range: *Sterculia urens*
Distribution: India

6. *Asteridiella combreti* (Stev.) Hansf. var. *leonensis* Hansf., Sydowia Beih. 20: 160, 1961; Hosag. & Goos, Mycotaxon 36: 238, 1989, Hosag., Meliolales of India, p 83, 1996.

Materials examined: On leaves of *Terminalia chebula* Retz. (Combretaceae), Radhanagari, Maharashtra, x.1971, A.N. Thite HCIO 31914; *T. paniculata* Roth, Idukki, Kerala, 13.xii.1982, V.B. Hosagoudar HCIO 40476, MH 75727; 24.i.1983, V.B. Hosagoudar MH 75824; Meenmutty, Kerala, 27.xii.1983, V.B. Hosagoudar MH 78990; 4.x.1983, V.B. Hosagoudar MH 78142; Chinnar, Munnar, Idukki, Kerala, 6.i.1999, C.K. Buju TBGT 906; TBGRI campus, Palode, Thiruvananthapuram, Kerala, 3.i.2001, H. Biju HCIO 44562, TBGT 849, on *Terminalia* sp., TBGRI campus, Palode, Thiruvananthapuram, Kerala, 20.i.2001, H. Biju HCIO 44575, TBGT 862.

Colonies epiphyllous, subdense, up to 4mm in diameter, confluent. Hyphae substraight to slightly undulate, branching alternate to opposite at wide angles, loosely reticulate, cells 20-34 x 6-8µm. Appressoria alternate, straight, antrorse, 20-26µm long; stalk cells cylindrical to cuneate, 6-8µm long; head cells globose, entire to angular, 12-18 x 12-16µm. Phialides numerous, borne on a separate mycelial branch, opposite, ampulliform, 14-24 x 4-8µm, tip occasionally twisted and bent variously. Perithecia scattered, verrucose, up to 170µm in diam.; perithecial cells mammillate, 8-10µm long; ascospores obovoidal, 4-septate, constricted, 36-42 x 12-18µm.

Host range: *Terminalia* spp.
Distribution: India

7. *Asteridiella formosensis* (Yamam.) Hansf., Sydowia 10: 48, 1957; Sydowia Beih. 2:686, 1961; Hosag. & Goos, Mycotaxon 36: 240, 1989; 42: 128, 1991; Hosag., Kaveriappa, Raghu & Goos, Mycotaxon 51:109, 1994, Hosag., Meliolales of India, p90, 1996. *Irene formosensis* Yamam., Trans. Nat. Hist. Soc. Taiwan 31: 15, 1941.

Meliola formosensis (Yamam.) Cif., Mycopathologia 7: 87, 1954 (non Yamam, 1941).

Materials examined: On leaves of *Callicarpa tomentosa* (L.) Murray (Verbenaceae), Idukki, Kerala, 4.x.1983, V.B. Hosagoudar

MH 78157; Pamba, Kerala, 10.x.1983, V.B. Hosagoudar MH 78929; Castle Rock, Karnataka, 1.i.1984, C.R. Patil HCIO 40031; 10.i.1984, C.R. Patil HCIO 30803; Kozhikamathi, Top Slip, Coimbatore, Tamil Nadu, 21.xii.1990, V.B. Hosagoudar HCIO 30517; Gersoppa, Uttar Kannada, Karnataka, 25.x.1992, P.A. Raghu HCIO 40856; Radhanagar, Maharashtra, 1981, A.N. Thite HCIO 31631; Zolambi, Chandoli, Sangli, Maharashtra, 29.iii.1991, C.R. Patil HCIO 30803; Veerapuli Reserve Forest, Kanniyakumari dist., Tamil Nadu, 22.ii.1994, V.B. Hosagoudar HCIO 41643.

Colonies epiphyllous, thin, smooth, up to 4mm in diameter, confluent. Hyphae substraight to undulate, branching alternate at wide angles, loosely reticulate, cells 30-44 x 6-8 μm . Appressoria alternate, straight to curved, antrorse, spreading, 26-36 μm long; stalk cells cuneate to cylindrical, 8-12 μm long; head cells ovate, clavate, entire to sublobate, 18-24 x 12-16 μm . Phialides borne on a separate mycelial branch, mostly opposite, rarely unilateral, often two phialides borne very closely to a single mycelial cells, ampulliform, 12-18 x 6-8 μm . Perithecia scattered, up to 200 μm in diam.; perithecial cells obtusely conoid, 6-10 μm long; ascospores ellipsoidal, 4-septate, constricted, middle cell slightly larger, 42-46 x 20-26 μm .

Host range: *Callicarpa tomentosa*

Distribution: India

8. *Asteridiella schlegeliae* (Stev.) Hansf. var. *stereospermi*
Hosag. & Raghu in Hosag., Raghu & Pillai, Nova Hedwigia 58: 531, 1994, Hosag., Meliolales of India, p102, 1996.

Materials examined: On leaves of *Stereospermum colais* (Buch.-Ham. ex Dillwyn.) Mabb. (Bignoniaceae), Gersoppa, Uttara Kannada, Karnataka, May 24, 1992, P.A. Raghu HCIO 40749 (type).

Colonies amphigenous, dense, crustose, up to 3mm in diameter. Hyphae straight to substraight, branching alternate to opposite at acute angles, closely reticulate, cells 12-22 x 6-9.5 μm . Appressoria alternate, straight to variously curved, antrorse, 21-31 μm long; stalk cells cylindrical to cuneate, 6-15.5 μm long; head cells ovate, globose, mostly sublobate, rarely entire to angular, 15-18.5 x 12-15.5 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 18-21.5 x 6-7 μm . Perithecia scattered, up to 124 μm in diam; perithecial cells conoid to mammiform, straight to curved, up to 25 μm long; ascospores obovoidal, 4-septate, slightly constricted, 40-43.5 x 18-22 μm .

Host range: *Stereospermum colais*

Distribution: India

9. *Irenopsis chukrasiae* Hosag. in Hosag., Raghu & Pillai, Nova Hedwigia 58: 532, 1994; Hosag., Meliolales of India, p. 109, 1996.

Materials examined: On leaves of *Chukrasia tabularis* A. Juss. (Meliaceae), North to Pachaiyar Estate, Seithur Hills, Kamarajar dist., Tamil Nadu, 9.ix.1992, V.B. Hosagoudar HCIO 40750 (type).

Colonies hypophyllous, subdense to dense, strongly appressed to the lead, up to 4mm in diameter, rarely confluent. Hyphae substraight to crooked, branching alternate to irregular at acute angles, closely reticulate, cells 24-31 x 6-9.5 μm . Appressoria closely to distantly placed, alternate, straight, curved to flexuous, antrorse to recurved, 18-46.5 μm long; stalk cells cylindrical to cuneate, straight to flexuous, 1-3 celled, 6-34 μm long; head cells ovate, globose, angular to sublobate to deeply lobate, 9-15.5 x 12-18.5 μm . Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 21-25 x 5-7 μm . Perithecia scattered, verrucose, up to 210 μm in diam.; perithecial setae 5-12, erect to prostrate, simple, straight, acute to obtuse at the tip, bulbous at the base, up to 110 μm long; ascospores oblong, obovate, 4-septate, 40-46.5 x 15-18.5 μm .

Host range: *Chukrasia tabularis*

Distribution: India

10. *Irenopsis helicteridis* Hosag., Crypt. Bot. 2/3: 184, 1991; Hosag., Meliolales of India, p. 111, 1996.

Materials examined: On leaves of *Helicteres isora* L. (Sterculiaceae), Sri Madurai, Nilgiris, Tamil Nadu, 25.i.1990, V.B. Hosagoudar HCIO 30358 (type); Kombe, Meenmutty, Thiruvananthapuram, Kerala, 9.iv.1996, V.B. Hosagoudar HCIO 42146, TBGT 10; Kombe, Meenmutty, Thiruvananthapuram, Kerala, 19.ii.1997, V.B. Hosagoudar TBGT 188.

Colonies epiphyllous, dense, up to 2mm in diameter. Hyphae tortuous, branching irregular at acute angles, closely to loosely reticulate, cells 24-40 x 6-9 μm long; stalk cells cylindrical to cuneate, 3-15.5 μm long; head cells ovate, globose, versiform, angular, truncate to slightly lobate, 12-15.5 x 15.5-19 μm . Phialides mixed with appressoria, opposite to alternate, ampulliform, 40-46.5 x 12-15.5 μm . Perithecia scattered, globose, up to 175 μm in diam.; perithecial setae 4-10, straight to curved, obtuse, up to 120 μm long; ascospores obovoidal, 4-septate, constricted, 31-40.5 x 12-15.5 μm .

Host range: *Helicteres isora*

Distribution: India

11. *Irenopsis indica* (Anahosur) Hosag., J. Econ. Tax. Bot. 6:250, 1985. 250, 1985; Hosag., Meliolales of India, p. 111, 1996.
Irene indica Anahosur, Sydowia 23:58, 1970.

Materials examined: On leaves of *Aphanamixis polystachya* (Wall.) Parker [*Amoora rohituka* (Roxb.) Wight & Arn.] (Meliaceae), Coorg, Karnataka, 17.x.1967, K.H. Anahosur AMH 620 (type).

Colonies hypophyllous, subdense to dense, scattered, up to 3 mm in diameter. Hyphae crooked, branching irregular at acute to wide angles, loosely reticulate, cells 24-37 x 6-9.5 μm . Appressoria alternate, distantly arranged, straight to variously curved, 15-18.5 μm long; stalk cells cuneate to cylindrical, 3-6.5 μm long; head cells ovate, entire to angular, 9.5-12.5 x 12.5-15.5 μm . Phialides few, mixed with appressoria, alternate,

ampulliform, 18.5-25 x 9-12.5 μm . Perithecia mostly grouped, up to 233 μm in diam.; perithecial setae 10-15, straight, simple, septate, acute to obtuse at the tip, 108-140 x 6-9.5 μm ; ascospores obovoidal, 4-septate, constricted, 40-43.5 x 18.5-22 μm .

Host range: *Aphanamixis polystachya*

Distribution: India

12. *Irenopsis mudumalaiensis* Hosag., Crypt. Bot. 2/3: 184, 1991 (*mudumalaiense*); Hosag., Meliolales of India, p. 114, 1996.

Materials examined: On leaves of *Kydia calycina* Roxb. (Malvaceae), Sri Madurai, Nilgiris, Tamil Nadu, 24.i.1990, V.B. Hosagoudar HCIO 30359 (type).

Colonies epiphyllous, subdense, up to 3mm in diameter, confluent. Hyphae flexuous to tortuous, branching alternate to irregular at acute angles, loosely reticulate, cells 34-37 x 6-9.5 μm . Appressoria alternate, scattered, mostly antorse, 15-28 μm long; stalk cells cylindrical to cuneate, 6-9.5 μm long; head cells globose, ovate, entire to slightly angulose, 9-15.5 x 12-15.5 μm . Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 18-28 x 6-9 μm . Perithecia scattered, verrucose, up to 140 μm in diameter; perithecial setae 4-10, straight to curved, dark, obtuse at apex, up to 110 μm long; ascospores obovoidal, mostly cylindrical, 4-septate, 37-40.5 x 15-18.5 μm .

Host range: *Kydia calycina*

Distribution: India

13. *Irenopsis sidae* (Rehm) Hughes var. *indica* Hosag. & Manoj., Zoo's Print J. 18: 1000, 2003.

Materials examined: On leaves *Sida cordata* (Burm. f.) Borssum Waalkes (Malvaceae), Karikulam, Ranni, Pathanamthitta, Kerala, 9.x.2002, A. Manojkumar HCIO 44625 (type); TBGT 907 (isotype).

Colonies amphigenous, mostly epiphyllous, subdense to dense, up to 2mm in diameter, confluent. Hyphae straight to flexuous, branching alternate, opposite to irregular at acute angles, loosely to closely reticulate, cells 22-29 x 7-9 μm . Appressoria alternate, about 5% opposite, antorse, subantrorse to rarely retrorse, 14-18 μm long; stalk cells cylindrical to cuneate, 3-6 μm long; head cells ovate to globose, entire, angular to truncate at the apex, straight to curved, 9-13 x 8-10 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14-18 x 6-8 μm . Perithecia scattered, globose, perithecial cells slightly projected, perithecial setae 0-12 in numbers, simple, straight, acute at the apex, deep brown, septa not visible, up to 125 μm long; ascospores oblong, 4-septate, slightly constricted at the septa, 30-32 x 11-13 μm .

Host range: *Sida cordata*

Distribution: India

14. *Meliola abrahamii* Hosag., C.K. Biju & Rajkumar, Zoos' Print J. 16: 595, 2001.

Materials examined: On leaves of (Anacardiaceae), Kerala, India, 26.x.2000, G. Rajkumar HCIO 43794, TBGT 394.

Colonies epiphyllous, dense up to 3 mm in diameter, confluent. Hyphae straight to slightly flexuous, branching mostly opposite at acute angles, loosely to closely reticulate, cells 24-32 x 8-10 μm . Appressoria alternate, antorse to subantrorse, 28-40 μm long; stalk cells cylindrical to cuneate, 6-16 μm long; head cells oblong, straight to curved, entire, angular to sublobate, 22-24 x 11-16 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 19-24 x 6-8 μm . Mycelial setae scattered to grouped around perithecia, simple straight; setae around perithecia are few, acute obtuse, up to 300 μm long; setae on mycelia are acute, up to 1200 μm long. Perithecia scattered, up to 175 μm in diameter; ascospores cylindrical, 4-septate, constricted, 46-50 x 18-20 μm .

Host range: *Semecarpus anacardium*

Distribution: India

15. *Meliola adenathericola* Hosag., Kamarudeen & Babu in Hosag., C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 68, 2001.

Materials examined: On leaves of *Adenanthera pavonia* L. (Mimosaceae), Kerala, India, M. Kamarudeen & K.P. Babu HCIO 43799, TBGT359; Vithura, Thiruvananthapuram, Kerala, 22.xi.2000, M. Kamarudeen HCIO 44123, TBGT 518; 3.xii.2000, M. Kamarudeen & Babu HCIO 43799, TBGT 359;

Colonies amphigenous, mostly epiphyllous, dense up to 2mm in diameter, confluent. Hyphae mostly crooked, rarely flexuous, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 18-25 x 6-8 μm . Appressoria alternate, antorse to spreading, 12-21 μm long; stalk cells cylindrical to cuneate, 3-10 μm long; head cells predominantly globose, often oblong to cylindrical, straight to curved, entire, 9-11 x 8-10 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 19-24 x 8-10 μm . Mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse at the tip, up to 345 μm long. Perithecia scattered, up to 125 μm in diameter; ascospores cylindrical to slightly fusiform, 4-septate, constricted, 35-39 x 12-15 μm .

Host range: *Adenanthera pavonia*

Distribution: India

16. *Meliola aethiops* Sacc., Biol. Orto Bot. Napoli 6: 41, 1921. Hansf., Sydowia Beih. 2: 252, 1961.

= *Meliola javanica* Cif., Mycopathologia 6: 19, 1951.

Materials examined: On leaves of *Cassia fistula* L. (Caesalpiniaceae), Eanikara, Karakulam, Thiruvananthapuram, Kerala, 15.i.2001, Mrs. H.V. Sharada HCIO 43742, TBGT 385; Karikulam, Ranni, Pathanamthitta, Kerala, 4.x.2002, A. Manojkumar HCIO, TBGT 899.

Colonies amphigenous, subdense to dense, up to 2mm in diameter, confluent and cover larger area on the lower surface. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely to closely reticulate, cells 16-24 x 4-6 μ m. Appressoria opposite, about 10% alternate, antrorse to subantrorse, 8-16 μ m long; stalk cells cylindrical to cuneate, 3-5 μ m long; head cells ovate, entire, 4-11 x 7-9 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 17-21 x 6-8 μ m. Mycelial setae scattered to mostly grouped around perithecia, simple, straight, obtuse at the tip, up to 250 μ m long. Perithecia loosely grouped, up to 175 μ m in diameter; ascospores cylindrical to ellipsoidal, 4-septate, constricted at the septa, 35-40 x 14-16 μ m.

Host range: *Cassia fistula*

Distribution: India

17. *Meliola ailanthi* Sharma, Mohanan & Florence, Kerala Forest Research Institute Report 36: 248, 1985 (*ailanthii*) emend. Hosag. in Hosag., Raghu & Pillai, Nova Hedwigia 58: 524, 1994; Hosag., Meliolales of India, p. 126, 1996.

Materials examined: On leaves of *Ailanthus triphysa* (Dennst.) Alston (Simaroubaceae), Vettiyar, Mavelikara, Kerala, India, 14.ix.1992, C.M. Pillai HCIO 40752; *Ailanthus* sp., Eanikara, Thiruvananthapuram, Kerala, 20.i.2001, V.B. Hosagoudar HCIO 43998, TBGT 427.

Colonies epiphyllous, scattered, dense, velvety, up to 2mm in diameter. Hyphae straight, rarely substraight, branching mostly opposite at acute angles, loosely to closely reticulate, cells 24-31 x 5-7 μ m. Appressoria alternate, straight, antrorse, 15-22 μ m long; stalk cells cylindrical to cuneate, 5-7 μ m long; head cells ovate to cylindrical, entire, 10-15.5 x 9-11 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 18-22 x 9-12.5 μ m. Mycelial setae numerous, straight to slightly curved but not uncinate, simple, acute to 2-3 dentate at the tip, up to 260 μ m long. Perithecia scattered to loosely grouped, verrucose, up to 172 μ m in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 37-40.5 x 13-15.5 μ m.

Host range: *Ailanthus triphysa*

Distribution: India

18. *Meliola beilschmiediae* Yamam. var. *cinnamomicola* Hosag. in Hosag. & Goos, Mycotaxon 87: 222, 1990; Hosag., Meliolales of India, p. 142, 1996.

Materials examined: On leaves of *Cinnamomum malabatrum* (Burm.f.) Blume (Lauraceae), Calvary Mount, Idukki, Kerala, 5.x.1983, V.B. Hosagoudar HCIO 34973 (type), MH 78160; Calvary Mount, Idukki, Kerala, 14.vi.1982, V.B. Hosagoudar MH 79012; Idukki, Kerala, 13.xii.1982, V.B. Hosagoudar MH 75741; Calvary Mount, Idukki, Kerala, 21.ii.1983, V.B. Hosagoudar MH 75833; Lakshmi Estate, Idukki, Kerala, 12.vi.1983, V.B. Hosagoudar MH 75081; Idukki, Kerala, 3.x.1983, V.B. Hosagoudar MH 78159; Pamba, Kerala, 11.x.1983, V.B. Hosagoudar MH

78940; Idukki, Kerala, 21.xii.1983, V.B. Hosagoudar MH 78970.

Colonies hypophyllous, dense, velvety, up to 3mm in diameter, rarely confluent. Hyphae flexuous, branching alternate to irregular at acute angles, closely reticulate, form almost solid mycelial mat, cells 20-30 x 6-8 μ m. Appressoria alternate, straight to variously curved, antrorse to reflexed, 20-24 μ m long; stalk cells cylindrical to cuneate, 6-10 μ m long; head cells globose, ovate angular, entire, 14-16 x 12-14 μ m. Phialides few, mixed with appressoria, opposite to alternate, ampulliform, 18-22 x 8-10 μ m. Mycelial setae numerous, evenly scattered, straight, simple, acute to variously dentate at the tip, up to 684 μ m long. Perithecia closely scattered, verrucose, up to 216 μ m in diam.; ascospores obovoidal, 4-septate, slightly constricted, 54-60 x 16-20 μ m.

Host range: *Cinnamomum malabatrum*

Distribution: India

19. *Meliola buteae* Hafiz, Azmatulla & Kafi, Biologia 1: 112, 1955; Hansf., Sydowia Beih. 2: 291, 1961; Thite & Patil, Kavaka 10: 29, 1982; Hosag. & Goos, Mycotaxon 37: 223, 1990; Hosag., Meliolales of India, p. 148, 1996.

Materials examined: On leaves of *Butea monosperma* (Lam.) Taub. (*B. frondosa* Roxb.) (Fabaceae), Radhanagari, Kolhapur, Maharashtra, 10.xi.1974, M.S. Patil HCIO 31940; Idukki, Kerala, 9.x.1982, V.B. Hosagoudar MH 73797; 4.x.1983, V.B. Hosagoudar MH 78145; *B. parviflora* Roxb., Vellakayam, Idukki, Kerala, 24.ii.1983, M. Ali & C.N. Mohanan MH 75010; Kombe, Peppara and Neyyar Wildlife Sanctuary, Thiruvananthapuram, Kerala, 19.ii.1997, V.B. Hosagoudar HCIO 42518, TBGT 165; TBGRI arboretum, Palode, Thiruvananthapuram, Kerala, 5.ix.2002, Manojkumar & H. Biju HCIO 44598, TBGT 885.

Colonies epiphyllous, subdense to dense, velvety, up to 4mm in diameter, confluent. Hyphae substraight to crooked, branching opposite to irregular at wide angles, loosely to closely reticulate, cells 22-38 x 6-8 μ m. Appressoria alternate about 5% opposite, antrorse, mostly spreading, straight to lcurved, 14-20 μ m long; stalk cells cylindrical to cuneate, 4-8 μ m long; head cells globose to subglobose, mostly curved, truncate, entire, 10-16 x 10-12 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 18-22 x 6-8 μ m. Mycelial setae mostly grouped around perithecia, straight, simple, acute to obtuse at the tip, up to 846 μ m long. Perithecia scattered to grouped, verrucose, up to 180 μ m in diam.; ascospores oblong, 4-septate, constricted, 40-48 x 16-20 μ m.

Host range: *Butea* spp.

Distribution: Asia

20. *Meliola caesalpiniae* Hansf. & Deight. var. *indica* Hosag. & H. Biju, J. Econ. Taxon. Bot. 25: 555, 2001.

Materials examined: On leaves of *Caesalpinia sappan* L. (Caesalpiniaceae), in the campus of TBGRI, Palode, Thiruvananthapuram, Kerala, 8.xi.2000, H. Biju HCIO 43686,

TBGT 355.

Colonies amphigenous, mostly epiphyllous, dense, up to 2mm in diameter, often confluent. Hyphae substraight, branching mostly opposite at wide angles, loosely to closely reticulate, cells 19-23 x 4-5µm. Appressoria alternate, up to 2% opposite, subantrorse, 12-16µm long; stalk cells cylindrical to cuneate, 3-5 µm long; head cells ovate, globose, straight to curved, entire, 9-12 x 8-10µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 12-16 x 6-8µm. Mycelial setae scattered, simple, straight, few curved, acute to obtuse at the tip, up to 345µm long. Perithecia scattered, verrucose, up to 125µm in diameter; ascospores oblong, 4-septate, constricted, 33-36 x 11-13µm.

Host range: *Caesalpinia sappan*

Distribution: India

21. *Meliola canarii* Sydow, Ann. Mycol. 2: 550, 1914; Hansf., Sydowia Beih. 2: 399, 1961; Hosag., Dayal & Goos, Mycotaxon 46: 204, 1993; Hosag., Meliolales of India, p. 150, 1996.

Meliola nigro-rufescens Sacc., Att. Acad. Ven.-Trent.-Istr. 10: 60, 1914.

Materials examined: On leaves of seedlings of *Canarium strictum* Roxb. (Burseraceae), Sampaje forest nursery, Sampaje, Kodagu, Karnataka, 22.xii.1991, B.R. Dayal HCIO 30838; Kakachi, Tirunelveli, Tamil Nadu, 23.ii.1994, V.B. Hosagoudar HCIO 41615.

Colonies epiphyllous, thin to thinly velvety, up to 5mm in diameter, rarely confluent. Hyphae straight to flexuous, branching opposite at wide angles, loosely reticulate, cells 34-50 x 6-8µm. Appressoria alternate, less than 1% opposite, antrorse, 34-40.5µm long; stalk cells cuneate, 6-12.5µm long; head cells ovate, tapered and broadly rounded but rarely truncate at the apex, entire, 24-285 x 6-8µm. Mycelial setae thinly scattered, simple, straight, acute to obtuse at the tip, up to 1050µm long. Perithecia scattered, globosoe, up to 140µm in diam.; ascospores obovoidal to cylindrical, 4-septate, slightly constricted at the septa, 43-46.5 x 18-20µm.

Host range: *Canarium strictum*

Distribution: Tropics

22. *Meliola capensis* (Kalch., & Cooke) Theiss. var. *schleicherae* Hosag. & Pillai in Hosag., Raghu & Pillai, Nova Hedwigia 58: 583, 1994; Hosag., Meliolales of India, p. 157, 1996.

Materials examined: On leaves of *Schleichera oleosa* (Lour.) Oken (Sapindaceae), Vettiyar, Mavelikara, Kerala, 14.ix.1992, C.M. Pillai HCIO 40757 (type); Koomati, Anamalai, Coimbatore, Tamil Nadu, 13.iii.1994, V.B. Hosagoudar HCIO 41581; Kombe, Meenmutty, Peppara & Neyyar Wildlife Sanctuary, Thiruvananthapuram, Kerala, 28.iii.1996, V.B. Hosagoudar 55; Sankili forest, Kollam, Kerala, 27.xii.2001, V.B. Hosagoudar TBGT 623; *Lepisanthes erecta* (Thw.) Leenh. (Sapindaceae), Sankili forest,

Kollam, Kerala, 27.xii.2001, V.B. Hosagoudar HCIO 44348, TBGT 643.

Colonies epiphyllous, rarely amphigenous, dense, velvety, up to 2mm in diameter, confluent. Hyphae straight, branching opposite at acute angles, loosely to closely reticulate, cells 15-25 x 6-7µm. Appressoria opposite, crowded to sparse, 9-15.5µm long; stalk cells cuneate, 3-5µm long; head cells conoid, rarely broadly rounded at the apex, entire, 6-11 x 6-9.5µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 12-15.5 x 6-9.5µm. Mycelial setae scattered, straight, acute to dentate at the tip, up to 320µm long. Perithecia scattered, verrucose, up to 155µm in diam.; ascospores obovoidal, 4-septate, slightly constricted, 30-35 x 12-15.5µm.

Host range: *Schleichera oleosa*, *Lepisanthes erecta*

Distribution: Tropics

23. *Meliola chandrasekharanii* Hosag. in Hosag. & Goos, Mycotaxon 37: 225, 1990; 42: 133, 1991; Hosag., Meliolales of India, p. 164, 1996.

Materials examined: On leaves, stems and petioles of *Apodytes dimidiata* E. Meyer ex Arn. (Icacinaceae), Lakshmi Estate, Idukki, Kerala, 15.xii.1982, V.B. Hosagoudar MH 79089; 20.x.2000, M. Kamarudeen HCIO 43983, TBGT 478; on *Apodytes* sp., Kannimala Estate, Munnar, Kerala, 20.xii.2001, S. Shibraj HCIO 44349, TBGT 705; on *Notopodytes nimmoniana* (Graham) Mabberly, Shankarankudi, Valparai, Coimbatore, Tamil Nadu, 27.xii.1990, V.B. Hosagoudar HCIO 30538; Mahabaleshwar, Maharashtra, ii.1977, V.P. Kaul HCIO 33811; Bhagamandala, Karnataka, 1.iii.1984, C.R. Patil HCIO 40004; Veerapuli Reserve Forest, Kanniyakumari, Tamil Nadu, 22.ii.1994, V.B. Hosagoudar HCIO 41532.

Colonies amphigenous, caulicolous, mostly hypophyllous, subdense, velvety, up to 3mm diameter, confluent. Hyphae undulate, branching opposite at acute angles, loosely to closely reticulate and form almost solid mycelial mat, cells 16-30 x 6-8µm. Appressoria alternate (few opposite), straight to curved, spreading, mostly antrorse, 16-24µm long; stalk cells cuneate to cylindrical, 4-10µm long; head cells subglobose, ovate, angular to sublobate, 12-16 x 14-16µm. Phialides borne on a separate mycelial branch and also few mixed with appressoria, alternate, mostly opposite, ampulliform, 12-20 x 6-10µm. Mycelial setae fairly numerous, straight, simple, acute to subacute at the tip, up to 477µm long. Perithecia scattered, verrucose, up to 153µm in diam.; ascospores obovoidal to cylindrical, 4-septate, 32-42 x 10-16µm.

Host range: *Apodytes* spp., *Notopodytes nimmoniana*

Distribution: India

24. *Meliola clerodendricola* Henn. var. *micromera* (Sydow & Sydow) Hansf., Sydowia Beih. 2: 694, 1961; Hosag. & Goos, Mycotaxon 37: 227, 1990; Hosag., Meliolales of India, p. 170, 1996.

Meliola micromera Sydow, Ann. Mycol. 12: 552, 1914.

Materials examined: On leaves of *Gmelina arborea* Roxb. (Verbenaceae), Meenmutty, Idukki, Kerala, 12.xii.1982, V.B. Hosagoudar HCIO 40511, MH 73690; near Painavu, Idukki, Kerala, 12.xii.1983, V.B. Hosagoudar MH 78979; 3.x.1983, V.B. Hosagoudar MH 78126; *G. asiatica* L., Mundandurai, Tamil Nadu, 7.xii.1987, A. Rajendran HCIO 39285; Peppara, Thiruvananthapuram, Kerala, 20.ii.1997, V.B. Hosagoudar HCIO 44070, TBGT 503; in the campus of TBGRI, Thiruvananthapuram, Kerala, 7.xii.2001, H. Biju HCIO 44467, TBGT 757; 7.xii.2001, H. Biju 44468, TBGT 793.

Colonies epiphyllous, subdense, velvety, up to 2mm in diameter, confluent. Hyphae straight to sinuous, branching opposite at acute angles, loosely to closely reticulate, cells 18-34 x 6-8 μ m. Appressoria alternate, antrorse, rarely spreading, mostly straight, 16-20 μ m long; stalk cells cuneate, 5-8 μ m long; head cells ovate, globose, entire, 11-14 x 10-12 μ m. Phialides numerous, mixed with appressoria, opposite to alternate, ampulliform, 12-20 x 6-10 μ m. Mycelial setae few, grouped around perithecia, straight, simple, obtuse at the tip, up to 190 μ m long. Perithecia scattered, up to 189 μ m in diameter; ascospores oblong, 4-septate, constricted, 30-32 x 10-14 μ m.

Host range: *Gmelina arborea*

Distribution: Asia

25. *Meliola cycleae* Hosag. in Hosag. & Goos, Mycotaxon 37: 228, 1990; Hosag., Meliolales of India, p. 176, 1996.

Materials examined: On leaves, stems and petioles of *Cyclea peltata* Cooke (Menispermaceae), Meenmutty, Idukki, Kerala, 12.xii.1982, V.B. Hosagoudar HCIO 40516 (type); Castle Rock, Karnataka, 10.i.1984, C.R. Patil HCIO 40014; Peppara, Thiruvananthapuram, Kerala, 5.ii.1997, V.B. Hosagoudar HCIO 43948, TBGT 434; TBGRI campus, Thiruvananthapuram, Kerala, 4.xi.2000, H. Biju, HCIO 44544, TBGT 830; Vettipalpara, Vazhachal, Trissur, Kerala, 24.x.2002, H. Biju & A. Manojkumar TBGT 958.

Colonies amphigenous, mostly epiphyllous, subdense to dense, up to 3 mm in diameter, confluent. Hyphae substraight to slightly undulate, branching opposite to irregular at acute angles, loosely to closely reticulate, cells 16-28 x 6-8 μ m. Appressoria alternate to unilateral, straight, antrorse, 20-28 μ m long; stalk cells cuneate, 6-12 μ m long; head cells ovate, versiform, slightly and bluntly pointed at the apex, entire, 14-18 x 12-14 μ m. Phialides borne on a separate mycelial branch, alternate to opposite, conoid to ampulliform, 14-22 x 6-8 μ m. Mycelial setae scattered to grouped around the perithecia, simple, acute at the tip, up to 432 μ m long. Perithecia scattered, verrucose, up to 160 μ m in diameter; ascospores oblong, 4-septate, slightly constricted, 34-40 x 16-20 μ m.

Host range: *Cyclea peltata*

Distribution: India

26. *Meliola cymbopogonis* Kapoor, Indian Phytopathol. 20: 152, 1967; Hosag. & Goos, Mycotaxon 37: 229, 1990; Hosag., Meliolales of India, p. 177, 1996.

Materials examined: On leaves of *Cymbopogon nardus* (L.) Rendle (Poaceae), Wyanad, Kerala, 13.ix.1909, W. McRae HCIO 28213 (type); *C. flexuous* (Nees ex Steud.) Wats., Vazhathope, Idukki, Kerala, 26.iii.1983, V.B. Hosagoudar MH 75879; Idukki, Kerala, 4.x.1983, V.B. Hosagoudar MH 781521 HCIO 34972.

Colonies epiphyllous, rarely amphigenous, subdense to dense, velvety, up to 3mm in diameter. Hyphae straight to tortuous, straight hyphae run along the veins and tortuous hyphae cross the straight hyphae, branching mostly opposite at wide to acute angles, loosely to closely reticulate, cells 14-22 x 6-8 μ m. Appressoria alternate, unilateral, antrorse, spreading, 10-24 μ m long; stalk cells cuneate to cylindrical, 4-12 μ m long; head cells ovate, globose, angular to sublobate, 10-14 x 12-14 μ m. Phialides few, mixed with appressoria, opposite to alternate, ampulliform, 12-18 x 10-12 μ m. Mycelial setae straight, dichotomously branched at the tip, up to 176 μ m long till branching, primary branch up to 20 μ m long, while tertiary up to 10 μ m long, branchlets reflexed, acute to obtuse at the tip. Perithecia scattered, verrucose, up to 120 μ m in diameter; ascospores ellipsoidal, 4-septate, constricted, 38-44 x 12-14 μ m.

Host range: *Cymbopogon* spp.

Distribution: India

27. *Meliola diospyri* Sydow & Sydow in Sydow & Butler, Ann. Mycol. 9: 281, 1911; Hansf., Sydowia Beih. 2: 498, 1961; Thite & Kulkarni, J. Shivaji Univ. (Sci.) 6: 162, 1973; Srinivasulu, Nova Hedwigia Beih. 47: 426, 1974; Maity, Indian J. Mycol. Res. 16: 25, 1978; Hosag. & Goos, Mycotaxon 37: 230, 1990; Hosag., Siddappa & Udaiyarn, Nova Hedwigia 56: 197, 1993; Hosag., Raghu & Pillai, Nova Hedwigia 58: 538, 1994; Hosag., Meliolales of India, p. 181, 1996.

Materials examined: On leaves of *Diospyros montana* Roxb. (Ebenaceae), Koppa, Karnataka, 15.ix.1903, E.J. Butler HCIO 1044; *D. nigrescens* (Dalzel) Saldhana, Radhanagari, Kolhapur, Maharashtra, 10.xi.1974, M.S. Patil HCIO 31944; *D. pruriens* Dalz., Petlond, Sangli, Maharashtra, 20.iv.1984, C.R. Patil HCIO 40003; *Diospyros* sp., Anmode, Maharashtra, x.1974, A.N. Thite HCIO 31905; *D. sylvatica* Roxb., Calvary Mount, Idukki, Kerala, 5.x.1983, V.B. Hosagoudar HCIO 40520, MH 78169; Anmode, Maharashtra, 17.x.1974, A.N. Thite HCIO 31905; *Diospyros* sp., in the campus of TBGRI, palode, Thiruvananthapuram, Kerala, 10.iii.1996, V.B. Hosagoudar HCIO 42187, TBGT 58; *D. malabarica* (Desr.) Kostel., Bekur, Kasargod, Kerala, 13.ix.1992, P. Ram Bhat HCIO 40758; on *D. ebenum* Koen., in the campus of TBGRI, palode, Thiruvananthapuram, Kerala 18.xii.2001, H. Biju HCIO 44552, TBGT 838; 7.xii.2001, H. Biju HCIO 44466, TBGT 756; 23.i.2001, H. Biju HCIO 44545, TBGT 813.

Colonies amphigenous, mostly hypophyllous, subdense to dense, up to 5mm in diameter, confluent. Hyphae straight to slightly undulate, branching opposite at wide to acute angles, loosely reticulate, cells 20-36 x 6-10 μ m. Appressoria alternate, about 40% opposite, antrorse, spreading, 18-26 μ m long; stalk cells cylindrical to cuneate, 4-8 μ m long; head cells ovate, versiform, entire, rarely angular, 14-18 x 8-10 μ m. Phialides

numerous, mixed with appressoria, alternate to opposite, ampulliform, 20-28 x 8-10 μm . Mycelial setae scattered, straight, simple, acute to obtuse at the tip, up to 774 μm long. Perithecia scattered to grouped, up to 200 μm in diameter; ascospores obovoidal, 4-septate, constricted, 42-50 x 16-18 μm .

Host range: *Diospyros* spp.

Distribution: India

28. *Meliola dysoxyli-malabarici* Hosag. & Kamar., Zoos' Print J. 17: 749, 2002.

Materials examined: On leaves of *Dysoxylum malabaricum* (Meliaceae), Kerala, India, 5.ix.2001, M. Kamarudeen TBGT 565.

Colonies hypophyllous, subdense, up to 2mm in diameter, confluent. Hyphae substraight, branching irregular at acute to wide angles, loosely to closely reticulate, cells 22-26 x 4-5 μm . Appressoria alternate, unilateral, about 30% opposite, antrorse, subantrorse to slightly retrorse, 11-16 μm long; stalk cells cylindrical to cuneate, 2-5 μm long; head cells ovate, entire, straight to slightly recurved, broadly rounded at the apex, 8-11 x 6-8 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 16-18 x 6-8 μm . Mycelial setae two type: setae scattered on mycelia are simple, straight, mostly obtuse at the tip, up to 1470 μm long; setae grouped around perithecia are simple, straight, curved, uncinate, acute at the tip, up to 150 μm long. Perithecia scattered, globose, up to 175 μm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 30-32 x 12-16 μm .

Host range: *Dysoxylum malabaricum*

Distribution: India

29. *Meliola entadicola* Deighton, Sydowia 11: 104, 1958; Hansf., Sydowia Beih. 2: 260, 1961; Hosag., Kaveriappa, Raghu & Goos, Mycotaxon 51: 111, 1994; Hosag., Meliolales of India, p. 187, 1996.

Materials examined: On leaves of *Entada rheedii* Sprengel (*E. persaetha* DC.) (Mimosaceae), Gersoppa, Uttara Kannada, Karnataka, 24.x.1992, P.A. Raghu HCIO 40867.

Colonies amphigenous, mostly epiphyllous, thin, confluent. Hyphae straight to substraight, branching alternate to opposite at acute angles, loosely to closely reticulate, cells 24-34 x 4-6.5 μm . Appressoria alternate and opposite, straight to curved, antrorse to recurved, 12-15.5 μm long; stalk cells cylindrical to cuneate, 4-6.5 μm long; head cells ovoid, globose to oblong, entire to rarely angular, 7-9.5 x 6-8 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 15-22 x 6-9.5 μm . Mycelial setae fairly numerous, scattered, straight to rarely and slightly flexuous at the upper portion, acute, obtuse to dentate at the tip, up to 430 μm . Perithecia scattered, up to 126 μm in diameter; ascospores oblong to cylindrical, 4-septate, slightly constricted at the septa, 34-37.5 x 12-15.5 μm .

Host range: *Entada rheedii*

Distribution: Tropics

30. *Meliola floridensis* Hansf., Sydowia 10: 72, 1957; Sydowia Beih. 2: 56, 1961; Hosag. & Goos, Mycotaxon 37: 408, 1990; Hosag., Meliolales of India, p. 199, 1996.

Materials examined: On leaves of *Persea macrantha* (Nees) Kosterm (Lauraceae), Pudukadu, Lower Sheikalmudi, Coimbatore, Tamil Nadu, 17.i.1987, V.B. Hosagoudar HCIO 39437.

Colonies amphigenous, mostly epiphyllous, subdense, crustose, up to 2mm in diameter, rarely confluent. Hyphae straight to slightly undulate, branching alternate to opposite at acute angles, very closely reticulate, cells 12-15.5 x 7-9.5 μm . Appressoria alternate, antrorse to subantrorse, straight to slightly curved, 18-28 μm long; stalk cells cuneate, 3-12.5 μm long; head cells obovate, clavate, globose, entire to rarely angular, 15-18.5 x 12-15 μm . Phialides not seen. Mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse, up to 430 μm long. Perithecia scattered to loosely grouped at the centre, verrucose, up to 170 μm in diam.; ascospores cylindrical, 4-septate, strongly constricted, 52-56 x 18-22 μm .

Host range: *Persea macrantha*

Distribution: Tropics

32. *Meliola gamsii* Hosag. & S. Shiburaj, Nova Hedwigia 74: 411, 2002.

Materials examined: On leaves of *Strychnos nux-vomica* (Strychnaceae), Kerala, India, 17.ix.1998, S. Shiburaj TBGT 407; Eanikara, Thiruvananthapuram, Kerala, 23.i.2001, V.B. Hosagoudar HCIO 44067, TBGT 505; 26.i.2001, V.B. Hosagoudar HCIO 44133, TBGT 515; Anchal, Kollam, Kerala, 23.ix.2001, M.M. Shajivaj HCIO 44362, TBGT 652.

Colonies mostly epiphyllous rarely amphigenous, dense, up to 2mm diam., confluent. Hyphae mostly straight to substraight, branching mostly opposite at acute angles, loosely to closely reticulate, cells 28-35 x 6-7 μm . Appressoria alternate, antrorse, straight to slightly curved, 19-24 μm long; stalk cells cylindrical to cuneate, 6-8 μm long; head cells ovate, oblong, attenuated to broadly rounded at the apex, entire, 12-16 x 8-10 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, neck with elongated, 12-28 x 6-7 μm . Mycelial setae scattered, simple, straight, partly (about 10%) curved to arcuate, acute to subacute at the tip, up to 350 μm long. Perithecia scattered, verrucose, up to 135 μm diam., ascospores oblong to cylindrical, 4-septate, constricted at the septa, 30-40 x 12-15 μm .

Host range: *Strychnos nux-vomica*

Distribution: India

33. *Meliola hemidesmi* Kamal & Gupta, Indian J. Mycol. Pl. Pathol. 16: 245, 1986 (*hemidesmae*); Hosag., Meliolales of India, p. 212, 1996.

Materials examined: Material was not available for the study.

Type: On leaves of *Hemidesmus indicus* (L.) R.Br. (Periplocaceae), Gorakhpur, Uttar Pradesh, B.K. Gupta IMI 281887 (type).

Colonies amphigenous, dense. Hyphae sinuous to flexuous, branching opposite at acute to wide angles, loosely reticulate, cells 15-35 x 4-9 μ m. Appressoria alternate, straight to curved, subantrorse to retrorse, 9-20 μ m long; stalk cells cylindrical to cuneate, 3-8 μ m long; head cells ovate, entire, 6-12.5 x 4-6 μ m. Phialides not seen. Mycelial setae numerous, simple, straight, acute to obtuse at the apex, up to 400 μ m long. Perithecia scattered, up to 250 μ m in diam.; ascospores cylindrical, 4-septate, slightly constricted at the septa, 25-55 x 12-18 μ m.

Host range: *Hemidesmus indicus*

Distribution: Tropics

34. *Meliola hemidesmicola* Hosag., Meliolales of India, p. 212, 1996.

Materials examined: On leaves of *Hemidesmus indicus* (L.) R. Br. (Periplocaceae), Panhala, Maharashtra, x.1980, A.N. Thite HCIO 33673 (type); Peppara, Thiruvananthapuram, Kerala, 5.ii.1997, V.B. Hosagoudar HCIO 42512, TBGT 174; Vithura, Thiruvananthapuram, Kerala, 3.xii.2000, M. Kamarudeen HCIO 43824, TBGT 363; TBGRI campus, Palode, Thiruvananthapuram, Kerala, 18.xii.2001, H. Biju HCIO 44576, TBGT 863; in the forest, near Kushvoor, Palode, Thiruvananthapuram, Kerala, 1.ix. 2002, A. Manojkumar HCIO 44593, TBGT 880.

Colonies epiphyllous, dense, confluent and cover the entire upper leaf surface. Hyphae straight to slightly flexuous, branching mostly opposite at wide angles, loosely to closely reticulate, cells 24-28 x 6-8 μ m. Appressoria alternate, antrorse to subantrorse, 18-22 μ m long; stalk cells cylindrical to cuneate, 5-7 μ m long; head cells ovate, globose, entire, 12-15.5 x 9-12.5 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 21-25 x 5-7 μ m. Mycelial setae fairly numerous, scattered, simple, straight, acute at the tip, up to 650 μ m long. Perithecia scattered, verrucose, up to 124 μ m in diam.; ascospores oblong to subellipsoidal, 4-septate, constricted at the septa, 32-35 x 12-15.5 μ m.

Host range: *Hemidesmus indicus*

Distribution: India

35. *Meliola hydnocarpi* Hansf. var. *indica* Hosag. & Kamar., Zoos' Print J. 17: 750, 2002.

Materials examined: On leaves of *Hydnocarpus pentandra* (Flacourtiaceae), Kerala, India, 6.ix.2001, M. Kamarudeen HCIO. TBGT 564; *H. laurifolius* (Dennst.) Sleumer, Parakuzhy forest area, Karikulam, Ranni, Pathanamthitta, Kerala, 4.x.2002, A. Manojkumar TBGT 941.

Colonies hypophyllous, dense, velvety, up to 3mm in diameter, rarely confluent. Hyphae substraight to crooked, branching

irregular at acute to wide angles, loosely to closely reticulate, cells 25-35 x 6-7 μ m. Appressoria alternate, about 2% opposite, antrorse to subantrorse, straight to curved, 14-18 μ m long; stalk cells cylindrical to cuneate, 4-6.5 μ m long; head cells ovate to globose, straight to curved, entire to rarely angular, 9-11 x 7-9 μ m. Mycelial setae densely scattered on the colonies, simple, straight, rarely about 1% uncinate, acute at the tip, up to 350 μ m long. Perithecia scattered, globose, up to 163 μ m in diameter; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 36-40 x 12-15 μ m.

Host range: *Hydnocarpus* spp.

Distribution: India

36. *Meliola ichnocarpi-volubili* Hansf., Sydowia 16: 320, 1963. *Meliola ichnocarpi* Stev. & Rold., Philippine J. Sci. 56: 66, 1935 (non Hansf. & Thirum., 1948); Hansf., Sydowia Beih. 2: 561, 1961.

Materials examined: On leaves of *Ichnocarpus frutescens* (L.) R. Br. (Apocynaceae), in the campus of Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala, 5.ix.2002, H. Biju HCIO 44637, TBGT 919.

Colonies mostly epiphyllous, subdense, up to 5mm in diameter. Hyphae straight to flexuous, branching mostly opposite at acute angles, loosely reticulate, cells 19-24 x 4-6 μ m. Appressoria alternate, antrorse to closely antrorse, 12-18 μ m long; stalk cells cylindrical to cuneate, 3-7 μ m long; head cells ovate, globose, slightly attenuated to truncate at the apex, mostly entire, rarely sublobate, 9-12 x 8-10 μ m. Mycelial setae scattered to mostly grouped around perithecia, simple, straight, curved, acute to obtuse at the apex, up to 600 μ m long. Perithecia scattered, globose, often peridial cells projected, up to 125 μ m in diameter; ascospores oblong to slightly ellipsoidal, 4-septate, slightly constricted, 35-37 x 11-13 μ m.

Host range: *Ichnocarpus frutescens*

Distribution: Asia

37. *Meliola kingiodendri* Hosag., Dayal & Goos, Mycotaxon 46: 205, 1993; Hosag., Meliolales of India, p. 234, 1996.

Materials examined: On leaves of *Kingiodendron pinnatum* (Roxb.) Harms (Caesalpiniaceae), Sampaje forest nursery, Sampaje, Kodagu, Karnataka, B.R. Dayal HCIO 30836 (type).

Colonies hypophyllous, rarely amphigenous, dense, up to 5 mm in diameter, rarely confluent. Hyphae straight, very rarely crooked, branching mostly opposite at acute to wide angles, loosely reticulate, cells 27-35.5 x 6-9.5 μ m. Appressoria opposite, rarely solitary, antrorse to recurved to spreading, 15-18 μ m long; stalk cells cylindrical to cuneate, 3-6.5 μ m long; head cells pyriform, conoid with rounded ends, straight, curved to recurved, entire, 12-15.5 x 6-9.5 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, straight to curved at the apex, 18-25 x 9-12 μ m. Mycelial setae evenly scattered on the colonies, simple, straight, obtuse to dentate at

the tip, up to 575 μm long. Perithecia scattered, globose, up to 248 μm in diam.; perithecial cells projected, rounded at the apex; ascospores ellipsoidal, 4-septate, constricted at the septa, 37-40.5 x 18-22 μm .

Host range: *Kingiodendron pinnatum*

Distribution: India

38. *Meliola kydiae-calycinae* Hansf. & Thirum., Farlowia 3: 296, 1948; Hansf., Sydowia Beih. 2: 188, 1961; Hosag., Meliolales of India, p. 235, 1996.

Materials examined: Material was not available for the present study and the report is on *Kydia calycina* Roxb., Karnataka, Thirumalachar No. 852.

Colonies mostly epiphyllous, dense, velvety, up to 4mm in diameter, confluent. Hyphae undulate to crooked, branching opposite to irregular at wide angles, closely reticulate, cells 20-30 x 7-9 μm . Appressoria alternate, antrorse to spreading, 15-24 μm long; stalk cells cylindrical to cuneate, 4-10 μm long; head cells angulose to irregularly sublobate, straight to curved, 10-15 x 12-19 μm . Phialides borne on a separate mycelial branch, opposite to alternate, conoid to ampulliform, 16-23 x 6-8 μm . Mycelial setae numerous, mostly grouped around perithecia, straight to curved, simple, acute to obtuse, up to 340 μm long. Perithecia scattered, verrucose, up to 180 μm in diam.; ascospores ellipsoidal to cylindrical, 4-septate, constricted, 33-39 x 10-12 μm .

Host range: *Kydia calycina*

Distribution: India

39. *Meliola machili* Yamam., Trans. Nat. Hist. Soc. Taiwan 31: 23, 1941; Hansf., Sydowia Beih. 2: 54, 1961; Hosag. & Goos, Mycotaxon 37: 239, 1990; Hosag., Dayal & Goos, Mycotaxon 46: 206, 1993; Hosag., Meliolales of India, p. 244, 1996.

Materials examined: On leaves of *Persea macrantha* (Nees) Kosteerm. (*Machilus macrantha* Nees) (Lauraceae), Idukki, Kerala, 12.i.1982, V.B. Hosagoudar HCIO 40543, MH 72681; 19.iv.1982, V.B. Hosagoudar MH 73646, 73711; 15.xii.1982, V.B. Hosagoudar MH 75764; Lakshmi Estate, Idukki, Kerala, 12.vi.1983, V.B. Hosagoudar MH 75091, 75092, 75094; Pooyankutty, Kerala, 16.vi.1983, V.B. Hosagoudar MH 79021; Idukki, Kerala, 3.x.1983, V.B. Hosagoudar MH 78134; 28.xii.1983, V.B. Hosagoudar MH 80320; Calvary Mount, Idukki, Kerala, 24.ii.1984, M. Ali MH 80371; Idukki, Kerala, 25.x.1984, A. Diraviadoss MH 82612; Pudukadu, Lower Sheikalmudy, Coimbatore, Tamil Nadu, 17.i.1987, V.B. Hosagoudar MH 82670, 82678, 82684; Sampaje forest nursery, Sampaje, Kodagu, Karnataka, 22.xii.1991, B.R. Dayal HCIO 30834; Peppara, Thiruvananthapuram, 5.ii.1997, V.B. Hosagoudar HCIO 42510, TBGT 176; Kombe, Thiruvananthapuram, Kerala, 20.ii.1997, Meenmutty, Thiruvananthapuram, Kerala, 9.iii.1996, V.B. Hosagoudar HCIO 42165, TBGT 27.

Colonies hypophyllous, dense, velvety, up to 6mm in diameter, confluent. Hyphae crooked and geniculate, branching opposite

to irregular at acute to wide angles, closely reticulate, rarely form solid mycelial mat, cells 20-28 x 6-10 μm . Appressoria alternate to unilateral, straight to curved, antrorse, spreading, 16-22 μm long; stalk cells cylindrical to cuneate, 4-10 μm long; head cells ovate, globose, slightly angular, truncate, entire, 12-14 x 14-16 μm . Phialides mixed with appressoria, alternate to unilateral, 10-16 x 8-12 μm . Mycelial setae numerous, scattered to grouped around perithecia, straight, simple, acute at the tip, up to 486 μm long. Perithecia scattered, verrucose, up to 246 μm in diam.; ascospores obovoidal to cylindrical, 4-septate, constricted, 54-56 x 18-22 μm .

Host range: *Persea macrantha*

Distribution: Tropics

40. *Meliola melanoxylonis* Hosag. & Pillai in Hosag., Raghu & Pillai, Nova Hedwigia 58:540, 1994; Hosag., Meliolales of India, p. 255, 1996.

Materials examined: On leaves of *Acacia melanoxylon* R. Br. (Mimosaceae), Vettiyar, Mavelikara, Kerala, 14.ix.1992, C.M. Pillai HCIO 40763; Ponmudy hills, Thiruvananthapuram, Kerala, 10.x.2000, C.K. Biju HCIO 44016, TBGT 438; Ramagirikotta, Palghat, Kerala, vii.2002, A. Manojkumar & H. Biju HCIO 44524, TBGT 810; TBGRI campus, Palode, Thiruvananthapuram, Kerala, 23.i.2001, H. Biju HCIO 44543, TBGT 829; Hyderabad, Andhra Pradesh, 16.vi.2002, G. Bagyanarayana HCIO 44601, TBGT 888; Vandananam, Alapuzha, Kerala, 3.x.2002, A. Manojkumar TBGT 956; Pariyaram forest range office, Chalakudy, Trissur, Kerala, 22.x.2002, A. Manojkumar TBGT 963; *A. sinuata* (Lour.) Merr., Sampaje forest nursery, Sampaje, Kodagu, Karnataka, 22.xii.1991, B.R. Dayal HCIO 30832; on the way to Alapuzha, Kerala, 21.x.2002, A. Manojkumar TBGT 967; *Acacia* sp., KFRI campus, Peechi, Trissur, Kerala, 5.vi.1997, K.V. Sankaran TBGT 142; Chettikulam, Chalakudy, Trissur, Kerala, 22.x.2002, H. Biju & A. Manojkumar TBGT 986; Peelarmuzhy, Trissur, Kerala, 22.x.2002, H. Biju & A. Manojkumar TBGT 965; Kamarudeen HCIO 43955, TBGT 437; Peppara, Thiruvananthapuram, Kerala, 6.ii.1997, V.B. Hosagoudar HCIO 43953, TBGT 439;

Colonies amphigenous, mostly epiphyllous, scattered, dense, subvelvety, up to 2mm in diameter. Hyphae substraight to crooked, branching alternate, opposite to irregular at wide angles, loosely to closely reticulate, cells 15-22 x 3-5 μm . Appressoria mostly opposite, rarely alternate to solitary, straight to curved, antrorse, subantrorse to recurved, 12-18.5 μm long; stalk cells cylindrical to cuneate, 3-6.5 μm long; head cells globose, ovate, cylindric, entire to angular, 9-12.5 x 6-9.5 μm . Phialides mixed with appressoria, alternate to opposite, 12-15.5 x 6-8 μm . Mycelial setae numerous, scattered, simple, straight, obtuse to 2-3 dentate at the tip, up to 650 μm long. Perithecia scattered, verrucose, up to 124 μm in diam.; ascospores obovoidal, 4-septate, constricted, 34-37.5 x 14-16 μm .

Host range: *Acacia* spp.

Distribution: India

41. *Meliola mucunae-acuminatae* Hansf. var. *indica* Hosag., Siddappa & Udaiyan, Nova Hedwigia 56: 198, 1993; Hosag., Meliolales of India, p. 261, 1996.

Materials examined: On leaves of *Mucuna pruriens* (L.) DC. (Fabaceae), Anmode, Maharashtra, 10.x.1994, A.N. Thite HCIO 31907 (type).

Colonies epiphyllous, thin to dense, confluent. Hyphae crooked, branching opposite to irregular at wide angles, loosely reticulate, cells 15-28 x 4-6.5 μ m. Appressoria alternate, about 5% opposite, straight to variously curved, 12-18.5 μ m long; stalk cells cylindrical to cuneate, 3-6.5 μ m long; head cells ovate, globose, entire, curved, 9-12.5 x 10-12.5 μ m. Phialides mixed with appressoria, alternate to opposite, conoid to ampulliform, 18.5-25 x 6-8 μ m. Mycelial setae few, grouped around perithecia, simple, straight, acute, obtuse to few dentate at the tip, up to 280 μ m long. Perithecia scattered, up to 125 μ m in diam.; ascospores cylindrical, 4-septate, constricted at the septa, 30-34 x 12-15.5 μ m.

Host range: *Mucuna pruriens*

Distribution: India

42. *Meliola panici* Earle var. *vetiveriicola* Hosag. & Shajivaz (in press)

Materials examined: On leaves of *Vetiveria zizanoides* (L.) Nash (Poaceae), Medicinal plants garden, Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala, India, 29.xi.2001, M.M. Shajivaz. HCIO 44577, TBGT 864

Colonies amphigenous, mostly epiphyllous, dense, crustose, up to 2mm in diameter, confluent. Hyphae substraight to flexuous, branching irregular at acute angles, loosely to closely reticulate, cells 19-24 x 6-8 μ m. Appressoria alternate to unilateral, antrorse to subantrorse, 20-24 μ m long; stalk cells cylindrical to cuneate, 8-10 μ m long; head cells ovate, globose, entire, angular, lobate to stellately lobate, 13-15 x 11-16 μ m. Phialides borne on a separate mycelial branch, alternate, opposite to unilateral, ampulliform, 16-20 x 6-8 μ m. Mycelial setae scattered to grouped around perithecia, simple, straight, curved to rarely uncinate, acute to obtuse at the tip, up to 400 μ m long. Perithecia loosely grouped, globose, up to 125 μ m in diameter; ascospores oblong, 4-septate, slightly constricted at the septa, 33-39 x 12-16 μ m.

Host range: *Vetiveria zizanoides*

Distribution: India

43. *Meliola petchii* Hansf., Proc. Linn. Soc. London 157: 182, 1946; Sydowia Beih. 2: 527, 1961; Hosag., Lakshmanan & Viswanathan, Indian J. Bot. 11: 187, 1988; Hosag., Raghu & Pillai, Nova Hedwigia 58: 542, 1994; Hosag., Meliolales of India, p. 281, 1996.

Materials examined: On leaves of *Strychnos nux-vomica* L. (Loganiaceae), Malabar, Kerala, 17.xi.1912, T.R. Ranganath HCIO 10488; Taliparamba, Kerala, 27.v.1952, N.V. Sundaram HCIO

20422 (as *M. stenospora*); Londha, Karnataka, xii.1971, A.N. Thite HCIO 31908; Calicut, Kerala, 17.xi.1986, V.B. Hosagoudar AMH 7135; Gersoppa, uttara Kannada, Karnataka, 23.ix.1992, P.A. Raghu HCIO 40765.

Colonies epiphyllous, rarely hypophyllous, dense, thinly velvety, up to 4mm in diameter, largely confluent. Hyphae straight, branching opposite at acute angles, loosely reticulate, cells 18-28 x 4-6 μ m. Appressoria alternate, straight, antrorse, 18-25 μ m long; stalk cells cuneate, 6-9.5 μ m long; head cells ovate, broadly rounded at the apex, entire 12-15.5 x 9-11 μ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 12-15.5 x 6-9.5 μ m. Mycelial setae few, mostly grouped around perithecia, simple, straight, acute to obtuse, up to 232 μ m long. Perithecia scattered, verrucose, up to 124 μ m in diam.; ascospores obovoidal, 4-septate, slightly constricted, 31-35.5 x 12-15.5 μ m.

Host range: *Strychnos nux-vomica*

Distribution: India

44. *Meliola pongamiae* Hosag. & Abraham, Nova Hedwigia 68: 483, 1998.

Materials examined: On leaves of *Pongamia pinnata* (Fabaceae), TBGRI campus, Thiruvananthapuram, Kerala, India, 21.i.1997, V.B. Hosagoudar TBGT 123, HCIO 42482; 20.xi.2000, V.B. Hosagoudar HCIO 42482, TBGT 123; 18.xii.2000, H. Biju HCIO 44542, TBGT 828; 23.i.2001, H. Biju HCIO 44563, TBGT 850; 20.xi.2000, V.B. Hosagoudar HCIO 43950, TBGT 422; Peringammala, Thiruvananthapuram, Kerala, 25.ix.2000, M. Kamarudeen HCIO 43965, TBGT443.

Colonies epiphyllous, crustose, up to 5mm in diameter. Surrounded by yellow haloes, with yellow discolouration of the lower leaf surface, several such spots causing defoliation. Hyphae straight to substraight, branching mostly opposite at wide angles, loosely to closely reticulate, cells 17-29 x 4-8 μ m. Appressoria alternate, about 2% opposite, antrorse, subantrorse to retrorse, 14-22 μ m long; stalk cells cylindrical to cuneate, 2-7 μ m long; head cells ovate, globose, 12-15 x 9-12 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, neck twisted, 19-22 x 7-10 μ m. Mycelial setae scattered, simple, straight, acute at the tip, up to 255 μ m long. Perithecia scattered loosely to grouped, verrucose, up to 150 μ m in diameter; ascospores oblong to cylindrical, 4-septate, slightly constricted, 38-44 x 14-17 μ m.

Host range: *Pongamia pinnata*

Distribution: India

45. *Meliola pterocarpi* Yates, Philippine J. Sci. 13: 235, 1918; Hansf., Sydowia Beih. 2: 299, 1961; Hosag., Dayal & Goos, Mycotaxon 46: 208, 1993; Hosag., Meliolales of India, p. 290, 1996.

Materials examined: On leaves of *Pterocarpus marsupium* Roxb. (Fabaceae), Sampaje forest nursery, Sampaje, Kodagu, Karnataka, 22.xii.1991, B.R. Dayal HCIO 30835; Peppara,

Thiruvanantha-puram, Kerala, 3.ii.1997, V.B. Hosagoudar HCIO 42494, TBGT 144; 6.ii.1997, V.B. Hosagoudar HCIO 43951, TBGT 445; Kombe, Peppara and Neyyar Wildlife Sancturies, Thiruvananthapuram, Kerala, 19.ii.1997, V.B. Hosagoudar TBGT 196; 8.iii.2001, H. Biju HCIO 44453, TBGT 742; on *Pterocarpus santalinus* L.f., in the campus of TBGRI, Palode, Thiruvananthapuram, Kerala, 18.xii.2001, H. Biju HCIO 44492, TBGT 782.

Colonies amphigenous, mostly epiphyllous, dense, up to 3mm in diam., rarely confluent. Hyphae substraight to flexuous, branching opposite at acute angles, loosely to closely reticulate, cells 18-31 x 6-9.5 μm . Appressoria alternate, straight to curved, antrorse to reflexed, 15-18 μm long; stalk cells cylindrical to cuneate, 6-9.5 μm ; head cells globose to obovoidal, entire to rarely slightly angulose, 12-16 x 12-15.5 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 15-22 x 7-9.5 μm . Mycelial setae mostly grouped around perithecia, simple, straight, obtuse at the apex, up to 500 μm long. Perithecia scattered, globose, up to 168 μm in diam.; ascospores obovoidal, 4-septate, slightly constricted at the septa, 40-43.5 x 15-18.5 μm .

Host range: *Pterocarpus* spp.

Distribution: Asia

46. *Meliola ramacharii* Hosag., Kavaka 15: 5, 1987; Hosag., Meliolales of India, p. 295, 1996.

Materials examined: On leaves of *Persea macrantha* (Nees) Kosterm. (Lauraceae), 17.iv.1987, Pudukadu, Valparai, Coimbatore, Tamil Nadu, V.B. Hosagoudar HCIO 39316 (type).

Colonies epiphyllous, each on black leaf spots, subdense to dense, up to 2mm in diameter. Hyphae straight to substraight, branching mostly opposite at wide angles, loosely reticulate, cells 21.5-28 x 9-12.5 μm . Appressoria alternate, mostly antrorse, rarely spreading, straight to curved, 18.5-25 μm long; stalk cells cylindrical to cuneate, 3-6.5 μm long; head cells ovate, versiform to cylindrical, entire, straight to slightly curved, 15.5-18.5 x 12.5-15.5 μm . Phialides mixed with appressoria, opposite to alternate, ampulliform, 15.5-31 x 7.5-9.5 μm . Mycelial setae few, grouped around perithecia, straight, simple, acute to obtuse, up to 500 μm . Perithecia scattered, verrucose, up to 130 μm in diam.; ascospores obovoidal, 4-septate, slightly constricted, 37-40.5 x 15.5-18.5 μm .

Host range: *Persea macrantha*

Distribution: India

47. *Meliola rauvolfiae* Mibey in Mibey & Hawksworth, Mycol. Pap. 174: 69, 1997.

Materials examined: On leaves of *Rauvolfia hookeri* Srinivasan & Chithra (Apocynaceae), Gravel bank, Munnar, Idukki, Kerala, x.2001, S. Shiburaj HCIO 44383, TBGT 628.

Colonies epiphyllous, thin to subdense, up to 3mm in diameter, rarely confluent. Hyphae straight to flexuous, branching opposite at acute angles, loosely reticulate, cells 24-40 x 4-6 μm .

Appressoria alternate, antrorse, 12-18 μm long; stalk cells cylindrical to cuneate, 3-7 μm long; head cells ovate, globose, entire, often attenuated and broadly rounded at the apex, 9-11 x 9-10 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 12-16 x 6-7 μm . Mycelial setae mostly grouped around perithecia, simple, straight to slightly curved, obtuse at the tip, up to 350 μm long. Perithecia scattered to mostly grouped, globose, up to 120 μm in diam.; ascospores oblong to cylindrical, 4-septate, constricted, 27-32 x 11-15 μm .

Host range: *Rauvolfia hookeri*

Distribution: Tropics

48. *Meliola samaderae* Hosag., PonnuSwamy & C.K. Biju, Indian Phytopathol. 56: 295, 2003.

Materials examined: On leaves of *Samadera indica* Gaertn. (= *Quassia indica* (Gaertn.) Nooteboon) (Simaroubaceae), Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala, India, 18.v.1998, C.K. Biju HCIO 43364, TBGT 263; 5.i.2001, H. Biju HCIO 44511, TBGT 797; 20.i.2001, S. Shiburaj HCIO 44055, TBGT 507.

Colonies amphigenous, predominantly epiphyllous, dense, up to 3mm in diameter, confluent. Hyphae straight, branching opposite at acute angles, loosely to closely reticulate, cells 19-24 x 6-8 μm . Appressoria alternate, about 2% opposite, antrorse, mostly straight, rarely curved, 20-25 μm long; stalk cells cylindrical to cuneate, 6-8 μm long; head cells ovate, oblong to cylindrical, entire, rarely angular, 14-19 x 9-11 μm . Phialides mixed with appressoria, alternate to opposite, conoid to ampulliform, 19-22 x 8-10 μm . Mycelial setae thinly to densely scattered, simple, straight, acute, broadly rounded to 1-5 times dentate to once furcate and dentate at the apex, up to 445 μm long. Perithecia scattered, verrucose, up to 220 μm in diameter; ascospores oblong to ellipsoidal, 4-septate, constricted at the septa, often the central cell slightly larger, 61-63 x 17-19 μm .

Host range: *Samadera indica*

Distribution: India

49. *Meliola sarcostigmatica* Hosag., Abraham & C.K. Biju, Nova Hedwigia 68: 484, 1998.

Materials examined: On leaves of *Sarcostigma kleini* Wight & Arn. (Icacinaceae), Kerala, India, 18.iii.1997, V.B. Hosagoudar TBGT 124, HCIO 42483.

Colonies mostly hypophyllous, dense, velvety, up to 3mm in diameter, rarely confluent. Hyphae straight to flexuous, branching mostly opposite to irregular at wide angles, loosely to closely reticulate, cells 19-24 x 6-8 μm . Appressoria alternate, subantrorse, straight to rarely curved, 16-23 μm long; stalk cells cylindrical to cuneate, 3-7 μm long; head cells ovate to cylindrical, straight to rarely curved, entire, 11-15 x 9-11 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 11-19 x 8-10 μm . Mycelial setae scattered, simple, straight to curved but not uncinate, acute, obtuse to variously

dentate at the tip, up to 490 μm long. Perithecia loosely grouped, verrucose, up to 150 μm in diameter; ascospores cylindrical, 4-septate, slightly constricted, 33-35 x 12-15 μm .

Host range: *Sarcostigma kleinii*

Distribution: India

50. *Meliola sarcostigmatis* Hosag. in Hosag. & Goos, Mycotaxon 37: 246, 1990 (*Sarcostigmatea*); Hosag., Meliolales of India, p. 305, 1996.

Materials examined: On leaves of *Sarcostigma kleinii* Wight & Arn. (Icacinaceae), Idukki, Kerala, 18.ii.1983, V.B. Hosagoudar HCIO 40561 (type), MH 75835 (isotype).

Colonies hypophyllous, dense, velvety, up to 5mm in diameter, rarely confluent. Hyphae substraight to undulate, branching mostly opposite at wide angles, closely reticulate, cells 24-32 x 6-10 μm . Appressoria alternate, about 10% opposite, straight to curved, antrorse, spreading, 14-24 μm long; stalk cells cylindrical to cuneate, 4-10 μm long; head cells ovate, globose, entire, 10-14 x 8-10 μm . Phialides mixed with appressoria, opposite to alternate, ampulliform, 22-26 x 6-10 μm . Mycelial setae numerous, scattered, straight, simple, acute to obtuse at the tip, up to 468 μm long. Perithecia scattered, surface cells projecting, up to 170 μm in diam.; ascospores obovoid, 4-septate, constricted, 38-44 x 14-16 μm .

Host range: *Sarcostigma kleinii*

Distribution: India

51. *Meliola semecarpri-anacardii* Hosag., Kaveriappa, Raghu & Goos, Mycotaxon 51: 114, 1994; Hosag., Meliolales of India, p. 308, 1996.

Materials examined: On leaves of *Semecarpus anacardium* L.f. (Anacardiaceae), Dakhina Kannada, Mangalore, Karnataka, 24.xi.1992, P.A. Raghu HCIO 40877 (type); Peppara, Thiruvananthapuram, Kerala, 5.ii.1997, V.B. Hosagoudar HCIO 42495, TBGT 145.

Colonies epiphyllous, dense, crustose, up to 3mm in diameter. Hyphae straight, branching opposite at acute to wide angles, closely reticulate and form dense mycelial mat, cells 15-18.5 x 6-9.5 μm . Appressoria alternate, antrorse to subantrorse, 18-28 μm long; stalk cells cylindrical to cuneate, 6-9.5 μm long; head cells ovoid to globose, entire to angular, 12.5-18.5 x 12-15.5 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 18-22 x 9-12.5 μm . Mycelial setae numerous, simple, straight, acute at the tip, up to 500 μm long. Perithecia scattered to loosely grouped, verrucose, up to 250 μm in diam.; ascospores obovoidal, 4-septate, deeply constricted at the septa, 49-56 x 21-25 μm .

Host range: *Semecarpus anacardium*

Distribution: India

52. *Meliola spigeliae* Hansf., Slydowia 9: 49, 1955; Sydowia Beih. 2: 527, 1961; Hosag., Siddappa & Udayan, Nova Hedwigia 56: 200, 1993; Hosag., Meliolales of India, p. 312, 1996.

Materials examined: On leaves of *Strychnos nux-vomica* L. (Loganiaceae), Londa, Karnataka, xii.1971, A.N. Thite HCIO 31908; Cheppad, Alapuzha, Kerala, 23.xi.2000, M. Kamarudeen HCIO 43822, TBGT 365; in the campus of TBGRI, Palode, Kerala, 23.i.2001, H. Biju HCIO 44535, TBGT 821; 18.i.2001, H. Biju HCIO 44573, TBGT 860.

Colonies amphigenous, subdense to dense, up to 2mm in diameter, confluent. Hyphae straight to undulate, branching opposite at acute to wide angles, loosely to closely reticulate, cells 18-37 x 5-7 μm . Appressoria alternate, antrorse, 18-22 μm long; stalk cells cuneate, 6-9.5 μm long; head cells ovate, versiform, entire, attenuated and rounded to truncate at the apex, entire, 12-15.5 x 9-12.5 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 18-25 x 3-6.5 μm . Mycelial setae fairly numerous, scattered, simple, straight, acute to obtuse at the apex, up to 250 μm long. Perithecia scattered, up to 155 μm in diam.; ascospores obovoidal to cylindrical, 4-septate, constricted at the septa, 31-34 x 12-15.5 μm .

Host range: *Strychnos nux-vomica*

Distribution: India

53. *Meliola stenospora* Wint., Hedwigia 25: 97, 1886; Hansf., Sydowia Beih. 2: 75, 1961; Hosag. & Raghu, New Botanist 20: 72, 1993; Hosag., Meliolales of India, p. 314, 1996.

Materials examined: On leaves of *Piper* sp. (Piperaceae), Gersoppa, Uttar Kannada, Karnataka, 20.x.1992, P.A. Raghu HCIO 40888; *P. trichostachyon* (Miq.) DC., Petland, Sangli, Maharashtra, 20.iii.1984, C.R. Patil HCIO 40005.

Colonies amphigenous, mostly hypophyllous, thin, spreading, up to 5mm in diameter. Hyphae substraight to flexuous, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 18-25 x 6-9.5 μm . Appressoria alternate, antrorse to spreading, 15-25 μm long; stalk cells cylindrical to cuneate, 6-9.5 μm long; head cells ovate to globose, angular to very slightly lobate, 9-16 x 9-15 μm . Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 15-18.5 x 6-9.5 μm . Mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse at the tip, up to 530 μm long. Perithecia scattered, verrucose, up to 150 μm in diam.; ascospores oblong, 4-septate, constricted at the septa, 40-46.5 x 12-18.5 μm .

Host range: *Piper* spp.

Distribution: Tropics

54. *Meliola stenospora* Wint. var. *major* Hansf., Sydowia 16: 303, 1963; Patil & Pawar, Indian Phytopathol. 39: 306, 1986; Hosag., Meliolales of India, p. 316, 1996.

Meliola stenospora Wint. var. *major* Hansf., Sydowia Beih. 2: 75, 1961.

Materials examined: On leaves of *Piper nigrum* L. (Piperaceae), Mahabaleshwar, Satara, Maharashtra, 22.iii.1980, M.S. Patil HCIO 36749; Veerapuli Reserve Forest, Kanniyanumari, Tamil Nadu, 25.ii.1994, V.B. Hosagoudar HCIO 41610.

Colonies mostly epiphyllous, subdense, thinly velvety, up to 3mm in diameter, confluent. Hyphae substraight to slightly undulate, branching opposite to irregular at wide angles, closely reticulate, cells 20-25 x 8-10 μ m. Appressoria alternate, about 1% opposite, spreading to antrorse, straight to curved, 17-23 μ m long; stalk cells cuneate to cylindrical, 3-9 μ m long; head cells subglobose with crenate to lobulate margin, 11-15 x 12-20 μ m. Phialides borne on a separate mycelial branch, opposite to alternate, ampulliform, 17-20 x 7-9 μ m. Mycelial setae mostly grouped around perithecia, straight, simple, acute, up to 1000 μ m long. Perithecia loosely grouped, verrucose, up to 170 μ m in diam.; ascospores oblong, 4-septate, slightly constricted, 37-43 x 11-15 μ m.

Host range: *Piper nigrum*

Distribution: Asia

55. *Meliola symlocicola* Yamam., Trans., Nat. Hist. Soc. Taiwan 31: 57, 1941; Hansford, Sydowia Beih. 2: 519, 1961; Hosag. & Goos, Mycotaxon 37: 249, 1990; Hosag., Meliolales of India, p. 318, 1996.

Materials examined: On leaves of *Symplocos cochinchinensis* (Lour.) Moore ssp. *laurina* (Retz.) Nooteboom (Symplocaceae), Meenmutty forest, Idukki, Kerala, 20.ii.1983, V.B. Hosagoudar HCIO 40564, MH 75875; 20.viii.1983, V.B. Hosagoudar MH 75876; 5.x.1983, V.B. Hosagoudar MH 72162.

Colonies hypophyllous, subdense, velvety, up to 8mm in diameter, confluent. Hyphae substraight to flexuous, branching mostly opposite at wide angles, loosely reticulate, cells 18-34 x 6-8 μ m. Appressoria alternate to unilateral, straight to variously curved, antrorse, spreading, 22-26 μ m long; stalk cells cylindrical to cuneate, 6-10 μ m long; head cells globose, angulose, truncate, variously curved, entire, 12-18 x 8-12 μ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 20-30 x 8-10 μ m. Mycelial setae grouped around perithecia, straight, simple, acute, very few 2-3 dentate, up to 360 μ m long. Perithecia scattered, verrucose, up to 200 μ m in diam.; ascospores 4-septate, obovoidal to cylindrical, constricted, 48-59 x 16-20 μ m.

Host range: *Symplocos cochinchinensis*

Distribution: Asia

56. *Meliola toonae* Hosag. & T. Sabu in Hosag., C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 72, 2001.

Materials examined: On leaves of *Toona ciliata* (Meliaceae), in the campus of TBGRI, Palode, Thiruvananthapuram, Kerala, India, 30.xi.2000, T. Sabu HCIO 43827, TBGT 366.

Colonies amphigenous, mostly epiphyllous, dense, velvety, up to 3mm in diameter, confluent. Hyphae straight to substraight,

branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 24-36 x 5-7 μ m. Appressoria alternate, less than 1% opposite, subantrorse to spreading, straight, 16-24 μ m long; stalk cells cylindrical to cuneate, 6-10 μ m long; head cells ovate, oblong to cylindrical, entire, 9-15 x 8-10 μ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16-20 x 6-8 μ m. Mycelial setae scattered, simple, straight, obtuse to 3-4 times dentate, up to 245 μ m long. Perithecia scattered to loosely grouped, verrucose, up to 190 μ m in diameter; ascospores cylindrical, 4-septate, constricted, 40-44 x 12-16 μ m.

Host range: *Symplocos cochinchinensis*

Distribution: Asia

REFERENCES

- Hosagoudar, V.B. (1996). *Meliolales of India*. Botanical Survey of India, Calcutta, 363pp.
 Nair, K.K.N. (2000). *Manual of Non-Wood Forest Produce Plants of Kerala*. KFRI, Peechi, Trissur, Kerala, India, 449pp.
 Nayar, M.P., K. Ramamurthy and V.S. Agarwal, (1989). *Economic Plants of India*. Vol.-I & II. Botanical Survey of India, Calcutta, 159pp.

ACKNOWLEDGEMENTS

Thanks are due to Dr. S. Ganeshan, Director, TBGRI, Palode for the facilities. I am grateful to Mr. B.V. Shetty, Emeritus Scientist, Mangalore University, Karnataka for reviewing the manuscript critically.

