

# MELIOLALES OF INDIA – VOLUME III

V.B. Hosagoudar



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## MELIOLALES OF INDIA – VOLUME III

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**Abstract:** This work, is the continuation of my preceding two works on Meliolales of India, gives an account of 123 fungal species belonging to five genera, *Amazonia* (3), *Appendiculella* (1), *Asteridiella* (22), *Ectendomeliola* (1), *Irenopsis* (8) and *Meliola* (88), infecting 120 host plants belonging to 49 families. Generic key, digital formula, synoptic key to the species is provided. In the key, all the species are arranged under their alphabetically arranged host families. Description of the individual species is provided with the citation, detailed description, materials examined and their details including their herbarium details. Each species is supplemented with line drawings. Host and the species index is provided at the end. This work includes five new species: *Meliola arippaensis*, *M. calycopteridis*, *M. cariappae*, *M. harpullicola* and *M. mutabilidis*; a new variety: *Irenopsis hiptages* Yamam. var. *indica* and two new names: *Asteridiella micheliifolia* (based on *A. micheliae*) and *Meliola strombosiicola* (based on *Meliola strombosiae*)

**Keywords:** *Amazonia*, *Appendiculella*, *Asteridiella*, *Ectendomeliola*, India, *Irenopsis*, *Meliola*, *Meliolales*.

### Malayalam Abstract:

മുൻപ് രണ്ട് വാല്യങ്ങളിലായി പ്രസിദ്ധീകരിച്ച "മെലിയോളേൽസ് ഓഫ് ഇന്ത്യ" എന്ന എൻറെ പുസ്തകത്തിൻറെ തുടർച്ചയായാണ് മൂന്നാം പതിപ്പ് പ്രസിദ്ധീകരിക്കുന്നത്. വിവിധങ്ങളായ 49 സസ്യകുടുംബങ്ങളിലെ 120 സസ്യങ്ങളിൽ കരീംകുയിൽ രോഗമുണ്ടാക്കുന്ന 123 തരം ഫംഗസുകളെ അഞ്ചു ജനുസുകളിലായി (ആമസോണിയ - 3, അപ്പൻറിക്കുലല്ല - 1, ആസ്ഡ്രഡിയല്ല - 22, എക് ടെൻഡോമെലിയോള -1, ഐറനോപ്പസിസ് -8, മെലിയോള -88) വിവരിച്ചിരിക്കുന്നു. സ്പീഷീസുകളെ തരം തിരിക്കുന്നതിന് വേണ്ടി ജെനറിക് കീ, ഡിജിറ്റൽ ഫോർമുല, സിനോപ്റ്റിക് കീ എന്നിവ കൊടുത്തിരിക്കുന്നു. വിവിധ ഹോസ്റ്റ് ഫാമിലികളിലായി എല്ലാ ഫംഗസ് സ്പീഷീസുകളെയും ആൽഫബെറ്റിക് ഓർഡറിലാണ് അറേഞ്ച് ചെയ്തിരിക്കുന്നത്. ഓരോ ഫംഗസുകൾക്കും അതിൻറെ സൈറ്റേഷൻ, വിശദമായ സ്വഭാവ സവിശേഷതകൾ, ഹോസ്റ്റ് സസ്യങ്ങളെക്കുറിച്ചുള്ള ഹെർബറിയം വിവരങ്ങൾ തുടങ്ങിയവയും പ്രദീപായിച്ചിരിക്കുന്നു. കൂടാതെ ലൈൻ ഡ്രോയിംഗ് സും കൊടുത്തിരിക്കുന്നു. അനുബന്ധമായി ഹോസ്റ്റ്-സ്പീഷീസ് റെൻഡെക്സും അടങ്ങിയിരിക്കുന്നു.

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Author Details: DR. V.B. HOAGOU DAR is a Senior Scientist in JNTBGRI, has been working on foliicolous fungi since 1974, published 16 books and more than 400 research papers mostly on foliicolous fungi; and has proposed three new families, 17 genera and more than 800 species and infra specific taxa.



## INTRODUCTION

The study of the meliolaceous fungi in the Western Ghats of peninsular India has taken a momentum in taxonomic account but the thorough knowledge and their systematic study of all the forest areas in the biodiversity rich areas like Western Ghats, Eastern Ghats, northeastern India is lacking. The systematic study of these fungi from the Andaman Islands is yet to be started. The present work is the third Indian monographic work in addition to my first and second volumes (Hosagoudar 1996, 2008). The present work is mainly concentrated on the additional taxa to the preceding work. To facilitate the generic identity, key has been provided.

### KEY TO THE GENERA

1. Perithecia flattened-globose in the radiating hyphae ..... *Amazonia*
1. Perithecia globose ..... 2
2. Mycelium partly endophytic ..... *Ectendomeliola*
2. Mycelium ectophytic only ..... 3
3. Perithecial setae present ..... *Irenopsis*
3. Perithecial setae absent ..... 4
4. Mycelial setae present ..... *Meliola*
4. Mycelial setae absent ..... *Asteridiella*

### DIGITAL FORMULA

Beeli formula consists of 8 digits. The first 4 digits before the stop (left side to the stop) represent the morphological characters like ascospore septation, presence or absence and the nature of the perithecial setae or appendages, presence or absence and the nature of the mycelial setae and the arrangements of appressoria, respectively. The second 4 digits, after the stop, represent the measurements such as length and breadth of ascospores, diameter of perithecia and length of mycelial setae, respectively. The species having both simple & dentate setae is denoted by  $\frac{1}{3}$ , while species having straight and uncinete setae are designated as  $\frac{1}{2}$ . The Beeli formula is modified here to accommodate the genus *Armatella* having 1-2 septate ascospores. Further, for *Prataprajella*, the second digit becomes  $\frac{3}{4}$  or so.

## I. MORPHOLOGY (first four digits from left)

### 1. Normal septation of ascospores

1. 1-septate
2. 3-septate
3. 4-septate

### 2. Perithecia

1. Without setae or appendages
2. With larviform, horizontally striated appendages
3. With uncinete or coiled setae
4. With straight setae

### 3. Mycelial setae (often on perithecia and from subiculum)

0. Absent
1. Simple
2. Simple, entire, uncinete or coiled
3. Dentate or shortly furcate (up to 30 $\mu$ m)
4. Branched (branches more than 30 $\mu$ m)

### 4. Appressoria

1. Alternate or unilateral (less than 1% opposite)
2. Regularly opposite
3. Both opposite and alternate

## II. Measurements (second four digits from the full stop)

### 5. Maximum ascospore length

1. Below 20 $\mu$ m
2. 21–30  $\mu$ m
3. 31–40  $\mu$ m
4. 41–50  $\mu$ m
5. 51–60  $\mu$ m
6. More than 60 $\mu$ m long

### 6. Maximum ascospore width

1. Up to 10 $\mu$ m
2. 11–20  $\mu$ m
3. 21–30  $\mu$ m
4. More than 30 $\mu$ m

### 7. Maximum diameter of perithecia

1. Up to 100 $\mu$ m
2. 101–200  $\mu$ m
3. 201–300  $\mu$ m
4. More than 301 $\mu$ m

### 8. Maximum length of mycelial setae

1. Up to 300 $\mu$ m
2. 301–500  $\mu$ m
3. 501–1000  $\mu$ m
4. More than 1000 $\mu$ m
0. Absent.



The treatment of species and varieties consists of the original citation of the correct name, citation of the world monograph and Indian monograph, relevant synonyms (if any) based on the monographs Hansford (1961) and Hosagoudar (1996). The citation is followed by the description based on the present collections, which are deposited in JNTBGRI (Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Thiruvananthapuram) and HClO (Herbarium Cryptogamae Indiae Orientalis), New Delhi and few are at ILLS (Illinois Natural History Survey, Illinois, USA). At the end of the description of each taxon, notes have been provided regarding their identification and distribution. Line drawings have been provided to most of the studied taxa.

## DESCRIPTION OF SPECIES

### THE GENUS *AMAZONIA*

*Amazonia dikesinghii* Hosag., Jacob Thomas & Agarwal, Nelumbo 52: 1, 2010. (Image 1, Fig. 1)

Colonies epiphyllous, dense, up to 3mm in diameter, scattered. Hyphae substraight to flexuous, branching

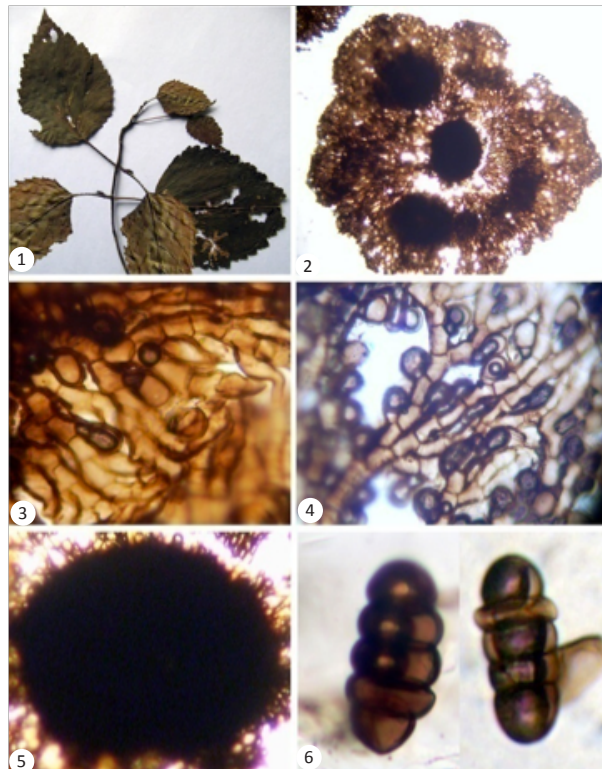


Image 1. *Amazonia dikesinghii*

1 - Infected leaves; 2 - Colony with perithecia; 3-4 - Appressorate mycelium; 5 - Perithecium; 6 - Ascospores

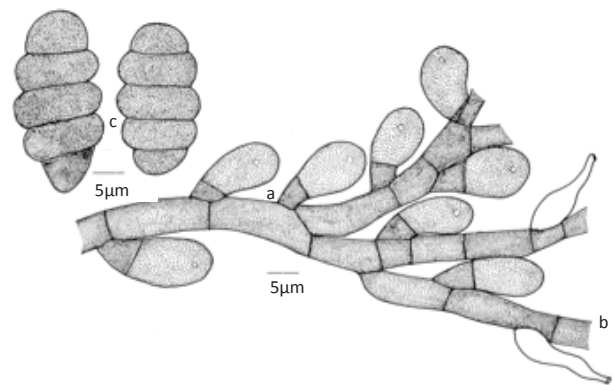


Figure 1. *Amazonia dikesinghii*

a - Appressorium; b - Phialide; c - Ascospores

alternate to rarely opposite at acute angles, very closely reticulate to form a solid mycelial mat, cells 6–13x6–8µm. Appressoria alternate to unilateral, straight to curved, antrorse to closely antrorse and often appressed to the hyphae, 12–17 µm long; stalk cells cylindrical to cuneate, 3–5 µm long; head cells ovate to globose, entire, 12–16x11–16 µm. Phialides born on a separate mycelial branches, alternate to opposite, conoid to ampulliform, 8–11x6–8 µm. Perithecia flattened-globose, up to 200µm in diameter; ascospores oblong to ellipsoidal, 4-septate, constricted at the septa, 35–40x12–18 µm.

Materials examined: HClO 49045 (holotype), TBGT 3311 (isotype), 02.ii.2008, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, Athirumala, on leaves of *Pogostemon travancoricus* Bedd. (Lamiaceae), Jacob Thomas; HClO 49045, TBGT 3300, 02.iii.2008, Thiruvananthapuram, Neyyar Wildlife Sanctuary, Pongalappara, Jacob Thomas. This is the only species of the genus *Amazonia* on the members of Lamiaceae (Hansford 1961; Hu et al. 1996, 1999; Hosagoudar 1996,

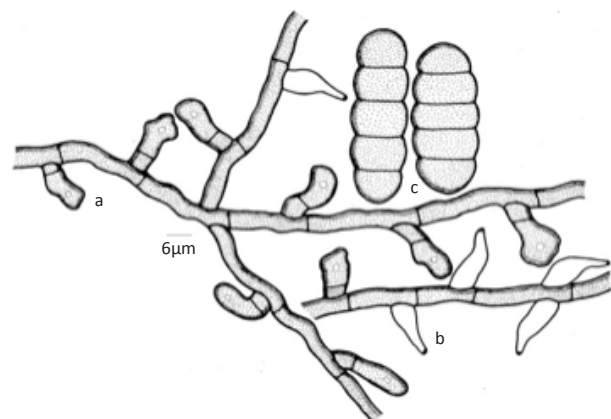


Figure 2. *Amazonia elaeocarpi*

aa - Appressorium; b - Phialide; c - Ascospores

2008; Hosagoudar et al. 1997; Hosagoudar & Agarwal 2008).

***Amazonia elaeocarpi*** Hosag., Agarwal, H. Biju & Archana, Indian Phytopathol. 60: 82, 2007 (Fig. 2)

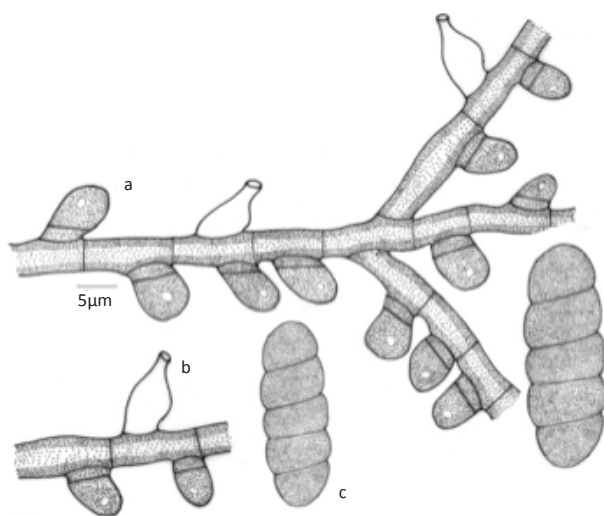
Colonies amphigenous, thin, up to 2mm in diameter. Hyphae straight to flexuous, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 13–35x4–8  $\mu\text{m}$ . Appressoria alternate, unilateral, antrorse to retrorse, straight to curved, 11–24  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 3–10  $\mu\text{m}$  long; head cells ovate, oblong, cylindrical, straight to curved, entire to angular, broadly rounded to truncate at the apex, 8–16x6–11  $\mu\text{m}$ . Phialides mixed with appressoria, alternate, opposite to unilateral, 9–26x6–10  $\mu\text{m}$ . Perithecia flattened-globose, scattered, up to 130 $\mu\text{m}$  in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 41–48x14–19  $\mu\text{m}$ .

**Material examined:** HClO 46372 (holotype), TBGT 2018 (isotype), 12.xii.2003, Kerala, Palakkad, Silent Valley, Sairandhri, on leaves of *Elaeocarpus munronii* (Wight) Mast. (Elaeocarpaceae), V.B. Hosagoudar et al.

This species differs from *Asteridiella elaeocarpicola* Hansf., *A. elaeocarpi-tuberculati* Hosag. and *Meliola elaeocarpi* Yates in absence of mycelial setae and having flattened-globose perithecia (Hansford 1961; Hosagoudar 1996).

***Amazonia palaquii*** Hosag. & Robin, Bioscience Discovery 2(2): 264, 2011. (Fig. 3)

Colonies hypophyllous, crustose, up to 4mm in diameter, confluent. Hyphae substraight, branching



**Figure 3. *Amazonia palaquii***  
a - Appressorium; b - Phialide; c - Ascospores

opposite at acute angles, loosely to closely reticulate, cells 13–22x5–7  $\mu\text{m}$ . Appressoria alternate to unilateral, antrorse, straight to slightly curved, 13–17  $\mu\text{m}$  long; stalk cells cuneate, 2–5  $\mu\text{m}$  long; head cells globose, ovate, entire, 9–13x7–10  $\mu\text{m}$ . Phialides few, mixed with appressoria, alternate, ampulliform, 13–20x7–9  $\mu\text{m}$ . Perithecia mostly aggregated, flattened-globose, up to 220 $\mu\text{m}$  in diam.; ascospores ellipsoidal, 4-septate, constricted at the septa, 33–44x16–20  $\mu\text{m}$ .

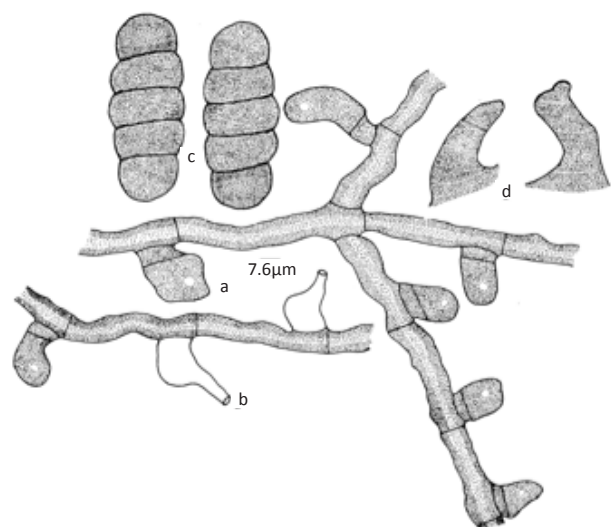
**Material examined:** TBGT 4651 (holotype), HClO 50734 (isotype), 18.i.2007, Kerala, Pathanamthitta, Gavi, on leaves of *Palaquium* sp. (Sapotaceae), Gireesh Kumar et al.

*Amazonia sideroxyli* Hansf. is the only species of the genus *Amazonia* known on *Sideroxylon* sp. from Malaysia (Hansford 1961). Three species of the genus *Palaquium* are known from Kerala and all are endemic to the region (Nayar et al. 2006). The present species differs from *A. sideroxyli* Hansf. in having loosely reticulate hypophyllous colonies with straight to substraight mycelia in contrast to colonies forming solid mycelial mat and the hyphae straight to substraight.

#### THE GENUS APPENDICULELLA

***Appendiculella elaeocarpi*** Hosag. & Robin, J. Threatened Taxa 3(5): 1782, 2011. (Fig. 4)

Colonies epiphyllous, subdense, up to 3mm in diameter. Hyphae straight to undulate, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 22–29x3–5  $\mu\text{m}$ . Appressoria alternate, antrorse to subantrorse, 17–19  $\mu\text{m}$  long; stalk

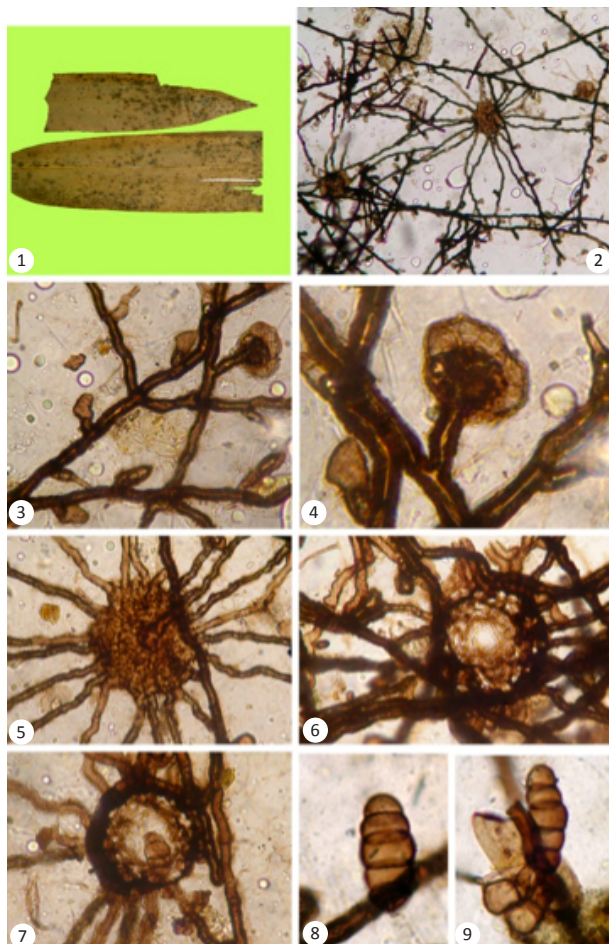


**Figure 4. *Appendiculella elaeocarpi***  
a - Appressorium; b - Phialide; c - Ascospores; d - Perithecial appendages

cells cylindrical to cuneate, 5–7  $\mu\text{m}$  long; head cells globose, ovate, entire, 12–14x7–10  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–22x7–10  $\mu\text{m}$ . Perithecia scattered, globose, up to 106 $\mu\text{m}$  in diameter; perithecial appendages conoid, straight to curved, horizontally striated, attenuated to broadly rounded at the apex, up to 24 $\mu\text{m}$  long; ascospores oblong to ellipsoidal, 4-septate, constricted at the septa, 34–38x12–14  $\mu\text{m}$ .

**Materials examined:** HClO 48808 (holotype), TBGT 3184 (isotype), 04.iii.2007, Kerala, Kottayam, Ponthanpuzha, Chapathu, on leaves of *Elaeocarpus tuberculatus* Roxb. (Elaeocarpaceae), P.J. Robin.

*Asteridiella elaeocarpi-tuberculati* Hosag., *A. elaeocarpicola* Hansf. and *Meliola elaeocarpi* Yates are known on this host genus (Hansford 1961; Hosagoudar et al. 1997; Hosagoudar 1996, 2008; Hosagoudar & Agarwal 2008). The present taxon differs from all in



**Image 2. *Asteridiella amomi***

1 - Infected leaves; 2 - Colony with perithecia; 3 - Appressariate mycelium; 4-7 - Developing perithecium; 8-9 - Ascospores

having perithecial appendages and is the first species of the genus *Appendiculella* known on the members of the family Elaeocarpaceae.

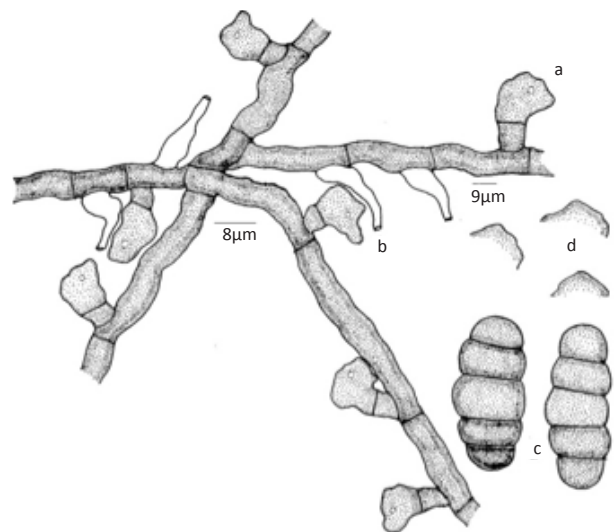
## THE GENUS *ASTERIDIELLA*

*Asteridiella amomi* Hosag., Jacob Thomas & Agarwal, Nelumbo 52: 1, 2010. (Image 2, fig 5).

Colonies amphigenous, dense, subvelvety, up to 4mm in diameter, confluent. Hyphae substraight to slightly crooked, branching opposite to irregular at acute to wide angles, loosely reticulate, cells 19–36x7–10  $\mu\text{m}$ . Appressoria alternate and unilateral, straight to curved, antrorse to spreading, 21–29  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 9–12  $\mu\text{m}$  long; head cells ovate, globose, angular to sublobate, 12–18x9–15  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–26x4–7  $\mu\text{m}$ . Perithecia scattered, up to 100 $\mu\text{m}$  in diameter; perithecial cells conoid to mammiform, 9–14x9–12  $\mu\text{m}$ ; ascospores ellipsoidal, 4-septate, constricted at the septa, 36–41x14–17  $\mu\text{m}$ .

**Materials examined:** HClO 48833 (holotype), TBGT 3209 (isotype), 04.iii.2008, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, Athirumala, on leaves of *Amomum subulatum* Roxb. (Zingiberaceae), Jacob Thomas et al.; HClO 48834, TBGT 3210, 04.iii.2008, Thiruvananthapuram, Neyyar Wildlife Sanctuary, Kombe, Jacob Thomas et al.

Two species of the genus *Asteridiella*, namely, *A. costi* (Stev.) Hansf. and *A. parasitica* (Stev.) Hansf. are known on *Costus* sp. from Panama and Ecuador, respectively. However, *Asteridiella amomi* differs from



**Figure 5. *Asteridiella amomi***

a - Appressorium; b - Phialide; c - Ascospores; d - Perithecial wall cells



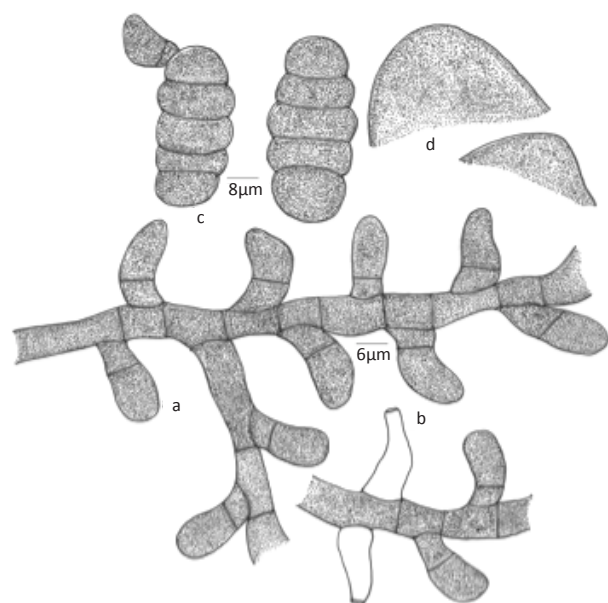
both the species in having broader mycelial cells, longer appressoria with entire to lobate head cells. Further, this forms the first melioliaceous fungus on the genus *Amomum* (Hansford 1961).

***Asteridiella anacolosae*** Hosag., Sabeena & Jacob Thomas, *Bioscience Discovery* 2: 17, 2011. (Fig. 6)

Colonies mostly hypophyllous, thin, up to 2mm in diameter, confluent. Hyphae substraight, branching opposite to unilateral at acute to wide angles, loosely reticulate, cells 12–25x7–10  $\mu$ m. Appressoria alternate to unilateral, closely arranged, antrorse, subantrorse to retrorse, 12–15  $\mu$ m long; stalk cells cylindrical to cuneate, 2–7  $\mu$ m long; head cells oblong, ovate, globose, entire, angular to sublobate, attenuated towards the tip, 10–17x7–15  $\mu$ m. Phialides mixed with appressoria, ampulliform, 15–20x7–10  $\mu$ m. Perithecia scattered, up to 100 $\mu$ m in diam., perithecial wall cells conoid, up to 15 $\mu$ m long; ascospores cylindrical, 4-septate, constricted at the septa, 37–45x17–20  $\mu$ m.

**Material examined:** TBGT 4554 (holotype). HCIO 50637 (isotype), 14.iii.2007, Kerala, Pathanamthitta, Sabrimala, on leaves of *Anacolosa* sp. (Olacaceae), Jacob Thomas et al.

Three species of the genus *Asteridiella* are known on the members of the family Olacaceae, namely, *A. ximeniae* (Bat. & Silva) Hansf., *A. scordocarp*i Hansf. & *A. strombosiae* Hansf. Of these, the former two species are similar to the present species in having 3-septate



**Figure 6. *Asteridiella anacolosae***

a - Appressorium; b - Phialide; c - Ascospores; d - Perithecial wall cells

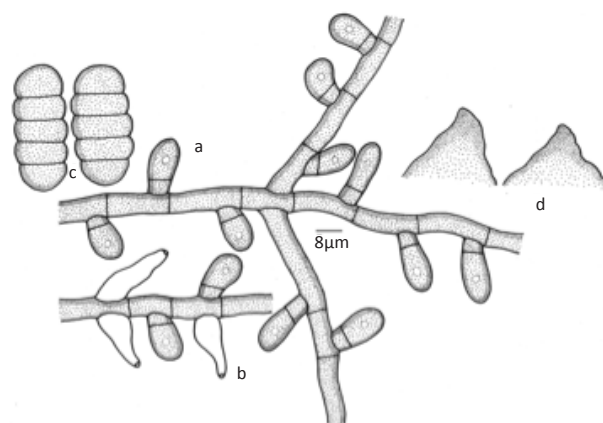
ascospores but differs from both in having ovate, oblong to cylindrical head cells attenuated towards the apex in contrast to globose cells (Hansford 1961).

***Asteridiella brahmagiriensis*** Hosag., Archana. & Agarwal, *Indian Phytopath.* 60: 237, 2007. (Fig. 7)

Colonies amphigenous, subdense, up to 2mm in diameter, confluent. Hyphae substraight to flexuous, branching opposite to irregular at acute to wide angles, cells 14–38x4–7  $\mu$ m. Appressoria alternate to unilateral, antrorse to subantrorse, straight to slightly curved, 9–27  $\mu$ m long; stalk cells cylindrical to cuneate, 3–8  $\mu$ m long; head cells oblong, ovate, globose, entire, 6–19x6–11 $\mu$ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 11–24x4–8  $\mu$ m. Perithecia globose, scattered to grouped, up to 284 $\mu$ m in diameter; perithecial wall cells conoid to mammiform, up to 35 $\mu$ m long; ascospores obovoidal, 4-septate, constricted at the septa, 36–43x14–19  $\mu$ m.

**Material examined:** HCIO 46967 (holotype), TBGT 2184 (isotype), 13.xi.2003, Karnataka, Coorg, Talacauveri, Brahmagiri, MPCA, on leaves of *Syzygium* sp. (Myrtaceae), V.B.Hosagoudar et al.

Based on the Beeli formula, this species is closer to *Asteridiella zeheri* (Doidge) Hansf. known on *Eugenia zeheri* from South Africa (Hansford 1961) but differs from it in having entire margin of the head cells of appressoria in contrast to angular to lobate. *Asteridiella eugeniae-fruticosae* Jana et al. is known on *Eugenia fruticosa* from Nagaland (Jana et al. 2005). However, *A. brahmagiriensis* differs from it in having longer appressoria (10–27  $\mu$ m against 12–17  $\mu$ m), head cells entire in contrast to angular, larger perithecia (284 $\mu$ m vs. 105 $\mu$ m) and having larger ascospores (36–43x14–19  $\mu$ m against 27–35x10–



**Figure 7. *Asteridiella brahmagiriensis***

a - Appressorium; b - Phialide; c - Ascospores; d - Perithecial wall cells

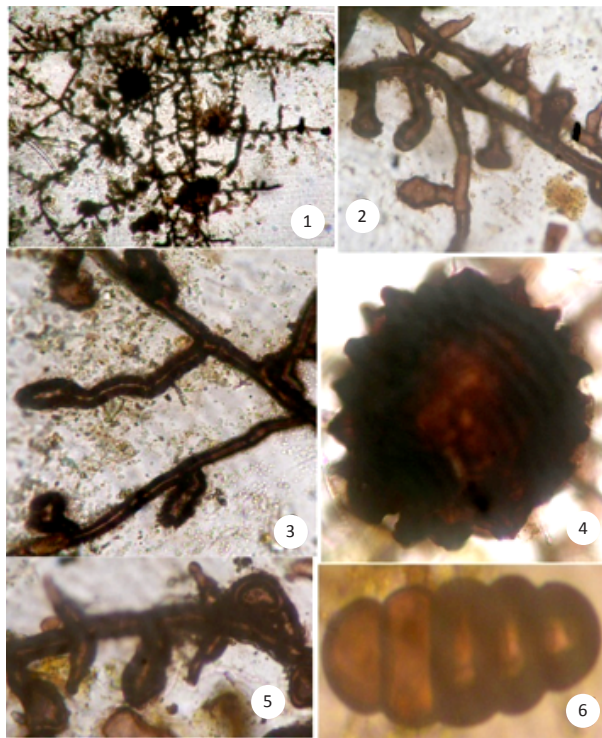


16  $\mu\text{m}$ ).

***Asteridiella chowrirae*** Hosag., Thimmaiah & Jayashankara, *Mycosphere* 2(6), 611, 2011. (Image. 3).

Colonies epiphyllous, dense, up to 3mm in diameter. Hyphae substraight to flexuous, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 23–25 $\times$ 6–8  $\mu\text{m}$ . Appressoria alternate, antrorse, subantrorse to reflexed, straight to variously curved, 22–30(–48)  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, rarely up to 2-septate, 6–12(–20)  $\mu\text{m}$  long; head cells ovate, globose, cylindrical, entire, angular to rarely sublobate, very few attenuated at the apex, 16–23  $\times$  12–20  $\mu\text{m}$ . Phialides numerous, apparently borne on a separate mycelium but mixed with appressoria, alternate to opposite, ampulliform, 15–30  $\times$  5–8  $\mu\text{m}$ . Perithecia scattered, up to 120  $\mu\text{m}$  in diam.; perithecial wall cells conoid, projected, attenuated at the apex, up to 20  $\mu\text{m}$  high; ascospores straight to slightly curved, oblong to cylindrical, 4-septate, constricted at the septa, 42–45  $\times$  16–18  $\mu\text{m}$ .

Material examined: TBGT 5708 (holotype), 29.xi.2009, Karnataka, Kodagu, Hoddur, Chowrira House, on leaves of *Euphorbia pulcherrima* Willd. ex Klotz.



**Image 3. *Asteridiella chowrirae***

1- Fungal colony; 2 - Appressorial mycelium; 3 - Elongated basal cell of the appressorium; 4 - Perithecium with perithecial wall cells; 5 - Phialides mixed with appressoria; 6 - Ascospore; Bars = 24  $\mu\text{m}$

(*Poinsettia pulcherima* Graham) (Euphorbiaceae), C. Jagath Thimmaiah.

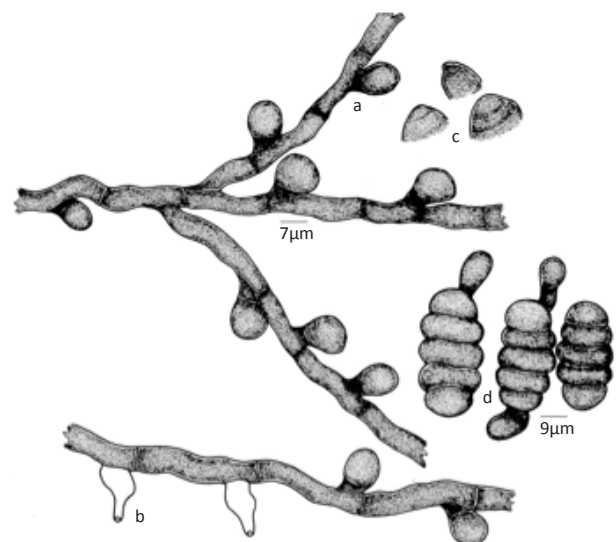
*Asteridiella antidesmatis* Hansf., *A. cleistanthi* Hansf., *A. drypeticola* Hansf., *A. mallotica* Yamam., *A. sapii* Hansf. & *A. subapoda* Sydow have the same digital formula 3101.4220. Of these, it is similar to *A. sapii* Sydow in having entire to sublobate head cells of the appressoria but differs from it in having longer and often septate stalk cells of the appressoria and the head cells are entire, angular to sublobate (Hansford 1961).

***Asteridiella crotonis-caudati*** Hosag., Riju & Agarwal, *Indian Phytopath.* 63: 76, 2010. (Fig. 8).

Colonies amphigenous, thin, scattered, up to 6mm in diameter. Hyphae straight to flexuous, branching alternate, opposite, unilateral at acute to wide angles, loosely to closely reticulate, cells 17–40 $\times$ 3–5  $\mu\text{m}$ . Appressoria alternate, unilateral, antrorse, 13–21  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 3–8  $\mu\text{m}$  long; head cells globose, ovate, entire, 8–13 $\times$ 8–13  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, unilateral, ampulliform, 13–23 $\times$ 6–8  $\mu\text{m}$ . Perithecia scattered, up to 110 $\mu\text{m}$  in diameter; perithecial wall cells conoid to mammiform, up to 16 $\mu\text{m}$  long; ascospores cylindrical, 4-septate, constricted at the septa, 30–34 $\times$ 13–15  $\mu\text{m}$ .

Material examined: HClO (holotype), TBGT 3436 (isotype), 3.viii.2008, Kerala, Palakkad, Silent Valley National Park, Thondakulam, on leaves of *Croton caudatus* Geisel. (Euphorbiaceae), M. C. Riju et al.; HClO 50574, TBGT 4491, 04.viii.2008, M.C. Riju.

Based on the digital formula 3101.3220, this species



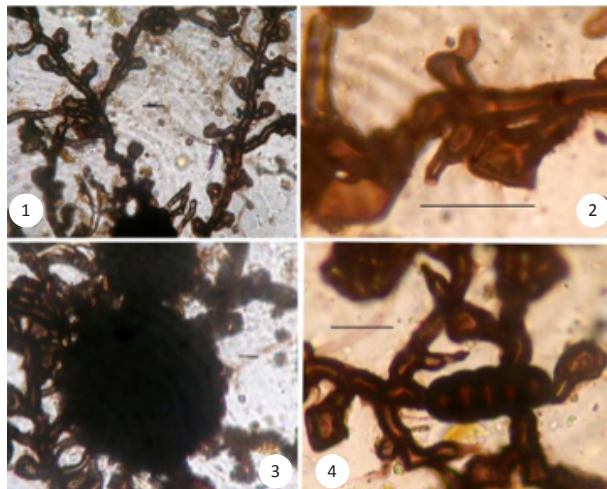
**Figure 8. *Asteridiella crotonis-caudati***

a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

is similar to *Asteridiella phyllanthi* (Deight.) Hansf., *A. erythrocoxae* Hansf., *A. hansfordii* (Stev.) Hansf. and *A. hansfordii* (Stev.) Hansf. var. *densa* (Hansf. & Deight.) Hansf. However, differs from all in having entire head cells of appressoria. Based on the character of entire head cells of the appressoria, *Asteridiella crotonis-caudati* differs from *A. phyllanthi* in having longer and regularly antrorse appressoria; from *A. macarangicola* Hosag. in having straight to flexuous hyphae. Based on the host specificity, it differs from *A. kombeensis* Hosag., *A. wyanadensis* Hosag. et al. and *A. crotonis* Hosag. in having entire head cells of the appressoria (Hansford 1961; Hosagoudar 1996).

***Asteridiella depokensis*** Hansf., Sydowia 10: 47, 1957; Sydowia Beih. 2: 688, 1961; Hosag., Timmaiah & Jayashankara, Mycosphere 2(6), 612, 2011. (Image. 4)

Colonies epiphyllous, dense, up to 7mm in diameter. Hyphae flexuous to crooked, branching alternate to opposite at acute to wide angles, closely reticulate, cells 12–17x6–8  $\mu\text{m}$ . Appressoria alternate, closely placed, antrorse to closely antrorse, often appressed to the hyphae, straight to curved, 14–24  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 4–13  $\mu\text{m}$  long; head cells globose, clavate, distinctly angular to truncate, rarely rounded, 9–16 x 12–18  $\mu\text{m}$ . Phialides many, mixed with appressoria, ampulliform, 16–20 x 6–7  $\mu\text{m}$ . Perithecia scattered, up to 130 $\mu\text{m}$  in diam.; perithecial cells mammiform, broadly rounded at the apex, up to 12 $\mu\text{m}$  long; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 35–38x14–16  $\mu\text{m}$ .



**Image 4. *Asteridiella depokensis***  
1 - Appressorium; 2 - Phialide; 3 - Ascospores; 4 - Perithecial wall cells; Bars = 8  $\mu\text{m}$

**Material examined:** TBGT 5698, 16.xi.2009, Karnataka, Kodagu, Hoddur, on leaves of *Vitex negundo* L. (Verbenaceae), C. Jagath Thimmaiah.

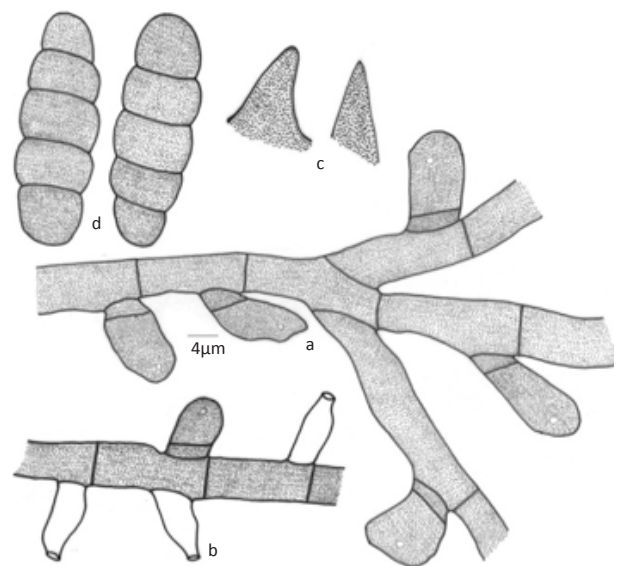
Angular head cells of the appressoria distinguish this species from others.

***Asteridiella emciana*** Hosag., Robin & Archana, Sydowia 61(2): 244, 2009. (Fig. 9)

Colonies amphigenous, mostly epiphyllous, thin, up to 3mm in diameter. Hyphae straight, substraight to slightly undulate, branching mostly opposite at acute angles, loosely to closely reticulate, cells 24–31  $\mu\text{m}$  long. Appressoria alternate, unilateral, antrorse to subantrorse, 21–26  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 7–9  $\mu\text{m}$  long; head cells globose, ovate, oblong, entire, angular to slightly lobate, 12–17x10–12  $\mu\text{m}$ . Phialides mixed with appressoria, opposite, alternate to unilateral, ampliform, 14–19x5–7  $\mu\text{m}$ . Perithecia scattered, up to 110 $\mu\text{m}$  in diam.; ascospores oblong, ellipsoidal to cylindrical, 4-septate, constricted at the septa, 34–39x12–14  $\mu\text{m}$ .

**Materials examined:** HClO 48442 (holotype), TBGT 3163 (isotype), 24.xii.2007, Tamil Nadu, Chennai, in the campus of Madras Christian College, on leaves of *Scutia myrtiana* (Burm.f.) Kurz (Rhamnaceae), V. B. Hosagoudar et al.

*Asteridiella colubrinae* (Stev.) Hansf. is known on *Colubrina rufa* from Panama, is the only species of the genus *Asteridiella* on Rhamnaceae (Hansford 1961; Hosagoudar 1996; Hosagoudar et al. 1997; Hosagoudar 2008; Hosagoudar & Agarwal 2008). However, *A.*



**Figure 9. *Asteridiella emciana***  
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores



*emciana* differs from it having straight hyphae with entire, angular to sublobate head cells of appressoria.

***Asteridiella ficicola*** Hosag., Archana & Sabu, J. Threatened Taxa 1(9): 474, 2009. (Fig. 10)

Colonies epiphyllous, dense, up to 2mm in diameter, confluent. Hyphae straight, substraight to flexuous, branching mostly opposite to alternate at acute to wide angles, loosely to closely reticulate, cells 9–24x6–8 µm. Appressoria alternate to unilateral, straight to slightly curved, antrorse to subantrorse, rarely retrorse, 12–21 µm long; stalk cells cylindrical to cuneate, 3.8µm long; head cells straight to slightly curved, globose, ovate, oblong, entire to rarely angular, 8–13x6–10 µm. Phialides mixed with appressoria, opposite, alternate to unilateral, ampulliform, 12–19x6–10 µm. Perithecia scattered to grouped, up to 160µm in diam., perithecial wall cells mammiform, up to 16µm long; ascospores obovoidal, 4-septate, constricted at the septa, 33–38x17–19 µm.

**Material examined:** HClO 46806 (holotype), TBGT 2147 (isotype) (MycoBank # MB513420), 01.iv.2006, Kerala, Thiruvananthapuram, Palode, JNTBGRI Campus, Arboretum, on leaves of *Ficus microcarpa* L. (Moraceae), T. Sabu.

Based on the digital formula 3101.3220, this species is similar to *Asteridiella olmediae* Hansf. reported on *Olmedia aspera* from Panama. However, *Asteridiella ficicola* differs from it in having only epiphyllous and confluent colonies, shorter appressoria with mostly ovate to oblong head cells (Hansford 1961; Hosagoudar 1996).

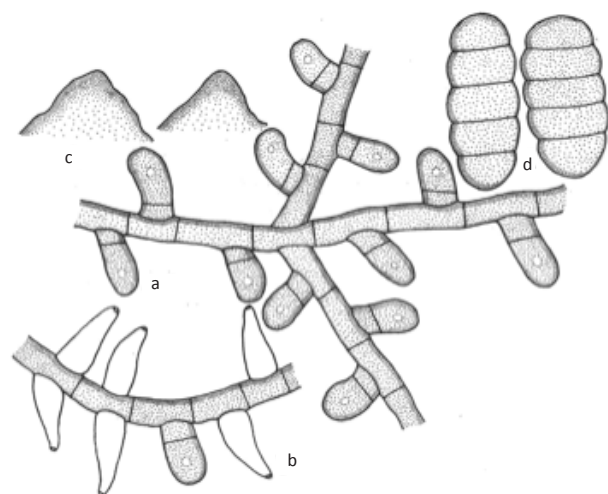
In some perithecia, marginal cells were radiating and reminding of the genus *Amazonia*. However, most of the

perithecia were globose so as to accommodate it in the genus *Asteridiella*.

***Asteridiella homaligena*** Hosag., Thimmaiah & Jayashankara, Mycosphere 2(6):613, 2012. (Image. 5)

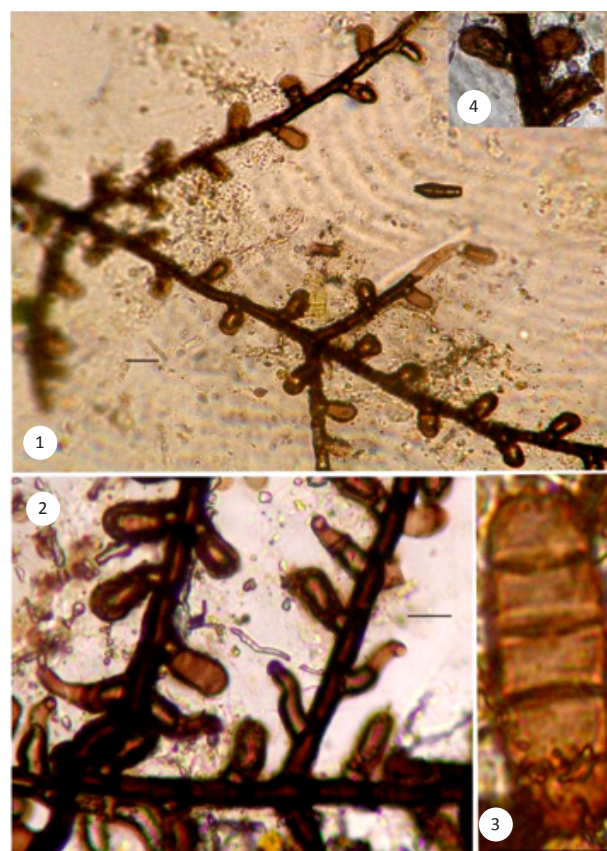
Colonies amphigenous, mostly epiphyllous, subdense, up to 4mm in diameter. Hyphae straight to substraight, branching alternate to opposite at acute to subacute angles, loosely reticulate, cells 17–25x6–9µm. Appressoria alternate, about 5% opposite, antrorse to spreading, 16–25 µm long; stalk cells cylindrical to cuneate, 3–6 µm long; head cells ovate to obovate, entire to slightly angular, 14–20x11–15 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 21–27x4–9 µm. Perithecia scattered, up to 130µm in diam., perithecial wall cells mammiform, up to 15µm high; ascospores obovoidal, oblong to cylindrical, 4-septate, constricted at the septa, 37–40x13–16 µm.

**Material examined:** TBGT 5696 (holotype), 22.vii.2009, Karnataka, Kodagu, Hoddur, river side, on leaves of *Homalium zeylanicum* Benth. (Flacourtiaceae), C.Jagath Thimmaiah.



**Figure 10. *Asteridiella ficicola***

a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores



**Image 5. *Asteridiella homaligena***

1 - Fungal colony; 2 - Phialides mixed with appressoria; 3 - Ascospore; 4 - Opposite appressoria; Bars = 12 µm

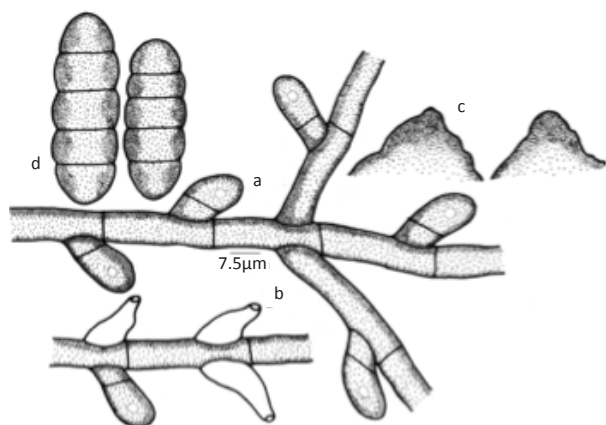
*Asteridiella homalii-angustifolii* (Deight.) Hansf. is known on *Homalium angustifolium* from Sierra Leone. However, the present species differs from it in having entire head cells of the appressoria in contrast to lobate ones (Hansford 1961, Hosagoudar 1996, 2008, Hu et al. 1996, 1999).

***Asteridiella ixorae*** Hosag. & Archana, J. Threatened Taxa 2: 889, 2010. (Fig. 11)

Colonies amphigenous, subdense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely to closely reticulate, cells 12–30x4–8  $\mu$ m. Appressoria alternate, unilateral, 1% opposite, antrorse, to subantrorse, straight, 12–22  $\mu$ m long; stalk cells cylindrical to cuneate, 3–10  $\mu$ m long; head cells ovate, oblong, globose, entire to slightly angular, 8–13x8–11  $\mu$ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 12–22x6–8  $\mu$ m. Perithecia scattered, globose, up to 145 $\mu$ m in diameter; perithecial cells mammiform, obtuse at the tip, up to 10 $\mu$ m long; ascospores obovoidal, 4-septate, constricted at the septa, 35–42x12–18  $\mu$ m.

**Material examined:** HClO 48165 (holotype), TBGT 2901 (isotype), 27.ix.2006, Kerala, Thiruvananthapuram, Palode Forest area, on leaves of *Ixora* sp. (Rubiaceae), V.B.Hosagoudar et al.

Based on the digital formula 3101.4220, it can be compared with *Asteridiella glabra* (Berk. & Curt.) Hansf. & *Asteridiella uncariicola* Hansf. but differs from the former species in having straight and loosely reticulate hyphae and from the latter species in having shorter with only entire head cells of the appressoria (Hansford 1961).



**Figure 11. *Asteridiella ixorae***  
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

***Asteridiella kodaikanalensis*** Hosag., Ravikumar & Archana, J. Threatened Taxa 1(8):434, 2009. (Fig. 12).

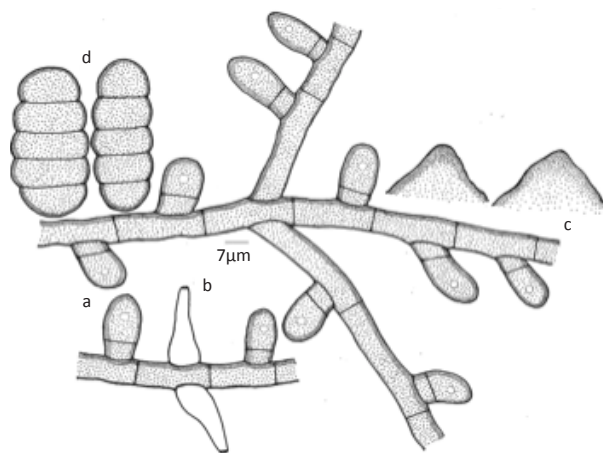
Colonies amphigenous, mostly epiphyllous, dense, up to 2mm in diameter, confluent and opposite at acute angles, loosely to closely reticulate, cells 11–32x6–10  $\mu$ m. Appressoria alternate, unilateral, straight, antrorse, 14–27  $\mu$ m long; stalk cells cylindrical to cuneate, 3.11 $\mu$ m long; head cells mostly straight, globose, ovate, entire, 11–16x9–13  $\mu$ m. Phialides mixed with appressoria, opposite, unilateral, ampulliform, 16–24x6–10  $\mu$ m. Perithecia globose, grouped, up to 168 $\mu$ m in diam.; perithecial wall cells conoid to mammiform, up to 32 $\mu$ m long; ascospores cylindrical, 4-septate, constricted at the septa, 35–42x16–18  $\mu$ m.

**Material examined:** HClO 46807 (holotype), TBGT 2148 (isotype); HClO 46808, TBGT 2149, 20.ii.2006, Tamil Nadu, Kodaikanal, Shenbaganur Shola, on leaves of *Symplocos anamallayana* Bedd. (Symplocaceae), K. Ravi Kumar.

This species is similar to *Asteridiella fidelis* (Toro) Hansf., known on *Symplocos theiformis* from Philippines in which ascospores are four septate (Hansford 1961). However, *A. kodaikanalensis* differs from it in having predominantly globose but entire head cells of appressoria and also phialides produced on the mycelial branch where appressoria are also borne.

***Asteridiella madikeriensis*** Hosag., Jagath & Jayashankara, Mycosphere 2(6): 613, 2011. *Asteridiella depokensis sensu* Hosag., Meliolales of vol. 2: 127, 2008 (*non* Hansford 1957). (Fig. 13)

Colonies epiphyllous, dense, up to 2mm in diameter. Hyphae flexuous to crooked, branching alternate, opposite to irregular at acute angles, loosely to closely



**Figure 12. *Asteridiella kodaikanalensis***  
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores



reticulate, cells 19–21x8–10  $\mu\text{m}$ . Appressoria alternate, antrorse, subantrorse, retrorse, straight to variously curved, 24–37  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 8–10  $\mu\text{m}$  long; head cells ovate, oblong, globose, angular to variously sublobate, 16–21x12–14  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–23x6–8  $\mu\text{m}$ . Perithecia scattered, up to 196  $\mu\text{m}$  in diam.; perithecial wall cells conoid to mammiform, up to 24  $\mu\text{m}$  long; ascospores ellipsoidal, 4-septate, constricted at the septa, 41–45x16–18  $\mu\text{m}$ .

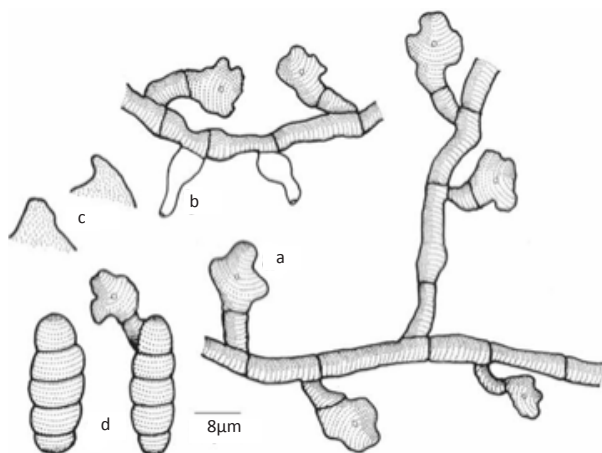
**Material examined:** HClO 46240 (holotype), TBGT 1652 (isotype), 14.xi.2003, Karnataka, Kodagu, Madikeri, Nishane motta, on leaves of *Premna* sp. (Verbenaceae), V.B. Hosagoudar et al.

This species differs from *Asteridiella depokensis* in having sublobate head cells of the appressoria (Hosagoudar 2008).

***Asteridiella micheliifolia* nom. nov.** *Asteridiella micheliae* Hosag., Archana. & Agarwal, Indian Phytopath. 60: 237, 2007 (*non* Jana et al. 2005). (Fig. 14).

(Fig. 14; MycoBank 803916)

Colonies epiphyllous, thin, up to 4mm in diameter. Hyphae substraight, branching alternate to opposite at wide angles, loosely reticulate, cells 19–22x3–5  $\mu\text{m}$ . Appressoria alternate, antrorse, mostly straight, 13–14  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–6  $\mu\text{m}$  long; head cells ovate, oblong, angular to sublobate, 8-10 x 6–8  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 12–13x4–5  $\mu\text{m}$ . Perithecia scattered, globose, up to 145  $\mu\text{m}$  in diameter; perithecial wall cells mammiform, obtuse at the tip, up to 20  $\mu\text{m}$  long; ascospores obovoidal to slightly cylindrical, 4-septate, constricted at the septa, 20–29x10–12  $\mu\text{m}$ .



**Figure 13. *Asteridiella madikeriensis***

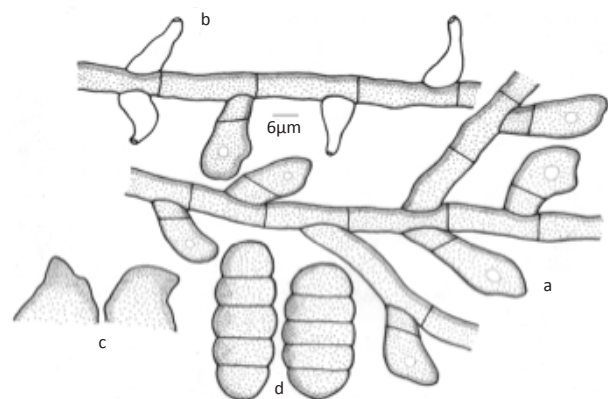
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

**Material examined:** HClO 47370 (holotype), TBGT 2408 (isotype), 12.i.2005, Arboretum, on leaves of *Michelia champaka* L. (Magnoliaceae), JNTBGRI Campus, Palode, Thiruvananthapuram, Kerala, T. Sabu; HClO 50939, TBGT 4856, 31.iii.2009, A. Sabeena & M.C. Riju; HClO 50944, TBGT 4861, 15.xi.2007, A. Sabeena & M.C. Riju; HClO 50953, TBGT 4870, 31.iii.2009, A. Sabeena & M.C. Riju; HClO 51047, TBGT 4964, 27.xii.2008, Wayanad, 16<sup>th</sup> mile, Padinharathara, M.C. Riju; HClO 49973, TBGT 4125, 14.iii.2007, Puthusserrykadavu, M.C. Riju; TBGT 5047, 03.i.2011, Kollam, Chozhiakodu, V.B. Hosagoudar et al.; TBGT 5047, 03.i.2011, Kollam, Chozhiakodu, V.B. Hosagoudar et al.

*Asteridiella micheliae* Hosag. et al. & *Asteridiella micheliae* Jana et al. are known on the same host genus from Kerala and Nagaland, respectively (Hosagoudar et al. 2007; Jana et al. 2005). However, the former species differs from the latter in having shorter appressoria with angular to sublobate head cells, phialides and appressoria borne on the same hyphae and possessing smaller ascospores. Taxonomically, both are different species. Hence, a new name has been proposed to *Asteridiella micheliae* Hosag. et al.

***Asteridiella phukanea*** Hosag., Jacob. & Robin, Indian J. Sci. Technol. 2(6): 3, 2009. (Fig. 15)

Colonies amphigenous, mostly epiphyllous, up to 2mm in diameter, confluent. Hyphae substraight to slightly undulate, branching alternate to opposite at acute to wide angles, closely reticulate, cells 21–28x7–10  $\mu\text{m}$ . Appressoria alternate, antrorse to sub antrorse, 24–31  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–12  $\mu\text{m}$  long; head cells ovate, globose, entire, angular to slightly lobate, 14–22x10–19  $\mu\text{m}$ . Phialides mixed with appressoria, opposite to alternate, ampulliform,



**Figure 14. *Asteridiella micheliifolia* nom. nov.**

a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

17–22x7–10  $\mu\text{m}$ . Perithecia scattered, up to 120 $\mu\text{m}$  in diameter; ascospores obovoidal to cylindrical, 3-septate, constricted at the septum, 36–43x16–18  $\mu\text{m}$ .

**Material examined:** HClO 48066 (holotype), TBGT 2849 (isotype), 18.i.2007, Meghalaya, Shillong, Mawphlang, on leaves of *Castanopsis armata* Spach. (Fagaceae), Jacob Thomas & P.J. Robin.

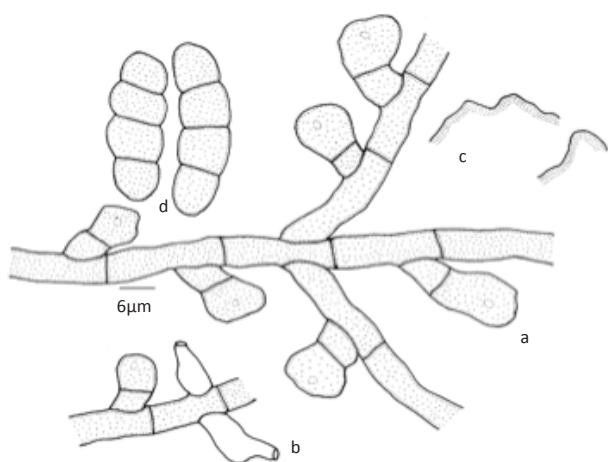
This new species is distinct from all the known species of the genus *Asteridiella* known on the members of the family Fagaceae in having three septate ascospores (Hansford 1961; Hosagoudar 1996; Hu et al. 1996, 1999).

***Asteridiella pittosporacearum*** Hosag. & Sabeena, Plant Pathology & Quarantine 3(1): 10, 2012. (Fig. 16).

Colonies amphigenous, thin to subdense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 17–30x5–7  $\mu\text{m}$ . Appressoria alternate, antrorse to subantrorse, 12–17  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–5  $\mu\text{m}$  long; head cells globose to ovate, entire, 10–12x5–12  $\mu\text{m}$ . Phialides mixed with appressoria, opposite, ampulliform, 15–25x5–10  $\mu\text{m}$ . Perithecia scattered, up to 110 $\mu\text{m}$  in diam.; Perithecial cells conoid to mammiform, up to 22 $\mu\text{m}$  long; ascospores cylindrical, 4-septate, constricted at the septa, 37–42x15–17  $\mu\text{m}$ .

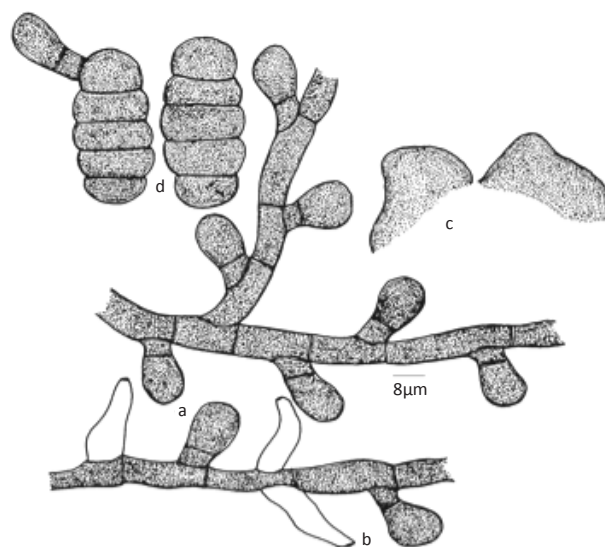
**Materials examined:** TBGT 5731 (holotype), 20.i.2009, Kerala, Kottayam, Pampavalley, on leaves of *Pittosporum neelgherrense* Wight & Arn. (Pittosporaceae), Jacob Thomas et al. Part of the collection has been deposited in HClO, New Delhi.

Five species of the genus *Meliola* are known on the



**Figure 15. *Asteridiella phukanea***

a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores



**Figure 16. *Asteridiella pittosporacearum***

a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

members of Pittosporaceae (Hansford 1961). However, the present collection differs from all in absence of mycelial setae and form the first species of the genus *Asteridiella* on the members of Pittosporaceae.

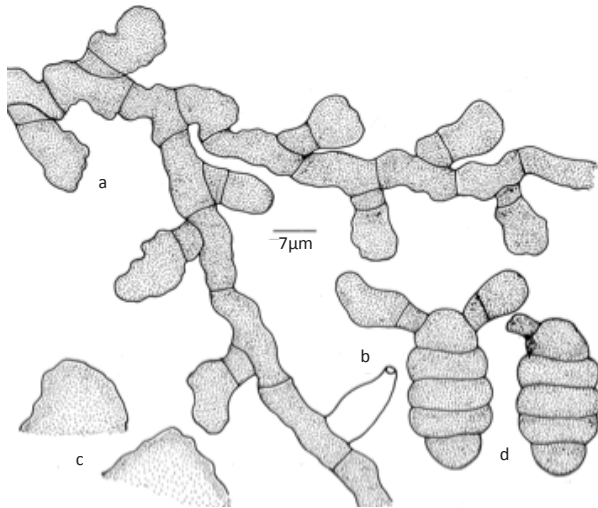
***Asteridiella scolopiae* var. *indica*** Hosag. & Riju, Plant Pathology & Quarantine 1(2): 121, 2011. (Fig. 17).

Colonies epiphyllous, scattered, crustose, mostly near the leaf margins, up to 4mm in diam., often confluent. Hyphae substraight to crooked, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 12–25x7–10  $\mu\text{m}$ . Appressoria alternate, unilateral, up to 1% opposite, antrorse, subantrorse to retrorse, 15–25  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–10  $\mu\text{m}$  long; head cells ovate, oblong to cylindrical, straight to curved, entire to angular, 10–15x7–10  $\mu\text{m}$ . Phialides mixed with appressoria, ampulliform, 17–23x7–8  $\mu\text{m}$ . Perithecia scattered, up to 145 $\mu\text{m}$  in diam.; perithecial wall cells conoid to mammiform, straight to curved, 12–15x22–28  $\mu\text{m}$ ; ascospores oblong, 4-septate, slightly constricted at the septa, 35–43x15–18  $\mu\text{m}$ .

**Material examined:** TBGT 5066 (holotype), 10.i.2007, Kerala, Pathanamthitta, Sabarigiri project area, on leaves of *Scolopia* sp. (Flacourtiaceae), M.C. Riju et al. Part of the collection has been deposited in HClO, New Delhi.

The variety differs from the species type in having straight to curved and antrorse to retrorse appressoria (Hosagoudar 1996).

***Asteridiella sebastianiae*** Hosag., Sabeena & Jacob Thomas, Taprobanica 2(2): 95, 2010. (Fig. 18).

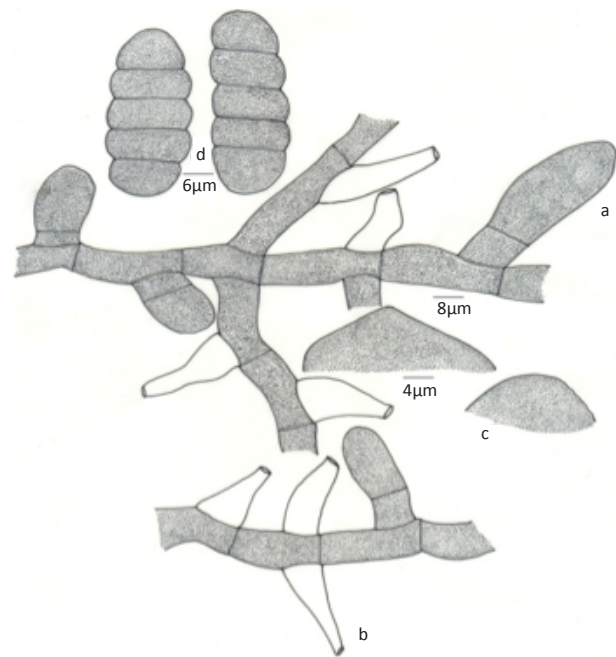


**Figure 17. *Asteridiella scolopiae* var. *indica***  
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

Colonies amphigenous, thin, up to 2mm in diameter, confluent. Hyphae substraight, flexuous to crooked, branching opposite to unilateral at acute to wide angles, cells 20–50x6–9 µm. Appressoria alternate to unilateral, antrorse, subantrorse to retrorse, straight to curved, 18–29 µm long; stalk cells cylindrical to cuneate, 4–9 µm long; head cells ovate, globose, entire, angular, 13–20x9–13 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 15–24x6–9 µm. Perithecia globose, scattered, up to 172µm in diameter; perithecial walls conoid, up to 26µm long; ascospores oblong, ellipsoidal to cylindrical, 4-septate, constricted at the septa, 31–37x9–13 µm.

**Material examined:** HClO 48046 (holotype), TBGT 2829 (isotype), 14.v.2007, Kerala, Thiruvananthapuram, Palode, JNTBGRI Campus, on leaves of *Sebastiania chamaelea* (L.) Mull. (Euphorbiaceae), A. Sabeena et al.; HClO 48365, TBGT 3086, 10.vi.2007, A. Sabeena & Bijesh; HClO 48367, TBGT 3088, 14.v.2007, A. Sabeena & Bijesh; HClO 50587, TBGT 4504, 21.iv.2010, A. Sabeena; Thiruvananthapuram, Peppara Wildlife Sanctuary, Kottoor Forest, HClO 48836, TBGT 3212, 10.ii.2008, Jacob Thomas & Anilkumar.

*Asteridiella sebastianiae* can be compared with *Asteridiella phyllanthi* (Deight.) Hansf., *A. erythrocoxae* Hansf., *A. hansfordii* (Stev.) Hansf. var. *densa* (Hansf. & Deight.) Hansf., *A. macarangicola* Hosag. & *A. wayanadensis* Hosag. et al. (Hansford 1961; Biju et al. 2005; Hosagoudar 1996, 2008; Hosagoudar & Agarwal, 2008) having the beeli formula 3101. 3220. However, it differs from *A. phyllanthi*, *A. hansfordii* var. *densa*, *A. macarangicola* and *A. combeensis* in having distinctly



**Figure 18. *Asteridiella sebastianiae***  
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores

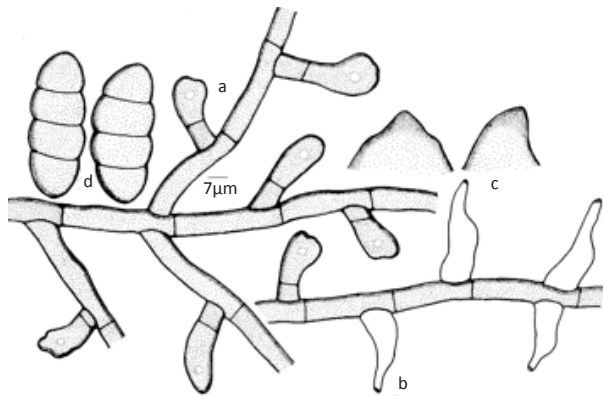
narrow ascospores (9–13 µm against 16–18 µm). It differs from *A. erythrocoxae* in having entire head cells of the appressoria in contrast to angulose to sublobate. *Asteridiella sebastianiae* also differs from *A. wayanadensis* in having longer, antrorse to retrorse appressoria. This is first report of meliolaceous fungi on this host genus.

***Asteridiella shenbaganurensis*** Hosag., Ravikumar & Archana, J. Threatened Taxa 1(8): 434, 2009. (Fig. 19).

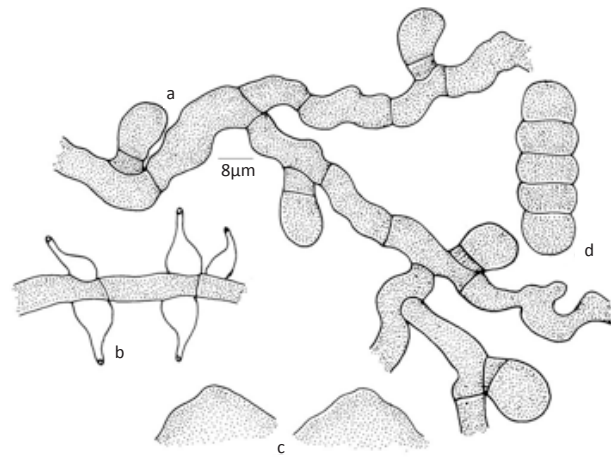
Colonies amphigenous, mostly epiphyllous, dense, up to 2mm in diameter, confluent and cover an entire upper surface of the leaves. Hyphae straight to substraight, branching opposite to alternate at acute to wide angles, loosely to closely reticulate, cells 16–42x8–10 µm. Appressoria alternate, unilateral, straight to often slightly curved, antrorse to subantrorse, 17–42 µm long; stalk cells mostly unicellular, rarely 1-septate, cylindrical to cuneate, 4–18 µm long; head cells mostly straight, often curved, oblong, ovate, clavate, mostly entire, often angular, rarely sublobate, 9–24x8–16 µm. Phialides mixed with appressoria, opposite, alternate, unilateral, ampulliform, 20–37x8–10 µm. Perithecia globose, grouped, up to 208µm in diam.; perithecial wall cells conoid to mammiform, up to 32µm long; ascospores ellipsoidal to fusiform, straight to curved, 3-septate, constricted at the septa, 43–49x14–19 µm.

**Material examined:** HClO 46808 (holotype), TBGT





**Figure 19. *Asteridiella shenbaganurensis***  
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores



**Figure 20. *Asteridiella solani* var. *kodaikanalensis***  
a - Appressorium; b - Phialide; d - Ascospores; e - Perithecial wall cells

2149 (isotype). (MycoBank # MB5140117), 20.ii.2006, Tamil Nadu, Kodaikanal, Shenbaganur Shola, on leaves of *Symplocos anamallayana* Bedd. (Symplocaceae), K. Ravi Kumar.

This species is similar to *Asteridiella singalensis* Hansf., reported on *Symplocos* sp. from Sri Lanka, in having 3-septate ascospores (Hansford 1961). However, differs from it in having distinctly oblong and entire to angular head cells of appressoria. Further, phialides are mixed with appressoria and having smaller ascospores.

***Asteridiella solani* Mc Alpine var. *kodaikanalensis*** Hosag., Dhivaharan & Riju, J. Sci. Trans. Techno. 4(4): 165, 2011. (Fig. 20).

Colonies mostly epiphyllous, scattered, subdense, velvety, up to 2mm in diameter. Hyphae flexuous, branching alternate at acute to wide angle, closely to loosely reticulate, cells 22–27x5–7 µm. Appressoria alternate, straight to curved, subantrorse to closely antrorse, 15–17 µm long; stalk cells cylindrical to cuneate, 5–7 µm; head cells globose, sub-lobate, slightly angular, entire, 10–12x7–10 µm. Phialides borne on a separate mycelial branch, alternate, rarely opposite, ampulliform, 15–17x7–10 µm. Perithecia scattered to grouped, up to 225µm in diameter; perithecial cells larviform, mammiform, 12–15x12–17 µm; ascospores 4-septate, cylindrical, 35–43x12–15 µm.

Materials examined: 4457 (holotype), HClO 50540 (isotype), 02.ii.2008, Tamil Nadu, Kodaikanal, Periyakanal, Kukkal shola forest, on leaves of *Solanum viburnum* (Solanaceae), V. Dhivaharan et al.

Based on the digital formula, morphology of the hyphae and appressoria, the present collection is similar to *Asterina solani* known on *Solanum viride* from New South Wales but the new variety differs from it in having the phialides borne on a separate mycelial branch.

***Asteridiella symploci-microphyllae*** Hosag. & Sabeena, Bioscience Discovery 2: 117, 2011. (Fig. 21).

Colonies amphigenous, subdense, up to 3mm in diameter, confluent. Hyphae straight to substraight, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 17–32x6–8 µm. Appressoria alternate to unilateral, antrorse to subantrorse, 15–20 µm long; stalk cells cylindrical to cuneate, 2–7 µm long; head cells globose to ovate, entire, 10–15x10–12 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 15–25x5–10 µm. Perithecia scattered, up to 240µm in diam., perithecial wall cells conoid to mammiform, up to 50µm long; ascospores cylindrical, 4-septate, constricted at the septa, 32–40x15–17µm.

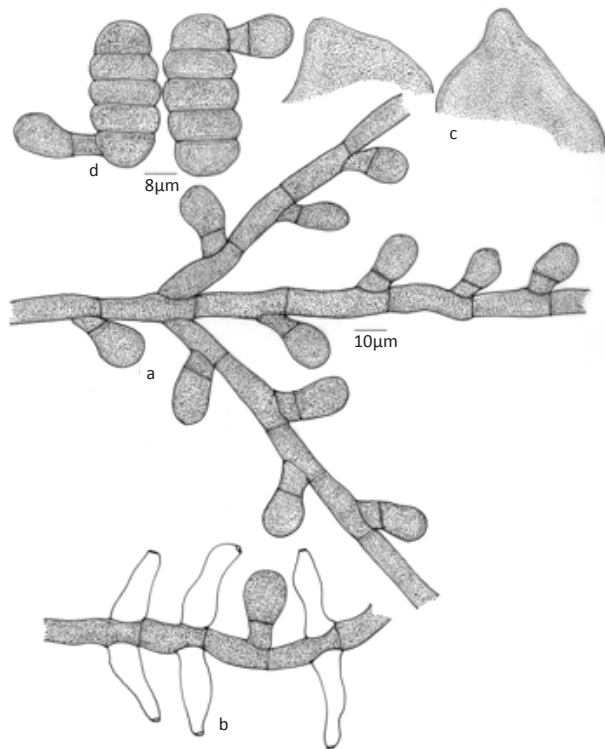
Material examined: TBGT 4553 (holotype), HClO 50536 (isotype), 01.xi.2007, Kerala, Wayanad, Banasuramala, on leaves of *Symplocos macrophylla* Wallich. ex DC. (Symplocaceae), A. Chandraprabha.

*Asteridiella singalensis* Hansf. & *A. fidelis* (Toro) Hansf. are known on the genus *Symplocos* sp. from Sri Lanka, Columbia and Philippines (Hansford 1961). However, the present new species differs from the former in having 4-septate ascospores and from the latter in having entire head cells of appressoria in contrast to angular ones.

***Asteridiella toddaliae*** Hosag. & Riju, J. Threatened Taxa 3(3): 1615, 2011. (Fig. 22).

Colonies amphigenous, dense, velvety, up to 3mm diam., rarely confluent. Hyphae straight, substraight to undulating, branching mostly opposite at wide angles, loosely to closely reticulate, cells 22–30x7–10 µm. Appressoria alternate, unilateral, about 10% opposite, antrorse to subantrorse, rarely retrorse, 12–25 µm long;



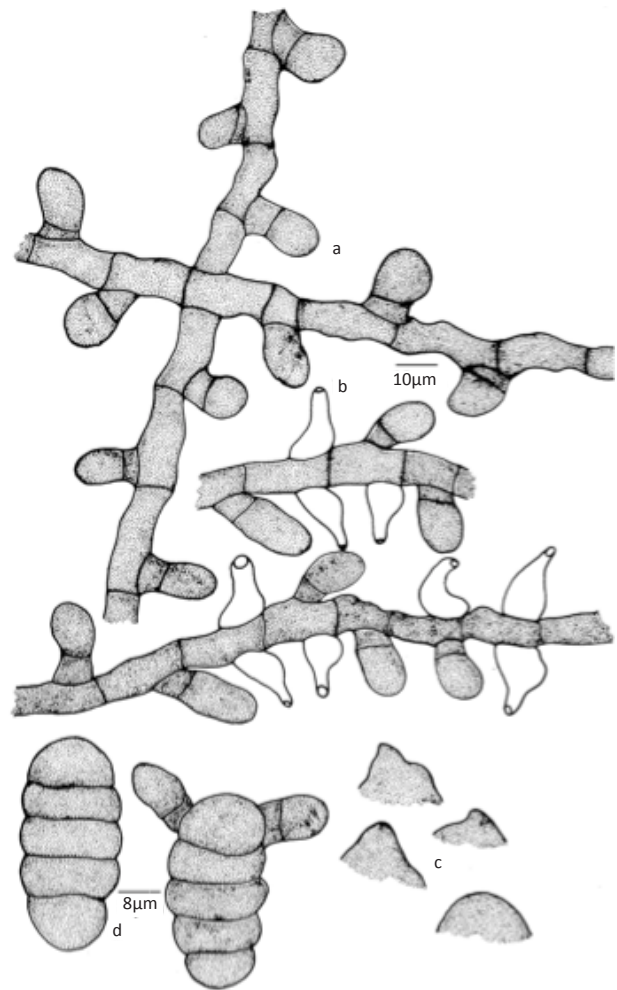


**Figure 21. *Asteridiella symploci-microphyllae***  
a - Appressorium; b - Phialide; d - Ascospores; e - Perithecial wall cells

stalk cells cylindrical to cuneate, 2–8 µm long; head cells ovate, globose, entire, 10–18 x 7–13 µm. Phialides mixed with appressoria, alternate, opposite, ampulliform, 15–23x5–8 µm. Perithecia loosely grouped at the centre of the colony, up to 210µm in diam.; perithecial wall cells mammiform to conoid, 17–28 µm long; ascospores oblong to ellipsoidal, 4-septate, constricted at the septa, 45–48x22–25 µm.

**Material examined:** TBGT 4513 (holotype), HClO 50596(isotype),(MycoBank#561021),02.vii.2008,Kerala, Palakkad, Silent Valley National Park, Cheriavalakkad, on leaves of *Toddalia asiatica* (L.) Lam. (Rutaceae), M.C. Riju et al.; Palakkad, on leaves of *Toddalia* sp., HClO 50719, TBGT 4636, 16.iii.2007, Robin et al.

Of the known species of the genus *Asteridiella* on Rutaceae, *Asteridiella obesa* (Speg.) Hansf. var. *obesula* (Speg.) Hansf. & *A. fagaricola* (Speg.) Hansf. var. *zanthoxyli* Hansf. having alternate and opposite appressoria (Hansford 1961). The present new species differs from the former taxon known on *Esenbeckia latifolia* from Paraguay in having perfectly rounded head cells of appressoria in contrast to rounded-angulose. It also differs from the latter taxon known on *Zanthoxylum hymenale* from Argentina in having only 10% opposite appressoria in contrast to 90% (Hansford 1961). The specific epithet is derived from the host genus.



**Figure 22. *Asteridiella toddaliae***  
a - Appressorium; b - Phialide; d - Ascospores; e - Perithecial wall cells

***Asteridiella viticis-negundo*** Hosag., Jagath & Jayashankara, Mycosphere 2(6): 614, 2011. (Image. 6)

Colonies epiphyllous, dense, up to 3mm in diameter. Hyphae straight, substraight to flexuous, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 18–23x7–10 µm. Appressoria alternate, antrorse to subantrorse, straight to curved, 20–32 µm long; stalk cells cuneate to cylindrical, 6–12 µm long; head cells globose, ovate, clavate to cylindrical, mostly angular, few sublobate, rarely entire, truncate, 15–23x11–20 µm. Phialides many, apparently borne on a separate mycelial branch but mixed with appressoria, mostly opposite, often unilateral, ampulliform, 16–22x5–7 µm. Perithecia scattered, globose, up to 150 µm in diam.; perithecial wall cells mammiform to conoid, attenuated at tip, up to 22µm long; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 48–50x18–21 µm.

**Material examined:** TBGT 5704 (holotype),

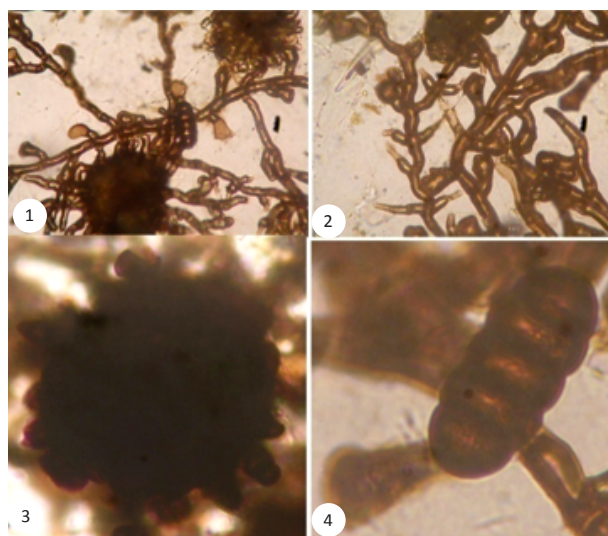
29.xii.2008, Karnataka, Kodagu, Hoddur, on leaves of *Vitex negundo* L. (Verbenaceae), C. Jagath Thimmaiah.

Based on the morphology of appressoria and measurements, this collection can be compared with *Asteridiella lagerheimii* (Gaill.) Hansf. & *A. depokensis* Hansf. known on *Citharexylum ilicifolium* and *Vitex paniculata* and *Premna subglabra* from Ecuador, Java and Philippines. However, differs from the former species in having distantly placed and recurved appressoria with typically angular head cells. It differs from the latter species in having flexuous hyphae and larger ascospores (Hansford 1961).

***Asteridiella winteri*** (Speg.) Hansf. var. ***macrospora*** Jana & Ghosh, J. Mycopath. Res. 47(1): 91, 2009.

Colonies epiphyllous, thin, up to 6mm in diameter, confluent. Hyphae flexuous, branching alternate, opposite to unilateral at acute angles, closely reticulate, cells 19–50x6–11 µm. Appressoria alternate, alternate to rarely opposite, antrorse, straight to curved, 17–36 µm long; stalk cells cylindrical, 5–16 µm long; head cells ovate to cylindrical, sometimes reniform entire, 12–20x10–15 µm. Phialides borne on a separate mycelial branch, alternate to unilateral, ampulliform, 18–27x7–11 µm. Perithecia scattered to loosely grouped, up to 200µm in diameter; perithecial wall cells projected; asci oval to elliptical, 2-spored, 55–64x39–51 µm; ascospores cylindrical, straight, 4-septate, constricted at the septa, middle cell slightly larger, 60–80x32–38 µm.

West Bengal, Chilapata forest, Cooch Behar, on leaves



**Image 6. *Asteridiella viticis-negundo***

1- Fungal colony formed from the ascospores; 2 - Appressoria mixed with phialides; 3 - Perithecium with projected wall cells; 4 - Germinated ascospore; Bars = 12µm

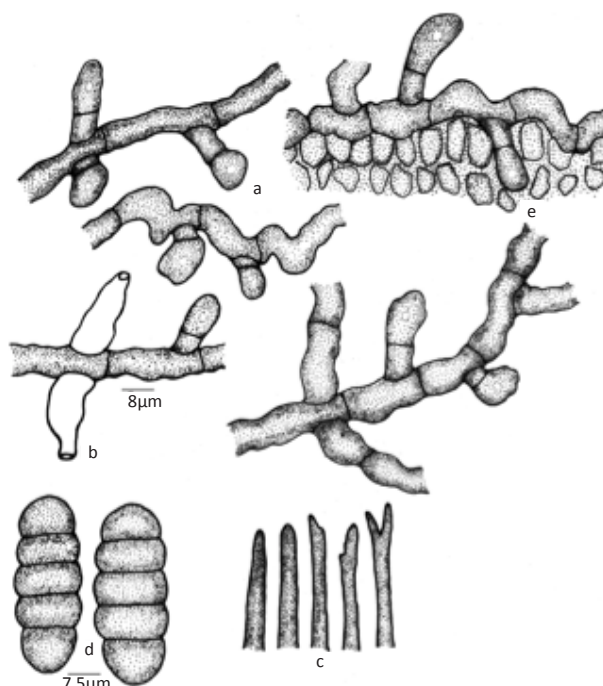
of *Solanum verbasifolium* L. (Solanaceae), 20August 1984, S.N. Ghosh IMI 233927 (holotype).

## THE GENUS *ECTENDOMELIOLA*

***Ectendomeliola otonephelii*** Hosag. & Archana, J. Threatened Taxa 2(8): 1092, 2010. (Image. 7; Fig. 23).

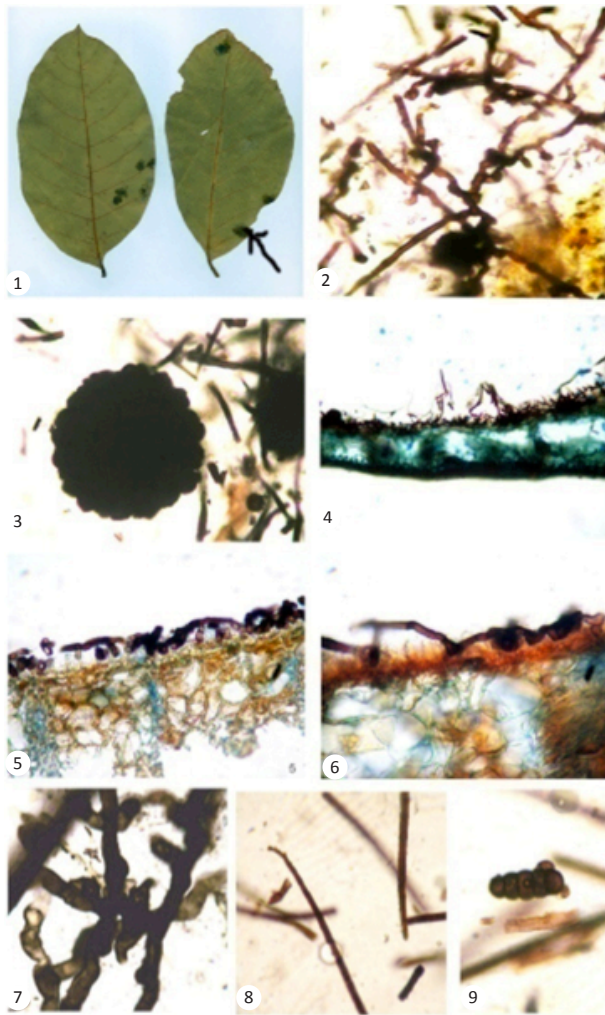
Colonies hypophyllous, subdense, crustose, up to 4mm in diameter, often confluent. Hyphae substraight to crooked, branching irregular at acute angles, form irregular mycelial net, loosely to closely reticulate, cells beaded to bulged, 11–29x4–7 µm. Appressoria ectophytic and endophytic, innate appressoria intra-epidermal, often in mesophyll cells, two celled, 11–24 µm long; stalk cells cylindrical to cuneate, 3–8 µm long; head cells ovate, globose, oblong, entire to angular, 8–16x6–8 µm. Phialides few, mixed with appressoria, opposite, ampulliform, 9–22x6–8 µm. Mycelial setae numerous, simple, straight to uncinete, acute, obtuse, dentate to furcate at the tip, up to 412µm long. Perithecia superficial, scattered to grouped, globose, ostiolate, up to 126µm in diameter; ascospores oblong, cylindrical, straight to slightly curved, 4-septate, constricted at the septa, 35–4x11–15 µm.

**Materials examined:** TBGT 3941 (holotype), HClO 49789 (isotype) (MycoBank # 518657), 14.xii.2007, Kerala, Patanamthitta, Moozhiyar forest, on leaves of



**Figure 23. *Ectendomeliola otonephelii***

a - Appressorium; b - Phialide; c - Apical portion of the mycelial setae; d - Ascospores; e - Innate appressorium



**Image 7. *Ectendomeliola otonephelii***

1 - Hypophyllous colonies on the leaves; 2 - Crooked mycelium with appressoria with an intermitant mycelial knot; 3 - Perithecium; 4 - T.S. showing the arrangement of mycelium and appressoria; 5 - Subepidermal appressoria; 6 - Mycelium, appressorium and initials of perithecia; 7 - Phialides on the mycelium; 8 - Apical tip of mycelial setae; 9 - Ascospore

*Otonephelium stipulaceum* (Bedd.) Radlk. (Sapindaceae), V. Gireesh Kumar et al. This species differs from *E. walsurae* in having longer mycelial setae and larger perithecia.

## THE GENUS *IRENOPSIS*

*Irenopsis hiptages* Yamam. var. *indica* Hosag. & Sabeena, var. nov.

(Fig. 24; MycoBank 803918)

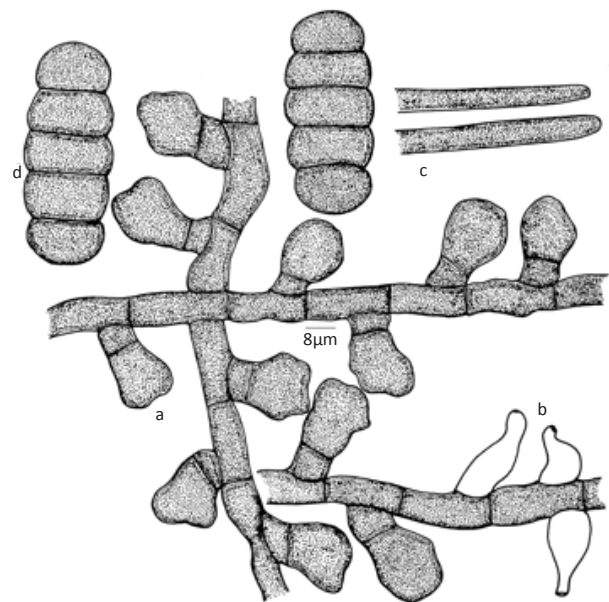
Colonies amphigenous, subdense, up to 3mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely reticulate, cells 17–25x6–8  $\mu$ m. Appressoria alternate, unilateral to 3–4% opposite, antrorse to subantrorse, 22–30  $\mu$ m long; stalk cells cylindrical to cuneate, 5–10  $\mu$ m long; head cells ovate, entire, mostly angular to rarely sublobate, 15–20x12–17  $\mu$ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 15–25x7–10  $\mu$ m. Perithecia scattered orbicular, up to 190 $\mu$ m in diam.; perithecial setae simple, straight, obtuse at the tip, up to 117 $\mu$ m long; ascospores cylindrical, 4-septate, constricted at the septa, 47–55x17–22  $\mu$ m.

Materials examined: TBGT 5747 (holotype), 18.ix.2008, Kerala, Wayanad, Thirunelli, on leaves of *Hiptage* sp. (Malpighiaceae), P.J. Robin et al.

This collection matches with the species but the new variety differs from it in having 2–3% opposite appressoria with mostly angular but often with slightly lobate head cells of appressoria.

Etymology: It is named after India.

*Irenopsis kleinhoviae* Hosag. & Archana, J. Threatened Taxa 2: 889, 2010. (Fig. 25)



**Figure 24. *Irenopsis hiptages* var. *indica* var. nov.**

a - Appressorium; b - Phialide; c - Apical portion of the mycelial setae; d - Ascospores



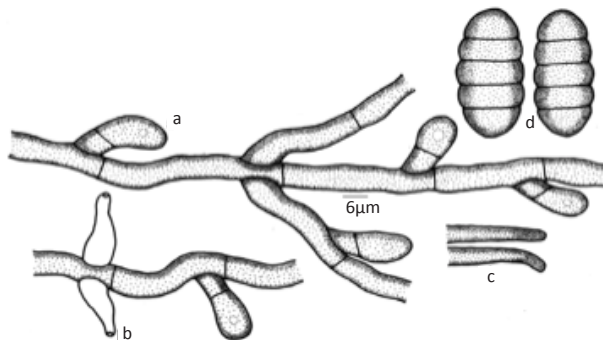
Colonies amphigenous, subdense, up to 5mm in diameter, confluent. Hyphae substraight to undulate, branching opposite, alternate, acute to wide angles, loosely to closely reticulate, cells 16–40x4–7  $\mu\text{m}$ . Appressoria alternate, unilateral, antrorse, subantrorse to retrorse, straight to curved, 12–23  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 3–11  $\mu\text{m}$  long; head cells globose, ovate, oblong, entire to angular, 8–14x8–11 $\mu\text{m}$ . Phialides mixed with appressoria, opposite to alternate, ampulliform, 12–24x4–8  $\mu\text{m}$ . Perithecia globose, scattered to grouped, up to 130 $\mu\text{m}$  in diameter; perithecial setae 4–10 in number, simple, straight, pale brown, septate, straight to uncinata at the apical part, obtuse at the tip, up to 145 $\mu\text{m}$  long, smooth; ascospores obovoidal, 4-septate, slightly constricted at the septa, 32–43x11–18  $\mu\text{m}$ .

**Material examined:** HClO 48166 (holotype), TBGT 2902 (isotype), 24.iv.2007, Kerala, Thiruvananthapuram, Karimancode, on leaves of *Kleinhovia hospita* L. (Sterculiaceae), G.R. Archana.

*Irenopsis buettneriicola* Deight. known on *Buettneria* sp. and *Sterculia sphanoghei* from Sierra Leone and Java having both straight and uncinata perithecial setae. However, *Irenopsis kleinhoviae* differs from it in having pale brown, smooth walled perithecial setae and shorter appressoria having entire head cells.

***Irenopsis loranthicola*** Hosag. & Riju, Plant Pathology & Quarantine 1(2): 122, 2011. (Fig. 26).

Colonies epiphyllous, dense, velvety, up to 3mm in diam., often confluent. Hyphae substraight, flexuous to crooked, branching opposite at acute to wide angles, loosely to closely reticulate, cells 15–23x5–8  $\mu\text{m}$ . Appressoria alternate to unilateral, antrorse, subantrorse to retrorse, 12–20  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–7  $\mu\text{m}$  long; head cells mostly entire, ovate, clavate to cylindrical, rarely angular to sublobate,



**Figure 25. *Irenopsis kleinhoviae***  
a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores

10–13x10–13  $\mu\text{m}$ . Phialides mixed with appressoria, opposite, alternate to unilateral, ampulliform, 12–18x5–8  $\mu\text{m}$ . Perithecia scattered, up to 130 $\mu\text{m}$  in diam.; perithecial setae 2–10 in number, simple, straight to uncinata at the apical portion, acute to obtuse at the tip, up to 185 $\mu\text{m}$  long; ascospores cylindrical to oblong, 4-septate, slightly constricted at the septa, 37–48x11–18  $\mu\text{m}$ .

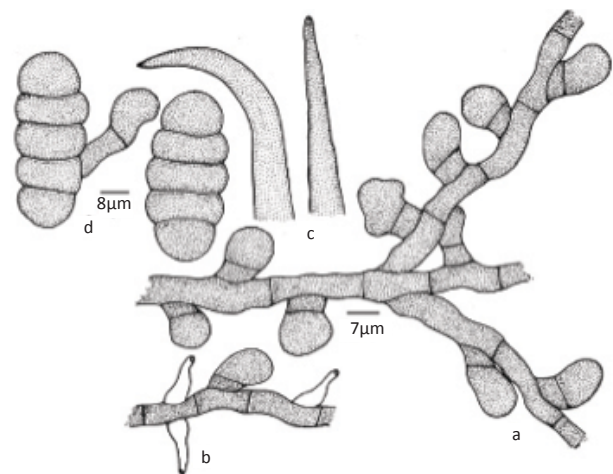
**Material examined:** TBGT 5068 (holotype), 03.i.2011, Kerala, Kollam, Chozhiakode, on leaves of *Loranthus* sp. (Loranthaceae), V.B. Hosagoudar et al. Part of the collection has been deposited in HClO, New Delhi.

This collection showed much variation in the ascospores measurements. Many *Meliola* species are known on members of the family Loranthaceae but the present fungus differs from the genus *Meliola* in having perithecial setae. Hence, it has been accommodated in a new species of *Irenopsis* (Hansford 1961; Hosagoudar 1996, 2008; Hu et al. 1996, 1999).

The colonies of *Irenopsis loranthi* were associated with *Meliola loranthacearum* Hosag. & Abraham, *M. prataprajii* Hosag. & Abraham and *Asterina deightonii* Sydow.

***Irenopsis pavoniae*** Hosag. & Jacob Thomas, J. Appl. & Nat. Sci. 2: 103, 2010. (Fig. 27).

Colonies epiphyllous, thin, up to 2mm in diameter, confluent. Hyphae flexuous, branching opposite to irregular at wide angles, closely reticulate, cells 19–58x4–7  $\mu\text{m}$ . Appressoria alternate, 5% unilateral, antrorse to spreading, straight to variously curved, 14–19  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 4–10  $\mu\text{m}$  long; head cells ovate to globose, entire, subangular to



**Figure 26. *Irenopsis loranthicola***  
a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores



sublobate, truncate, 9–11x9–12  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–24x4–7  $\mu\text{m}$ . Perithecia scattered to loosely grouped, up to 140 $\mu\text{m}$  in diameter; perithecial setae 10–16 in number, simple, straight, smooth, obtuse at the tip, up to 120 $\mu\text{m}$  long; ascospores obovoidal to ellipsoidal, 4-septate, constricted at the septa, 31–36x12–14  $\mu\text{m}$ .

**Materials examined:** HCIO 49356 (holotype), TBGT 3601 (isotype), 18.xi.2007, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, on leaves of *Pavonia* sp. (Malvaceae), Jacob Thomas.

Based on the digital formula 3401.3220, flexuous to crooked hyphae and entire to sublobate apical cells of appressoria, this species is closer to *Irenopsis aciculosa* (Wint.) Stev., *I. sidae* (Rehm) Hughes (Hansford 1961). However, entire to angular head cells in contrast to lobate ones and obtuse tip of the perithecial setae are the distinguishing characters of this species.

***Irenopsis pterigotae*** Hosag., Sabeena & Jacob Thomas, *Bioscience Discovery* 2: 119, 2011. (Fig. 28).

Colonies amphigenous, thin, up to 2mm in diameter, confluent. Hyphae substraight to flexuous, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 17–22x5–7  $\mu\text{m}$ . Appressoria alternate, straight to curved, antrorse, subantrorse to retrorse, 15–25  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–10  $\mu\text{m}$  long; head cells globose, ovate, entire angular to sublobate, 10–15x10–12  $\mu\text{m}$ . Phialides mixed with appressoria, opposite to unilateral, ampulliform, 12–25x5–7  $\mu\text{m}$ . Perithecia scattered, up to 150 $\mu\text{m}$  in diam.; Perithecial setae 2–6, simple, straight, obtuse at the

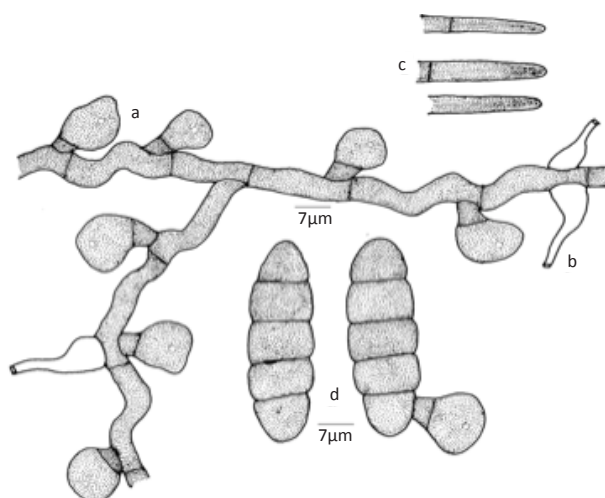
tip, up to 120 $\mu\text{m}$  long; ascospores oblong to cylindrical, 4-septate, constricted at the septa 37–40x13–15  $\mu\text{m}$ .

**Material examined:** TBGT 4555 (holotype), HCIO 50638 (isotype), 16.ii.2008, Kerala, Thiruvananthapuram, Kottoor, on leaves of *Pterigota alata* (Roxb.) R.Br. (Sterculiaceae), Jacob Thomas.

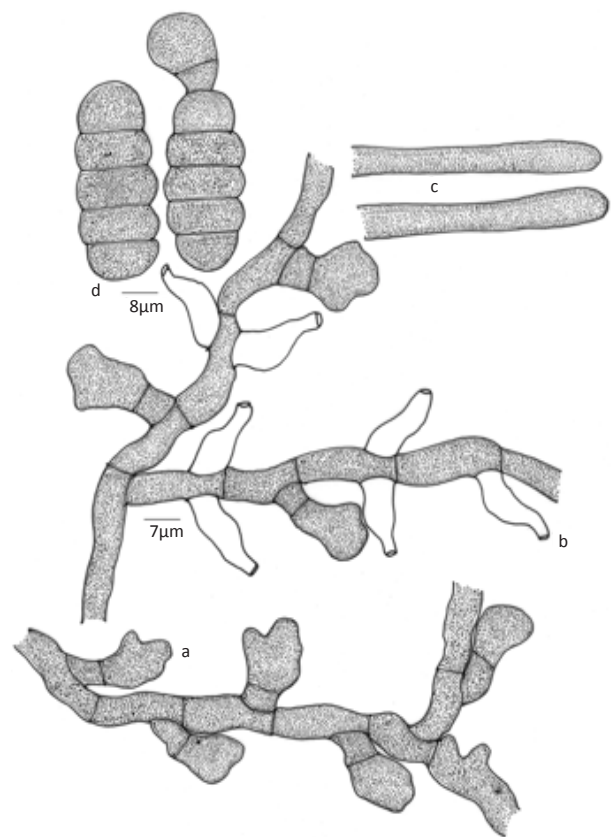
This species is similar to *I. helicteridis* Hosag. and *I. tjobodense* Hansf. in having sublobate head cells of appressoria. However, it differs from the former in having substraight hyphae and only antrorse appressoria having entire to sublobate head cells. It differs from the latter in having predominantly angular to sublobate head cells of appressoria (Hansford 1961; Hosagoudar 1996).

***Irenopsis sidae*** (Rehm) Hughes var. ***abutili*** Hosag., Agarwal, H. Biju & Archana, *Indian Phytopathol.* 60: 82, 2007. (Fig. 29).

Colonies amphigenous, thin, up to 1mm in diameter, confluent. Hyphae substraight to flexuous, branching opposite, alternate to irregular at acute to wide angles, loosely reticulate, cells 14–34x4–7  $\mu\text{m}$ . Appressoria alternate to unilateral, antrorse, sub-antrorse to retrorse, straight to curved, 11–19  $\mu\text{m}$  long; stalk cells cylindrical



**Figure 27. *Irenopsis pavoniae***  
a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores



**Figure 28. *Irenopsis pterigotae***  
a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores

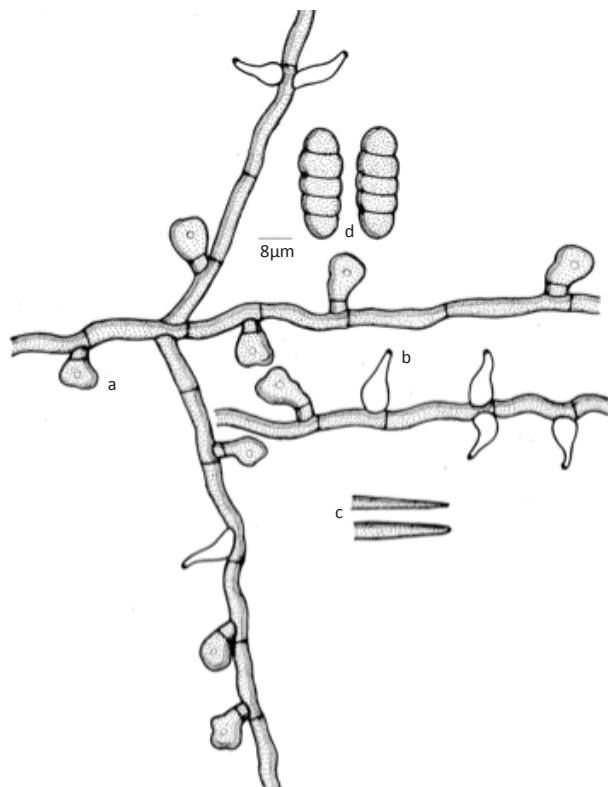
to cuneate, 3–8  $\mu\text{m}$  long; head cells globose, ovate, entire to sublobate, 8–11 $\times$ 6–11  $\mu\text{m}$ . Phialides mixed with appressoria, ampulliform, opposite to unilateral, 12–22 $\times$ 4–8  $\mu\text{m}$ . Perithecia globose, scattered up to 120 $\mu\text{m}$  in diameter, perithecial setae simple, straight to slightly curved, acute, obtuse at the tip up to 127 $\mu\text{m}$  long; ascospores obovoidal, 4-septate, constricted at the septa, 27–32 $\times$ 11–13  $\mu\text{m}$ .

**Material examined:** HClO 46340 (holotype) TBGT 1986 (isotype), 15.xii.2004, Kerala, Pathanamthitta, Anathode dam site, on leaves of *Abutilon* sp. (Malvaceae), V.B. Hosagoudar et al.

This variety differs from the variety *sidae* in having shorter perithecial setae and smaller ascospores (Hansford 1961).

***Irenopsis trichiliae*** Hosag. & Riju, J. Threatened Taxa 2(4): 824, 2010. (Fig. 30).

Colonies epiphyllous, subdense, scattered, up to 2 $\mu\text{m}$  in diam., confluent. Hyphae straight to flexuous, branching opposite to alternate at acute to wide angles, loosely to closely reticulate, cells 11–33 $\times$ 6–11  $\mu\text{m}$ . Appressoria alternate, unilateral, antrorse to subantrorse, 13–26  $\mu\text{m}$  long; stalk cells cylindrical to



**Figure 29** *Irenopsis sidae* var. *abutili*  
a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores

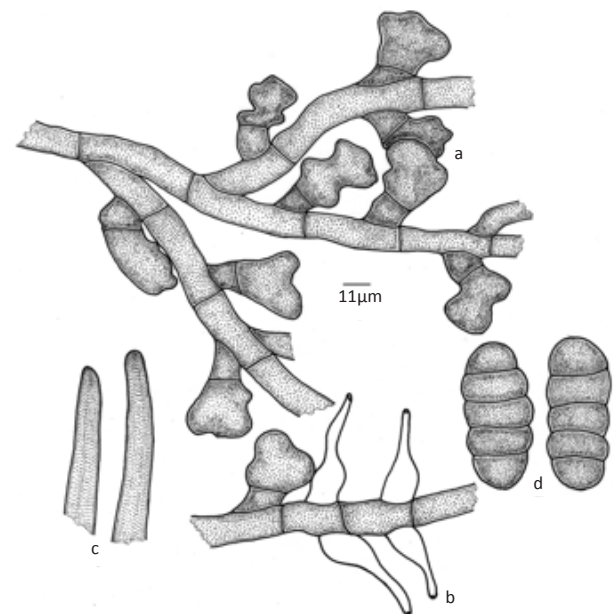
cuneate, 4–11  $\mu\text{m}$  long; head cells globose, angular, sublobate to deeply globose 8–18 $\times$ 11–18  $\mu\text{m}$ . Phialides mixed with appressoria, opposite to unilateral, ampulliform, 17–24 $\times$ 6–9  $\mu\text{m}$ . Perithecia scattered, up to 209 $\mu\text{m}$  in diameter; perithecial setae 0–5 in number, straight, simple, obtuse at the apex, up to 198 $\mu\text{m}$  long; ascospores cylindrical, 4-septate, slightly constricted at the septa, 37–47 $\times$ 15–18  $\mu\text{m}$ .

**Materials examined:** HClO 48177 (holotype), TBGT 2913 (isotype), 10.xi.2007, Kerala, Wayanad, Padinharathara, on leaves of *Trichilia* sp. (Meliaceae), 16<sup>th</sup> mile, M. C. Riju.

*Irenopsis chukrasiae* Hosag., *I. indica* (Anahosur) Hosag., *I. murrayae* Hosag. & Rajkumar are known on the members of the family Meliaceae (Hosagoudar 1996; Hosagoudar et al. 2001). *Irenopsis trichiliae* differs from *I. chukrasiae* in having only unicellular stalk cells of the appressoria and from *I. indica* in having straight hyphae and 0–5 perithecial setae. It also differs from *I. murrayae* in having angular to lobate head cells of the appressoria.

***Irenopsis xeromphidis*** Hosag. & Sabeena, Taiwania 55(3): 249, 2010. (Fig. 31).

Colonies epiphyllous, thin, up to 2mm in diameter, confluent. Hyphae substraight to flexuous, branching opposite to unilateral at acute to wide angles, loosely reticulate, cells 15–35 $\times$ 5–10  $\mu\text{m}$ . Appressoria alternate, 1% opposite to unilateral, antrorse to



**Figure 30.** *Irenopsis trichiliae*  
a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores

subantrorse, 20–30  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–10  $\mu\text{m}$  long; head cells ovate, oblong, straight to curved, entire, angular to rarely slightly lobate, 15–20 $\times$ 12–15  $\mu\text{m}$ . Phialides mixed with appressoria, opposite to unilateral, ampulliform, 12–25 $\times$ 5–10  $\mu\text{m}$ . Perithecia scattered, up to 150 $\mu\text{m}$  in diameter; perithecial setae 5–8, straight to slightly curved, upright, smooth walled, broadly rounded at the tip, up to 110 $\mu\text{m}$  long; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 40–45 $\times$ 17–20  $\mu\text{m}$ .

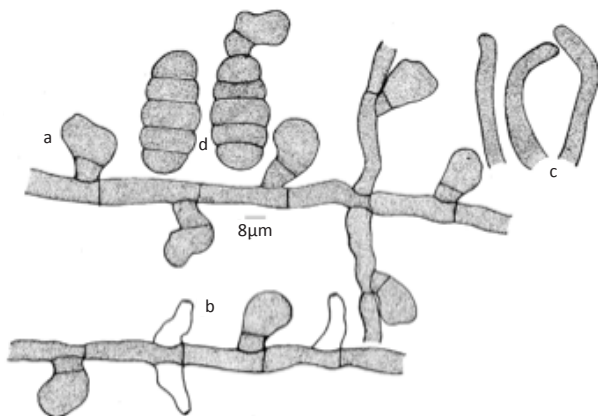
**Materials examined:** HCIO 49241 (holotype), TBGT 3480 (isotype), 24.ix.2008, On leaves of *Xeromphis uliginosa* (Thunb.) Keay (Rubiaceae), Kerala, Thiruvananthapuram, Palode, TBGRI Campus, A. Sabeena & M.C. Riju.

*Irenopsis bayamonensis* Tehon var. *guettardae* (Cif.) Hansf. and *I. chiococcae* Stev. are known on the members of the family Rubiaceae. The former taxon is of doubtful nature (Hansford 1961). The present new species differs from *I. chiococcae* in having longer appressoria, smooth walled perithecial setae in contrast to asperulate ones and straight to curved setae in contrast to twisted.

## THE GENUS MELIOLA

***Meliola abdukkalamii*** Hosag. & Riju, Plant Pathology & Quarantine 1(2): 123, 2011. (Fig. 32).

Colonies epiphyllous, crustose, up to 5mm in diam., scattered, confluent. Hyphae straight to flexuous, branching opposite at acute to wide angles, loosely to closely reticulate, cells 20–33 $\times$ 5–8  $\mu\text{m}$ . Appressoria alternate, unilateral, antrorse to subantrorse, 17–20  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–8  $\mu\text{m}$  long; head cells globose, subglobose, entire, 7–10 $\times$ 7–13  $\mu\text{m}$ . Phialides mixed with appressoria, mostly opposite,



**Figure 31. *Irenopsis xeromphidis***

a - Appressorium; b - Phialide; c - Perithecial setae; d - Ascospores

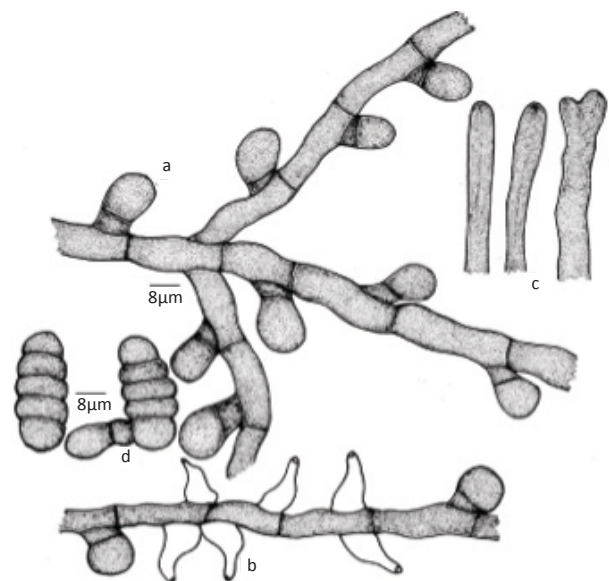
rarely alternate, ampulliform, 12–18 $\times$ 7–8  $\mu\text{m}$ . Mycelial setae simple, straight, obtuse, clavate, inflated, notched to bifid at the apex, ends broadly rounded, up to 320 $\mu\text{m}$  long. Perithecia up to 230 $\mu\text{m}$  in diam.; ascospores cylindrical to oblong, 4-septate, slightly constricted at the septa, 27–33 $\times$ 10–13  $\mu\text{m}$ .

**Material examined:** TBGT4958 (holotype), HCIO51041 (isotype), 14.vi.2009, Kerala, Wayanad, Padinharathara, 16<sup>th</sup> mile, on leaves of *Aralia* sp. (Araliaceae), M.C. Riju.

The present species different from other *Meliola* species known on members of Araliaceae in having broadly obtuse, inflated to bifid tips of the mycelial setae (Hansford 1961, Hosagoudar 1996, 2008, Hu et al. 1996, 1999).

***Meliola abri*** Hosag. & Riju, Plant Pathology & Quarantine 1(2): 124, 2011. (Fig. 33)

Colonies epiphyllous, thin, scattered, up to 3mm in diam. Hyphae flexuous to crooked, branching opposite at wide angles, loosely reticulate, cells 17–30 $\times$ 5–8  $\mu\text{m}$ . Appressoria alternate to unilateral, up to 1% opposite, antrorse, subantrorse to retrorse, 17–20 $\times$ 10–13  $\mu\text{m}$ ; stalk cells cylindrical to cuneate, 2–3  $\mu\text{m}$  long; head cells globose, ovate, straight to curved, 12–15 $\times$ 10–13  $\mu\text{m}$ . Phialides mixed with appressoria, opposite to unilateral, ampulliform, 20–25 $\times$ 5–8  $\mu\text{m}$ . Mycelial setae scattered to grouped around perithecia, simple, straight, acute at the tip, up to 360 $\mu\text{m}$  long. Perithecia scattered, up to 130 $\mu\text{m}$  in diam.; ascospores cylindrical, 4-septate, constricted at



**Figure 32. *Meliola abdukkalamii***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



the septa, 30–33×10–13 µm.

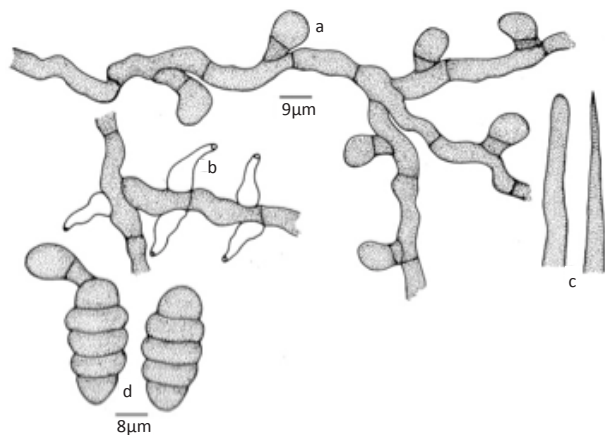
**Material examined:** TBGT 5070 (holotype), 16.i.2011, Kerala, Wayanad, Padinharathara, on leaves of *Abrus pulchellus* Wallich ex Thwaites (Fabaceae), M.C. Riju. Part of the collection has been deposited in HClO, New Delhi.

*Meliola bicornis* Wint. is known on *Abrus canescens* from Sierra Leone (Hansford 1961), but this is a complex species and Hansford (1961) has segregated more than hundred species. Based on the simple setae and smaller ascospores, we prefer to accommodate our collection in a new species.

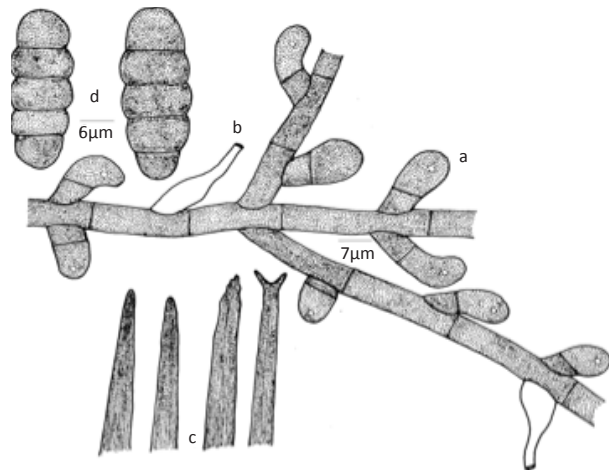
***Meliola abrupta*** Sydow, Ann. Mycol. 15: 181, 1917; Hansf., Sydowia Beih. 2: 292, 1961; Hosag., Jacob Thomas & Agarwal, Taprobanica 3(1): 42, 2011. *Meliola derridis* Yates, Philippine J. Sci. 13: 368, 1918. (Fig. 34).

Colonies amphigenous, mostly epiphyllous, dense, velvety, up to 2mm in diameter, confluent and covering entire upper surface of the leaves. Hyphae straight to substraight, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 14–38×4–7 µm. Appressoria alternate, about 5% opposite, antrorse, curved, 12–17 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells globose to subglobose, straight to curved, entire, 9–14×7–12 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–29×6–12 µm. Mycelial setae numerous, scattered, straight, simple, acute to dentate at the tip, up to 520µm long. Perithecia scattered, verrucose, globose, up to 160µm in diameter; ascospores cylindrical to ellipsoidal, 4-septate, constricted, 36–43×12–17 µm.

**Materials examined:** HClO 49034, TBGT 3289,



**Figure 33. *Meliola abri***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



**Figure 34. *Meliola abrupta***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

18.xi.2007, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, near Peppara Dam, on leaves of *Derris* sp. (Fabaceae), Jacob Thomas.

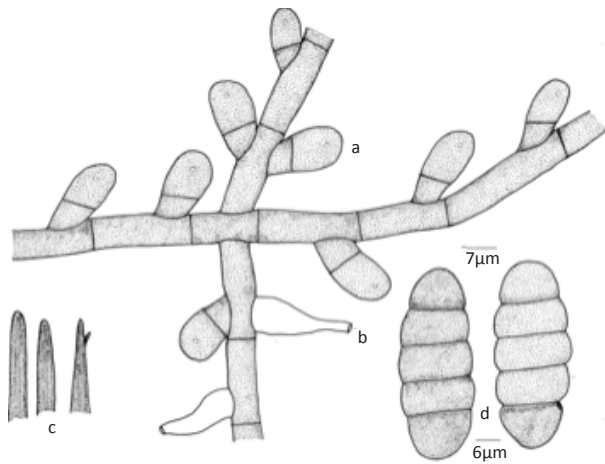
This is the only species known on this from India (Hosagoudar 1996, 2008).

***Meliola aganopes*** Hosag., Jacob Thomas & Agarwal, Nelumbo 52: 3, 2010. (Fig. 35).

Colonies epiphyllous, subdense, crustose, up to 4 mm in diameter, confluent. Hyphae straight, branching opposite at acute to subacute angles, loosely reticulate, cells 24–46×4–7 µm. Appressoria alternate, about 1% opposite, antrorse to spreading, straight to curved, 14–19 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate to oblong, entire, rounded at the apex, 9–15×7–10 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–22×6–8 µm. Mycelial setae fairly numerous, scattered, straight, simple, acute to dentate at the tip, up to 740µm long. Perithecia scattered, verrucose, up to 170µm in diam.; ascospores cylindrical to oblong, 4-septate, constricted at the septa, 33–38×12–15 µm.

**Materials examined:** HClO 49016 (holotype), TBGT 3271 (isotype), 21.viii.2007, Kerala, Thrissur, Vazhachal, on leaves of *Aganope thyrsoflora* (Benth.) Polh. (Fabaceae), Jacob Thomas et al.

Based on the digital formula  $31\frac{1}{3} 3.3223$ , *Meliola aganopes* is similar to *M. teramni* var. *millettia* Hosag. reported on *Millettia rubiginosa* from the Western Ghats region of Tamil Nadu (Hosagoudar & Goos, 1991; Hosagoudar 1996). However, *Meliola aganopes* differs from it in having typically ovate to oblong head cells of



**Figure 35. *Meliola aganopes***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

appressoria with appreciable number of mycelial setae.

***Meliola ailanthicola*** Hosag. & Riju, J. Threatened Taxa 2(4): 824, 2010. (Fig. 36).

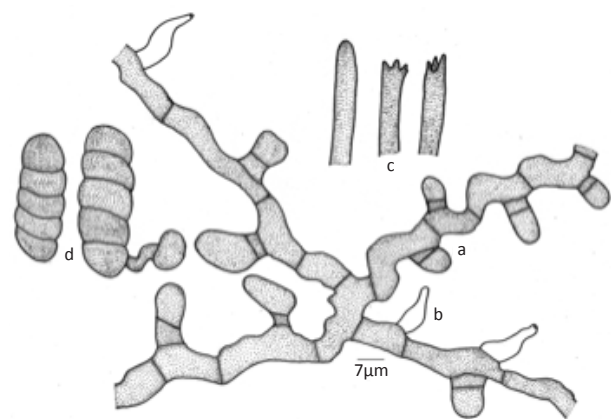
Colonies hypophyllous, thin, up to 4mm in diam., confluent. Hyphae crooked, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 13–33x4–9 µm. Appressoria alternate to unilateral, straight to curved, antrorse, subantrorse to retrorse, 13–27 µm long; stalk cells cylindrical to cuneate, 4–16 µm long; head cells ovate, globose, truncate to slightly lobate, 8–13x6–9 µm. Phialides mixed with appressoria, opposite, alternate to unilateral, ampulliform, 13–22x4–9 µm. Mycelial setae scattered, simple, straight, acute, obtuse to 2–5 dentate at the tip, up to 400µm long. Perithecia scattered, up to 160µm in diam.; ascospores obovoidal, 4-septate, slightly constricted at the septa, 37–44x13–16 µm.

**Materials examined:** HCIO 48170 (holotype), TBGT 2906 (isotype); HCIO 48173, TBGT 2909, 30.ix.2007, Kerala, Wayanad, 16<sup>th</sup> mile, Padinharathara, on leaves of *Ailanthus malabarica* (Dennst.) Alston (Simaroubaceae), M. C. Riju.

This species differs from *Meliola ailanthi* Sharma et al. emend. Hosag. in having strongly appressed colonies on the lower surface of the leaves and having distinctly crooked mycelium (Hosagoudar 1996).

***Meliola alangii* var. *salvifolii*** Hosag. & Sabeena, Zoos, Print J. 22:2786, 2007. (Fig. 37)

Colonies epiphyllous, thin, up to 4mm in diameter, confluent. Hyphae substraight to undulating, branching mostly opposite at acute angles, loosely reticulate, cells



**Figure 36. *Meliola ailanthicola***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

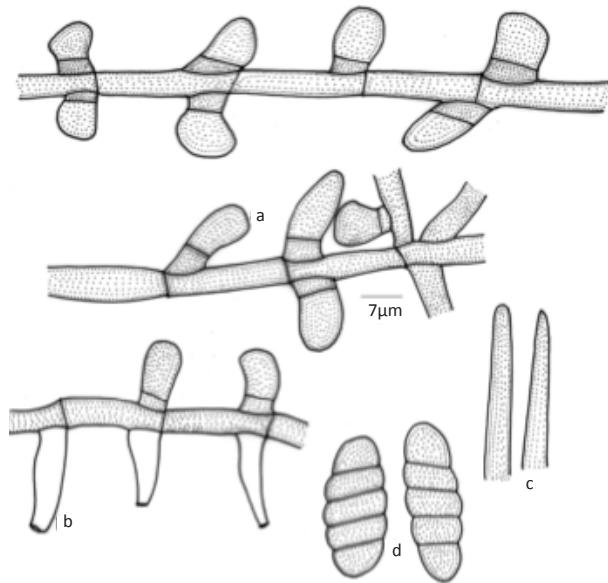
24–29x4–8 µm. Appressoria alternate, 30% opposite, antrorse, subantrorse to retrorse, 16–19 µm long; stalk cells cylindrical to cuneate, 3–8 µm long; head cells cylindrical, oblong, globose, ovoid, broadly rounded to truncate and often narrowed towards its apex, entire, 11–13x8–10 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 12–24x6–8 µm. Mycelial setae numerous, scattered, simple, straight, acute to obtuse at the tip, up to 500µm long. Perithecia globose, scattered, up to 140µm in diam.; ascospores cylindrical to oblong, 4-septate, constricted at the septa, 33–37x12–16 µm.

**Material examined:** HCIO 47493 (holotype), TBGT 2531 (isotype), 16.x.2006, Kerala, Kozhikode, in the Malabar Botanic Garden, on leaves of *Alangium salvifolium* (L.f.) Wagerin (Alangiaceae), A. Sabeena et al.

*Meliola alangii* Sydow is the only *Meliola* species known on the members of the family Alangiaceae (Hansford 1961; Hosagoudar 1996, Hosagoudar et al. 1997). However, variety *salvifolii* differs from the var. *alangii* in having 30% opposite appressoria.

***Meliola aporusae*** Hosag. & Robin, Bioscience Discovery 2(2): 265, 2011. (Fig. 38).

Colonies amphigenous, mostly hypophyllous, crustose, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite to alternate at acute angles, loosely reticulate, cells 19–24x5–7 µm. Appressoria alternate, about 15% opposite, antrorse to subantrorse, spreading, 24–29 µm long; stalk cells cylindrical to cuneate, 10–12 µm long; head cells ovate, clavate, globose, entire to 2–5-times lobate, often slightly angular, 12–19x14–19 µm. Phialides mixed with



**Figure 37. *Meliola alangii* var. *salvifolii***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

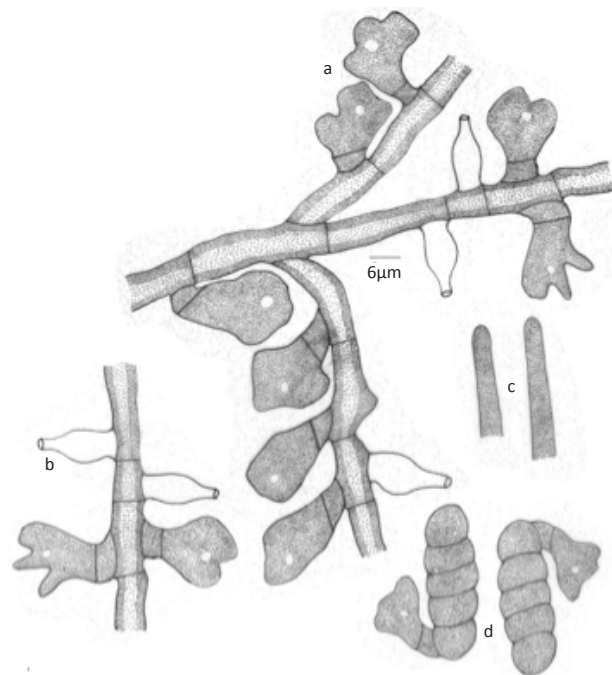
appressoria, alternate, ampulliform, 17–24x7–10  $\mu\text{m}$ . Mycelial setae few, simple, straight, obtuse at the tip, up to 410 $\mu\text{m}$  long. Perithecia scattered, up to 115 $\mu\text{m}$  in diam.; ascospores ellipsoidal, 4-septate, constricted at the septa, 41–43x14–17  $\mu\text{m}$ .

**Materials examined:** TBGT 4652 (holotype), HClO 50735 (isotype), 25.iv.2007, Kerala, Kottayam, Ponthanpuzha, Placherry, on leaves of *Aporusa* sp. (Euphorbiaceae), P.J. Robin et al.; HClO 50925, TBGT 4842, 23.xii.2008, Wayanad, Banasur mala, on leaves of *Aporusa* sp., M.C. Riju.

Based on the digital formula, the present new species is close to *Meliola golearia* Hansf. and *M. tetrorchidiicola* Hansf. known on *Galeario filiformis* and *Tetrorchidium rubivenium* from Java and Brazil, respectively. However, differs from both in having stellately lobate head cells of the appressoria (Hansford 1961). Based on the lobate head cells, it can be compared with *M. octephilae* Hosag. et al. but differs from it in having only 15% opposite appressoria with stellately lobate head cells (Biju et al. 2005; Hosagoudar 2008; Hosagoudar & Agarwal 2008).

***Meliola ardisiigena*** Hosag., Sabeena & Robin, Bioscience Discovery 2: 120, 2011. (Fig. 39).

Colonies hypophyllous, subdense to dense, up to 3mm in diameter, confluent. Hyphae substraight, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 15–30x5–7  $\mu\text{m}$ . Appressoria alternate, up to 30% opposite to unilateral, antrorse to



**Figure 38. *Meliola aporusae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

subantrorse, 12–22  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–7  $\mu\text{m}$  long; head cells ovate, globose, entire, 10–17x7–12  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 12–25x5–10  $\mu\text{m}$ . Mycelial setae simple, straight, acute to obtuse at the tip, up to 350 $\mu\text{m}$  long. Perithecia scattered, up to 200 $\mu\text{m}$  in diam.; ascospores elliptic, 4-septate, constricted at the septa, 42–57x12–15  $\mu\text{m}$ .

**Material examined:** TBGT 4556 (holotype), HClO 50639 (isotype), 27.ix.2008, Kerala, Wyanadu, Pulpally, on leaves of *Ardisia* sp. (Myrsinaceae), Robin et al.

*Meliola ardisiicola* Hosag. et al. is known on *Ardisia missionis* from the high ranges of Western Ghats (Hosagoudar 2008). However, the present new species differs from it in having longer and 30% opposite appressoria and longer ascospores.

***Meliola arippaensis* sp. nov.** Hosag. & Sabeena  
(Fig. 40; MycoBank 803909)

Colonies hypophyllous, subdense to dense, up to 2mm in diameter, confluent. Hyphae substraight, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 22–32x5–7 $\mu\text{m}$ . Appressoria alternate to unilateral, 1% opposite, antrorse to subantrorse, 20–30  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–10  $\mu\text{m}$  long; head cells ovate, oblong,



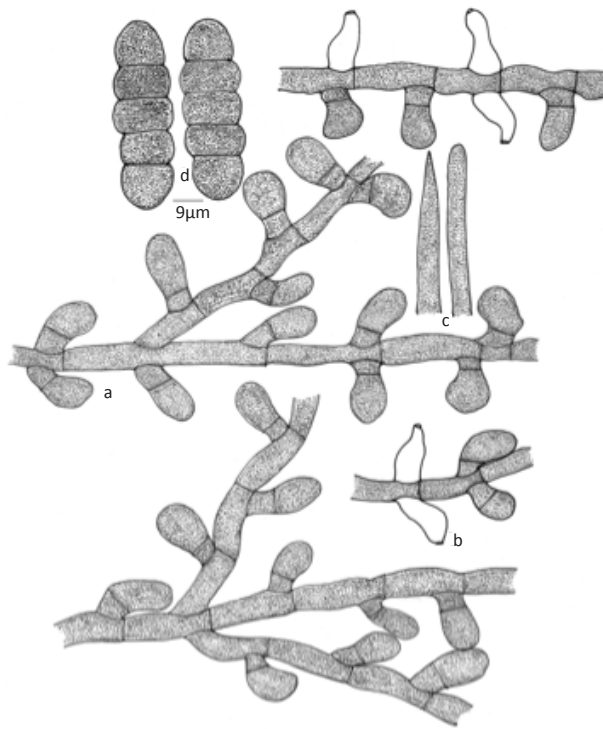


Figure 39. *Meliola ardisiigena*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

globose, entire, 12–20x10–15 µm. Phialides mixed with appressoria, opposite, ampulliform, 12–25x7–10 µm. Mycelial setae are of two types: setae on mycelia are scattered, simple, straight, acute to obtuse at the tip, up to 1200µm long and setae grouped around perithecia are simple, straight to curved, uncinata, up to 260µm long, acute, obtuse to dentate at the tip. Perithecia scattered, up to 180µm in diam.; ascospores cylindrical to oblong, 4-septate, constricted at the septa, 47–57x20–22 µm.

**Materials examined:** TBGT 5748 (holotype), 3.i.2011, Kerala, Kollam, Arippe, on leaves of *Flacourtia* sp. (Flacourtiaceae), V.B. Hosagoudar et al. Part of the collection has been deposited in HClO, New Delhi.

**Etymology:** Named after the collection locality.

This species stands distinct from the *Meliola* species reported on the members of Flacourtiaceae in possessing shorter and straight to uncinata mycelial setae (Hansford 1961; Hosagoudar 1996, 2008; Hu et al., 1996, 1999).

***Meliola aristolochigena*** Hosag. & Archana, J. *Threatened Taxa* 1: 348, 2009. (Fig. 41).

Colonies epiphyllous, thin to dense, up to 2mm in diam. Hyphae substraight to flexuous, branching alternate, opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 12–16x8–10 µm.

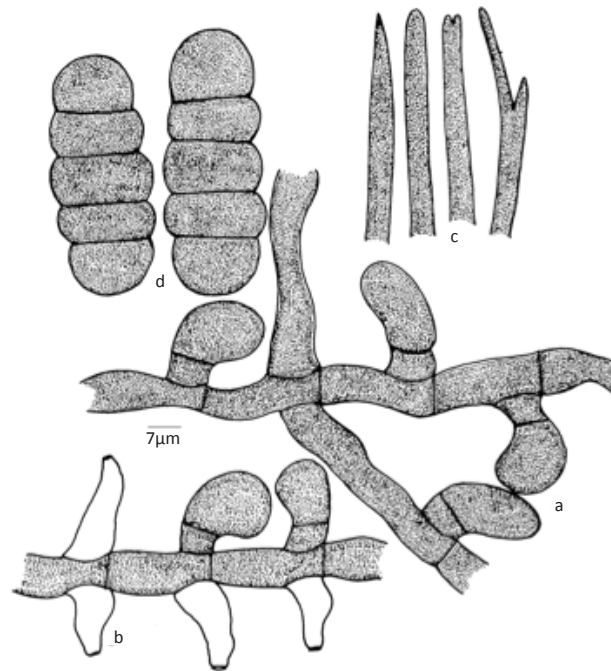


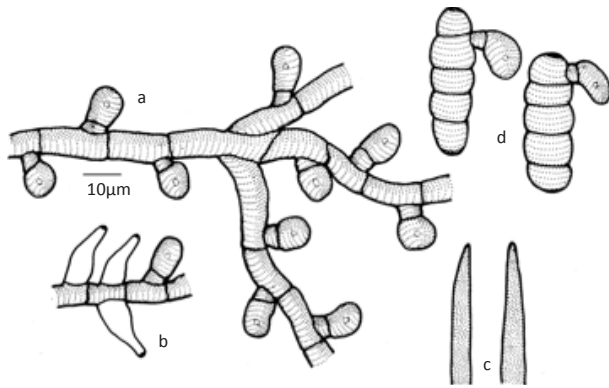
Figure 40. *Meliola arippeensis* sp. nov.

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

Appressoria alternate to about 3% opposite, antrorse to subantrorse, 14–20 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovate to globose, entire, 11–13x9–13 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–20x8–10 µm. Mycelial setae scattered, simple, straight, acute to obtuse at the tip, up to 540µm long. Perithecia scattered, up to 120µm in diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 35–40x12–14 µm.

**Material examined:** HClO 46237 (holotype), TBGT 1649 (isotype), 13.xii.2003, Kerala, Palghat, Silent Valley, Sairandhri, on leaves of *Aristolochia tagala* Cham. (Aristolochiaceae), V.B. Hosagoudar et al.; HClO 46033, TBGT 1796, 14.xii.2004, Mozhiar Forest, Pathanamthitta, Kerala, V.B. Hosagoudar et al.; Sairandhri, Silent Valley, Palghat, Kerala, HClO 46376, TBGT 2022; HClO 46378, TBGT 2024, 15.xii.2003, V.B. Hosagoudar et al.; *Aristolochia grandiflora* Sw., Wayanad, Periya, Gurukulam Botanic Garden, HClO 50362, TBGT 4279, 5.xi.2009, A. Sabeena & M.C. Riju.

Having opposite appressoria, *Meliola aristolochigena* can be compared with *M. catharinensis* Hansf. reported on *Aristolochia triangularis* from Brazil (Hansford 1961). However, differs from it in having distinctly longer appressoria (14–20 µm against 11–15 µm) and mycelial setae (540µm against 230µm).



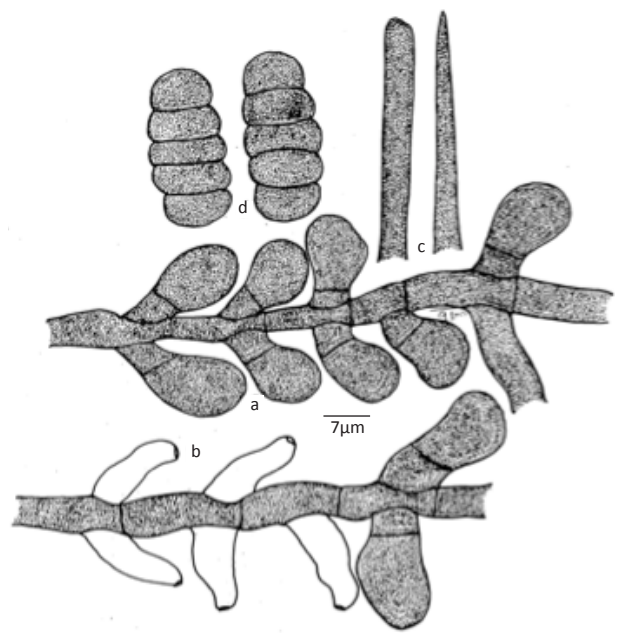
**Figure 41. *Meliola aristolochigena***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

***Meliola arkevermae*** Hosag. & Sabeena, Plant pathology & Quarantine 3(1): 11, 2012. (Fig. 42).

Colonies epiphyllous, subdense, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 17–30x5–7 µm. Appressoria arranged closely by leaving an intermittent gap, part of the mycelium literally devoid of appressoria, opposite, antrorse to subantrorse, closely arranged on the hyphae, 17–25 µm long; stalk cells cylindrical to cuneate, 2–7 µm long; head cells oblong, ovate, entire, angular to sublobate, 12–17x12–17 µm. Phialides mixed with appressoria, opposite, ampulliform, 15–27x5–12 µm. Mycelial setae numerous, scattered, simple, straight, acute to obtuse at the tip, up to 950µm long. Perithecia scattered, up to 160µm in diam. Ascospores cylindrical, 4-septate, constricted at the septa, 37–45x12–17 µm.

**Materials examined:** TBGT 5732 (holotype), 10.xi.2007, India, Kerala, Kottayam, Ponthanpuzha, Valiyakavu, on leaves of Meliaceae member, P.J. Robin. Part of the collection has been deposited in HCIO, New Delhi.

*Meliola dysoxyl* Hansf., *M. amoora* Yates, *M. opposita* Sydow, *M. opposita* Sydow var. *africana* Hansf., *M. aglaiana* Hansf. and *M. ekebergiae* Hansf. are known on the members of Meliaceae having opposite appressoria. Of these, the present species is similar to *M. dysoxyl* and as *M. opposita* Sydow var. *africana* Hansf. in having densely arranged appressoria. However, *Meliola arkevermae* differs from both in possessing intermittently densely arranged appressoria by leaving a gap or by leaving the mycelium free from appressoria (Hansford 1961, 1963).



**Figure 42. *Meliola arkevermae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

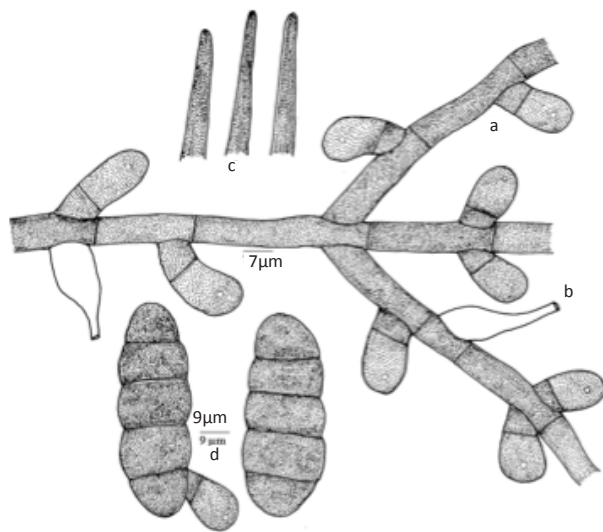
***Meliola bakeri*** Sydow, Ann. Mycol. 14: 335, 1916; Hansf. Sydowia Beih.2: 374, 1961; Hosag., Jacob Thomas and Agarwal, Taprobanica 3(1): 42, 2011. (Fig. 43)

Colonies epiphyllous, scattered, up to 2mm in diameter. Hyphae straight to undulate, branching opposite at acute angles, closely reticulate, cells 17–24x4–7 µm. Appressoria alternate to opposite, antrorse to subantrorse, retrorse to spreading, 17–20 µm long; stalk cells cuneate, 4–7 µm long; head cells ovate, globose, entire, 13–16x8–11 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–24x4–7 µm. Mycelial setae straight, simple, acute to obtuse at the tip, up to 580µm long. Perithecia scattered, verrucose, up to 128µm in diam.; ascospores obovoidal, 4-septate, constricted, 30–38x13–16 µm.

**Materials examined:** HCIO 48261, TBGT 3000, 19.xi.2006, Kerala, Pathanamthitta, Thiruvalla, on leaves of *Cayrtia pedata* (Lam.) A.L. Juss ex Gagnepain (Vitaceae), Jacob Thomas; HCIO 49143, TBGT 3398, 6.xi.2008, Karnataka, Bhagamandala, on leaves of Vitaceae member, V.B. Hosagoudar et al.; TBGT 5358, 26.xi.2008, C. Jagath.

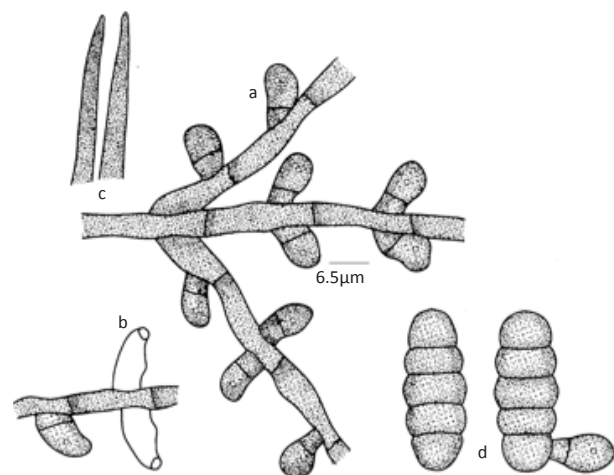
***Meliola bauhiniicola*** Yamam. var. *brevipoda* Hosag. & Sabeena in Hosag. & Archana, Foliicolous fungal flora of Palode forest range, Thiruvananthapuram, Kerala, p. 99, 2012. (Fig. 44)

Colonies epiphyllous, thin up to 2mm in diameter.



**Figure 43. *Meliola bakeri***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Figure 44. *Meliola bauhinicola* var. *brevipoda***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

Hyphae substraight to undulating, branching opposite to unilateral at acute to wide angles, loosely reticulate, cells 24–33x4–6 µm. Appressoria opposite, alternate to unilateral, antrorse, subantrorse to retrorse, 9–14 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate, globose, straight to curved, entire, 7–9x5–7 µm, phialides mixed with appressoria, opposite, ampulliform, 14–16x4–7 µm. Mycelial setae many, scattered, simple, straight, acute to obtuse at the tip, up to 350µm. Perithecia scattered, up to 132µm in diam. Ascospores oblong, cylindrical, 4-septate, slightly constricted at the septa, 31–44x12–16 µm.

**Material examined:** 22.iii.2007, Kerala, Thiruvananthapuram, Palode, JNTBGRI Campus, on leaves of *Bauhinia purpurea* L. (Caesalpiniaceae) 22.iii.2007, A. Sabeena & Jacob Thomas HClO 48057 (holotype), TBGT 2840 (isotype); 15.xi.2007, A. Sabeena et al. HClO 48374, TBGT 3095.

Based on the Beeli formula (3113. 4222) and host specificity, this fungus is similar to *Meliola bauhinicola* Yamam (Hansford 1961). However, var. *brevipoda* differs from the var. *bauhinicola* in having shorter appressoria (9–14 µm against 14–24 µm).

***Meliola caesalpiniicola*** Deight., Sydowia 11:40, 1958; Hansf., Sydowia Beih. 2: 253, 1961. (Fig. 45).

Colonies amphigenous, subdense to dense, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely reticulate, cells 13–23x6–8 µm. Appressoria opposite, unilateral, 2% alternate, antrorse to subantrorse, 16–18

µm long; stalk cells cylindrical to cuneate, 3–5 µm long; head cells ovate, globose, oblong, entire, 11–13x7–10 µm. Phialides mixed with appressoria, opposite, ampulliform, 16–27x3–6 µm. Mycelial setae numerous, simple, straight to uncinuate, acute at the tip, up to 294µm long. Perithecia numerous, scattered, up to 182µm in diameter; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 38–52x14–16 µm.

**Materials examined:** 21.i.2011, Kerala, Kannur, Payyannur, Edat, on leaves of *Caesalpinia banduc* (L.) Roxb. (Caesalpiniaceae), P. Ramya TBGT 4933, HClO 51016.

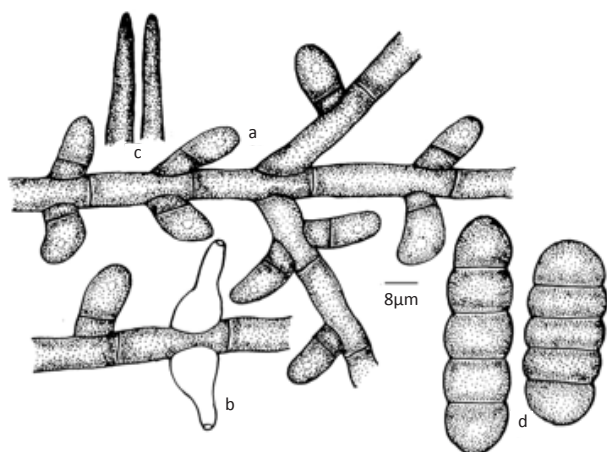
This species was known on *Caesalpinia nuga* from Philippines and is reported here for the first time from India on a hitherto unrecorded host (Hansford 1961).

***Meliola calycopteridis* sp. nov.** Hosag., G.R. Archana, K.M. Khaleel & M.P. Libina.

(Fig. 46; MycoBank 803911)

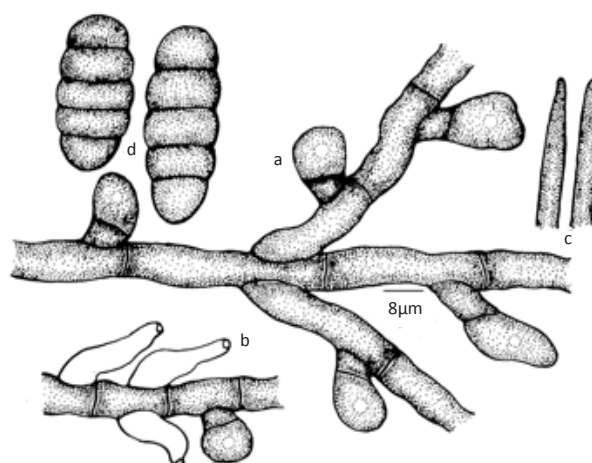
Colonies epiphyllous, thin, up to 2mm in diameter, scattered. Hyphae substraight to flexuous, branching opposite at acute angles, loosely to closely reticulate, cells 16–27x4–8 µm. Appressoria alternate, unilateral, antrorse, 13–20 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells globose, ovate, entire to slightly angular, 9–13x9–12 µm. Phialides mixed with appressoria, opposite, ampulliform, 13–37x8–10 µm. Mycelial setae numerous, simple, straight to uncinuate, acute to obtuse at the tip, up to 588µm long. Perithecia scattered to grouped, up to 146µm in diameter; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 26–33x13–17 µm.





**Figure 45. *Meliola caesalpinicola***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Figure 46. *Meliola calycopteridis* sp. nov.**

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

**Materials examined:** TBGT 4906 ((holotype), HClO 50989 (isotype), 21.i.2011, Kerala, Kannur, Mangattuparamba, Neeliyarkottam, on leaves of *Calycopteris floribunda* (Roxb.) Poiret (Combretaceae), M.P. Libina.

*Asteridiella combreti* (Stev.) Hansf. var. *leonensis* Hansf. is known on this host plant but differs from it in having mycelial setae (Hosagoudar 1996). Based on the digital formula, it is close to *Meliola sudanensis* Hansf. but differs from it in having longer mycelial setae and shorter but broader ascospores (Hansford 1961).

***Meliola canavaliae*** Hosag. & Riju, Plant Pathology & Quarantine 1(2): 125, 2011. (Fig. 47).

Colonies foliicolous, epiphyllous, thin, scattered, up to 4 mm in diam. Hyphae flexuous to undulate, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 15–38×5–8  $\mu$ m. Appressoria alternate, unilateral, rarely opposite, straight to slightly curved, antrorse, subantrorse to retrorse, 10–18  $\mu$ m long; stalk cells cylindrical to cuneate, 2–8  $\mu$ m long; head cells ovate, globose, 10–15×8–15  $\mu$ m. Phialides mixed with appressoria, opposite, unilateral, ampulliform, 15–25×7–10  $\mu$ m. Mycelial setae scattered to grouped around perithecia, simple, straight to slightly curved, acute to obtuse at the tip, up to 340 $\mu$ m long. Perithecia scattered, up to 160 $\mu$ m in diam.; ascospores cylindrical, 4-septate, slightly constricted at the septa, 33–35×10–13  $\mu$ m.

**Material examined:** TBGT 4960 (holotype), HClO 51043 (isotype), 10.1.2011, Kerala, Wayanad, Padinharathara, 16th mile, on leaves of *Canavalia* sp. (Fabaceae), M.C. Riju.

Hansford (1961) identified *M. teramni* Sydow infecting leaves of *Canavalia ensiformis* collected by F.C. Deighton from Sierra Leone. The present fungus is similar but differs in having shorter (340  $\mu$ m vs. 1000  $\mu$ m), acute to obtuse setae (in contrast to 2–4 dentate or furcate) and smaller ascospores (33–35×10–13  $\mu$ m vs. 35–42×13–16  $\mu$ m).

***Meliola canthiigena*** Hosag., Archana. & Agarwal, Indian Phytopath. 60: 239, 2007. (Fig. 48).

Colonies amphigenous, thin, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite to alternate at acute to wide angles, loosely to closely reticulate, cells 11–29×6–8  $\mu$ m. Appressoria alternate to unilateral, antrorse to subantrorse, straight to curved, 12–27 $\mu$ m long; stalk cells cylindrical to cuneate, 3–11  $\mu$ m long; head cells ovate, oblong, entire to slightly angular, 9–18×6–11  $\mu$ m. Phialides mixed with appressoria, alternate to opposite, ampulliform, 11–27×6–10 $\mu$ m. Mycelial setae simple, straight, acute at the tip, up to 600 $\mu$ m long. Perithecia grouped, globose, up to 160 $\mu$ m in diameter; ascospores obvoidal, 4-septate, constricted at the septa, 32–35×12–16  $\mu$ m.

**Material examined:** HClO (holotype), TBGT 2357 (isotype), 11.xi.2003, Karnataka, Coorg, Nishanemotta, Madikeri, on leaves of *Canthium* sp. (Rubiaceae), V.B. Hosagoudar et al.

Based on the host specificity, *Meliola canthiigena* can be compared with *M. canthii* Hansf. known on *Canthium vulgare* from Uganda (Hansford 1961) but differs from it in having entire head cells of the appressoria, longer mycelial setae and smaller ascospores (Hansford 1961).

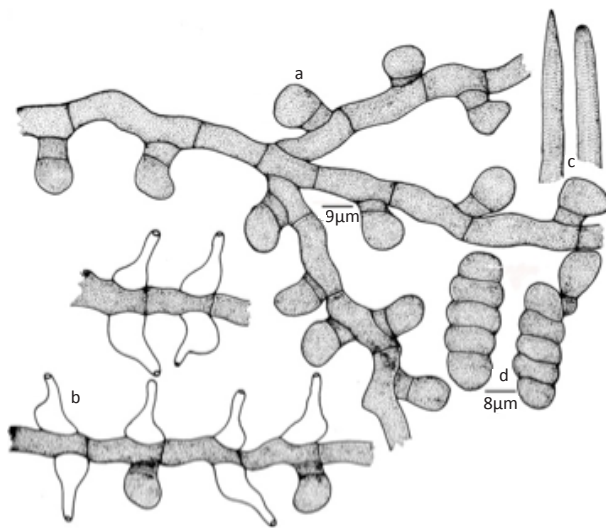


Figure 47. *Meliola canavaliae*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola cariappae* sp. nov.** V.B. Hosagoudar, Jagath Thimmaiah & G.R. Archana.

(Fig. 49; MycoBank 803913)

Colonies epiphyllous, dense, up to 4mm in diam., confluent. Hyphae substraight to flexuous to slightly crooked, branching mostly opposite, loosely to closely reticulate, cells 14–20x6–8 µm. Appressoria alternate, opposite to unilateral, antrorse to subantrorse, straight to variously curved, 19–27 µm long; stalk cells cylindrical to cuneate, often gibbous, 4–11 µm long; head cells ovate, oblong to cylindrical, entire, angular, crenately

lobate to sublobate, 12–27x11–15 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 17–27x4–8 µm. Mycelial setae grouped around perithecia, simple, straight, acute at the tip, up to 475µm long. Perithecia loosely grouped, up to 177µm in diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 40–46x14–17 µm.

**Materials examined:** TBGT5824 (holotype), 14.i.2010, On leaves of *Michelia champaka* L. (Magnoliaceae), Sampaje Ghats, Kodagu, Karnataka, C. Jagat Thimmaiah.

**Etymology:** Named in honour of the India's first Air Marshal K.C. Cariappa.

*Asteridiella micheliae* Jana et al. (Hosagoudar 2008) known on this host genus from northeastern India but differs from it in absence of mycelial setae. It also differs from *Meliola micheliae* Hansf. known on *Michelia fuscata* from Sri Lanka in having mostly angular to sublobate head cells of appressoria (Hansford 1961).

***Meliola cayratiae* Hosag., Jacob Thomas & Agarwal,** *Nelumbo* 52: 3, 2010. (Fig. 50).

Colonies epiphyllous, dense, velvety, scattered, up to 2mm in diameter. Hyphae straight to undulate, branching opposite at acute to wide angles, closely reticulate to form a mycelial mat, cells 12–22x7–12 µm. Appressoria opposite, about 20% alternate to unilateral, very closely placed, mostly antrorse, rarely spreading, straight to slightly curved, 16–22 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate to oblong, cylindrical, entire, slightly angular, often truncate at the apex, 14–19x9–15 µm. Phialides mixed with

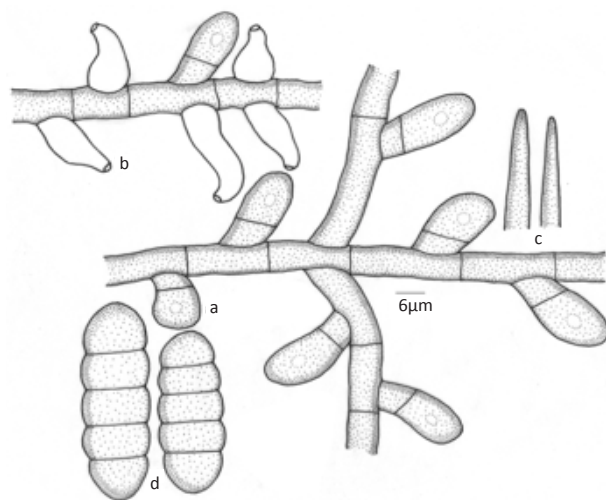


Figure 48. *Meliola canthiigena*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

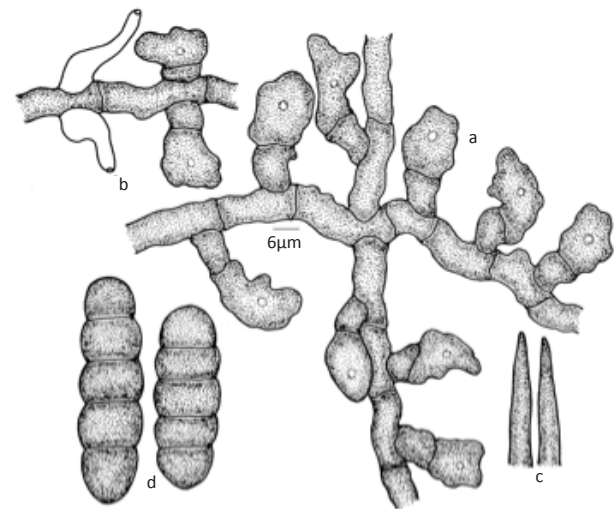


Figure 49. *Meliola cariappae* sp. nov.

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

appressoria, alternate to opposite, ampulliform, 16–22x7–10  $\mu\text{m}$ . Mycelial setae grouped around perithecia, straight, simple, obtuse to broadly rounded at the tip, up to 520 $\mu\text{m}$  long. Perithecia scattered, verrucose, up to 240 $\mu\text{m}$  in diam.; ascospores cylindrical to subellipsoidal, 4-septate, constricted at the septa, 38–43x14–17  $\mu\text{m}$ .

**Materials examined:** HClO 48840 (holotype), TBGT 3216 (isotype), TBGT 3217, 1.iii.2008, Kerala, Thiruvananthapuram, Neyyar Wildlife Sanctuary, Pongalappara, on leaves of *Cayratia pedata* (Lam.) A.L.Juss.ex Gagnepain (Vitaceae), Jacob Thomas.

Based on the digital formula 3113.4233, it is similar to *Meliola bakeri* Sydow (Hansford 1961; Hosagoudar 1996; Hosagoudar & Agarwal, 2008) but differs from it in having mycelial setae grouped around perithecia with broadly obtuse tip. Often sterile mycelia emerged from the base of the perithecia.

***Meliola cipadessae*** Hosag., Jacob Thomas & Agarwal, *Nelumbo* 52: 5, 2010. (Fig. 51).

Colonies epiphyllous, thin, velvety, up to 2mm in diameter, confluent, mixed with the colonies of *Aserina cipadessae*. Hyphae straight to substraight, branching opposite at acute to angles, closely reticulate, cells 16–26x6–8  $\mu\text{m}$ . Appressoria alternate, straight to curved, antrorse to spreading, 16–21  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 4–8  $\mu\text{m}$  long; head cells straight to curved, ovate, globose, cylindrical, entire, 11–16x6–10  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 12–19x6–8  $\mu\text{m}$ . Mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse at the tip, up to 550 $\mu\text{m}$  long. Perithecia grouped, verrucose, up to 210 $\mu\text{m}$  in diameter; ascospores

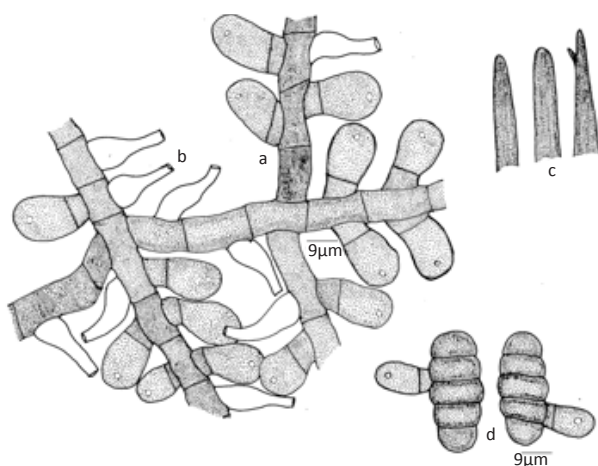
obovoidal to cylindrical, 4-septate, constricted at the septa, 32–35x12–15  $\mu\text{m}$ .

**Materials examined:** HClO 48871 (holotype), TBGT 3247 (isotype), 6.iii.2008, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, Bonocaud, on leaves of *Cipadessa baccifera* (Roth) Miq. (Meliaceae), Jacob Thomas.

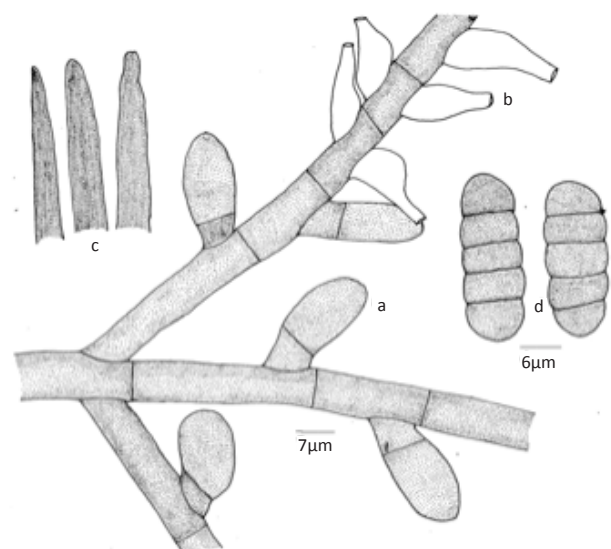
Based on the digital formula 3111.3233, it can be compared with *Meliola togoensis* Hughes var. *angulata* Hughes known on *Trichilia prieuriana* from Gold Coast. However, differs from it in having shorter appressoria with entire head cells. Further, this is the first report of the genus *Meliola* on this host genus *Cipadessa* (Hansford 1961; Hosagoudar 1996; Hosagoudar & Agarwal 2008).

***Meliola clausenigena*** Hosag. & Riju, J. *Threatened Taxa* 3(3): 1617, 2011. (Fig. 52).

Colonies amphigenous, dense, velvety, up to 3mm in diam., scattered to confluent. Hyphae straight, flexuous, branching opposite at wide angles, loosely to closely reticulate, cells 15–30x5–8  $\mu\text{m}$ . Appressoria mostly opposite, rarely unilateral, antrorse to subantrorse, 17–23  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 5–8  $\mu\text{m}$  long; head cells ovate, oblong, rarely globose, straight to curved, entire, often sinuate, truncate at the apex, 12–15x7–10  $\mu\text{m}$ . Phialides mixed with appressoria, opposite, alternate to unilateral, 15–20x7–10  $\mu\text{m}$ . Mycelial setae simple, straight to uncinatate at the apical portion, acute, obtuse to 2–3 times dentate at the tip, up to 240 $\mu\text{m}$  long. Perithecia scattered to grouped in the colonies, up to 190 $\mu\text{m}$  in diam.; ascospores

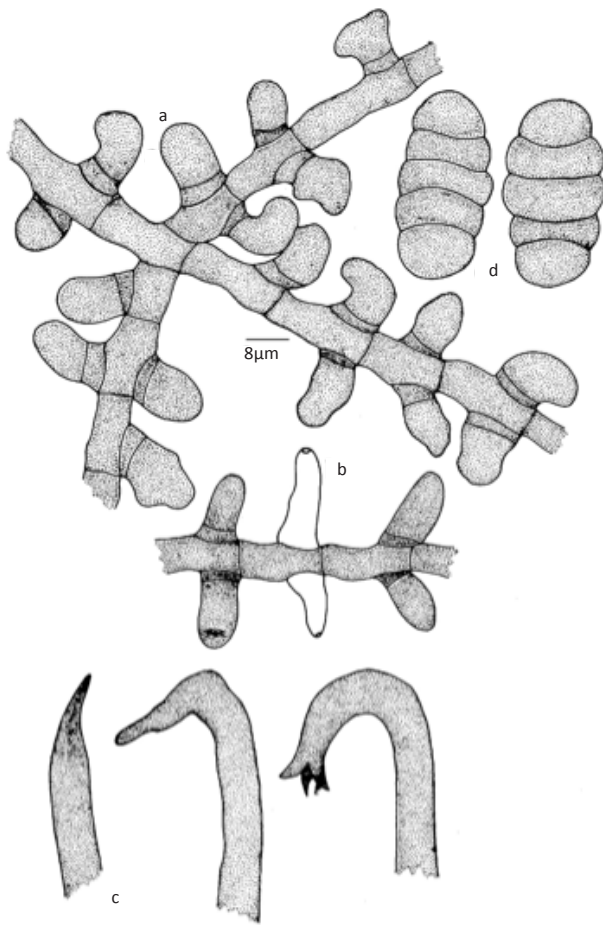


**Figure 50. *Meliola cayratiae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



**Figure 51. *Meliola cipadessae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores





**Figure 52. *Meliola clausenigena***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

to cylindrical, 4-septate, constricted at the septum, 37–40x15–20 µm.

**Material examined:** TBGT 4514 (holotype), HCIO 50597 (isotype), 1.viii.2008, Kerala, Palakkad, Silent Valley National Park, Poochipara, on leaves of *Clausena* sp. (Rutaceae), M.C. Riju et al.

This is the only species of the genus *Meliola* known on the members of the family Rutaceae having straight, curved to uncinuate apical portion of the mycelial setae (Hansford 1961; Hosagoudar et al. 1996; Hu et al. 1996, 1999; Hosagoudar 1996, 2008; Hosagoudar & Agarwal 2008). The specific epithet is derived from the host genus.

***Meliola colubrinicola*** Hosag. & Sabeena, Plant Pathology & Quarantine 3(1): 11, 2012. (Fig. 53).

Colonies hypophyllous, subdense to dense, up to 3mm in diameter, confluent. Hyphae flexuous to crooked, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 25–40x5–7 µm.

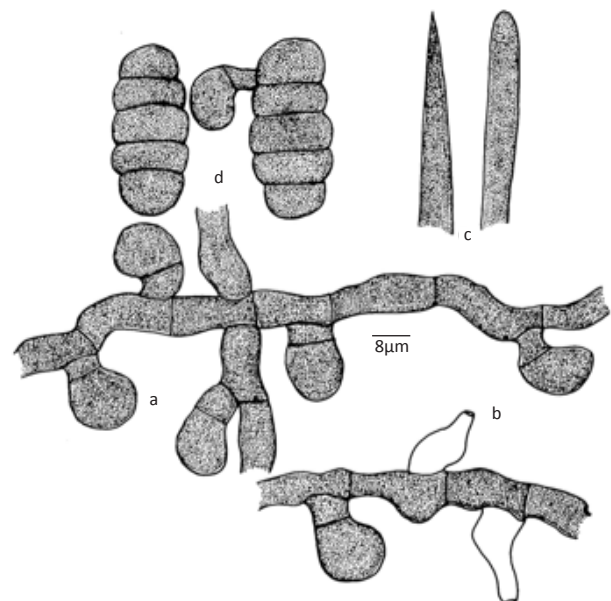
Appressoria alternate, antrorse, subantrorse to retrorse, 15–20 µm long; stalk cells cylindrical to cuneate, 2–7 µm long; head cells oblong, ovate, entire, 10–15x10–15 µm. Phialides mixed with appressoria, opposite, ampulliform, 12–25x5–7 µm. Mycelial setae scattered, simple, straight, up to 850µm long, acute to obtuse at the tip. Perithecia scattered, orbicular, up to 200µm in diam.; ascospores ellipsoidal to oblong, 4-septate, constricted at the septa, 37–42x12–15 µm.

**Materials examined:** TBGT 5733 (holotype), 25.xi.2009, India, Kerala, Kottayam, Ponthanpuzha, on leaves of *Colubrina travancorica* Bedd. (Rhamnaceae), P.J. Robin et al. Part of the collection has been deposited in HCIO, New Delhi.

*Asteridiella colubrinae* (Stev.) Hansf. known on *Colubrina ruffa* from Panama but the present species differs from it in having mycelial setae (Hansford 1961).

***Meliola cookeana*** Speg., Ann. Soc. Cient. Argentina 12: 41, 1881; Hansf., Sydowia Beih. 2: 695, 1961; Hosag. & Sabeena, Bulletin of Basic and Applied Plant Biology, 1(1): 49, 2011. *Meliola rizalensis* Sydow, Ann. Mycol. 12: 551, 1914. (Fig. 54).

Colonies epiphyllous, subdense to dense, up to 4mm in diameter, confluent. Hyphae substraight, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 27–42x5–7 µm. Appressoria alternate to unilateral, antrorse to subantrorse, 15–20 µm long; stalk cells cylindrical to cuneate, 5–7 µm long;



**Figure 53. *Meliola colubrinicola***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

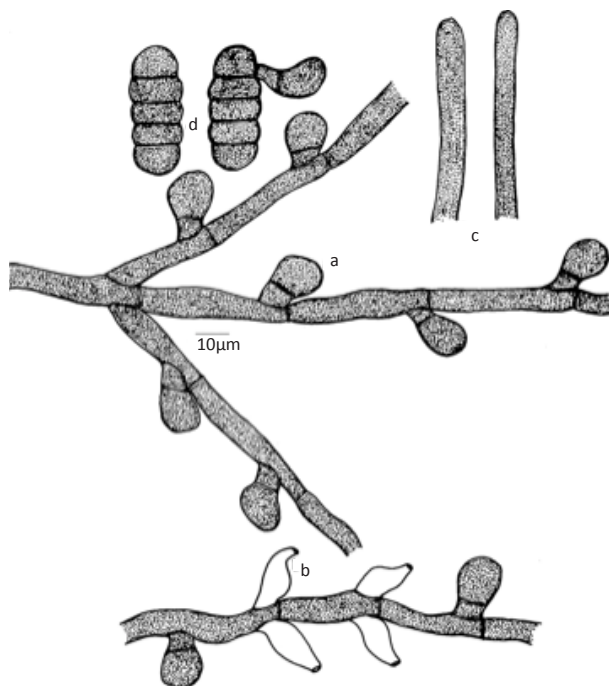
head cells globose to ovate, entire, 10–12x7–12 µm. Phialides mixed with appressoria, opposite to unilateral, ampulliform, 12–17x5–7 µm. Mycelial setae straight to curved, simple, up to 300µm long, acute to obtuse at the tip. Perithecia scattered, up to 150µm in diam. Ascospores oblong to cylindrical, 4-septate, constricted at the septa, 30–37x10–15 µm.

**Material examined:** TBGT 5098, 25.iii.2009, Kerala, Kottayam, Koruthodu, on leaves of *Vitex leucoxylo* L.f. (Verbenaceae), V. Gireesh Kumar et al. Part of the collection has been deposited in HCIO, New Delhi.

L.J. Sedgwick had collected this species on this host plant from North Canara, Karnataka, during the month of October, 1919. Since then there was no collection of this species on this host and the present collection forms the relocation of this species after a lapse of more than nine decades (Hansford 1961; Hosagoudar 1996).

***Meliola cynanchi*** Hosag., H. Biju, Agarwal & Archana, Indian Phytopath. 59: 345, 2006. (Fig. 55).

Colonies epiphyllous, thin to dense, up to 2mm in diam. Hyphae straight, substraight to flexuous, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 16–27x6–8 µm. Appressoria alternate, about 20% opposite, antrorse to subantrorse, 16–20 µm long; stalk cells cylindrical to cuneate, 4–6 µm



**Figure 54. *Meliola cookeana***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

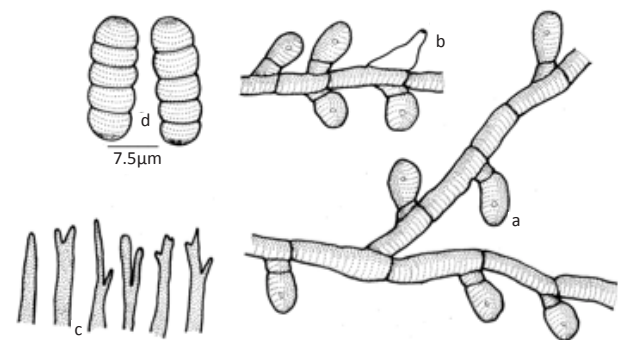
long; head cells globose to ovate, entire, 9–13x9–11 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–25x8–10 µm. Mycelial setae many, densely scattered, simple, straight to curved, very few uncinuate, obtuse, dentate, cristate, often furcate up to 20µm at the tip, up to 600µm long. Perithecia scattered, up to 125µm in diam.; ascospores oblong, cylindrical to slightly ellipsoidal, 4-septate, constricted at the septa, 38–42x15–17 µm.

**Material examined:** HCIO 46245 (holotype), TBGT 1657 (isotype), 12.xi.2003, Karnataka, Coorg, Madikeri, Jodupal, on leaves of *Cynanchum* sp. (Asclepiadaceae), V.B. Hosagoudar et al.

*Meliola asclepiadacearum* Hansf. is known on the host genus *Cynanchum*. According to Beeli formula 31½3.4223, it is similar to *M. hoyae* Sacc.. *M. cynanchi* differs from the former species in having opposite appressoria and dentate to furcate and longer mycelial setae. While, it differs from the latter species in having longer and dentate to furcate mycelial setae (Hansford 1961; Hosagoudar et al. 1997).

***Meliola cyperacearum*** Hosag., Dhivaharan & Riju, J. Sci. Trans. Technov. 4(4): 165, 2011. (Fig. 56).

Colonies amphigenous, dense, velvety, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching alternate at acute angles, cells 20–23x7–9 µm. Appressoria alternate, straight to curved, 30–35 µm long; stalk cells cylindrical to cuneate, 10–12 µm long; head cells cylindrical, globose, slightly angular, sublobate to lobate, often truncate at the apex, 20–22x10–17 µm. Phialides borne on a separate mycelial branch, alternate, ampulliform, 15–20x7–9 µm. Mycelial setae straight, simple, acute to obtuse at the tip, up to 360 µm long. Perithecia scattered, up to 140µm in diameter; ascospores obovoidal, 4-septate, constricted at the



**Figure 55. *Meliola cynanchi***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

septa, 35–37x12–15 µm.

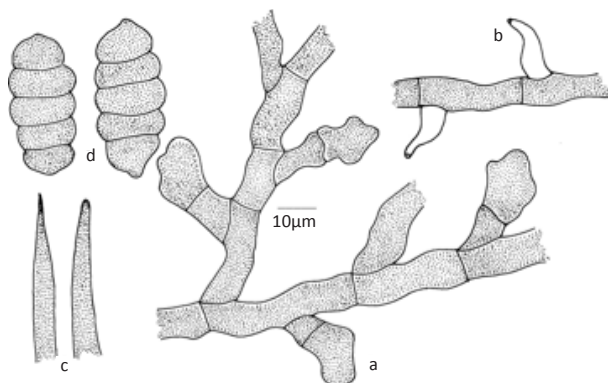
**Materials examined:** TBGT 4391 (holotype). HClO 50474 (isotype), 7.i.2007, Tamil Nadu, Kodaikanal, Kukkal shola forest, Periyakanal, on leaves of *Cyperus* sp. (Cyperaceae), V. Dhivaharan et al.

Based on the angular to sublobate head cells of appressoria and the position of the Phialides on a separate mycelial branch, this species can be compared with *Meliola cyperi* Pat. but differs from it in having distinctly shorter mycelial setae (Hansford 1961). It also differs from *Meliola tibigirica* Hosag. et al. in having distinctly lobate head cells of appressoria (Hosagoudar 2008).

***Meliola daviesii* Hansf. var. *kodaikanalensis* Hosag., Dhivaharan & Riju, J. Sci. Trans. TechNovember 4(4): 166, 2011.**

Colonies epiphyllous, thin, up to 2mm in diameter scattered. Hyphae flexuous, branching opposite at wide angles, loosely reticulate, cells 20–30x7–10 µm. Appressoria alternate, straight to curved, antrorse to retrorse, 30–32 µm long; stalk cells cylindrical to cuneate, 7–10 µm long; head cells oblong, ovate, rarely globose, entire, 20–25x12–17 µm. Phialides mixed with appressoria, opposite, ampulliform, 20–22x7–10 µm. Mycelial setae scattered, simple, obtuse at the tip, up to 440µm long. Perithecia scattered, globose upto 85µm in diameter; ascospores oblong, 4-septate, constricted at the septa, 45–47x15–20 µm.

**Materials examined:** 7.iii.2007, Tamil Nadu, Kodaikanal, Kukkal shola forest, Periyakanal, on leaves of *Jasminum brevilobum* A. DC. (Oleaceae), V. Dhivaharan et al. TBGT 4445 (holotype), HClO 50528 (isotype); 7.ii.2007, Kodaikanal, Periya kanal, R. Nithya tharani HClO 50648, TBGT 4565.



**Figure 56. *Meliola cyperacearum***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

Based on the digital formula, nature of the hyphae and morphology of appressoria, the present collection fits well into the assigned species but the new variety differs from it in having phialides borne with appressoria.

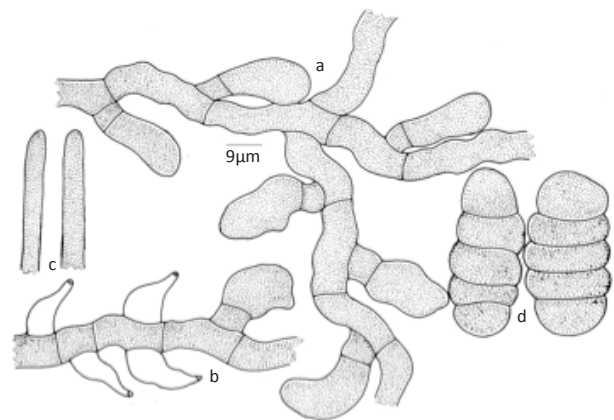
***Meliola desmodii-laxiflori* Deight. var. *indica* Hosag., Agarwal, Biju & Archana, Indian Phytopath. 59: 346, 2006. (Fig. 58).**

Colonies epiphyllous, dense, up to 2mm in diam. Hyphae flexuous to crooked, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 24–30x5–7 µm. Appressoria alternate, antrorse to subantrorse, 12–21 µm long; stalk cells cylindrical to cuneate, 2–7 µm long; head cells ovate, globose, straight to curved, entire, rarely slightly angular, 11–15x11–13 µm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 12–18x7–9 µm. Mycelial setae scattered, simple, straight, acute to obtuse at the tip, up to 430µm long. Perithecia scattered, up to 130µm in diam.; ascospores oblong to cylindrical, slightly constricted at the septa, 32–35x9–11 µm.

**Material examined:** HClO 46236 (holotype), TBGT 1648 (isotype); HClO 46242, TBGT 1654, 12.xi.2003, Karnataka, Coorg, Madikeri, Jodupal, on leaves of *Desmodium laxiflorum* DC. (Fabaceae), V.B. Hosagoudar et al.

***Meliola dioscoreacearum* Hosag. & Jacob Thomas, Indian J. Sci. Technol. 2(6): 22, 2009. (Fig. 59).**

Colonies epiphyllous, dense, velvety, up to 2mm in diameter, confluent. Hyphae straight, branching opposite at acute angles, loosely to closely reticulate, cells 16–34x4–7 µm. Appressoria alternate, about 3% opposite, antrorse to subantrorse, straight to curved,



**Figure 57. *Meliola daviesii* Hansf. var. *kodaikanalensis***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



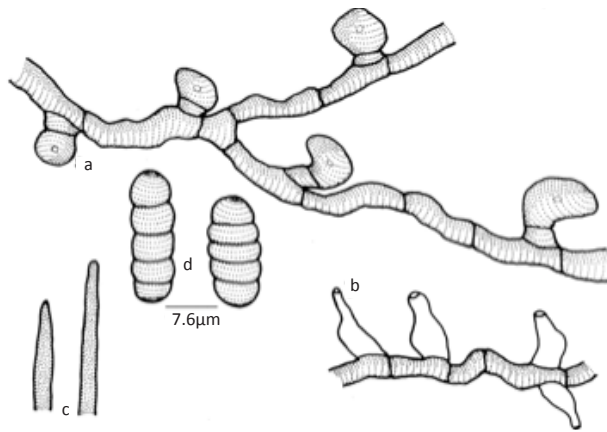


Figure 58. *Meliola desmodii-laxiflora* var. *indica*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

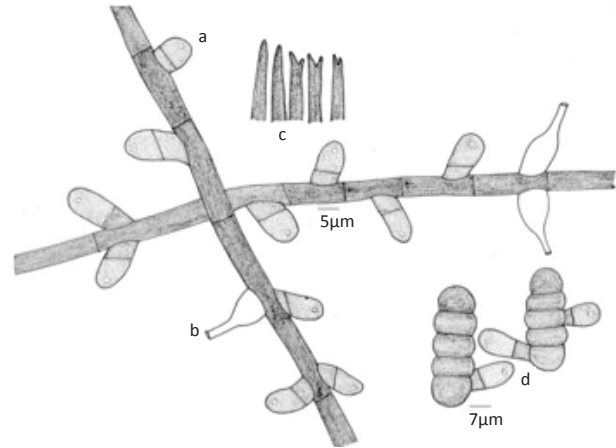


Figure 59. *Meliola dioscoreacearum*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

14–19  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–5  $\mu\text{m}$  long; head cells curved, cylindrical, ovate, entire, rounded at the apex, 12–15 $\times$ 7–10  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–24 $\times$ 7–10  $\mu\text{m}$ . Mycelial setae scattered, straight, simple, acute to dentate at the tip, up to 510 $\mu\text{m}$  long. Perithecia scattered, verrucose, up to 200 $\mu\text{m}$  in diam.; ascospores cylindrical, 4-septate, strongly constricted at the septum, 36–38 $\times$ 14–17  $\mu\text{m}$ .

**Materials examined:** HClO 48251 (holotype), TBGT 2990 (isotype), 12.xi.2007, Kerala, Thrissur, Vazhachal, lower Sholayar, on leaves of *Dioscorea* sp. (Dioscoreaceae), Jacob Thomas et al.

Based on the dentate mycelial setae and oppositely placed appressoria, this species can be compared with *Meliola dioscoreicola* Hansf. & Deight. and its variety *peruviensis* Hansf. but differs from both in having only 3% opposite appressoria, minutely dentate mycelial setae and the apical cells of the appressoria are typically ovate to cylindrical (Hansford 1961).

***Meliola dioscoregena*** Hosag. & Jacob., Indian J. Sci. Technol. 2(6): 22, 2009. (Fig. 60, Imgae. 8).

Colonies epiphyllous, dense, velvety, up to 2mm in diameter, not confluent. Hyphae straight to substraight, branching opposite at acute angles, closely reticulate, cells 9–15 $\times$ 4–7  $\mu\text{m}$ . Appressoria opposite, less than 1% alternate, antrorse to spreading, straight to slightly curved, 12–17  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–5  $\mu\text{m}$  long; head cells subglobose to ovate, entire, 9–12 $\times$ 7–10  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 7–14 $\times$ 4–7  $\mu\text{m}$ . Mycelial setae scattered to grouped around perithecia, straight, simple, acute to obtuse at the tip, up to 440 $\mu\text{m}$

long. Perithecia mostly grouped at the centre of the colony, verrucose, up to 190 $\mu\text{m}$  in diam.; ascospores cylindrical to ellipsoidal, 4-septate, constricted, 36–41 $\times$ 14–17 $\mu\text{m}$ .

**Materials examined:** HClO 48250 (holotype), TBGT 2989 (isotype), 18.xi.2007, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, on leaves of *Dioscorea* sp. (Dioscoreaceae), Jacob Thomas & Vimalkumar.

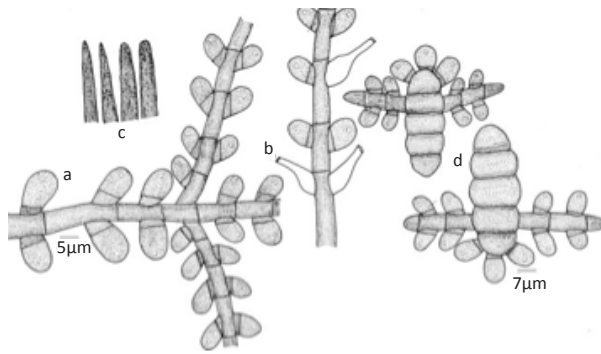
Typically opposite appressoria distinguishes this species from rest of the *Meliola* species known on the members of the family Dioscoreaceae (Hansford 1961, Hosagoudar et al. 1997).

Ascospores produce three appressoria from the terminal cells and the mycelium is being produced from the sub-terminal cells.

***Meliola diospyri-buxifoliae*** Hosag., Sabeena & Riju, Bioscience Discovery 2: 120, 2011. (Fig. 61).

Colonies amphigenous, mostly epiphyllous, thin, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite to unilateral at acute to wide angles, loosely reticulate, cells 13–24 $\times$ 4–6  $\mu\text{m}$ . Appressoria alternate, very rarely opposite, antrorse, subantrorse to retrorse, 11–15  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–4  $\mu\text{m}$  long; head cells ovate, globose, entire, 9–13 $\times$ 4–6  $\mu\text{m}$ . Phialides mixed with appressoria, opposite, alternate to unilateral, ampulliform, 13–22 $\times$ 4–9  $\mu\text{m}$ . Mycelial setae simple, straight, acute to obtuse at the tip, up to 450 $\mu\text{m}$  long. Perithecia scattered, up to 170 $\mu\text{m}$  in diam.; ascospores cylindrical, 4-septate, constricted at the septa, 28–35 $\times$ 11–17  $\mu\text{m}$ .

**Material examined:** TBGT 3731 (holotype), HClO 49489 (isotype), 15.xi.2007, Kerala, Thiruvananthapuram,



**Figure 60. *Meliola dioscoregena***  
 a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
 d - Ascospores

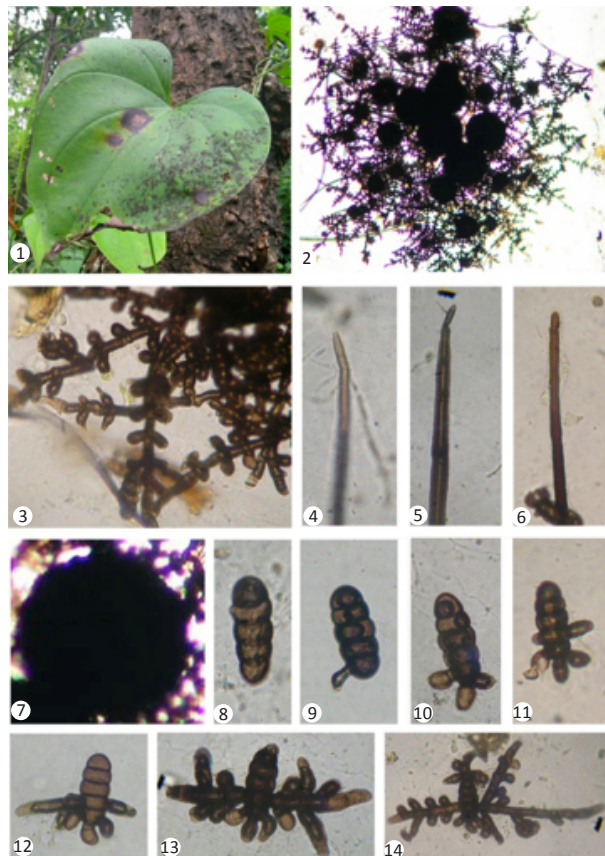
Palode, JNTBGRI Campus, on leaves of *Diospyros buxifolia* (Blume) Hiern. (Ebenaceae), A. Sabeena & M.C. Riju.

*Meliola megalocarpa* Sydow var. *microspora* Hosag., *M. diospyri* Sydow var. *yatesiana* Hansf. & Deight. and *M. diospyri* Sydow are known on this host genus (Hansford

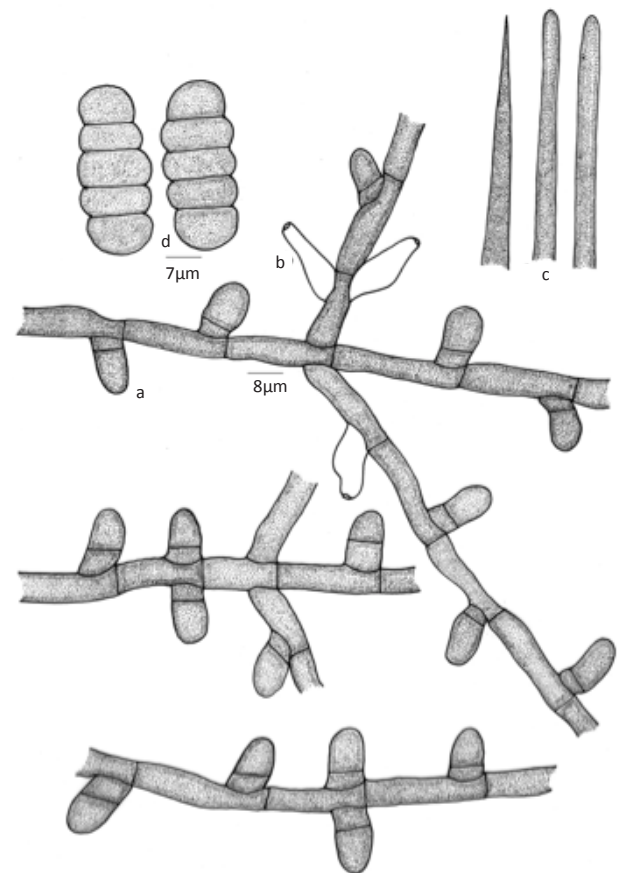
1961; Hosagoudar 1996). Based on the morphology of head cells of appressoria, this species is similar to *M. diospyri* known on *Diospyros* sp. from the Western Ghats. However, differs from it in having only 2% opposite (in contrast to 40%) shorter appressoria (11–15 µm against 18–26 µm) and having shorter ascospores (28–35 µm against 42–50 µm).

***Meliola dysoxyligena*** Hosag. & Riju, Plant Pathology & Quarantine 1(2): 126, 2011. (Fig. 62).

Colonies epiphyllous, dense, velvety, up to 5mm in diam. Hyphae substraight to crooked, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 20–45×7–8 µm. Appressoria alternate, unilateral, opposite, antrorse, subantrorse to retrorse, 15–17×7–10 µm; stalk cells cylindrical to cuneate, 3–5 µm long; head cells globose, subglobose, entire to rarely truncate, 10–13×7–10 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 15–38×7–10 µm. Mycelial setae scattered, simple, straight,



**Image 8. *Meliola dioscoregena***  
 1 - Infected leaf of *Dioscorea wightii*; 2 - Colonies perithecia; 3 - Appressariate mycelium with phialides; 4–6 - Apical portion of the mycelial setae; 7 - Perithecium; 8 - ascospore, 9–14 - Germinating to colony forming ascospore;



**Figure 61. *Meliola diospyri-buxifolia***  
 a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
 d - Ascospores

acute-, 2–3-times dentate at the tip, up to 200µm long. Perithecia scattered, up to 210µm in diam.; ascospores cylindrical to oblong, 4-septate, slightly constricted at the septa, 35–40×12–15 µm.

**Material examined:** TBGT 4962 (holotype), 26.xii.2009, Kerala, Wayanad, Padinharathara, Chennalode, on leaves of *Dysoxylum* sp. (Meliaceae), M.C. Riju. Part of the collection has been deposited in HCIO, New Delhi.

*Meliola ptaeroxyli* Doidge, *M. carapace* Hansf. & Deight. and *M. toonae* Hosag. & Sabu are the species that have simple and dentate mycelial setae. The present fungus differs from *M. ptaeroxyli* in not producing a pathogenic effect on the host, from *M. carapace* in having shorter appressoria (15–17 µm vs. 24–40 µm) and smaller ascospores (35–40×12–15 vs. 51–58×19–23 µm). It differs from *M. toonae* in having shorter appressoria (15–17 µm vs. 16–24 µm) and shorter ascospores (35–40 µm vs. 40–44 µm) (Hansford 1961; Hu et al. 1996; 1999; Hosagoudar 1996, 2008, ).

The neck or apical portion of the phialides are unusually elongated, often variously bent and proliferate as hyphae by holding the phialoconidia in their neck.

***Meliola ebeni*** Hosag. & Archana, J. Threatened Taxa 2: 890, 2010. (Fig. 63)

Colonies amphigenous, subdense, up to 2mm in diameter, confluent. Hyphae substraight to crooked, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 12–32×4–8 µm. Appressoria opposite, alternate, unilateral, antrorse, subantrorse to retrorse, straight to curved, 11–26 µm long; stalk cells cylindrical to cuneate, 3–8 µm long; head cells oblong, ovate, cylindrical, globose, straight to differently curved, entire to angular, 8–18×6–15 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 16–24×6–8 µm. Mycelial setae, simple, straight, acute at the tip, up to 490µm long. Perithecia scattered to grouped, up to 160µm in diameter; ascospores obovoidal, 4-septate, slightly constricted at the septa, 38–45×12–16 µm.

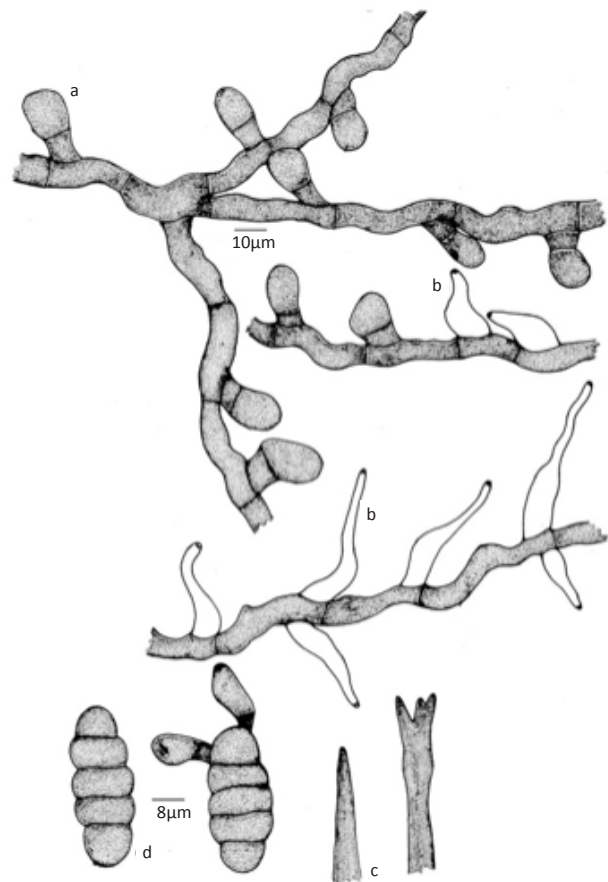
**Material examined:** HCIO 48167 (holotype), TBGT 2903 (isotype), 10.ix.2006, Kerala, Thiruvananthapuram, JNTBGR Campus, on leaves of *Diospyrus ebenum* Koenig (Ebenaceae), G.R. Archana et al. .

Crooked mycelium with variously curved appressoria with cylindrical to oblong head cells distinguishes this species from rest of the *Meliola* species known on the members of the family Ebenaceae (Hansford 1961; Hosagoudar et al. 1997; Hu et al. 1997, 1999; Hosagoudar & Agarwal 2008).

***Meliola erumeliensis*** Hosag., Archana., Rajendraprasad & Nazarudeen, J. Threatened Taxa 1: 347, 2009. (Fig. 64)

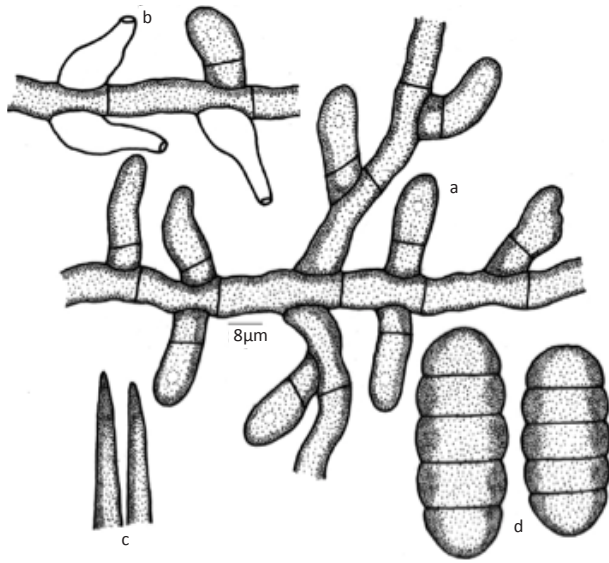
Colonies hypophyllous, subdense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 11–32×6–8 µm. Appressoria mostly opposite, alternate, straight to curved, antrorse, subantrorse to retrorse, 9–22 µm long; stalk cells cylindrical to cuneate, 2–8 µm long; head cells ovate, oblong, entire to predominantly angular, 8–16×8–11 µm. Phialides mixed with appressoria, numerous, opposite to alternate, ampulliform, 11–22×6–10 µm. Mycelial setae simple, crooked, uncinata, obtuse at the tip, up to 294µm long. Perithecia globose, scattered to grouped, up to 176µm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 36–43×17–21 µm.

**Material examined:** HCIO 46831 (holotype), TBGT 2172 (isotype), 16.iii.2006, Kerala, Idukki, Peeramed, Erumeli range, Murinjapuzha, on the leaves of *Drypetes*



**Figure 62. *Meliola dysoxyligena***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores





**Figure 63. *Meliola ebeni***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

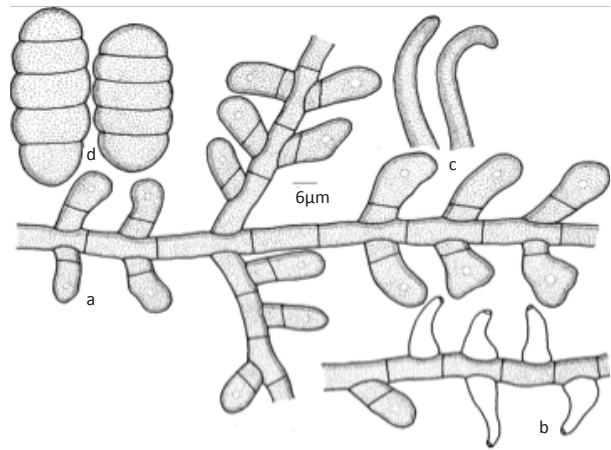
*elata* (Bedd.) Pax & Hoffm. (Euphorbiaceae), A. Nazaruddin & M. Rajendraprasad.

*Meliola drypeticola* Hosag. is the only species known on the host genera *Drypetes* and *Epiprinus* from the Western Ghats region of peninsular India (Hosagoudar 1996). *Meliola erumeliensis* distinctly differs from it in having crooked and uncinat mycelial setae.

***Meliola erythrinae*** Sydow var. *indica* Hosag. & Jacob. Indian J. Sci. Technol. 2(6): 23, 2009. (Fig. 65).

Colonies epiphyllous, thin, up to 3mm in diameter, confluent. Hyphae substraight to slightly undulate, branching opposite at acute to wide angles, loosely to closely reticulate, cells 21–41x4–7  $\mu$ m. Appressoria alternate, 5% unilateral, 5% opposite, antrorse to spreading, straight to curved, 12–17  $\mu$ m long; stalk cells cylindrical to cuneate, 2–5  $\mu$ m long; head cells subglobose, clavate, entire, 9–12x12–15  $\mu$ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 14–22x7–10  $\mu$ m. Mycelial setae numerous, scattered to grouped around perithecia, straight, simple, acute to obtuse at the tip, up to 410 $\mu$ m long. Perithecia scattered to grouped, verrucose, up to 160 $\mu$ m in diam.; ascospores cylindrical to subellipsoidal, 4-septate, constricted at the septa, 33–43x12–17  $\mu$ m.

**Materials examined:** HCIO 48253 (holotype), TBGT 2992 (isotype), 12.xi.2007, Kerala, Thrissur, Vazhachal, near Lower Sholayar dam, on leaves of *Erythrina variegata* L. (*E. indica* Lam.) (Fabaceae), Jacob Thomas et al.



**Figure 64. *Meliola erumeliensis***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

The present collection is similar to *Meliola erythrinae* but the variety differs from the var. *erythrinae* in having 5% opposite appressoria.

***Meliola euonymi*** Stev. ex Hansf., Sydowia Beih.1:108, 1957; Beih.2: 342, 1961. (Fig. 66).

Colonies amphigenous, subdense, up to 2mm in diam., confluent. Hyphae substraight to flexuous, branching alternate at acute to wide angles, cells 16–34x6–8  $\mu$ m. Appressoria alternate, straight to slightly curved, antrorse, subantrorse to retrorse, 24–42  $\mu$ m long; stalk cells cylindrical to cuneate, 8–28  $\mu$ m long; head cells ovate, globose, clavate, oblong, irregularly deeply lobate, rarely angular, 14–27x19–24  $\mu$ m. Phialides mixed with appressoria, alternate, unilateral, ampulliform, 19–26x4–7  $\mu$ m. Mycelia setae simple, scattered, straight to slightly curved, acute to obtuse at the tip, up to 420  $\mu$ m long. Perithecia scattered to loosely aggregated, up to 110 $\mu$ m in diam.; ascospores oblong to cylindrical, 3-septate, slightly constricted at the septa, 48–58x17–23  $\mu$ m.

**Materials examined:** TBGT 5746, 12.xi.2007, Tamil Nadu, Kodaikanal, Bhoothakanal, on leaves of *Eunymous* sp. (Celastraceae), R. Nithythanani.

This species was known only from a single collection from Philippines (Hansford 1961).

***Meliola exacigena*** Hosag., Archana & Kandavel, J. Scient. Trans. Environ. Techn. 1: 53, 2007. (Fig. 67)

Colonies hypophyllous, dense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite, often alternate at acute to wide angles, loosely to closely reticulate, cells 12–26x6–

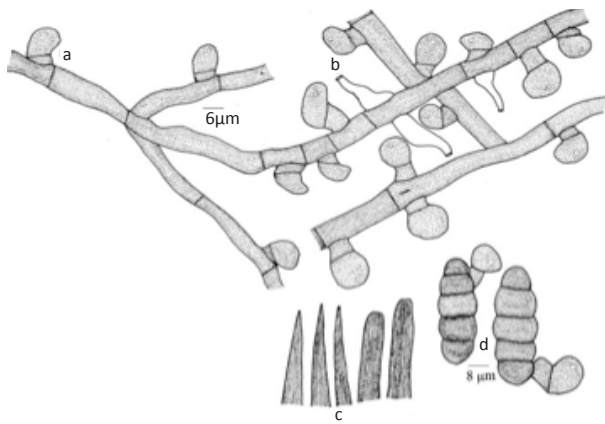


Figure 65. *Meliola erythrinae* var. *indica*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

10 µm. Appressoria alternate to unilateral, antrorse, subantrorse to retrorse, straight to curved, 16–29 µm long; stalk cells cylindrical to cuneate, 6–10 µm long; head cells ovate, oblong, entire to angular, 9–19x9–16 µm. Phialides mixed with appressoria, alternate, ampulliform, 12–19x6–10 µm. Mycelial setae simple, straight, acute at the tip, up to 530µm long. Perithecia scattered to grouped, globose, up to 235µm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 38–42x14–18 µm.

Material examined: HClO 47699 (holotype), TBGT 2721 (isotype), 18.vii.2006 Tamil Nadu, Kodaikanal, Mathikettan shola, on leaves of *Exacum* sp.

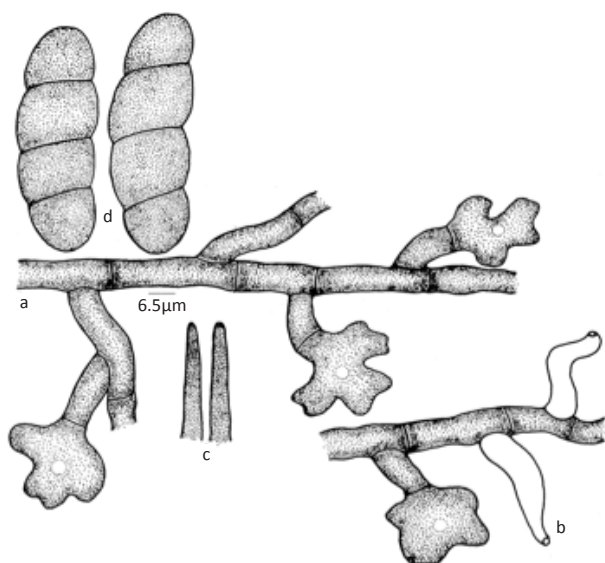


Figure 66. *Meliola euonymi*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

(Gentianaceae), B. Bhairavi.

*Meliola exaci* Hosag. is the only *Meliola* species known on the host genus *Exacum* (*E. tetragonum*) from Maharashtra (Hansford 1961; Hosagoudar et al. 1997; Hosagaoudar 1996; Hu et al. 1996 1999; Mebey & Hawksworth 1997; Mibey & Cannon 1999; Patil & Mahamulkar 1999). *M. exacigena* differs from it in having straight mycelium, having entire to angular head cells of the appressoria, longer mycelial setae and larger ascospores.

*Meliola filicii* Hosag. var. *indica* Hosag. & Archana, J. Threatened Taxa 2: 891, 2010. (Fig. 68)

Colonies hypophyllous, dense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite, alternate at acute to wide angles, loosely to closely reticulate, cells 11–24x4–7 µm. Appressoria opposite, alternate, antrorse, subantrorse to retrorse, 8–15 µm long; stalk cells cylindrical to cuneate, 2–6 µm long; head cells ovate, globose, entire to angular, straight to curved, 6–11x6–8 µm. Phialides few, mixed with appressoria, opposite to alternate, ampulliform, 9–16x4–7 µm. Mycelial setae, simple, straight, acute, dentate to furcate at the tip, up to 350µm long. Perithecia scattered to grouped, up to 196µm in diameter; ascospores obovoidal, 4-septate, slightly constricted at the septa, 25–37x8–13 µm.

Material examined: HClO 48168 (holotype), TBGT 2904 (isotype), 20.ii.2007, Kerala, Thiruvananthapuram, Ponmudi, on leaves of *Filicium decipiens* (Wight & Arn.) Thw. (Sapindaceae), G.R. Archana et al.

The variety *indica* differs from the variety *filicii* in having only dentate to furcate apical tip of the mycelial setae (Hosagoudar 1996).

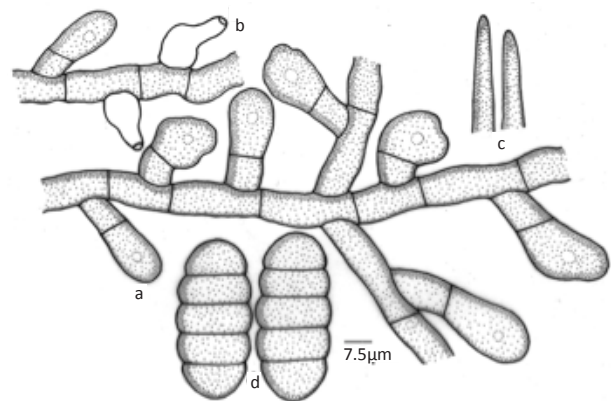


Figure 67. *Meliola exacigena*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola garugae*** Stev. & Rold., Philippine J. Sci. 56: 67, 1935; Hansf., Sydowia Beih. 2: 399, 1961; Hosag. & Robin, J. Threatened Taxa 3(3): 1786, 2011. (Imge. 9, Fig. 69)

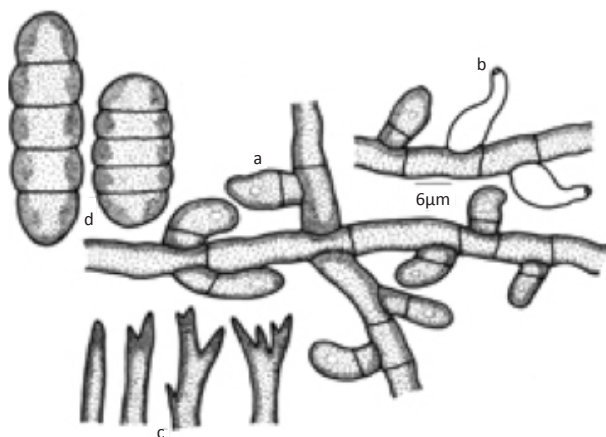
Colonies amphigenous, mostly epiphyllous, up to 3 mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite to alternate at acute angles, loosely reticulate, cells 24–36 × 5–7 µm. Appressoria alternate to unilateral, antrorse to subantrorse, 14–19 µm long; stalk cells cylindrical to cuneate, 5–7 µm long; head cells ovate, globose, entire, 10–12 × 7–10 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, neck elongated, 19–24 × 7–10 µm. Mycelial setae numerous, scattered, straight, dentate, cristate, bifid to obtuse at the tip, up to 370 µm long. Perithecia scattered, up to 170 µm in diameter; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 36–43 × 14–17 µm.

**Materials examined:** HClO 48791 (holotype), TBGT 3167, 29.vi. 2007, On leaves of *Garuga pinnata* Roxb. (Burseraceae), Vazhoor, Kottayam, Kerala, P. J. Robin.

This species was known in *Garuga* sp. from Philippines and was known only from a single collection (Hansford 1961).

***Meliola gluticola*** Hosag., Sabeena & Jacob Thomas, Taprobanica 2(2): 95, 2010. (Fig. 70)

Colonies amphigenous, mostly hypophyllous, thin, up to 4 mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute to wide angles, cells 13–20 × 6–9 µm. Appressoria alternate, closely arranged on the hyphae antrorse to subantrorse, 15–20 µm long; stalk cells cylindrical to cuneate, 2–6 µm long; head cells ovate, entire, 13–15 × 6–9 µm. Phialides mixed



**Figure 68. *Meliola filicii* var. *indica***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

with appressoria, alternate to opposite, ampulliform 15–22 × 6–9 µm. Mycelial setae simple, straight, acute to obtuse at the tip, up to 330 µm long. Perithecia scattered, up to 110 µm in diameter; ascospores cylindrical, 4-septate, constricted at the septa, 39–44 × 15–17 µm.

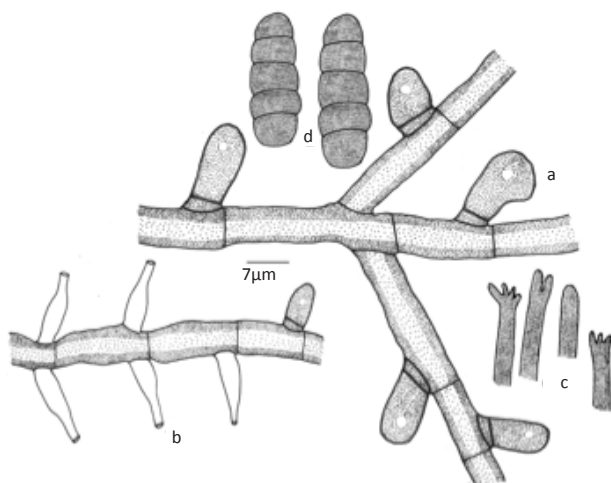
**Material examined:** HClO 48337 (holotype), TBGT 3058 (isotype), 10.x.2007, Kerala, Thiruvananthapuram, Palode, JNTBGR Campus, on leaves of *Gluta travancorica* L. (Anacardiaceae), A. Sabeena et al.

*Gluta travancorica* L. is an endemic plant and *Meliola glutae* is known to infect this plant (Hosagoudar 1996, 1998; Hosagoudar & Agarwal 2008; Hosagoudar et al. 1997). However, differs from it in having regularly antrorse to subantrorse appressoria with ovate to oblong and entire head cells. The colonies of both these species were mixed together but can be easily distinguished based on the above characters.



**Image 9. *Meliola garugae* infected leaves**





**Figure 69. *Meliola garugae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola gouaniae* Hansf. var. *keralica* Hosag. & Robin, J. Threatened Taxa 3(5): 1785, 2011. (Fig. 71)**

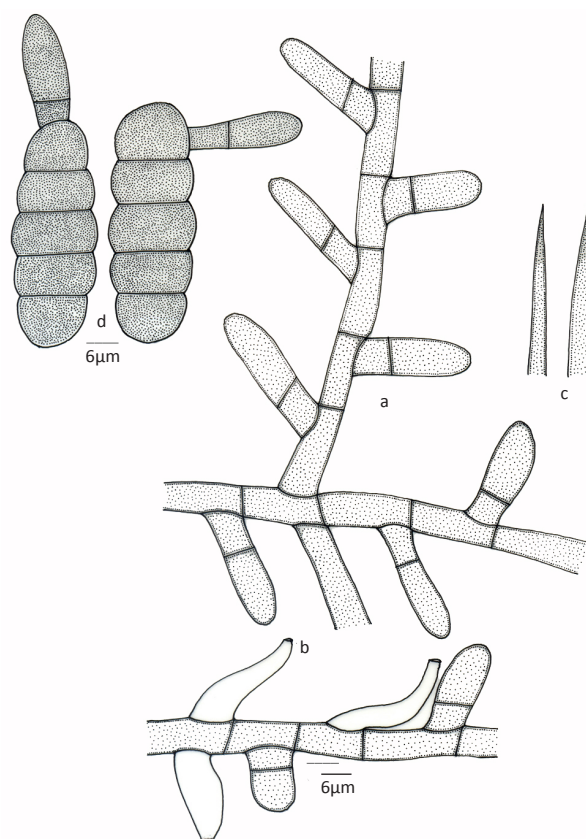
Colonies epiphyllous, thin, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite at acute angles, loosely reticulate, cells 19–29x5–7 µm. Appressoria mostly alternate, unilateral, antrorse to subantrorse, 12–17 µm long; stalk cells cylindrical to cuneate, 2–7 µm long; head cells ovate, globose, entire, angular to slightly lobate, 10–14x7–10 µm. Phialides mixed with appressoria, alternate to opposite, unilateral, ampulliform, 21–29x5–7 µm. Mycelial setae scattered, simple, straight, obtuse to dentate at the tip, up to 420µm long. Perithecia scattered, globose, up to 178µm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 31–38x12–14 µm, wall smooth.

**Materials examined:** HCIO 48793 (holotype), TBGT 3169 (isotype), 12.iii.2007, Kerala, Kottayam, Ponthanpuzha, on leaves of *Gouania* sp. (Rhamnaceae), P. J. Robin.

The present taxon is similar to *Meliola gouaniae* Hansf. known on *Gouania* sp. from Sierra Leone and Java. However, the new variety differs from the var. *gouaniae* in having longer and not torulose but dentate mycelial setae.

***Meliola gouaniicola* Hosag. & Robin, Bioscience Discovery 2(2): 266, 2011. (Fig. 72)**

Colonies amphigenous, dense, velvety, up to 4mm in diameter, confluent. Hyphae substraight to slightly undulate, branching opposite to irregular at acute angles,



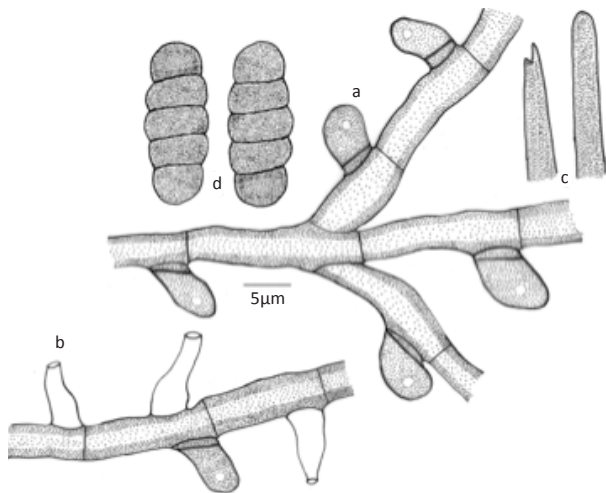
**Figure 70. *Meliola gluticola***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

loosely reticulate, cells 22–26x4–7 µm. Appressoria alternate to 5% unilateral, antrorse to sub antrorse, 13–18 µm long; stalk cells cylindrical to cuneate, 2–6 µm long; head cells globose, subglobose to oblong, 9–13x6–13 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 15–22x4–6 µm. Mycelial setae scattered, grouped around perithecia straight, simple, obtuse at the tip, up to 360µm long. Perithecia scattered, verrucose, up to 121µm in diameter; ascospores oblong to ellipsoidal, 4-septate, constricted at the septa, 28–33x11–12 µm.

**Materials examined:** TBGT 4654 (holotype), HCIO 50737 (isotype), 24.xi.2007, Karnataka, Coorg, Galibeedu, on leaves of *Gouania* sp. (Rhammanaceae), P.J. Robin.

*Meliola gouaniae* Hansf. is known on *Gouania* sp. from Sierra Leone and Java. However the *M. gouaniicola* differs from *M. gouaniae* in having striagt and obtuse mycelia setae torulose but dentate mycelial setae.



**Figure 71. *Meliola gouaniae* var. *keralica***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola harpullicola* sp. nov.** Hosag. & Sabeena

(Fig. 73; MycoBank 803914)

Colonies epiphyllous, subdense to dense, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 22–37x5–10 µm. Appressoria alternate to unilateral, antrorse to subantrorse, 15–20 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate, entire, 10–15x7–3 µm. Phialides numerous, mixed with appressoria, alternate to opposite, ampulliform, 10–25x5–7 µm. Mycelial setae numerous, scattered, simple, straight to uncinuate, up to 320µm long, obtuse, 1–3 dentate but predominantly cristate at the tip. Perithecia scattered, orbicular, up to 170µm in diam.; ascospores oblong, 4-septate, constricted at the septa, 37–42x12–15 µm.

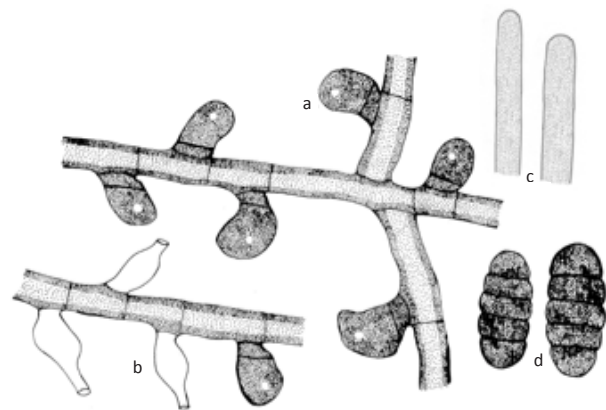
**Materials examined:** TBGT 5749 (holotype), 3.i.2011, Kerala, Kollam, Choziyakodu, on leaves of *Harpullia arborea* (Blanco) Radlk. (*H. imbricate* (Blume) Thwaites) (Sapindaceae), V.B. Hosagoudar et al. Part of the collection is deposited in HClO, New Delhi.

**Etymology:** Named after the host genus.

This species stands distinct from the other *Meliola* species known on the members of Sapindaceae in having straight to uncinuate mycelial setae having obtuse to cristate apical tip (Hansford 1961; Hosagoudar 1996, 2008; Hu et al. 1996, 1999).

***Meliola homonoiae*** Hosag. & Sabeena, Bulletin of Basic & Applied Plant Biology 1(1): 49, 2011. (Fig. 74)

Colonies mostly hypophyllous, subdense, velvety, up to 2mm in diameter, confluent. Hyphae crooked,



**Figure 72. *Meliola gouaniicola***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

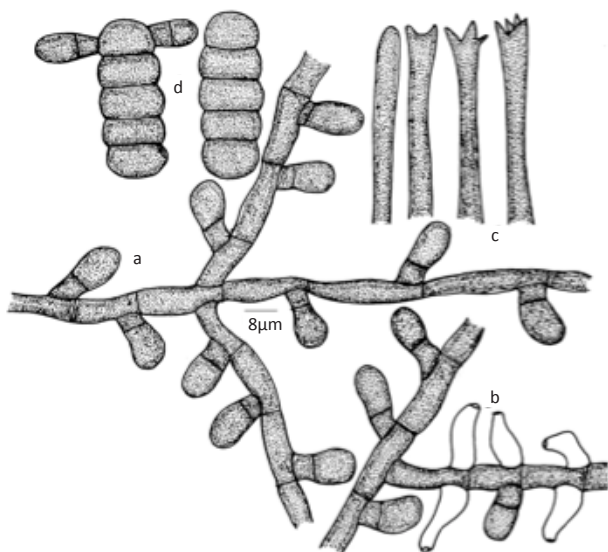
branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 15–32x7–10 µm. Appressoria alternate to unilateral, straight to curved, antrorse to subantrorse, 17–22 µm long; stalk cells cylindrical to cuneate, 5–7 µm long; head cells globose to ovate, entire, angular to lobate, 12–15x10–15 µm. Phialides mixed with appressoria, opposite, alternate to unilateral, ampulliform, 17–32x5–12 µm. Mycelial setae scattered, simple, straight, up to 650µm long, acute to obtuse at the tip. Perithecia scattered, up to 150µm in diam.; ascospores cylindrical, 4-septate, constricted at the septa, 40–50x17–22 µm.

**Material examined:** TBGT 5097 (Holotype *p.p.*), 25.iii.2009, Kerala, Kottayam, Koruthodu, on leaves of *Homonoia riparia* Lour. (Euphorbiaceae), V. Gireesh Kumar et al. Part of the collection has been deposited in HClO, New Delhi.

*Meliola romosii* Sydow is known on this host from Philippines and India (Hansford 1961; Hosagoudar 1996). However, the present new species differs from it in having crooked hyphae, longer mycelial setae and ascospores.

***Meliola hoveniae*** Hosag., Dhivaharan & Riju, J. Sci. Trans. Techn. 4(4): 166, 2011. (Fig. 75)

Colonies amphigenous, thin, confluent, 1–2 mm in diameter. Hyphae flexuous, branching alternate at acute to wide angles, loosely reticulate, cells 25–27x7–9 µm. Appressoria alternate, straight to curved, antrorse to retrorse, 24–25 µm long; stalk cells cylindrical to cuneate, 7–10 µm long; head cells ovate, globose, truncate to attenuated at the apex, sublobate, 15–17x12–15 µm. Phialides on borne on a separate mycelial branch, alternate, unilateral, opposite, ampulliform, 17–22x7–10



**Figure 73. *Meliola harpullicola* sp. nov.**

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

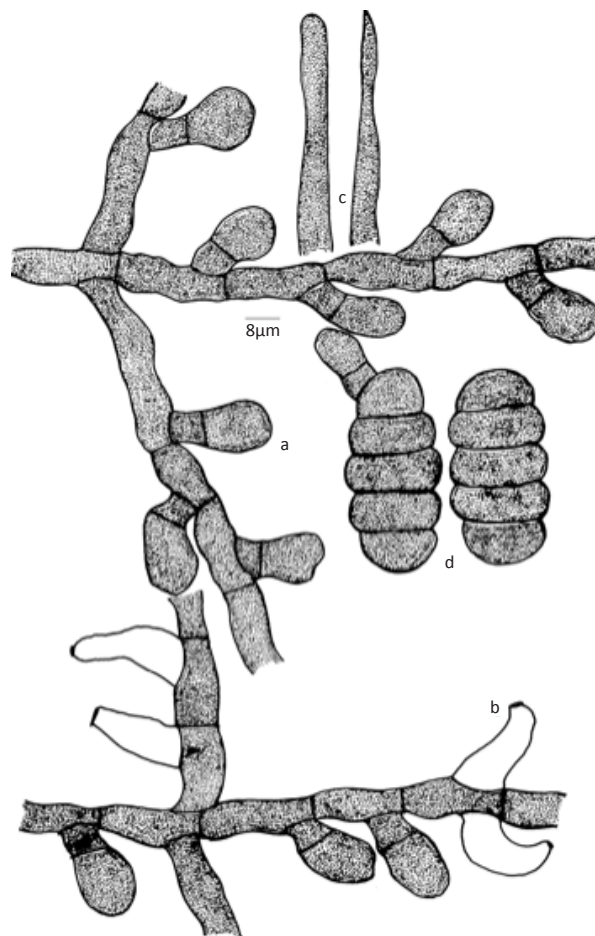
µm. Mycelial setae grouped around perithecia, simple, straight, acute to obtuse at the tip, up to 360µm long. Perithecia scattered to connate, globose, up to 205µm in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 42–45x15–17 µm.

**Materials examined:** TBGT 4442 (holotype), HCIO 50525 (isotype), 25.x.2007, Tamil Nadu, Kodaikanal, Kukkal shola, Periyakanal, on leaves of *Hovenia acerba* Lindl. (Rhamnaceae), V. Dhivaharan et al.

*Meliola ziziphi* Hansf. & Theiss. and *Meliola krugiodendr* Cif. can be compared with the present species. However, differs from both in having angular and truncate head cells of appressoria (Hansford 1961).

***Meliola hugoniae*** Hanf. & Deight., Mycol. Pap. 23: 5, 1948; Hansf. Sydowia Beih. 2: 91, 1961; Hosag., Jacob Thomas & Agarwal, Taprobanica 3(1): 43, 2011. (Fig. 76)

Colonies epiphyllous, subdense to dense, velvety, up to 2mm in diameter. Hyphae straight to substraight, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 15–29x4–7 µm. Appressoria opposite, about 2% alternate to unilateral, straight to curved, antrorse to spreading, 13–20 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate to oblong, entire, broadly rounded at the apex, 11–15x6–9 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 17–26x5–7 µm. Mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse at the tip, up to 1200µm long. Perithecia scattered, up to 160µm in diam.; ascospores obovoidal,



**Figure 74. *Meliola homoniae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

4-septate, constricted at the septa, 28–41x11–17 µm.

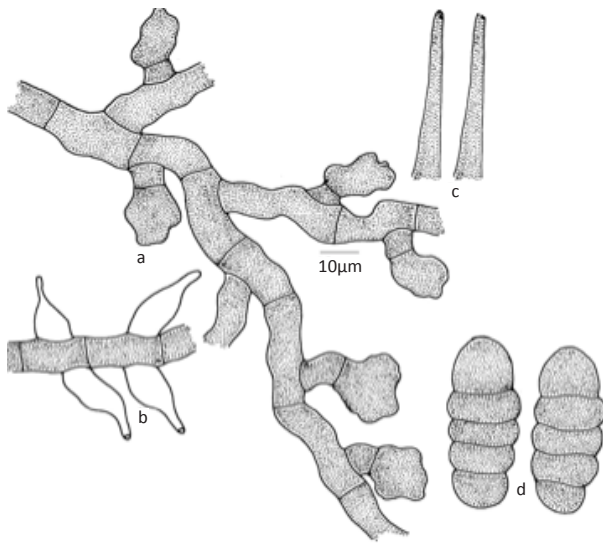
**Materials examined:** HCIO 49036, TBGT 3291, 28.ii.2007, Kerala, Kannur, Aaralam Wildlife Sanctuary, on leaves of *Hugonia belli* Sedgwick (Linaceae), Jacob Thomas et al.

This is the only species known on this host genus from India (Hosagoudar 1996, 2008).

***Meliola ichnocarpi-volubili*** Hansf., Sydowia 16: 320, 1963. (Fig. 77)

Colonies amphigenous, mostly epiphyllous, dense, velvety, up to 3mm in diameter, confluent and covering almost an entire upper surface of the leaves. Hyphae straight to substraight, branching opposite at acute to wide angles, closely reticulate, cells 16–29x4–7 µm. Appressoria alternate, about 5% unilateral, straight to curved, antrorse to spreading, 9–15 µm long; stalk cells cylindrical to cuneate, up to 3µm long; head cells globose to subglobose, ovate, entire, 7–12x7–10 µm.





**Figure 75. *Meliola hoveniae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

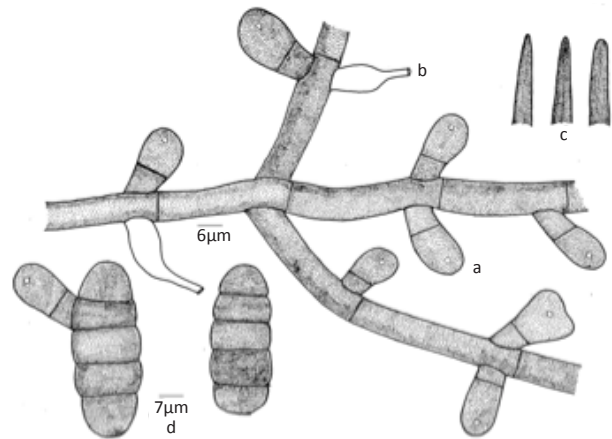
Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–19x4–10 µm. Mycelial setae numerous, scattered, straight, simple, acute to obtuse at the tip, up to 420µm long. Perithecia scattered, verrucose, up to 130µm in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted, 26–38x12–14 µm.

**Materials examined:** HCIO 49017, TBGT 3272, 18.xi.2007, Kerala, Thiruvananthapuram, Peppara Wildlife Sanctuary, near Peppara Dam, on leaves of *Quirvelia frutescens* (L.) M.R. Almeida & S.M. Almieda (*Ichnocarpus frutescens* (L.) R. Br (Apocyanaceae), Jacob Thomas.

*Meliola ichnocarpium* Hansf. & Thirum and *Meliola ichnocarpium-volubilis* Hansf. are known on this host genus. The former species differs from the latter in having longer appressoria (15–30) and larger ascospores (40–48x20–28 µm). Hence, the present species is accommodated in the latter species. This species was known on *Ichnocarpus volubilis* from Philippines and is reported here for the first time from India (Hansford 1961; Hosagoudar 1996, 2008).

***Meliola kakachiana* Hosag. var. *poochiparensis* Hosag. & Sabeena, Plant Pathology & Quarantine 3(1): 12, 2012. (Fig. 78)**

Colonies hypophyllous, subdense, up to 3mm in diameter, confluent. Hyphae straight to substraight, branching opposite to unilateral at acute to wide angles, loosely to closely reticulate, cells 17–35x5–7 µm. Appressoria alternate, about 40% opposite, antrorse to subantrorse, 12–17 µm long; stalk cells cylindrical



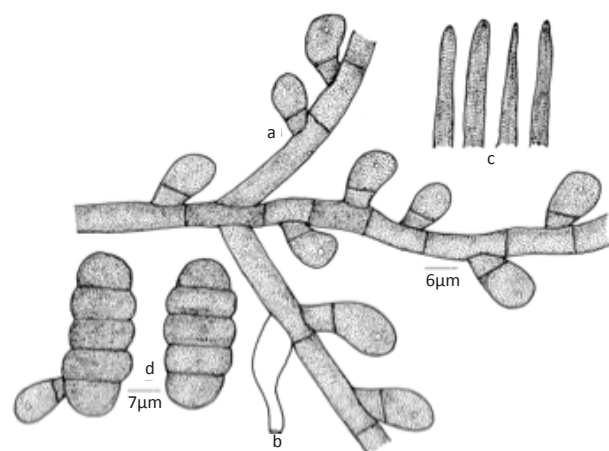
**Figure 76. *Meliola hugoniae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

to cuneate, 2–5 µm long; head cells globose, entire, 10–12x12–15 µm. Phialides mixed with appressoria, opposite, ampulliform, 12–20x5–10 µm. Mycelial setae numerous, scattered, simple, straight, up to 950µm long, acute, obtuse to dentate at the tip. Perithecia scattered, orbicular, up to 190µm in diam.; ascospores cylindrical to oblong, 4-septate, constricted at the septa, 40–45x17–22 µm.

**Materials examined:** TBGT 5734 (holotype), 8.iii.2010, Kerala, Palghat, Silent Valley, Poochippara, on leaves of *Litsea* sp. (Lauraceae), P.J. Robin et al. Part of the collection has been deposited in HCIO, New Delhi.

Based on the alternate and opposite appressoria and digital formula it is similar to *M. dactylipoda* Sydow var. *brevipoda* Hansf. and *M. acutiseta* Sydow known on *Cryptocarya patentinervis* and *Persea piriiformis* from



**Figure 77. *Meliola ichnocarpium-volubilis***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

New South Wales and Philippines. However, differs from both in having shorter appressoria and globose head cells. This collection is similar to the assigned species but differs from it in having more number of opposite appressoria and smaller ascospores (Hansford 1961).

***Meliola kamettiae*** Hosag. & Riju, J. Threatened Taxa 2(4): 825, 2010. (Fig. 79)

Colonies hypophyllous, scattered, dense, velvety, up to 4µm in diam., rarely confluent. Hyphae straight to substraight, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 13–35x4–7 µm. Appressoria alternate, unilateral, straight, antrorse, 11–20 µm long; stalk cells cylindrical to cuneate, 2–9 µm long; head cells ovate, globose, 7–13x6–11 µm. Phialides mixed with appressoria, opposite, alternate, unilateral, ampulliform 11–22x4–7 µm. Mycelial setae numerous, up to 260µm long, simple, straight, few slightly curved to uncinata, obtuse, bifid, trifid, often subdentate to furcated to branched at the tip, branches up to 30µm long. Perithecia scattered, up to 150µm in diam.; ascospores cylindrical, 4-septate, slightly constricted at the septa, 26–33x8–11 µm.

**Materials examined:** HCIO 48175 (holotype), TBGT 2911 (isotype), 29.ix.2007, on leaves of *Kamettia caryophyllata* Roxb. (Apocynaceae), 16<sup>th</sup> mile, Padinharathara,

Wayanad, Kerala, M. C. Riju.

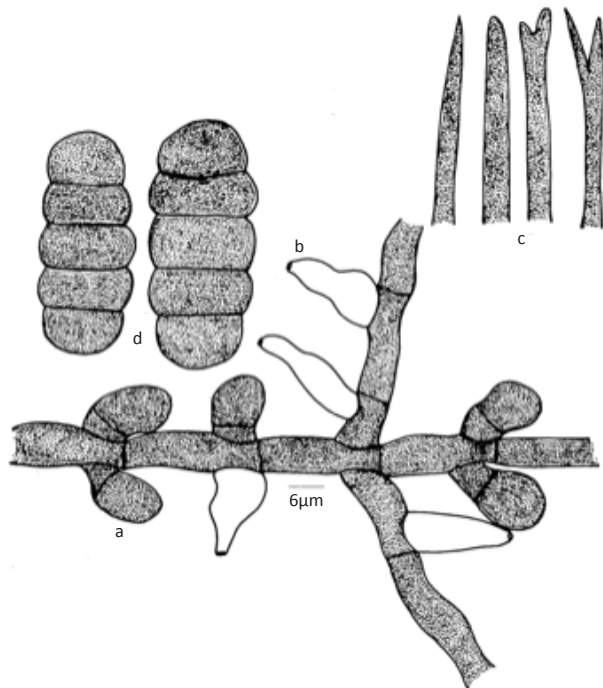
Straight, slightly curved to uncinata, obtuse, bifid, trifid, often subdentate to furcated mycelial setae distinguishes this taxon from rest of the *Meliola* species reported on the members of the family Apocynaceae (Hansford 1961; Hosagoudar 1996, 2008; Hosagoudar et al. 1997).

***Meliola kanniyakumariana*** Hosag. var. ***brahmagiriense*** Hosag., Agarwal, H. Biju & Archana, Indian Phytopath. 59: 347, 2006. (Fig. 80)

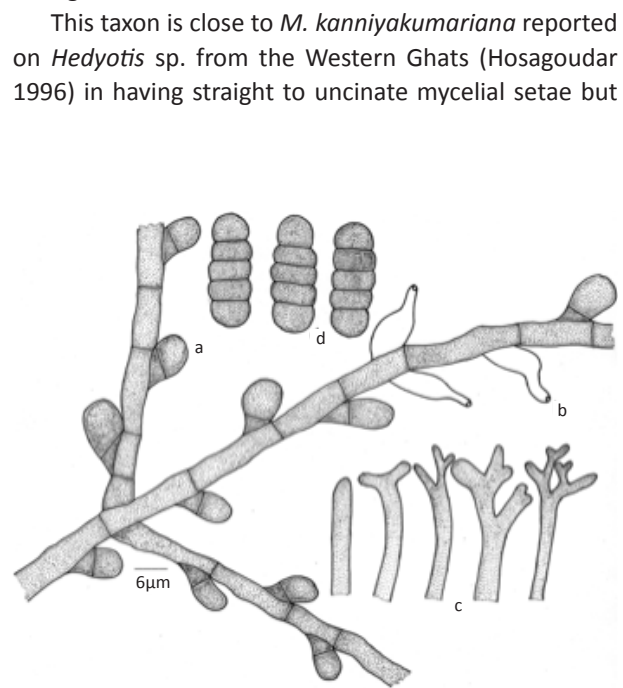
Colonies amphigenous rarely hypophyllous, sub-dense, up to 3mm in diameter, confluent. Hyphae sub straight, branching opposite to irregular at acute angles, loosely to closely reticulate, cells 14–24x6–8 µm. Appressoria alternate to unilateral, antrorse, spreading, straight, 14–22 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells globose, ovate, straight, entire, 9–14x8–11 µm. Phialides mixed with appressoria, ampulliform, opposite to alternate, 12–22x6–10 µm. Mycelial setae numerous, simple, straight to slightly curved, acute to obtuse at the tip, up to 216µm long. Perithecia globose, scattered to grouped up to 147µm in diameter; ascospores obovoidal to cylindrical, 4-septate, slightly constricted at the septa, 30–35x11–14 µm.

**Material examined:** HCIO 46304 (holotype), TBGT 1950 (isotype), 13.xi.2003, Karnataka, Talakaveri, Brahmagiri, on leaves of *Knoxia* sp. (Rubiaceae), V.B. Hosagoudar et al.

This taxon is close to *M. kanniyakumariana* reported on *Hedyotis* sp. from the Western Ghats (Hosagoudar 1996) in having straight to uncinata mycelial setae but



**Figure 78. *Meliola kakachiana* var. *poochiparensis***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



**Figure 79. *Meliola kamettiae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

differs from it in having phialides with appressoria.

***Meliola kannurensis*** Hosag., Archana, Khaleel & Soumya, Bioscience Discovery 2(3): 348, 2011. (Fig. 81)

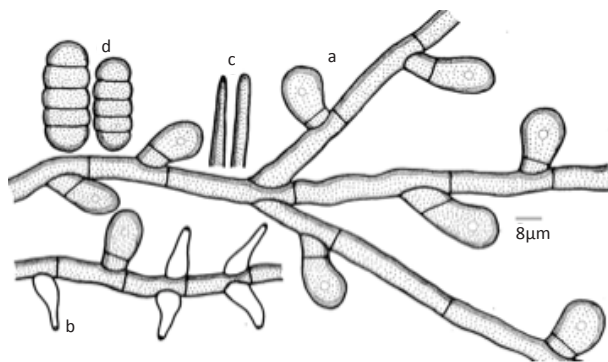
Colonies epiphyllous, thin to subdense, up to 5mm in diameter, confluent. Hyphae straight, substraight, branching opposite at acute to wide angles, loosely to closely reticulate, cells 16–27x6–10  $\mu$ m. Appressoria opposite, alternate, antrorse to subantrorse, 16–23  $\mu$ m long; stalk cells cylindrical to cuneate, 3–6  $\mu$ m long; head cells oblong, ovate, entire to slightly angular, 13–17x9–13  $\mu$ m. Phialides mixed with appressoria, alternate, opposite, ampulliform, 16–23x9–12  $\mu$ m. Mycelial setae numerous, simple, acute, obtuse to dentate at the tip, up to 882 $\mu$ m long. Perithecia scattered, up to 176 $\mu$ m in diameter; ascospores cylindrical, 4-septate, constricted at the septa, 39–43x13–17  $\mu$ m.

**Materials examined:** TBGT 4942 (holotype), HClO 51025 (isotype), 21.i.2011, Kerala, Kannur, Payyannur, Edat, on leaves of *Ficus gibbosa* Bl. (Moraceae), M. Soumya.

Based on the alternate and opposite appressoria, *Meliola kannurensis* is similar to *M. chlorophorae* Hansf. reported on *Chlorophora excelsa* from Uganda but differs from it having both acute, obtuse and dentate and longer mycelial setae (Hansford 1961).

***Meliola knemae*** Hosag. & Robin, Bioscience Discovery 2(2): 266, 2011. (Fig. 82)

Colonies epiphyllous, thin, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching opposite to alternate at acute to wide angles, loosely reticulate, cells 22–29x7–10  $\mu$ m. Appressoria alternate to unilateral, antrorse to subantrorse, 19–24  $\mu$ m long; stalk cells cylindrical to cuneate, 5–10  $\mu$ m long; head cells ovate to oblong, entire, 14–17x7–10  $\mu$ m.



**Figure 80. *Meliola kanniyakumariana* var. *brahmagiriense***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

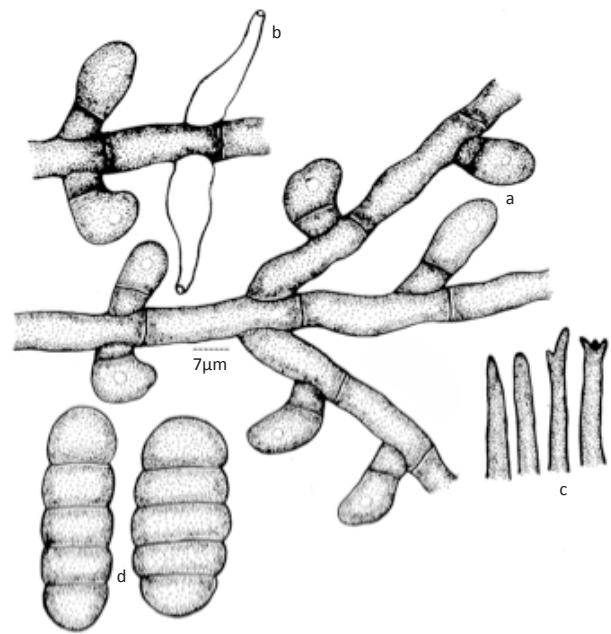
Phialides mixed with appressoria, opposite to alternate, ampulliform, 1.7–24x7–10  $\mu$ m. Mycelial setae grouped around perithecia, simple, straight, acute to obtuse at the tip, up to 750 $\mu$ m long. Perithecia scattered, verrucose, up to 173 $\mu$ m in diam.; ascospores ellipsoidal, 4-septate, constricted at the septa, 36–43x14–19  $\mu$ m.

**Material examined:** TBGT 4653 (holotype), HClO 50736 (isotype), 2.iii.2008, Kerala, Kottayam, Ponthanpuzha reserve forest, on leaves of *Knema attenuata* (Wall.ex Hook.f.) Thoms. (Myristicaceae), P.J. Robin.

*Meliola myristicae* Hosag. and Raghu is the only species known on *Myristica fatuo* Houtl var. *magnifico* (Bedd.) Sinclair (Myristicaceae) from Gerusoppa, Uttara Kannada, Karnataka (Hosagoudar 1996). However, this species differs from it in having entire, ovate to oblong head cells of appressoria.

***Meliola knowltoniae*** Doidge, Bothalia 1: 308, 1924; Hansf., Sydowia Beih. 2: 62, 1961. (Fig. 83)

Colonies epiphyllous, dense, up to 4mm in diameter, confluent. Hyphae substraight to flexuous, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 25–47x5–7  $\mu$ m. Appressoria alternate to unilateral antrorse, subantrorse to retrorse 22–32  $\mu$ m long; stalk cells cylindrical, 7–12  $\mu$ m long; head cells, ovate, entire, angular to sublobate, 15–20x5–12  $\mu$ m. Phialides mixed with appressoria, opposite, ampulliform, 15–25x5–7  $\mu$ m. Mycelial setae scattered,



**Figure 81. *Meliola kannurensis***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



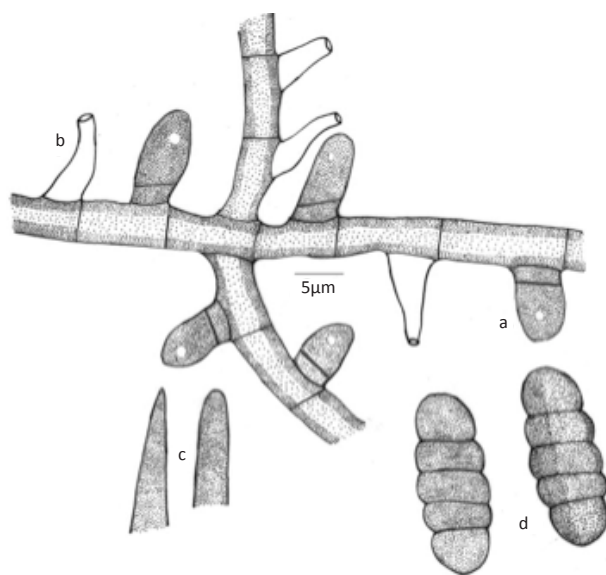
simple, straight, obtuse at the tip, up to 490µm long. Perithecia scattered orbicular, up to 170µm in diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 37–40x14–18 µm.

**Materials examined:** TBGT 5816, 9.i.2010, on leaves of *Clematis* sp. (Ranunculaceae), Igguthappa temple, Kodagu, Karnataka, C. Jagath Thimmiah.

***Meliola kukkeensis*** Hosag., Archana. & Agarwal, Hosag., Archana. & Agarwal, Indian Phytopath. 60: 240, 2007. (Fig. 84)

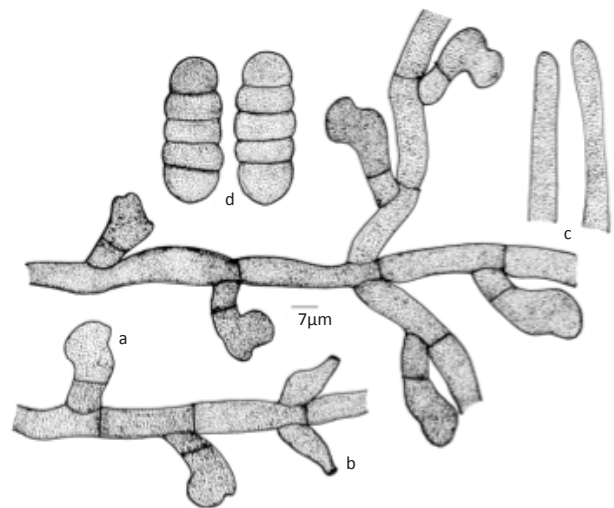
Colonies amphigenous, sub-dense, up to 2mm in diameter, confluent. Hyphae straight to sub-straight, branching opposite, alternate to irregular at acute to wide angles, loosely reticulate, cells 16–40x6–8 µm. Appressoria alternate, unilateral, antrorse to retrorse, straight to curved, 16–30 µm long; stalk cells cylindrical to cuneate, 6–11 µm; head cells oblong, ovate, curved, entire to angular, 10–22x10–16 µm. Phialides mixed with appressoria, opposite to alternate, unilateral, 16–29x6–11 µm. Mycelial setae straight, acute, obtuse, dentate to furcate at the tip, very long up to 1196µm long. Perithecia globose, up to 160µm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 48–53x17–22 µm.

**Material examined:** HCIO (holotype), TBGT 2075 (isotype), 15.xi.2003, Karnataka, South Canara, Kukke Subramanya, on leaves of *Syzygium* sp. (Myrtaceae), V.B. Hosagoudar et al.



**Figure 82. *Meliola knemae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Figure 83. *Meliola knowltoniae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

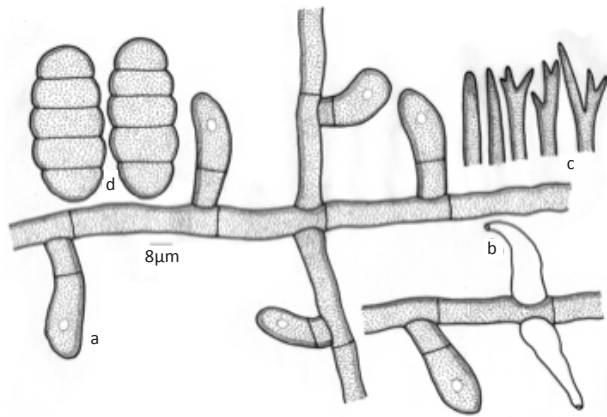
This species differs from all the known *Meliola* species on the members of the family Myrtaceae in having simple, dentate to furcate mycelial setae (Hansford 1961; Hosagoudar 1996; Hosagoudar et al. 1997; Hosagoudar & Abraham 1998).

***Meliola lophopetaligena*** Hosag. & Robin, J. Threatened Taxa 3(3): 1785, 2011. (Fig. 85)

Colonies epiphyllous, dense, velvety, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite at acute angles, loosely to closely reticulate, cells 22–31x7–12 µm. Appressoria opposite, about 3% alternate, arranged after an intermittent interval (in most places mycelium devoid of appressoria), closely antrorse, antrorse to subantrorse, 19–26 µm long; stalk cells cylindrical to cuneate, 2–7 µm long; head cells ovate, globose, entire, angular to slightly lobate, 10–14x7–10 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 19–26x9–12 µm. Mycelial setae numerous, scattered, simple, straight, acute to obtuse at the tip, up to 780µm long. Perithecia scattered, globose, up to 250µm in diameter; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 36–46x12–17 µm, wall smooth.

**Materials examined:** HCIO 48792 (holotype), TBGT 3168 (isotype), 9.xi.2007, Kerala, Kottayam, Ponthanpuzha, on leaves of *Lophopetalum wightiana* Arn. (Celastraceae), P.J. Robin.

*Meliola lophopetali* Stev. ex Hansf. Is known on *Lophopetalum toxicum* from Philippines. However, *Meliola lophopetalilola* differs from it in having



**Figure 84. *Meliola kukkeensis***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

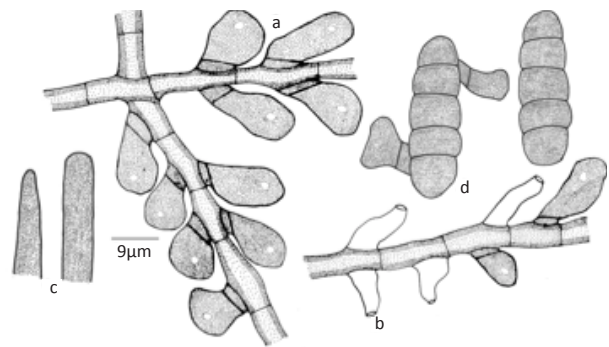
closely arranged longer appressoria arranged after an intermittent intervals, longer mycelial setae and larger ascospores (Hansford 1961). It also differs from *Meliola chennaiana* Hosag. & Goos known on *Lophopetalum* sp. from Chennai, Eastern Ghats in having 3% opposite appressoria, ovate, globose, entire, angular to slightly lobate head cells of the appressoria and phialides mixed with appressoria (Goos & Hosagoudar 1998).

***Meliola luculiae*** Hosag., Dhivaharan & Riju, J. Sci. Trans. Technov. 4(4): 167, 2011. (Fig. 86)

Colonies amphigenous, thin, scattered, 1–2 mm in diameter. Hyphae flexuous, branching alternate at acute to wide angles, loosely to closely reticulate, cells 22–30x6–7 µm. Appressoria alternate, antrorse to subantrorse, straight to curved, 22–25 µm long; stalk cells cylindrical to cuneate, 7–10 µm long; head cells cylindrical, ovate, angular to sublobate, 15–17x10–12 µm. Phialides borne on a separate mycelial branch, alternate, opposite to unilateral, ampulliform, 15–17x7–10 µm. Mycelial setae numerous, grouped around perithecia, simple, straight, obtuse at the tip, up to 300µm long. Perithecia scattered to loosely grouped, up to 190µm in diam.; ascospores cylindrical, 4-septate, constricted at the septa, 42–45x15–17 µm.

**Materials examined:** TBGT 4443 (holotype), HCIO 50526 (isotype), 4.iv.2008, Tamil Nadu, Kukkal shola, Periyakanal, on leaves of *Lucculia grandifolia* Ghose (Rubiaceae), V. Dhivaharan et al.

Based on the digital formula 3111. 4221, it is closer to *Meliola mitragynicola* Deight, *M. mitragynicola* var. *leonensis* (Hansf. & Deight.) Deight. and *M. henryi* Hansf. var. *oldenlandiae* Hosag. but differs from all in having angular to sublobate head cells of the appressoria and



**Figure 85. *Meliola lophopetaligena***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

shorter mycelial setae (Hansford 1961; Hosagoudar 1996; 2008).

***Meliola luvungicola*** Hosag. & Rajkumar, Hosag., Archana. & Agarwal, Indian Phytopath. 60: 241, 2007. (Fig. 87)

Colonies epiphyllous, thin, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely to closely reticulate, cells 11–29x6–8 µm. Appressoria alternate to unilateral, antrorse, 11–24 µm; stalk cells cylindrical to cuneate, 3–8 µm long; head cells oblong, sublobate, angular, straight to curved, 8–16x8–14 µm. Phialides mixed with appressoria, few, opposite, ampulliform, 11–16x6–8 µm. Mycelial setae scattered, simple, straight, acute at the tip, up to 314µm long. Perithecia scattered, globose, up to 128µm in diameter; ascospores 4-septate, constricted at the septa, 27–30x9–11 µm.

**Material examined:** HCIO 47056 (holotype), TBGT 2273 (isotype), 2.i.2002, Kerala, Thiruvananthapuram, Chemunji, on leaves of *Luvunga* sp. (Rutaceae), G. Rajkumar.

*Meliola luvungae* Hosag. is known on this host from Idukki region of the Western Ghats. However, *Meliola luvungicola* differs from it in having typically lobate head cells of the appressoria and smaller ascospores (Hosagoudar & Goos 1990; Hosagoudar 1996).

***Meliola mahamulkarii*** Hosag., Robin & Archana, J. Appl. & Nat. Sci. 2: 93, 2010. (Fig. 88).

Colonies amphigenous, mostly epiphyllous dense, up to 2mm in diameter. Hyphae straight to substraight, branching opposite at acute angles, densely reticulate, cells 24–31x5–7 µm. Appressoria opposite to alternate, antrorse, 12–17 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate to globose,

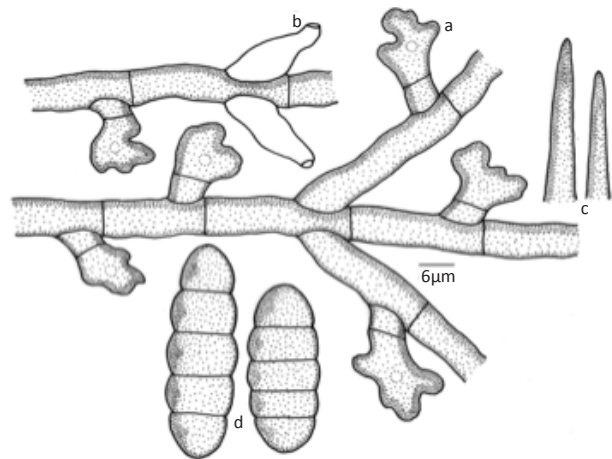
entire, 7–12x5–7  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–19x7–10  $\mu\text{m}$ . Mycelial setae scattered, straight, simple, obtuse at the tip, up to 440 $\mu\text{m}$  long. Perithecia scattered, up to 178 $\mu\text{m}$  in diam.; ascospores obovoidal, 4-septate, constricted at the septa, 43–50x17–19  $\mu\text{m}$ .

**Materials examined:** TBGT 3688 (holotype), HCIO 49443 (isotype), 01.i.2009, Maharashtra, on the way to Mahabeleswar, on leaves of *Osyris arborea* Wall. (Santalaceae), V.B. Hosagoudar et al.

*Meliola osyridicola* Hansf. and *Meliola osyridicola* Hansf. var. *indica* Hosag. are known on the host genus from the western Ghats of peninsular however *Meliola mahamulkarii* differs from both having 75% opposite appressoria.

***Meliola manoharacharyi*** Hosag., Riju & Agarwal, Indian Phytopath. 63: 76, 2010. (Fig. 89)

Colonies epiphyllous, scattered, thin, up to 2 $\mu\text{m}$  diameter, confluent. Hyphae straight to substraight, branching mostly opposite, rarely unilateral at acute to wide angles, loosely reticulate, cells 12–38x6–8  $\mu\text{m}$ . Appressoria opposite (48%), alternate, unilateral, antrorse to sub antrorse, 15–23  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–8  $\mu\text{m}$  long; head cells globose, ovate, rarely truncate, entire, 7–18x7–13  $\mu\text{m}$ . Phialides mixed with appressoria, mostly opposite, often unilateral to alternate, ampulliform, 20–25x7–10  $\mu\text{m}$ . Mycelial setae simple, straight to slightly curved,

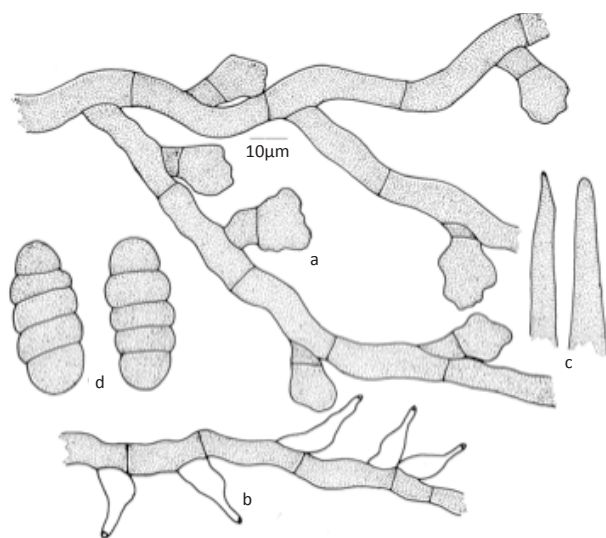


**Figure 87. *Meliola luvungicola***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

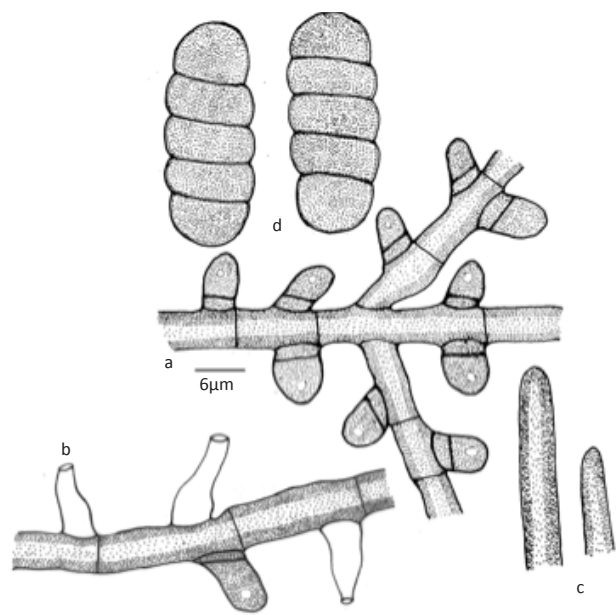
acute to 1–3 times dentate at the tip, up to 1050 $\mu\text{m}$  long. Perithecia scattered, varrucose, up to 163 $\mu\text{m}$  in diameter; ascospores cylindrical, 4-septate, constricted at the septa, 50–53x20–23  $\mu\text{m}$ .

**Materials examined:** HCIO 49198 (holotype), TBGT 3437 (isotype), 1.vii.2008, Kerala, Palakkad, Silent Valley National Park, on leaves of *Myristica* sp. (Myristicaceae), M.C. Riju et al.

*Meliola knemicola* Hansf., *M. uncinata* Sydow and *M. pycnanthi* Hansf. are known on the members of the family Myristicaceae (Hansford 1961). *Meliola manoharacharyi*



**Figure 86. *Meliola luculiae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Figure 88. *Meliola mahamulkarii***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

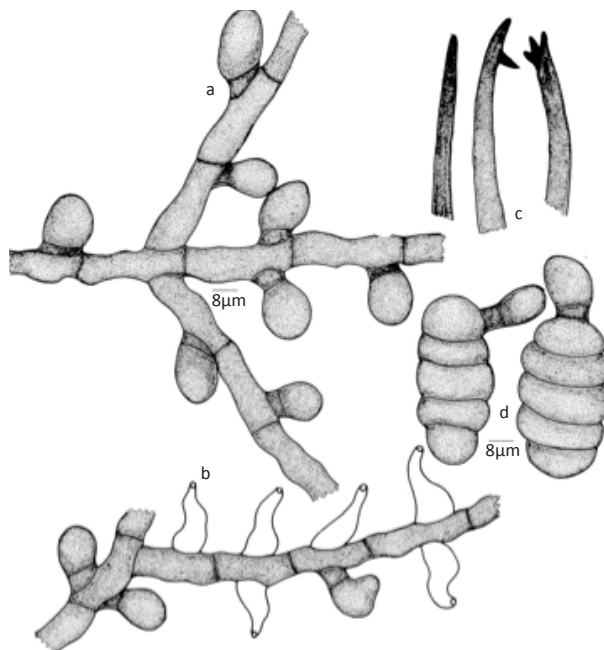


differs from the latter two species in having straight mycelial setae and from *Meliola knemicola* in having opposite appressoria. *Meliola knemicola* Hansf. var. *minor* Song & Ouyang and *M. myristicae* Hosag. & Raghu are known from China and the Western Ghats of Peninsular respectively, differ from the present taxon in absence of opposite appressoria and dentate mycelial setae (Hosagoudar 1996; Hosagoudar et al. 1997; Hosagoudar & Agarwal 2008; Hu et al. 1996, 1999).

***Meliola meghalayensis*** Hosag., Jacob. & Robin, *Indian J. Sci. Technov.* 2(6): 3, 2009. (Fig. 90)

Colonies epiphyllous, thin, up to 2mm in diameter. Hyphae straight to substraight, branching opposite at wide angles, closely reticulate and form a mycelial net, cells 21–31x7–10 µm. Appressoria alternate and about 2% unilateral, straight to curved, antrorse to subantrorse, 24–29 µm long; stalk cells cylindrical to cuneate, 10–12 µm long; head cells subglobose to ellipsoidal, entire to slightly angular, 14–19x12–19 µm. Phialides mixed with appressoria, opposite to unilateral, ampulliform, 17–26x9–12 µm. Mycelial setae grouped around perithecia, simple, straight, acute, obtuse to dentate at the tip, up to 820µm long. Perithecia scattered, globose, verrucose, up to 180µm. in diam.; ascospores cylindrical to ellipsoidal, 4-septate, constricted at the septa, 41–43x14–19 µm.

Materials examined: HCIO 48069 (holotype),



**Figure 89. *Meliola manoharacharyi***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

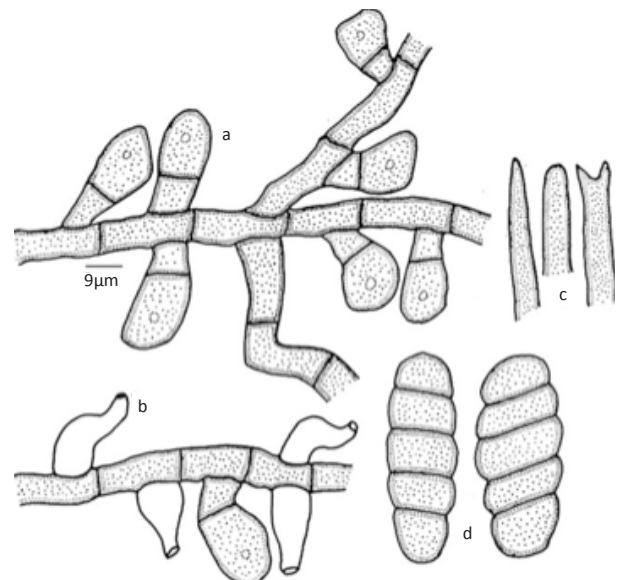
TBGT 2852 (isotype), 18.i.2007, Meghalaya, Shillong, Lumshillong, on leaves of *Castanopsis armata* Spach. (Fagaceae), Jacob Thomas & P.J. Robin.

This species differs from *Meliola taiwaniona* Yamam. and *M. melanochaeta* Sydow in having simple to dentate mycelial setae. However, it differs from both in having entire head cells of appressoria and smaller ascospores (Hansford 1961). It also differs from *M. bosei* Hosag. in having longer appressoria, mycelial setae and larger ascospores (Hosagoudar 1996).

***Meliola mesuae*** Hosag., Jacob Thomas & Agarwal, *Nelumbo* 52:5, 2010. (Fig. 91)

Colonies amphigenous, mostly epiphyllous, dense, up to 4mm in diameter, rarely confluent. Hyphae straight, branching opposite at acute to wide angles, loosely to closely reticulate, cells 15–26x6–9 µm. Appressoria alternate, about 2% opposite, closely arranged, antrorse to subantrorse, straight to curved, 17–29 µm long; stalk cells cylindrical to cuneate, 4–13 µm long; head cells ovate to globose, entire, rarely angular, 11–20x13–18 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 13–26x6–9 µm. Mycelial setae few, straight, simple, acute at the tip, up to 280µm long. Perithecia scattered, verrucose, up to 180µm in diameter; ascospores cylindrical to ellipsoidal, 4-septate, slightly constricted at the septa, 37–42x17–20 µm.

Materials examined: HCIO 49074 (holotype), TBGT 3329 (isotype), 28.ii.2008, Kerala, Thiruvananthapuram,



**Figure 90. *Meliola meghalayensis***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

Peppara Wildlife Sanctuary, Bonoccord, Kombe, on leaves of *Mesua ferrea* L. (Clusiaceae), Jacob Thomas.

Based on the angular head cells of the appressoria, this species can be compared with *Meliola clusiae* Stev. known on *Clusia* spp. from Porto Rico and Surinam but differs from it in having regularly antrorse appressoria, possessing few mycelial setae and having smaller ascospores (Hansford 1961; Hosagoudar 1996, 2008; Hosagoudar et al. 1997; Hosagoudar & Agarwal, 2008).

***Meliola mutabilidis* sp. nov.** Hosag., Archana, Khaleel & Libina

(Fig. 92; MycoBank 803915)

**Etymology:** Based on the species name of the host plant

Colonies epiphyllous, dense, up to 2mm in diameter, scattered. Hyphae substraight to flexuous, branching mostly opposite at acute to wide angles, closely reticulate, cells 12–19x4–6  $\mu$ m. Appressoria alternate, unilateral, antrorse, 9–16  $\mu$ m long; stalk cells cylindrical to cuneate, 3–6  $\mu$ m long; head cells globose, ovate, entire to slightly angular, 6–13x6–10  $\mu$ m. Phialides mixed with appressoria, opposite, ampulliform, 12–28x7–10  $\mu$ m. Mycelial setae numerous, scattered to grouped around perithecia, simple, straight to curved, acute to obtuse at the tip, up to 294 $\mu$ m long. Perithecia scattered to grouped, up to 146 $\mu$ m in diameter; ascospores cylindrical, 4-septate, constricted at the septa, 32–35x11–13  $\mu$ m.

**Materials examined:** TBGT 4911 (holotype), HClO 50994 (isotype); TBGT 4923, HClO 51006, 21.i.2011, Kerala, Kannur, Mangattuparamba, Neeliyarkottam, on leaves of *Hibiscus mutabilis* L. (Malvaceae), M.P. Libina.

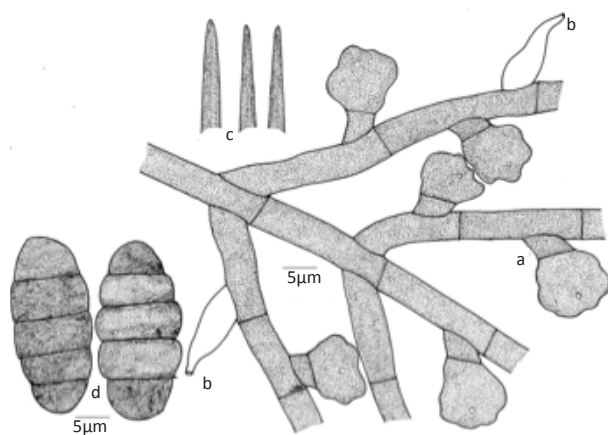
*Irenopsis molleriana* (Wint.) Stev. is known on this host from Sierra Leone (Hansford 1961) but differs from it

in having mycelial setae. *Meliola kydiae-calycinae* Hansf. & Thirum. is the only *Meliola* species on the members of the family Malvaceae. *M. mutabilidis* sp. nov. differs from it in having straight hyphae in contrast to crooked, having shorter appressoria 9–16  $\mu$ m (against 15–24  $\mu$ m) and having entire head cells of appressoria in contrast to lobate (Hansford 1961).

***Meliola ougeiniae*** R.K. Verma, N. Sharma & Soni, Forest fungi of India, p. 47, 2008. (Fig. 93)

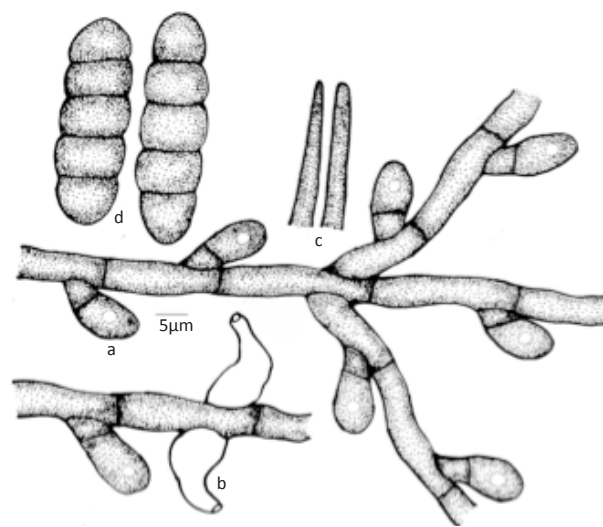
Colonies epiphyllous, subdense, up to 3mm in diam., confluent. Hyphae substraight, flexuous, branching opposite, alternate at acute to wide angles, closely to loosely reticulate, cells 24–40x4–6.5  $\mu$ m. Appressoria alternate, opposite (20%), unilateral, straight to curved, antrorse, subantrorse, retrorse, 8–19  $\mu$ m long; stalk cells cylindrical to cuneate, 1–12  $\mu$ m long; head cells globose, ovate, oblong, entire to slightly angular, 8–12x8–11  $\mu$ m. Phialides mixed with appressoria, alternate, opposite, unilateral, ampulliform, 11–24x6–8  $\mu$ m. Mycelial setae scattered to grouped around perithecia, simple, straight to slightly curved, acute at the tip, up to 637 $\mu$ m long. Perithecia scattered, up to 175 $\mu$ m in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 38–41x12–16  $\mu$ m.

**Materials examined:** TF201, HClO No. 46,449, 18.xii.2004, On leaves of *Ougeinia oojeinensis* (Roxb.) Hocherut (Fabaceae), Bhaisanghat, Balaghat (M.P.), R.K. Verma, GP 22°08'408" 81°05'500" Tropical Forest Research Institute.



**Figure 91. *Meliola musuae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Figure 92. *Meliola mutabilidis* sp. nov.**

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola palakkadensis*** Hosag., Agarwal, H. Biju & Archana, Indian Phytopathol. 60: 84, 2007. (Fig. 94)

Colonies hypophyllous, sub-dense, velvety, up to 10mm in diameter, confluent. Hyphae straight to undulate, branching mostly opposite to irregular at wide angles, loosely reticulate, cells 18–24x6–8  $\mu$ m. Appressoria alternate to unilateral, antrorse to sub-antrorse, straight to curved, 14–24  $\mu$ m long; stalk cells cylindrical to cuneate, 4–7  $\mu$ m long; head cells globose, ovate, slightly angular, entire, 9–18x8–13  $\mu$ m. Phialides mixed with appressoria, opposite to unilateral, ampulliform, 13–21x8–10  $\mu$ m. Mycelial setae numerous, scattered, straight, very few uncinuate, simple, acute to obtuse at the tip, up to 700 $\mu$ m long. Perithecia globose, scattered, up to 265 $\mu$ m in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 40–48x16–21  $\mu$ m.

**Material examined:** HClO 46140 (holotype), TBGT 1903 (isotype), 12.12.2003, On leaves of *Litsea* sp. (Lauraceae), Sairandhiri, Silent Valley, Palakkad, Kerala, V.B. Hosagoudar et al.

Based on the Beeli formula 3111.4333, this species is similar to *M. pushpangadani* Hosag. & Abraham (Hosagoudar et al. 1998) but differs from it in having dense colonies, shorter mycelial setae (against 1554  $\mu$ m) further, many setae are flexuous to uncinuate.

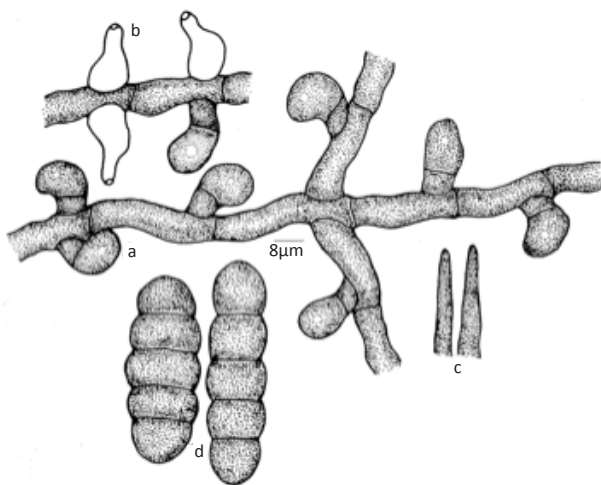
***Meliola pleurostylicola*** Hosag. & Sabu in Hosag., Archana. & Agarwal. Indian Phytopath. 60: 242, 2007. (Fig. 95)

Colonies mostly epiphyllous, rarely amphigenous, dense to subdense, up to 2mm in diameter, confluent.

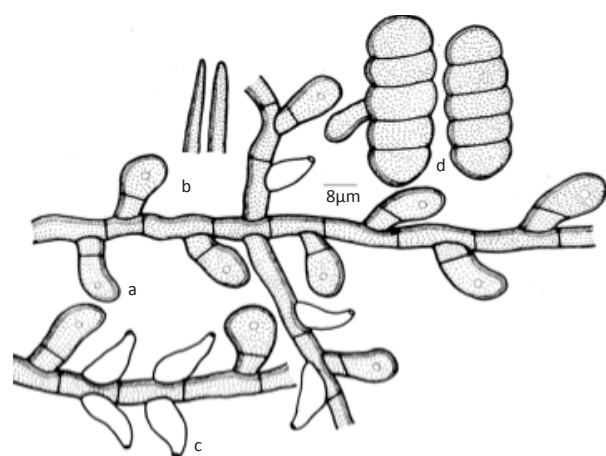
Hyphae substraight, branching opposite to irregular at acute to wide angles, closely reticulate, cells 12–17x4–5  $\mu$ m. Appressoria alternate, antrorse, 12–13  $\mu$ m long; stalk cells cylindrical to cuneate, 5–6  $\mu$ m long; head cells ovate, globose, entire, straight, 7–8x4–5  $\mu$ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 12–13x2–4  $\mu$ m. Mycelial setae many, simple, straight, acute to obtuse at the tip, up to 468  $\mu$ m long. Perithecia scattered, globose, up to 133 $\mu$ m in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 28–31x10–12  $\mu$ m.

**Material examined:** HClO 47317 (holotype), TBGT 2355 (isotype), 12.i.2005, Kerala, Thiruvananthapuram, Palode, JNTBGRI Campus, Arboretum, on leaves of *Pleurostyli* sp. (Celastraceae), T. Sabu.

*Asteridiella pleurostyli* (Berk. & Br.) Hansf. is known on *Pleurostyli* spp. from South Africa. However, *Meliola pleurostylicola* differs from it in having mycelial setae. *Meliola pleurostylicola* differs from *Meliola lophopetalii* Stev. ex Hansf., *M. daliasica* Petrak, *M. bhesae* Hosag. and *M. celastracearum* Hosag. & Dayal in having only alternate appressoria (Hansford 1961; Hosagoudar 1996). It also differs from all the *Meliola* species known on the members of Celastraceae in having 3-septate ascospores, only alternate appressoria and acute to obtuse tip of the mycelial setae (Hansford 1961, Hosagoudar 1996). It differs from *M. chennaiana* Hosag. & Goos in having shorter appressoria with entire head cells, phialides mixed with appressoria and smaller ascospores (Goos & Hosagoudar 1998).

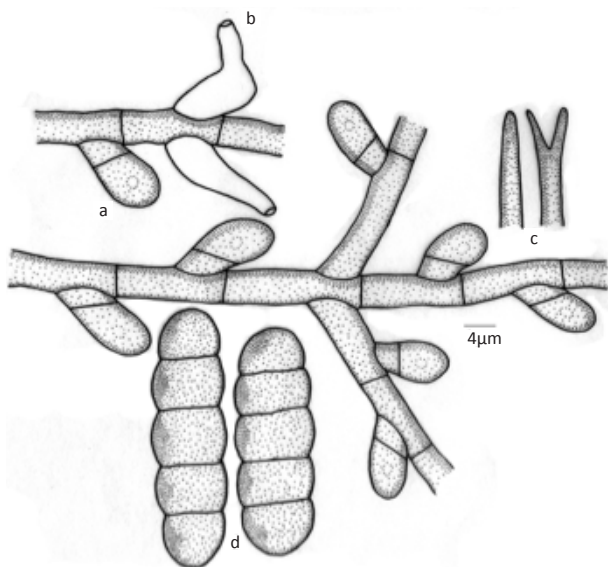


**Figure 93. *Meliola ougeinae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



**Figure 94. *Meliola palakkadensis***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores





**Figure 95. *Meliola pleurostylicola***

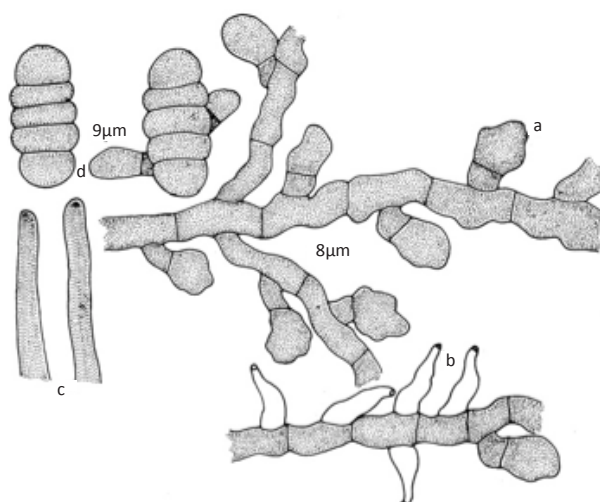
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola premnigena*** Hosag. & Riju, Plant pathology & Quarantine 1(2): 127, 2011. (Fig. 96)

Colonies epiphyllous, velvety, up to 5mm in diam. Hyphae flexuous to crooked, branching opposite at acute to wide angles, cells 15–25×5–8 μm. Appressoria alternate, unilateral, antrorse to subantrorse, 15–23 μm long; stalk cells cylindrical to cuneate, 5–8 μm long; head cells globose, subglobose, entire to sublobate, 10–18 × 7–13 μm. Phialides mixed with appressoria, opposite, alternate to unilateral, ampulliform, 14–23×4–6 μm. Mycelial setae scattered, simple, straight, slightly curved to uncinuate, up to 300μm long. Perithecia scattered, up to 150μm in diam.; ascospores cylindrical to oblong, 4-septate, slightly constricted at the septa, 32–38×12–15 μm.

**Material examined:** TBGT 5069 (holotype), 10.i.2011, Kerala, Wayanad, Padinharathara, Banasura mala, on leaves of *Premna glaberrima* Wight (Verbenaceae), M.C. Riju. Part of the collection has been deposited in HCIO, New Delhi.

Based on the alternate appressoria and simple setae, this species comes close to *M. cookeana* Speg. and *M. premnae* Hansf. However, it differs from the former in not having inflated, dentate or furcate apex of mycelial setae. It differs from the latter in having straight hyphae and mycelial setae in contrast to flexuous, crooked, uncinuate and twisted mycelia setae (Hansford 1961). It also differs from *M. premnicola* in having only obtuse mycelia setae in contrast to variously dentate ones (Hosagoudar 1996).



**Figure 96. *Meliola premnigena***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola pseudarthriae* var. *indica*** Hosag. & Jacob Thomas, J. Appl. & Nat. Sci. 2: 104, 2010. (Fig. 97)

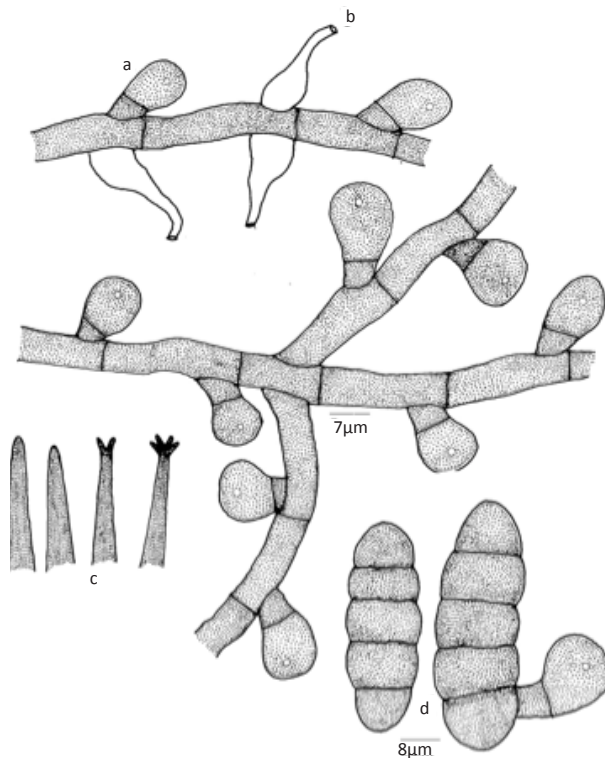
Colonies epiphyllous, dense, velvety, up to 4mm in diameter, confluent. Hyphae substraight to undulate, branching opposite at acute to wide angles, closely reticulate, cells 12.8–25.6×6.4–8 μm. Appressoria alternate to opposite, antrorse to spreading, straight to curved, 9.6–17.6 μm long; stalk cells cylindrical to cuneate, 3.2–6.4 μm long; head cells globose to subglobose, ovate, cylindrical, entire, 6.4–14.4×8–14.4 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14.4–20.8×6.4–8 μm. Mycelial setae, numerous, scattered, simple, straight to slightly curved, acute, dentate to cristate at the tip, up to 600 μm long. Perithecia scattered, globose, up to 160μm in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 35.2–40×12.8–16 μm.

**Material examined:** HCIO 49360 (holotype), TBGT 3605 (isotype), 15.iii.2008, Kerala, Thiruvananthapuram, Neyyar Wildlife Sanctuary, near Kombe, on leaves of *Pseudarthria viscida* (L) Wight & Arn. (Fabaceae), Jacob Thomas.

This variety differs from var. *pseudarthriae* in having dentate to cristate mycelia setae.

***Meliola psophocarp*** Hosag. & Riju, J. Threatened Taxa 2(4): 826, 2010. (Image. 10, Fig. 98)

Colonies foliicolous, fructicolous, epiphyllous, thin, scattered, up to 3μm in diam., often confluent. Hyphae undulating, branching mostly opposite at wide angles, loosely to closely reticulate, cells 11–33×4–7 μm. Appressoria alternate, unilateral, up to 3%, opposite,



**Figure 97. *Meliola pseudarthriae* var. *indica***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

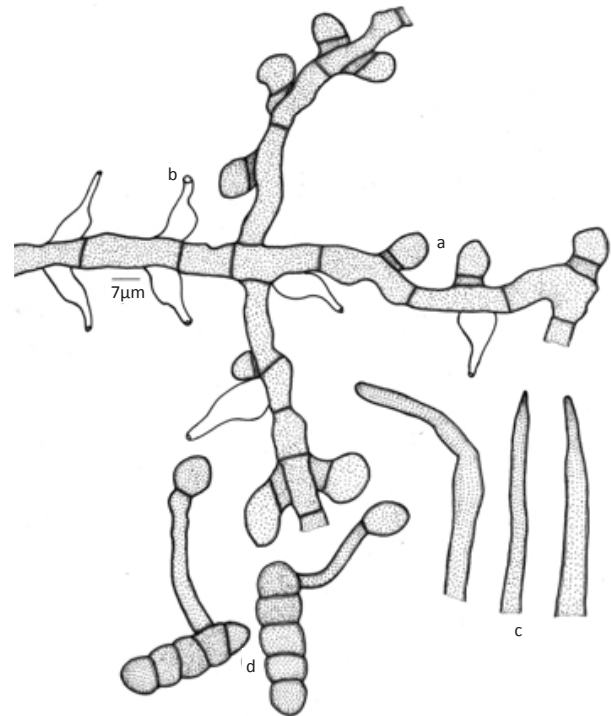
straight to slightly curved, subantrorse to retrorse, 11–20 µm long; stalk cells cylindrical to cuneate, 2–11 µm long; head cells ovate, globose, 8–11 µm. Phialides mixed with appressoria, alternate, opposite, unilateral, ampulliform, 13–20x6–9 µm. Mycelial setae scattered, simple, straight to slightly curved, acute to obtuse, up to 360 µm long. Perithecia scattered, up to 130µm in diam., ascospores cylindrical, 4 septate, slightly constricted at the septa, 33–38x8–11 µm.

**Materials examined:** HClO 48174 (holotype), TBGT 2910 (isotype), 30.ix.2007, on leaves of *Psophocarpus tetragonolobus* L. (Fabaceae), 16<sup>th</sup> mile, Padinharathara, Wayanad, Kerala, M.C. Riju.

*Psophocarpus tetragonolobus* is a climbing shrub, native of South East Asia, has been extensively cultivated in the backyards for its quadrangular pods used in the culinary purposes. The leaves of this plant is being infected with the black mildew fungus and is similar to *M. nyanzae* in having the same digital formula but differs from it in not being a strong parasite in producing pathogenic symptoms (Hansford 1961; Hosagoudar 1996; Hu et al. 1996, 1999).

***Meliola pterigotae*** Hosag., Agarwal, H. Biju & Archana, Indian Phytopath. 59: 347, 2006. (Fig. 99)

Colonies epiphyllous, dense, velvety, up to 3mm in diam., confluent. Hyphae straight to substraight, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 24–32x6–8 µm. Appressoria alternate, antrorse to subantrorse, 14–23 µm long; stalk cells cylindrical to cuneate, 3–10 µm long; head cells



**Figure 98. *Meliola psophocarpi***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Image 10. *Meliola psophocarpi* infected leaves**

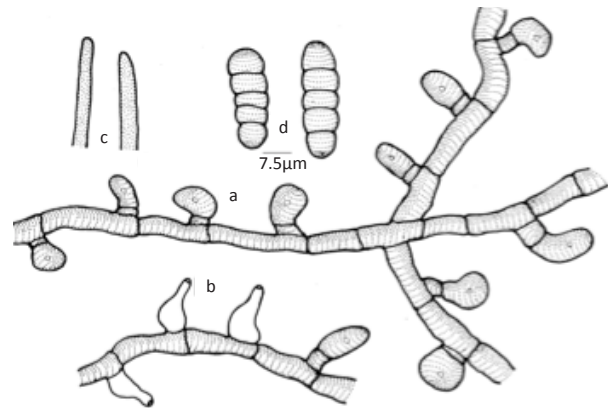
ovate, globose, oblong, mostly entire, often angular to rarely slightly lobate, 11–15x9–11  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–21x8–10  $\mu\text{m}$ . Mycelial setae scattered to grouped around perithecia, simple, straight, flexuous to rarely curved, very few uncinuate, obtuse at the tip, up to 440 $\mu\text{m}$  long. Perithecia scattered to loosely grouped, up to 120 $\mu\text{m}$  diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 32–36x11–13  $\mu\text{m}$ .

**Material examined:** HClO 46238 (holotype), TBGT 1650 (isotype), 15.xi.2003, Karnataka, South Canara, Kukke Subramanya, on leaves of *Pterygota alata* (Roxb.) R. Br. (Sterculiaceae), V.B. Hosagoudar et al.

Based on the Beeli formula 3111.3222 and flexuous mycelial setae, *M. pterigotae* is closer to *M. pterospermicola* Stev. & Rold. reported on *Pterospermum obliquum* from Philippines but differs from it in having smaller but dense colonies, shorter appressoria and longer mycelial setae (Hansford 1961; Hosagoudar 1996; Hosagoudar et al. 1997).

***Meliola pycnosporae*** Hosag. & Archana, J. Threatened Taxa 1: 348, 2009. (Fig. 100).

Colonies amphigenous, caulicolous, dense, up to 2mm in diam. Hyphae substraight, flexuous to crooked, branching alternate, opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 19–28x6–8  $\mu\text{m}$ . Appressoria alternate, about 2% opposite, antrorse to subantrorse, 11–16  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 3–5  $\mu\text{m}$  long; head cells ovate, globose, straight to curved, entire, 8–11x7–10 $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–



**Figure 100. *Meliola pycnosporae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

24x8–10  $\mu\text{m}$ . Mycelial setae few, scattered, simple, straight, obtuse at the tip, up to 300 $\mu\text{m}$  long. Perithecia scattered, up to 120 $\mu\text{m}$  in diam.; ascospores oblong, cylindrical, 4-septate, very slightly constricted at the septa, 30–32x9–11  $\mu\text{m}$ .

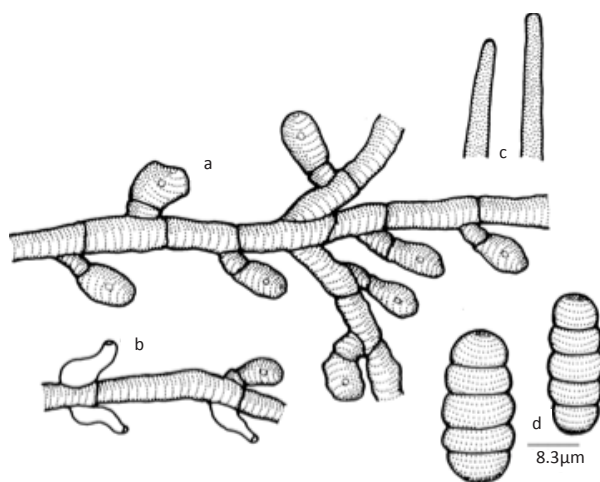
**Material examined:** HClO 46244 (holotype), TBGT 1656 (isotype), 14.xii.2003, Kerala, Palghat, Silent Valley, on the way to Chempathy, on leaves of *Pycnospora lutescens* (Poir.) Schindl. (Fabaceae), V.B. Hosagoudar et al.

Based on the Beeli formula 3113.3221, this species is close to *Meliola erythrinae-microptericis* Hansf. known on *Erythrina micropteryx* from San Domingo, but differs from it in having only 2% opposite appressoria, have straight setae and distinctly narrow ascospores (Hansford 1961).

***Meliola rachammae*** Hosag., Riju & Agarwal, Indian Phytopath. 63: 77, 2010. (Fig. 101)

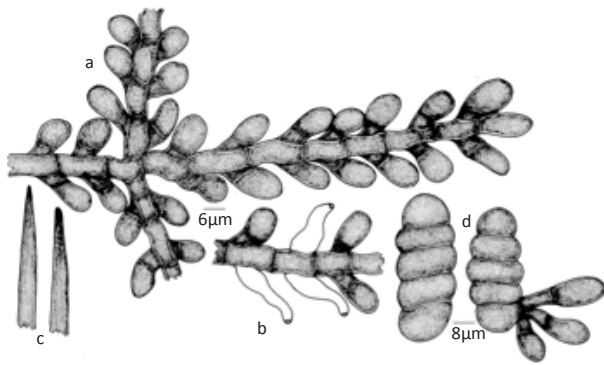
Colonies epiphyllous, dense, crustose, up to 5mm in diameter, confluent. Hyphae straight, branching opposite at wide angles, loosely to closely reticulate, cells 8–15x6–8  $\mu\text{m}$ . Appressoria opposite, antrorse, 16–21  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 3–7  $\mu\text{m}$  long; head cells globose, ovate, entire, 11–15x8–11  $\mu\text{m}$ . Phialides mixed with appressoria, opposite to unilateral, ampulliform, 16–27x7–10  $\mu\text{m}$ . Mycelial setae simple, straight to slightly curved, acute to obtuse at the tip, up to 690 $\mu\text{m}$  long. Perithecia scattered, globose, up to 185 $\mu\text{m}$  in diameter; ascospores cylindrical, 4-septate, constricted at the septa, 50–53x20–23  $\mu\text{m}$ .

**Material examined:** HClO 49199 (holotype), TBGT 3438 (isotype), 30.vii.2008, Kerala, Palakkad, Sailer Valley National Park, Cheriavalakkad, on leaves of



**Figure 99. *Meliola pterigotae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores





**Figure 101. *Meliola rachammae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

*Symplocos macrocarpa* ssp. *kanarana* (Talbot) Nooteb. (Symplocaceae), M.C. Rijju et al.

There are seven taxa known on the members of the family Symplocaceae (Hansford 1961; Hosagoudar 1996, 2008; Hosagoudar et al. 1997; Hosagoudar and Agarwal, 2008). Of these, the present species can be compared with *Meliola bissei* in having both alternate and opposite appressoria. However, the present new species differs from all in having regularly opposite appressoria.

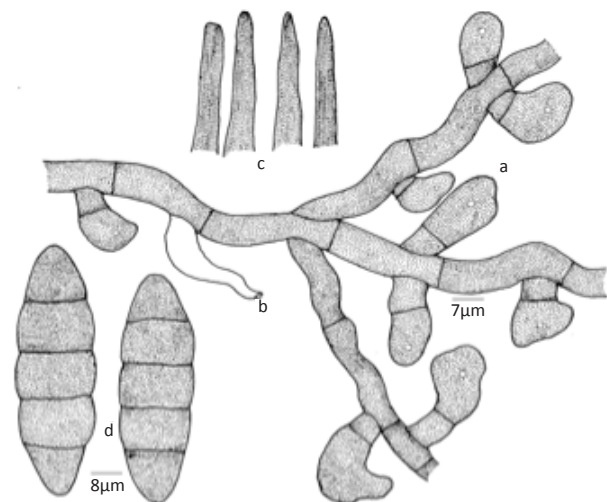
***Meliola rapanea*** Sydow, Ann. Mycol. 26: 87, 1928; Hansf, Sydowia Beih. 2: 510, 1961. (Fig. 102)

Colonies hypophyllous, dense, velvety, up to 5mm in diameter, confluent. Hyphae substraight to crooked, branching mostly opposite at acute angles, closely reticulate, cells 16–21x7–10 µm. Appressoria alternate to opposite, straight to curved, antrorse to spreading, retrorse, 14–22 µm long; stalk cells cylindrical to cuneate, 2–5 µm long; head cells ovate, globose to subglobose, cylindrical, clavate, entire, 9–17x9–12 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–26x7–12 µm. Mycelial setae fairly numerous, scattered to grouped around perithecia, straight to curved but not uncinata, acute to obtuse at the tip, up to 700µm long. Perithecia scattered to grouped, verrucose, up to 180µm in diam.; ascospores obovoidal, 4-septate, constricted at the septa, 50–55x14–17 µm.

**Materials examined:** HClO 49035, TBGT 3290, 3.iii.2008, Kerala, Thiruvananthapuram, Neyyar Wildlife Sanctuary, Pongalappara, on leaves of *Rapanea* sp. (Myrsinaceae), Jacob Thomas et al.

*Meliola rapanea* Sydow was known on *Rapanea umbellata* from British north Borneo and was known only from its holotype locality and the present record reveals its extended distribution.

In the present collection, ascospores were narrower



**Figure 102. *Meliola rapanea***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

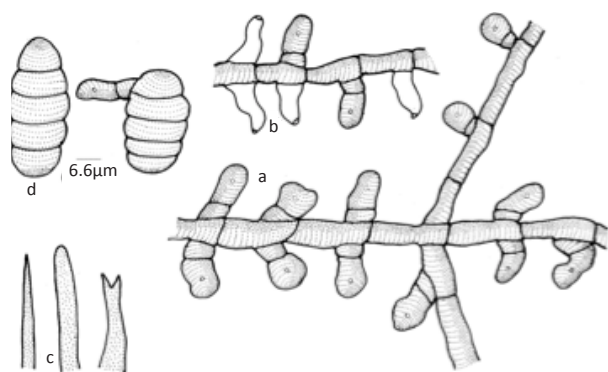
than the holotype.

***Meliola sairandhriana*** Hosag. & Archana, J. Threatened Taxa 1: 348, 2009. (Fig. 103)

Colonies amphigenous, mostly hypophyllous, dense, velvety, up to 5mm in diam. Hyphae straight to substraight, branching alternate to unilateral at acute to wide angles, loosely to closely reticulate, cells 19–32x6–8 µm. Appressoria opposite, rarely solitary, straight to curved, antrorse, subantrorse to retrorse, 14–18 µm long; stalk cells cylindrical to cuneate, 3–5 µm long; head cells ovate, oblong, cylindrical, entire, angular, sublobate to often bilobed, 11–13x8–12 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–23x8–10 µm. Mycelial setae many, grouped around perithecia, simple, sigmoid, curved to uncinata at the apical portion, acute, obtuse to bifid at the tip, up to 345µm long. Perithecia loosely grouped, up to 196µm in diam.; ascospores oval, 4-septate, constricted at the septa, 36–40x20–23 µm.

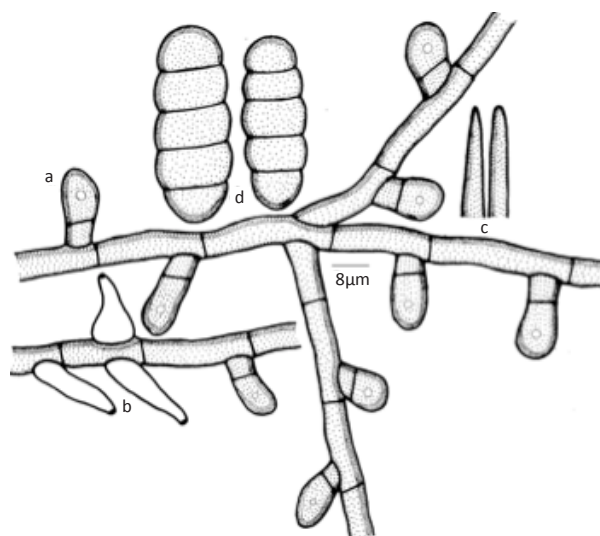
**Material examined:** HClO 46139 (holotype), TBGT 1902 (isotype), 13.xii.2003, Kerala, Palghat, Silent Valley, Sairandhri, on leaves of *Aglaiia minutiflora* Bedd. (Meliaceae), V.B. Hosagoudar et al.

Based on the uncinata mycelial setae, *M. sairandhriana* can be compared to *M. reinwardtiodendri* Hosag. known on *Reinwardtiodendron anamallayanam* from the Western Ghats region but differs from it in having amphigenous colonies, simple to dentate mycelial setae and smaller ascospores (Hosagoudar 1996).



**Figure 103. *Meliola sairandhriana***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



**Figure 104. *Meliola salaciicola***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

***Meliola salaciicola*** Hosag., Agarwal, H. Biju & Archana, Indian Phytopathol. 60: 85, 2007. (Fig. 104)

Colonies amphigenous, subdense, up to 2mm in diameter. Hyphae straight to sub straight, branching mostly opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 14–29x6–8 μm. Appressoria mostly alternate, up to 1% opposite, unilateral, antrorse to sub-antrorse, straight to slightly curved, 12–19 μm long; stalk cells cylindrical to cuneate, 3–6 μm long; head cells globose, ovate, oblong, entire to slightly angular, straight, 8–16x6–10 μm. Phialides mixed with appressoria, ampulliform, opposite, alternate to unilateral, 12–24x6–11 μm. Mycelial setae numerous, simple, straight, curved to arcuate, acute to obtuse at the tip, up to 510 μm long. Perithecia globose, grouped, up to 245 μm in diameter; ascospores obovoidal, 4-septate, slightly constricted at the septa, 40–48x16–18 μm.

**Material examined:** HClO 46307 (holotype), TBGT 1953 (isotype), 13.xii.2003, Kerala, Palakkad, Silent Valley, Sairandhiri, on leaves of *Salacia* sp. (Hippocrataceae), V.B. Hosagoudar et al.

This species differs from all the *Meliola* species known on the members of the host family Hippocrataceae in having curved to arcuate mycelial setae (Hansford 1961; Hosagoudar 1996; Hosagoudar et al. 1997).

***Meliola sanjappae*** Hosag., Jacob Thomas & Agarwal, Nelumbo 52: 7, 2010. (Fig. 105)

Colonies epiphyllous, dense, velvety, up to 4mm in diameter, scattered. Hyphae straight, branching opposite at wide angles, closely reticulate and form a mycelial net, cells 17–35x10–13 μm. Appressoria alternate, up to 5% opposite, antrorse to retrorse, straight to curved, 20–24 μm long; stalk cells cylindrical to cuneate, 4–10 μm long; head cells cylindrical to clavate, curved, entire,

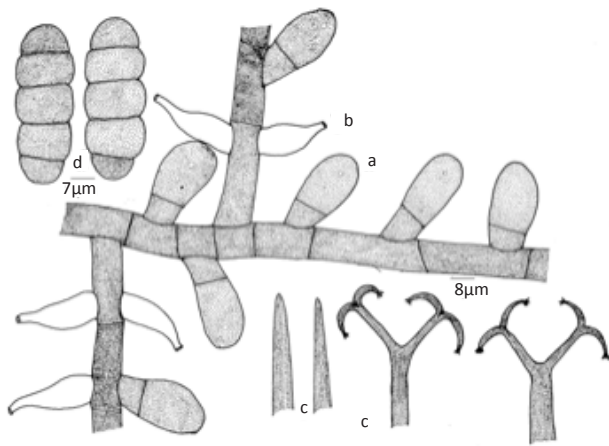
truncate, angular to rarely sublobate, 16–22x9–16 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 11–16x8–11 μm. Mycelial setae scattered, fairly numerous, simple, straight, dichotomously branched, up to 250 μm long up to first branching, first ray up to 70 μm long, second ray up to 5 μm long, acute to dentate at the tip, branches reflexed. Perithecia scattered, verrucose, up to 180 μm in diameter; ascospores obovoidal to subellipsoidal, 4-septate, constricted at the septa, 44–50x20–23 μm.

**Materials examined:** HClO 49043 (holotype), TBGT 3298 (isotype), 5.iii.2008, Kerala, Thiruvananthapuram, Neyyar Wildlife Sanctuary, Kombe, on leaves of *Semecarpus travancorica* Bedd. (Anacardiaceae), Jacob Thomas.

*Meliola tapiriae* Stev. & Tehon and *M.brachydenta* Sydow var. *dammeri* Hansf. are the two taxa reported on *Tapiria* sp. and *Rhus villosa* from British Guiana and Uganda having dichotomously branched mycelial setae. However, the new species differs from both in having alternate and opposite appressoria and differ in ascospore measurements (Hansford 1961; Hosagoudar 1996; Hosagoudar et al. 1997; Hosagoudar & Agarwal, 2008).

***Meliola shillongensis*** Hosag., Jacob. & Robin, Indian J. Sci. Technol. 2 (6): 4, 2009. (Fig. 106)

Colonies epiphyllous, dense, velvety, up to 3mm in diameter. Hyphae substraight to undulate, branching alternate to opposite at acute to wide angles, closely reticulate and form a mycelial mat at the centre, cells



**Figure 105. *Meliola sanjappae***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

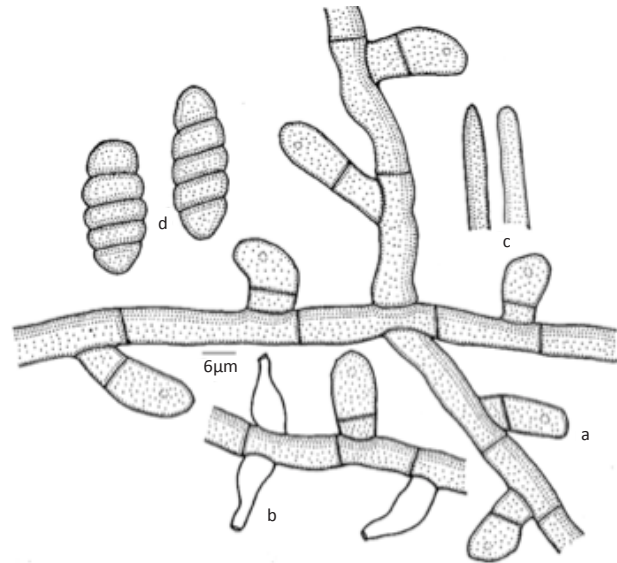
19–25x7–9 μm. Appressoria alternate, antrorse to retrorse, straight to curved, closely placed, 22–34 μm long; stalk cells cylindrical to cuneate, 7–12 μm long; head cells ovate, globose to subglobose, entire, 14–22x9–12 μm. Phialides few in number, mixed with appressoria, opposite, ampulliform, 21–29x7–10 μm. Mycelial setae numerous, grouped around perithecia, simple, straight, slightly curved, acute to obtuse at the tip, up to 620 μm long. Perithecia scattered, globose, verrucose, up to 170 μm in diam.; ascospores oblong to obovoidal, cylindrical, 4-septate, constricted at the septa, 19–31x10–12 μm.

**Materials examined:** HClO 48065 (holotype), TBGT 2848 (isotype), 21.i.2007, Meghalaya, Shillong, Mawphlang, on the leaves of *Vaccinium griffithianum* Wight (Vacciniaceae), Jacob Thomas & P.J. Robin.

Based on the morphology and measurements, *M. shillongensis* closer to *M. vaccinii* Stev. known on *Vaccinium reticulatum* from Hawaii (Hansford 1961; Hosagoudar et al. 1997). However, differs from it in having only alternate and shorter appressoria and smaller ascospores.

***Meliola sterculicola*** Hosag. & Robin, J. Threatened Taxa 3(5): 1782, 2011. (Fig. 107)

Colonies epiphyllous, thin, up to 3mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite at wide angles, loosely to closely reticulate, cells 19–26x4–7 μm. Appressoria mostly alternate, unilateral, antrorse to subantrorse, 21–26 μm long; stalk cells cylindrical to cuneate, 5–10 μm long; head cells ovate, globose, entire, angular to slightly lobate, 19–14x10–12 μm. Phialides borne on a separate



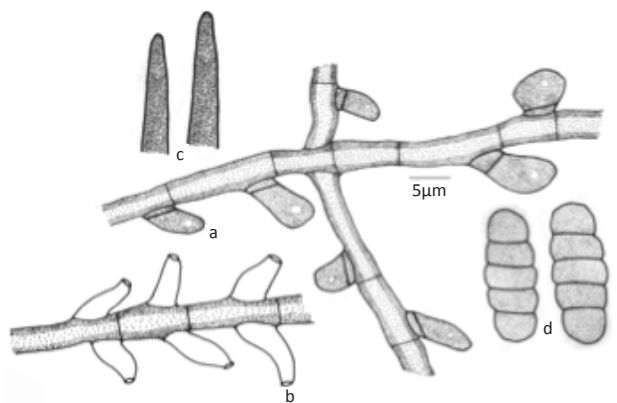
**Figure 106. *Meliola shillongensis***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

mycelia branch, opposite, alternate to unilateral, ampulliform, 14–24x5–7 μm. Mycelial setae few, simple, straight, acute at the tip, up to 480 μm long. Perithecia scattered, globose, up to 110 μm in diameter; ascospores oblong, ellipsoidal, 4-septate, constricted at the septa, 34–41x14–17 μm.

**Materials examined:** HClO 48143 (holotype), TBGT 2879 (isotype), 22.xii.2006, Kerala, Kottayam, Placherry, Ponthanpuzha, on leaves of *Sterculia* sp. (Sterculiaceae), P.J. Robin & M. Harish.

Based on the digital formula 3111.3222, it can be compared with *Meliola sterculiacearum* Hosag. & Kamar. known on the same host genus from Wayanad in Western



**Figure 107. *Meliola sterculicola***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores



Ghats. However, the present new species differs from it in having longer appressoria with angular to sublobate head cells and phialides borne on a separate mycelia branch (Hosagoudar 2005).

***Meliola strebli*** Hosag. & Archana, J. Threatened Taxa 1: 349, 2009. (Fig. 108)

Colonies amphigenous, mostly hypophyllous, dense, velvety, up to 3mm diam., confluent. Hyphae straight to substraight, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 20–24x6–8 µm. Appressoria alternate to unilateral, distantly placed, antrorse, subantrorse to rarely retrorse, 17–21µm long; stalk cells cylindrical to cuneate, 4–6µm long; head cells ovate, globose, entire, straight to curved, 11–15x9–11 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–19x8–10 µm. Mycelial setae scattered, simple, straight, acute at the tip, up to 735µm long. Perithecia scattered to loosely grouped, up to 212µm diam.; ascospores oblong, 4-septate, slightly constricted at the septa, 40–44x16–18 µm.

**Material examined:** HClO 46162 (holotype), TBGT 1574 (isotype); TBGT 1605, HClO 46193, 24.xi.2004, Kerala, Kollam, Sankili forest, Shendhurney Wildlife Sanctuary, near Sasthanada tribal colony, on leaves of *Streblus taxoides* (Heyne ex Roth) Kurz (Moraceae), V.B. Hosagoudar et al.; TBGT 1889, HClO 46126, Kollam, Shendhurney Wildlife Sanctuary, Sankili forest, on leaves of *S. asper* Lour., V.B. Hosagoudar et al.; TBGT 1893, HClO 46130, Tribal colony, Sasthanamada, on leaves of *Streblus* sp., V.B. Hosagoudar et al.

Based on the digital formula 3111.4233, this species can be compared with *Meliola ficium* Yates and its variety var. *ugandensis* Hansf. However, *M. strebli* differs

from *M. ficium* in having narrow ascospores and having longer mycelial setae (3111.4333). It also differs from *M. ficium* Yates var. *ugandensis* Hansf. in having shorter appressoria and larger ascospores (Hansford 1961).

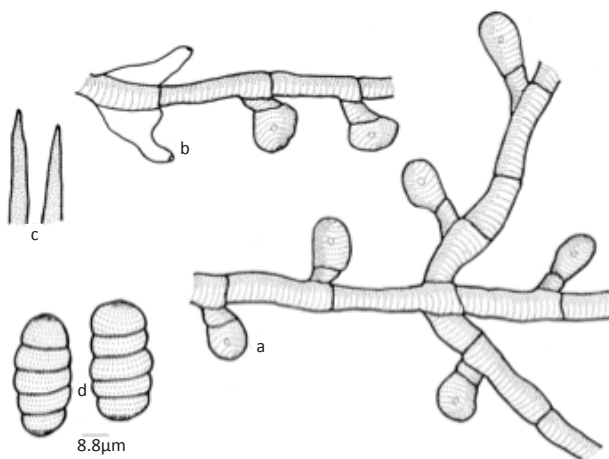
***Meliola strombosiicola* nom. nov.** *Meliola strombosiae* Hosag., Agarwal, H. Biju & Archana, Indian Phytopath. 59: 348, 2006 (*non* Ciferri, 1954). (Fig. 109; MycoBank 803917)

Colonies epiphyllous, dense, up to 1mm in diam. Hyphae straight, substraight to flexuous, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 16–20x6–8 µm. Appressoria alternate, antrorse, 20–32 µm long; stalk cells cylindrical to cuneate, 4–10 µm long; head cells ovate, oblong, entire, broadly rounded to truncate to attenuated at the apex, 16–24x6–8 µm. Mycelial setae scattered, simple, straight, acute at the tip, up to 650µm long. Perithecia scattered, up to 120µm in diam.; ascospores cylindrical to ellipsoidal, 4-septate, constricted at the septa, 36–40x15–17 µm.

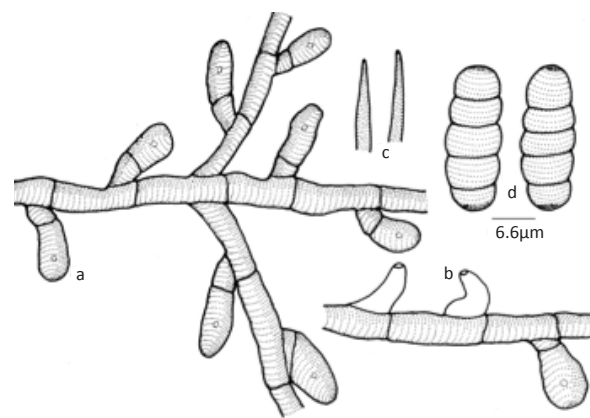
**Materials examined:** HClO 45972 (Holotype), TBGT 1736 (Isotype), 15.xi.2003, Karnataka, South Canara, Kukke Subramanya, on leaves of *Strombosia ceylanica* Garden. (Olacaceae), V.B. Hosagoudar et al.

**Etymology:** Based on the host genus

Hansford (1946) proposed *Irenina strombosiae* on *Strombosia scheffleri* from Uganda. Ciferri (1954) transferred this taxon to *Meliola strombosiae* (Hansf.) Cif. Hansford (1961) regarded the new combination of Ciferri (1954) are entirely unnecessary and superfluous “name-making”. Subsequent notable works of Hu et al. (1996, 1999), Hosagoudar (1996, 2008), Mibey & Hawksworth (1997) have followed Hansford (1961).



**Figure 108. *Meliola strebli***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores



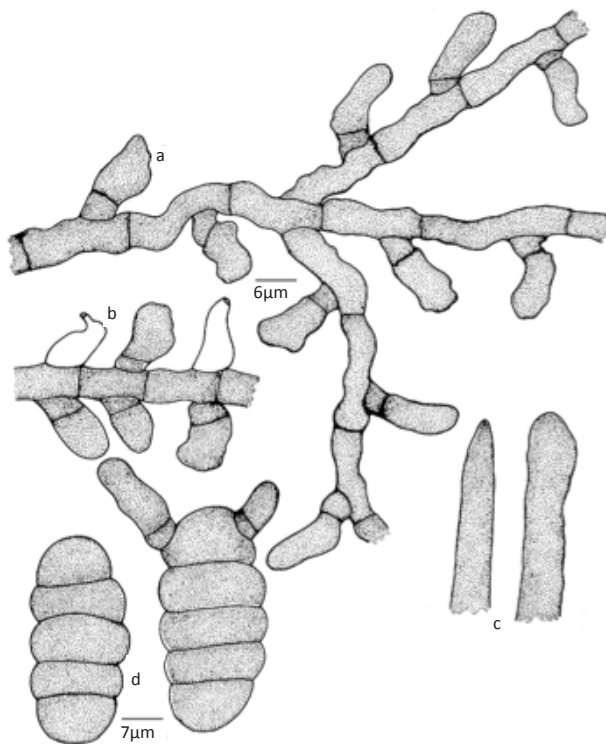
**Figure 109. *Meliola strombosiicola* nom. nov.**  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

Since *Meliola strobosiae* Hosag. et al. is the homonym of *Meliola strobosiae* (Hansf.) Cif., a new name has been proposed here.

***Meliola strobosiigena*** Hosag. & Riju, J. Threatened Taxa 3(3): 1618, 2011. (Fig. 110)

Colonies amphigenous, mostly hypophyllous, dense, velvety, up to 4mm diam., confluent. Hyphae flexuous to undulate, branching opposite to alternate at acute to wide angles, loosely to closely reticulate, cells 15–25x5–10  $\mu$ m. Appressoria alternate, opposite to unilateral, antrorse to subantrorse, rarely retrorse, 17–28  $\mu$ m long; stalk cells cylindrical to cuneate, 5–8  $\mu$ m long; head cells oblong to cylindrical, straight to flexuously curved, entire, 10–20x5–8  $\mu$ m. Phialides mixed with appressoria, alternate, opposite to unilateral, ampulliform, 20–30x6–8  $\mu$ m. Mycelial setae straight to curved, scattered, acute at the tip, up to 720 $\mu$ m long; Perithecia scattered in the colonies, up to 240 $\mu$ m in diam.; ascospores obovoidal, 4-septate, constricted at the septa, 50–55x20–23  $\mu$ m.

**Material examined:** TBGT 4515 (holotype), HCIO 50598 (isotype), New Delhi, (MycoBank # 561023), 01.viii.2008, Kerala, Palakkad, Silent Valley National Park, Cheriavalakkad, on leaves of *Strobosia* sp. (Olacaceae), M.C. Riju et al.



**Figure 110. *Meliola strobosiigena***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

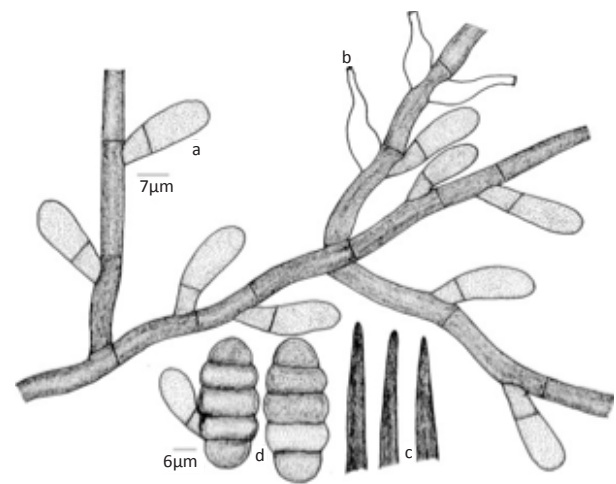
*Meliola strobosiae* Hosag. et al. is known on *Strobosia ceylonica* from Kukke Subramanya, Karnataka (Hosagoudar 2008). However, the present new species differs from it in having narrow head cells (5–8  $\mu$ m against 8–12  $\mu$ m) and larger spores (50–55 x 20–23 against 36–40 x 15–17  $\mu$ m). The specific epithet is derived from the host genus.

***Meliola strophanthicola*** Hansf. var. ***indica*** Hosag. & Jacob Indian J. Sci. Technol. 2(6): 23, 2009. (Fig. 111)

Colonies amphigenous, dense, velvety, up to 4mm in diameter, confluent. Hyphae substraight to undulate, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 19–26x5–7  $\mu$ m. Appressoria alternate, antrorse to subantrorse, spreading, 17–24  $\mu$ m long; stalk cells cylindrical to cuneate, 6–9  $\mu$ m long; head cells cylindrical, ovate, entire, 11–15x6–9  $\mu$ m. Phialides mixed with appressoria, opposite to alternate, ampulliform, 13–18 x 5–7  $\mu$ m. Mycelial setae numerous, scattered to grouped around perithecia, simple, straight to curved, acute at the tip, up to 480 $\mu$ m long. Perithecia scattered, verrucose, up to 170 $\mu$ m in diam.; ascospores cylindrical to subellipsoidal, 4-septate, slightly constricted at the septa, 33–38x11–16  $\mu$ m.

**Materials examined:** HCIO 48017 (holotype), TBGT 2800 (isotype), 1.ii.2007, Kerala, Pathanamthitta, Kozhencherry, St. Thomas College Campus, on leaves of *Strophanthus wightianus* Wallich ex Wight (Apocynaceae), Jacob Thomas.

Two species of the genus *Meliola*, *M. monilispota* Gaill. and *M. strophanthicola* Hansf. are known on the host genus *Strophanthus* from Congo Francoise and Uganda (Hansford 1961). The present collection differs



**Figure 111. *Meliola strophanthicola* var. *indica***

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

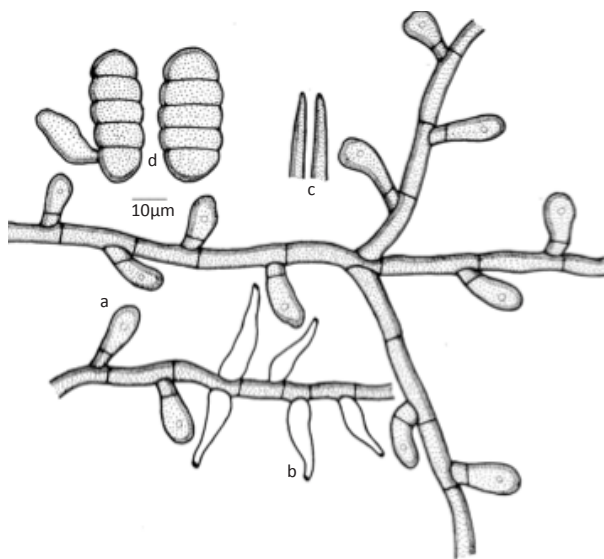
from the former species in having only acute mycelial setae in contrast to all dentate ones. It is similar to the later species but the new variety differs from the var. *strophanthicola* in having distinctly smaller ascospores (33–38x11–16 µm) in contrast to 42–46x15–17 µm.

***Meliola tabernaemontanae* Speg. var. *wrightiae*** Hosag., Agarwal, H. Biju & Archana, Indian Phytopath. 59: 349, 2006. (Fig. 112)

Colonies amphigenous, sub-dense, up to 2mm in diameter, scattered. Hyphae straight to sub straight, branching opposite at wide angles, loosely reticulate, cells 12–35x4–8 µm. Appressoria alternate, antrorse, recurved, straight to slightly curved, 14–19 µm long; stalk cells cylindrical to cuneate, 3–5 µm long; head cells, ovate, oblong, entire, 11–14x6–10 µm. Phialides mixed with to obtuse appressoria, ampulliform, opposite, alternate, 12–19x3–8 µm. Mycelial setae, simple, acute at the tip, up to 363µm long. Perithecia scattered, verrucose, up to 100 µm in diameter; ascospores obovoidal, 4-septate, slightly constricted at the septa, 35–45x14–18 µm.

**Material examined:** HCIO 46142 (type), TBGT 1905 (isotype), 13.xi.2003, On leaves of *Wrightia tinctoria* (Roxb.) R. Br. (Apocynaceae), MPCA, Talakaveri, Karnataka, India, V.B. Hosagoudar et al.

This variety differs from the species type in having straight apical portion of the mycelial setae and larger ascospores.

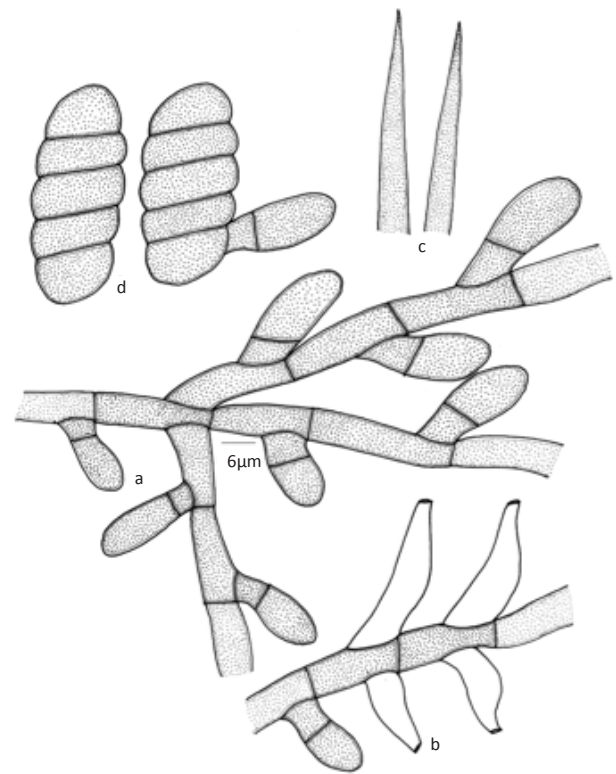


**Figure 112. *Meliola tabernaemontanae* var. *wrightiae***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

***Meliola vallaridis*** Hosag., Sabeena., Archana. & Jacob. J. Scient. Trans. Environ. Techn. 1: 69, 2007. (lamge. 11, Fig. 113)

Colonies amphigenous, mostly epiphyllous, caulicolous, ramicolous, dense, crustose to velvety, up to 2mm in diam., confluent. Hyphae straight, substraight to flexuous, branching mostly opposite at acute to wide angles, loosely to very closely reticulate, often form solid mycelial mat, cells 11–18x4–7 µm. Appressoria alternate, less than 1% opposite, antrorse to subantrorse, 17–22 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells ovate, oblong to cylindrical, often narrowed towards apex, entire, 11–16x6–9 µm. Phialides numerous, mixed with appressoria, alternate to opposite, ampulliform, 13–22x4–7 µm. Mycelial setae numerous, scattered to grouped around perithecia, simple, straight, acute at the tip, up to 450µm long. Perithecia closely scattered, up to 165µm in diam.; ascospores oblong to cylindrical, 4-septate, deeply constricted at the septa, 30–37x11–16 µm.

**Materials examined:** HCIO (holotype), TBGT 2832 (isotype), 8.ii.2007, Kerala, Thiruvananthapuram, Palode, JNTBGRI campus, on leaves of *Vallaris solanacea* (Roth.) Kuntze (Apocynaceae), Sabeena et al.; TBGT 867, HCIO



**Figure 113. *Meliola vallaridis***  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores





Image 11. *Meliola vallisariae* infected leaves

44580, 05.i.2001, H. Biju; Thiruvananthapuram, Govt. Museum (Zoo), TBGT 1120, HCIO 44892, 28.xii.2002, G. Rajkumar.

*Meliola tabernaemontanicola* Hansf. & Thirum. was described on *Tabernaemontana* sp. from Balehonnur, Karnataka (Hansford and Thirumalachar, 1948). Kar and Maity (1972) collected *Meliola* sp. on *Vallisaria solanacea* from Mallickput, West Bengal and attributed it to *M. tabernaemontanicola*. Hosagoudar (1996) procured the slide of the same from IMI (no. 139202) and also placed it under *M. tabernaemontanicola*. The present collections differ from the assigned species in causing pathological effect in producing yellow haloes around the colonies, infecting leaf petioles, soft and younger stem portions, causing 'shot-holes' and turning the infected leaves yellow and result in withering of such leaves.

***Meliola vatsavayae*** Hosag. & Riju, Indian J. Sci. Technol. 2(6): 25, 2009. (Image. 12, Fig. 114)

Colonies amphigenous, dense, velvety, scattered to confluent, up to 4mm in diameter. Hyphae straight, branching opposite at acute to wide angles, closely reticulate, cells 13–18x6–11  $\mu\text{m}$ . Appressoria alternate, rarely unilateral, often crowded, antrorse, straight, 24–40  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 8–13  $\mu\text{m}$  long; head cells ovate, angular, sinuately lobate to deeply lobate, 15–27x9–18  $\mu\text{m}$ . Phialides mixed with appressoria, mostly opposite, rarely alternate to unilateral, ampulliform, 22–31x4–9  $\mu\text{m}$ . Mycelial setae straight to slightly curved, scattered to grouped around perithecia, obtuse at the tip, up to 270  $\mu\text{m}$  long. Perithecia scattered, up to 110  $\mu\text{m}$  in diam.; ascospores cylindrical to slightly ellipsoidal, 4-septate, constricted at

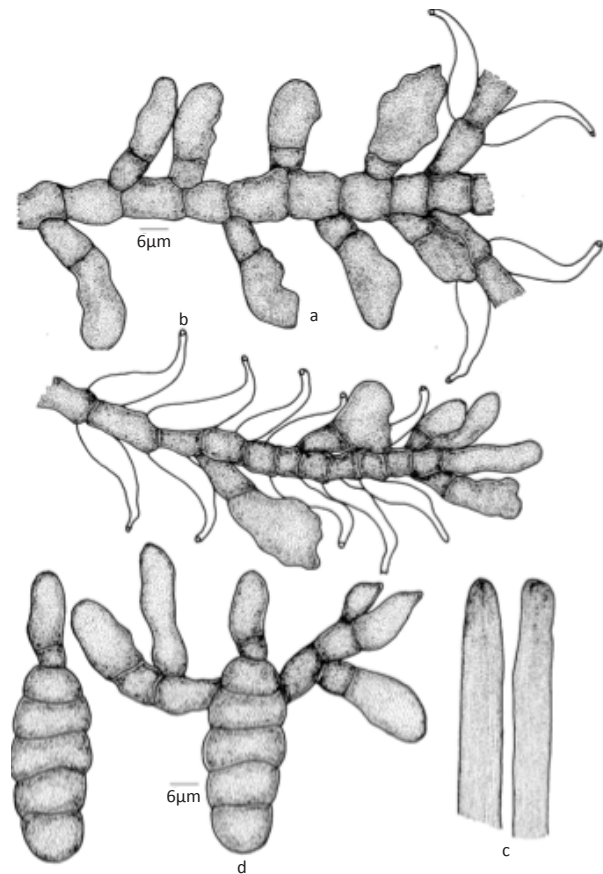


Figure 114. *Meliola vatsavayae*  
a - Appressorium; b - Phialide; c - Apical portion of mycelial setae;  
d - Ascospores

the septa, 37–44x15–20  $\mu\text{m}$ .

**Materials examined:** HCIO 48299 (holotype), TBGT 3018 (holotype), 22.iii.2008, Kerala, Wayanad, Padinharathara, 16th mile, on leaves of *Zanthoxylum rhetsa* (Roxb) DC. (Rutaceae), M.C. Riju.

Based on the digital formula 3113.4221, this species can be compared with *M. toddaliicola* Hansf. and *M. toddaliicola* Hanf. *indica* Hansf. & Thirum. known on the host genus *Toddalia* from Uganda and respectively. However, the present new species differs from both in having angular, sinuately to deeply lobate head cells of the appressoria (Hansford 1961; Hosagoudar 1996, 2008; Hosagoudar et al. 1997).

This species is named in honour of Prof. Vatsavaya S. Raju, Professor in Kakatiya University, Warangal, Andhra Pradesh, whose association and friendship triggered interest of the senior author (VBH) in this group around three decades ago.



Image 12. *Meliola vatsavayae* infected leaves

***Meliola vazhachalensis*** Hosag. & Jacob, Indian J. Sci. Technol. 2(6): 24, 2009. (Fig. 115)

Colonies epiphyllous, subdense, velvety, up to 4mm in diameter, confluent. Hyphae straight, branching opposite at acute angles, loosely to closely reticulate, cells 12–28x5–7  $\mu\text{m}$ . Appressoria opposite, antrorse, to subantrorse to spreading, 12–17  $\mu\text{m}$  long; stalk cells cylindrical to cuneate, 2–5  $\mu\text{m}$  long; head cells ovate, cylindrical, slightly attenuated and broadly rounded at the apex, entire, 9–15x7–10  $\mu\text{m}$ . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–22x5–9  $\mu\text{m}$ . Mycelial setae grouped around perithecia, simple, uncinuate to slightly coiled, acute at the tip, up to 220 $\mu\text{m}$  long. Perithecia scattered, verrucose, up to 140 $\mu\text{m}$  in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 28–36x12–15  $\mu\text{m}$ .

Materials examined: HClO 48206 (holotype), TBGT 2942 (isotype), 12.xi.2007, On leaves of *Aglaia* sp. (Meliaceae), Lower Sholayar, Vazhachal, Thrissur, Kerala,

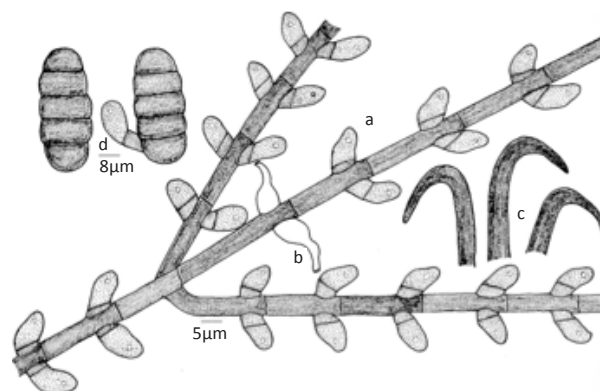


Figure 115. *Meliola vazhachalensis*

a - Appressorium; b - Phialide; c - Apical portion of mycelial setae; d - Ascospores

Jacob Thomas et al.

This species can be compared with *Meliola reinwardtiendri* Hosag. known on *Reinwardtiendron anamallayanum* (Bedd.) from Anamalai forests, Coimbatore, Tamil Nadu having opposite appressoria with uncinuate mycelial setae. The new species differs from it having distinctly attenuated head cells of appressoria in contrast to broadly rounded to truncate ones (Hosagoudar 1996).

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## KEY TO THE SPECIES OF MELIOLALES

ALANGIACEAE		
<i>Meliola</i> 3113.3222	Colonies epiphyllous, thin; hyphae substraight to undulating; appressoria alternate, 30% opposite, antrorse, subantrorse to retrorse, head cells cylindrical, oblong, globose, ovoid, broadly rounded to truncate and often narrowed towards its apex, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, simple, straight, acute to obtuse at the tip	<i>Meliola alangii</i> var. <i>salvifolii</i>
ANACARDIACEAE		
<i>Meliola</i> 3111.4222	Colonies amphigenous, mostly hypophyllous, thin; hyphae straight to substraight; appressoria alternate, closely arranged on the hyphae antrorse to subantrorse; head cells ovate, entire; phialides mixed with appressoria; mycelial setae simple, straight	<i>Meliola gluticola</i>
3143.4321	Colonies epiphyllous, dense, velvety; hyphae straight; closely reticulate and form a mycelial net; appressoria alternate, up to 5% opposite, antrorse to retrorse, straight to curved; head cells cylindrical to clavate, curved, entire, truncate, angular to rarely sublobate; phialides mixed with appressoria; mycelial setae scattered, fairly numerous, simple, straight, dichotomously branched	<i>Meliola sanjappai</i>
APOCYNACEAE		
<i>Meliola</i> 3111.3222	Colonies amphigenous, mostly epiphyllous, dense, velvety; hyphae straight to substraight, ; appressoria alternate, about 5% unilateral, straight to curved, antrorse to spreading; head cells globose to subglobose, ovate, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, straight.	<i>Meliola ichnocarpi-volubili</i>
3141.3221	Colonies hypophyllous, scattered, dense, velvety, hyphae straight to substraight, appressoria alternate, unilateral, straight, antrorse, head cells ovate, globose, mycelial setae numerous, up to 260 µm long, simple, straight, few slightly curved to uncinata, obtuse, bifid, trifid, often subdentate to furcated to branched at the tip	<i>Meliola kamettiae</i>
3111.3222	Colonies amphigenous, mostly epiphyllous, caulicolous, ramicolous, dense, crustose to velvety; hyphae straight, substraight to flexuous; appressoria alternate, less than 1% opposite, antrorse to subantrorse; head cells ovate, oblong to cylindrical, often narrowed towards apex, entire; phialides numerous, mixed with appressoria; mycelial setae numerous, scattered to grouped around perithecia, simple, straight, acute at the tip	<i>Meliola vallaridis</i>
3111.3222	Colonies amphigenous, dense, velvety; hyphae substraight to undulate; appressoria alternate, antrorse to subantrorse, spreading; head cells cylindrical, ovate, entire; phialides mixed with appressoria; mycelial setae numerous, scattered to grouped around perithecia, simple, straight to curved, acute at the tip	<i>Meliola strophanthicola</i> var. <i>indica</i>
3111.4212	Colonies amphigenous, sub-dense; hyphae straight to sub straight; appressoria alternate, antrorse, recurved, straight to slightly curved, head cells, ovate, oblong, entire; phialides mixed with to obtuse appressoria; mycelial setae, simple, acute at the tip	<i>Meliola tabernaemontanae</i> var. <i>wrightiae</i>
ARALIACEAE		
<i>Meliola</i> 3141.3232	Colonies epiphyllous, crustose; hyphae straight to flexuous; appressoria alternate, unilateral, antrorse to subantrorse, head cells globose, subglobose, entire, phialides mixed with appressoria, mostly opposite, rarely alternate; mycelial setae simple, straight, obtuse, clavate, inflated, notched to bifid at the apex, ends broadly rounded	<i>Meliola abdukkalamii</i>
ARISTOLOCHIACEAE		
<i>Meliola</i> 3113.3222	Colonies epiphyllous, thin to dense; hyphae substraight to flexuous; appressoria alternate to about 3% opposite, antrorse to subantrorse, head cells ovate to globose, entire; phialides mixed with appressoria; mycelial setae scattered, simple, straight, acute to obtuse at the tip	<i>Meliola aristolochigena</i>
ASCLEPIADACEAE		
<i>Meliola</i> 3113.5221	Colonies amphigenous, mostly epiphyllous; hyphae straight to substraight; appressoria opposite, about 5% alternate, antrorse, straight to curved, head cells ovate cylindrical, entire; phialides few, borne on a separate mycelial branch; mycelial setae numerous, scattered to grouped around perithecia, simple, straight to slightly curved, acute to obtuse at the tip	<i>Meliola buxaduarii</i>
3143.4223	Colonies epiphyllous, thin to dense; hyphae straight, substraight to flexuous; appressoria alternate, about 20% opposite, antrorse to subantrorse, head cells globose to ovate, entire; phialides mixed with appressoria, alternate to opposite, ampulliform; mycelial setae many, densely scattered, simple, straight to curved, very few uncinata, obtuse, dentate, cristate, often furcate up to 20 µm at the tip	<i>Meliola cynanchi</i>
BURSERACEAE		
3141.4222	Colonies amphigenous, mostly epiphyllous; hyphae straight to substraight; appressoria alternate to unilateral, antrorse to subantrorse; head cells ovate, globose, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, straight, dentate, cristate, bifid to obtuse at the tip	<i>Meliola garugae</i>

	<b>CAESALPINIACEAE</b>	
3113.4222	Colonies epiphyllous; hyphae substraight to undulating, branching opposite to unilateral at acute to wide angles, loosely reticulate; appressoria opposite, alternate to unilateral, antrorse, subantrorse to retrorse, head cells ovate, globose, straight to curved, entire; phialides mixed with appressoria; mycelial setae many, scattered, simple, straight, acute to obtuse at the tip	<i>Meliola bauhiniicola</i> var. <i>brevipoda</i>
3113.5231	Colonies amphigenous, subdense to dense; hyphae straight to substraight; appressoria opposite, unilateral, 2% alternate, antrorse to subantrorse, head cells ovate, globose, oblong, entire; phialides mixed with appressoria; mycelial setae numerous, simple, straight to unciniate, acute at the tip	<i>Meliola caesalpiicola</i>
	<b>CELASTRACEAE</b>	
<i>Meliola</i> 3111.3222	Colonies mostly epiphyllous, rarely amphigenous, dense to subdense; hyphae substraight; appressoria alternate, antrorse, head cells ovate, globose, entire; phialides mixed with appressoria; mycelial setae many, simple, straight, acute to obtuse at the tip	<i>Meliola pleurostylicola</i>
3113.4233	Colonies epiphyllous, dense, velvety; hyphae straight to substraight; appressoria opposite, about 3% alternate, arranged after an intermittent interval (in most places mycelium devoid of appressoria), closely antrorse, antrorse to subantrorse; head cells ovate, globose, entire, angular to slightly lobate; phialides mixed with appressoria; mycelial setae numerous, scattered, simple, straight, acute to obtuse at the tip.	<i>Meliola lophopetaligena</i>
3111.5322	Colonies amphigenous, subdense; hyphae substraight to flexuous; appressoria alternate, straight to slightly curved, antrorse, subantrorse to retrorse, head cells ovate, globose, clavate, oblong, irregularly deeply lobate, rarely angular; phialides mixed with appressoria; mycelial setae simple, scattered, straight to slightly curved, acute to obtuse at the tip	<i>Meliola euonymi</i>
	<b>CLUSIACEAE</b>	
3113.4221	Colonies amphigenous, mostly epiphyllous, dense; hyphae straight; appressoria alternate, about 2% opposite, closely arranged, antrorse to subantrorse, straight to curved; head cells ovate to globose, entire, rarely angular; phialides mixed with appressoria; mycelial setae few, straight, simple, acute at the tip	<i>Meliola mesuae</i>
	<b>COMBRETACEAE</b>	
3111.3223	Colonies epiphyllous, thin; hyphae substraight to flexuous; appressoria alternate, unilateral, antrorse, head cells globose, ovate, entire to slightly angular; phialides mixed with appressoria; mycelial setae numerous, simple, straight to unciniate, acute to obtuse at the tip	<i>Meliola calycopteridis</i> sp. nov.
	<b>CYPERACEAE</b>	
<i>Meliola</i> 3111.3222	Colonies amphigenous, dense, velvety; hyphae straight to substraight; appressoria alternate, straight to curved, head cells cylindrical, globose, slightly angular, sublobate to lobate, often truncate at the apex; phialides borne on a separate mycelial branch; mycelial setae straight, simple, acute to obtuse at the tip	<i>Meliola cyperacearum</i>
	<b>DIOSCOREACEAE</b>	
3113.3223	Colonies epiphyllous, dense, velvety; hyphae straight; appressoria alternate, about 3% opposite, antrorse to subantrorse, straight to curved; head cells curved, cylindrical, ovate, entire, rounded at the apex; phialides mixed with appressoria; mycelial setae scattered, straight, simple, acute to dentate at the tip	<i>Meliola dioscoreacearum</i>
3112.4222	Colonies epiphyllous, dense, velvety; hyphae straight to substraight; appressoria opposite, less than 1% alternate, antrorse to spreading, straight to slightly curved; head cells subglobose to ovate, entire; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, straight, simple, acute to obtuse at the tip	<i>Meliola dioscoregena</i>
	<b>EBENACEAE</b>	
<i>Meliola</i> 3113.4222	Colonies amphigenous, subdense; hyphae substraight to crooked; appressoria opposite, alternate, unilateral, antrorse, subantrorse to retrorse, straight to curved, head cells oblong, ovate, cylindrical, globose, straight to differently curved, entire to angular; phialides mixed with appressoria; mycelial setae, simple, straight, acute at the tip	<i>Meliola ebeni</i>
3111.3222	Colonies amphigenous, mostly epiphyllous, thin, Hyphae straight to substraight, Appressoria alternate, very rarely opposite, antrorse, subantrorse to retrorse, head cells ovate, globose, entire, Phialides mixed with appressoria; mycelial setae simple, straight, acute to obtuse at the tip	<i>Meliola diospyri-buxifoliae</i>
	<b>ELAEOCARPACEAE</b>	
<i>Amazonia</i> 3101.4220	Colonies amphigenous, thin; hyphae straight to flexuous; appressoria alternate, unilateral, antrorse to retrorse, straight to curved, head cells ovate, oblong, cylindrical, straight to curved, entire to angular, broadly rounded to truncate at the apex; phialides mixed with appressoria	<i>Amazonia elaeocarpi</i>
<i>Appendiculella</i> 3201.3220	Colonies epiphyllous, subdense; hyphae straight to undulate; appressoria alternate, antrorse to subantrorse; head cells globose, ovate, entire, 12-14 x 7-10 µm; phialides mixed with appressoria; perithecial appendages conoid, straight to curved, horizontally striated, attenuated to broadly rounded at the apex.	<i>Appendiculella elaeocarpi</i>

	EUPHORBIACEAE	
<i>Asteridiella</i> 3101.3220	Colonies amphigenous, thin; hyphae straight to flexuous; appressoria alternate, unilateral, antrorse, head cells globose, ovate, entire; phialides mixed with appressoria; perithecial wall cells conoid to mammiform	<i>Asteridiella crotonis-caudati</i>
3101.3220	Colonies amphigenous, thin; hyphae substraight, flexuous to crooked; appressoria alternate to unilateral, antrorse, subantrorse to retrorse, straight to curved; head cells ovate, globose, entire, angular; phialides mixed with appressoria; perithecial wall cells conoid	<i>Asteridiella sebastianiae</i>
3101.4220	Colonies epiphyllous, dense; hyphae substraight to flexuous; appressoria alternate, antrorse, subantrorse to reflexed, straight to variously curved, stalk cells rarely up to 2-septate, head cells ovate, globose, cylindrical, entire, angular to rarely sublobate, very few attenuated at the apex; phialides numerous, apparently borne on a separate mycelium but mixed with appressoria, perithecial wall cells conoid, projected, attenuated at the apex, up to 20 µm high ascospores straight to slightly curved	<i>Asteridiella chowirae</i>
<i>Meliola</i> 31¼3.4321	Colonies hypophyllous, subdense; hyphae straight to substraight; appressoria mostly opposite, alternate, straight to curved, antrorse, subantrorse to retrorse, head cells ovate, oblong, entire to predominantly angular; mycelial setae simple, crooked, uncinata, obtuse at the tip.	<i>Meliola erumeliensis</i>
3113.4222	Colonies amphigenous, mostly hypophyllous, crustose; hyphae straight to substraight; appressoria alternate, about 15% opposite, antrorse to subantrorse, spreading, head cells ovate, clavate, globose, entire to 2-5-times lobate, often slightly angular; phialides mixed with appressoria; mycelial setae few, simple, straight, obtuse at the tip	<i>Meliola aporusae</i>
3111.4323	Colonies mostly hypophyllous, subdense, velvety; hyphae crooked; appressoria alternate to unilateral, straight to curved, antrorse to subantrorse, head cells globose to ovate, entire, angular to lobate; phialides mixed with appressoria; mycelial setae scattered, simple, straight	<i>Meliola homoniaiae</i>
	FABACEAE	
<i>Meliola</i> 31¼3.3223	Colonies epiphyllous, dense, velvety; hyphae substraight to undulate; appressoria alternate to opposite, antrorse to spreading, straight to curved; head cells globose to subglobose, ovate, cylindrical, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, simple, straight to slightly curved, acute, dentate to cristate at the tip	<i>Meliola pseudarthrae</i> var. <i>indica</i>
31¼1.3223	Colonies epiphyllous, subdense, crustose; hyphae straight, branching opposite at acute to subacute angles, loosely reticulate; appressoria alternate, about 1% opposite, antrorse to spreading, straight to curved; head cells ovate to oblong, entire, rounded at the apex; phialides mixed with appressoria; mycelial setae fairly numerous, scattered, straight, simple, acute to dentate at the tip	<i>Meliola aganopes</i>
3113.4222	Colonies epiphyllous, thin; hyphae substraight to slightly undulate, branching opposite at acute to wide angles, loosely to closely reticulate; appressoria alternate, 5% unilateral, 5% opposite, antrorse to spreading, straight to curved; head cells subglobose, clavate, entire; phialides mixed with appressoria; mycelial setae numerous, scattered to grouped around perithecia, straight, simple, acute to obtuse at the tip	<i>Meliola erythrinae</i> var. <i>indica</i>
31¼3.4222	Colonies amphigenous, mostly epiphyllous, dense, velvety; hyphae straight to substraight; appressoria alternate, about 5% opposite, antrorse, curved; head cells globose to subglobose, straight to curved, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, straight, simple, acute to dentate at the tip	<i>Meliola abrupta</i>
3113.3221	Colonies amphigenous, caulicolous, dense, hyphae substraight, flexuous to crooked, appressoria alternate, about 2% opposite, antrorse to subantrorse, head cells ovate, globose, straight to curved, entire, phialides mixed with appressoria, mycelial setae few, scattered, simple, straight, obtuse at the tip	<i>Meliola pycnosporae</i>
3113.3222	Colonies foliicolous, fructicolous, epiphyllous, thin, scattered, hyphae undulating, appressoria alternate, unilateral, up to 3%, opposite, straight to slightly curved, subantrorse to retrorse, head cells ovate, globose, mycelial setae scattered, simple, straight to slightly curved, acute to obtuse	<i>Meliola psophocarpi</i>
3111.3222	Colonies epiphyllous, thin, scattered; hyphae flexuous to crooked; appressoria alternate to unilateral, up to 1% opposite, antrorse, subantrorse to retrorse, head cells globose, ovate, straight to curved, Phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, acute at the tip	<i>Meliola abri</i>
3111.3222	Colonies foliicolous, epiphyllous, thin, scattered; hyphae flexuous to undulate; appressoria alternate, unilateral, rarely opposite, straight to slightly curved, antrorse, subantrorse to retrorse, head cells ovate, globose; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight to slightly curved, acute to obtuse at the tip	<i>Meliola canavaliae</i>
311x.4233	Colonies epiphyllous, effuse, black; hyphopodia dark brown; setae dark brown, straight to slightly curve, acuminate	<i>Meliola ougeinae</i>
3111.3222	Colonies epiphyllous, dense; hyphae flexuous to crooked; appressoria alternate, antrorse to subantrorse, head cells ovate, globose, straight to curved, entire, rarely slightly angular; phialides borne on a separate mycelial branch; mycelial setae scattered, simple, straight, acute to obtuse at the tip	<i>Meliola desmodii-laxiflori</i> var. <i>indica</i>



	<b>FAGACEAE</b>	
<i>Asteridiella</i> 3101.4220	Colonies amphigenous, mostly epiphyllous, hyphae substraight to slightly undulate, appressoria alternate, antrorse to sub antrorse, head cells ovate, globose, entire, angular to slightly lobate, phialides mixed with appressoria, ascospores obovoidal to cylindrical, 3-septate	<i>Asteridiella phukanea</i>
<i>Meliola</i> 31½3.4223	Colonies epiphyllous, thin, hyphae straight to substraight, appressoria alternate and about 2% unilateral, straight to curved, antrorse to subantrorse, head cells subglobose to ellipsoidal, entire to slightly angular, phialides mixed with appressoria, mycelial setae grouped around perithecia, simple, straight, acute, obtuse to dentate at the tip	<i>Meliola meghalayensis</i>
	<b>FLACOURTIACEAE</b>	
<i>Asteridiella</i> 3103.3220	Colonies amphigenous, mostly epiphyllous, subdense; hyphae straight to substraight; appressoria alternate, about 5% opposite, antrorse to spreading, head cells ovate to obovate, entire to slightly angular; phialides mixed with appressoria, perithecial wall cells mammiform	<i>Asteridiella homaligena</i>
3101.4220	Colonies epiphyllous, scattered, crustose, mostly near the leaf margins; hyphae substraight to crooked; appressoria alternate, unilateral, up to 1% opposite, antrorse, subantrorse to retrorse, head cells ovate, oblong to cylindrical, straight to curved, entire to angular; phialides mixed with appressoria; perithecial wall cells conoid to mammiform, straight to curved	<i>Asteridiella scolopiae</i> var. <i>indica</i>
<i>Meliola</i> 31½1.5324	Colonies hypophyllous, subdense to dense; hyphae substraight; appressoria alternate to unilateral, 1% opposite, antrorse to subantrorse, head cells ovate, oblong, globose, entire; phialides mixed with appressoria; mycelial setae are of two types: setae on mycelia are scattered, simple, straight, acute to obtuse at the tip, up to 1200 µm long and setae grouped around perithecia are simple, straight to curved, uncinata	<i>Meliola arrippaensis</i> sp. nov.
	<b>GENTIANACEAE</b>	
<i>Meliola</i> 3111.4233	Colonies hypophyllous, dense, hyphae straight to substraight, appressoria alternate to unilateral, antrorse, subantrorse to retrorse, straight to curved, head cells ovate, oblong, entire to angular, phialides mixed with appressoria, mycelial setae simple, straight, acute at the tip	<i>Meliola exacigena</i>
	<b>HIPPOCRATAEAE</b>	
<i>Meliola</i> 31½1.4233	Colonies amphigenous, subdense, hyphae straight to sub straight, appressoria mostly alternate, up to 1% opposite, unilateral, antrorse to sub-antrorse, straight to slightly curved, head cells globose, ovate, oblong, entire to slightly angular, straight, phialides mixed with appressoria, mycelial setae numerous, simple, straight, curved to arcuate, acute to obtuse at the tip	<i>Meliola salaciicola</i>
	<b>LAMIACEAE</b>	
<i>Amazonia</i> 3101.3220	Colonies epiphyllous, dense; hyphae substraight to flexuous; appressoria alternate to unilateral, straight to curved, antrorse to closely antrorse and often appressed to the hyphae; head cells ovate to globose, entire; phialides born on a separate mycelial branches	<i>Amazonia dikesinghii</i>
	<b>LAURACEAE</b>	
<i>Asterediella</i> 3101.4220	Colonies amphigenous, mostly hypophyllous, dense, velvety, Hyphae straight to substraight, Appressoria alternate, antrorse, subantrorse to rarely retrorse, straight to rarely curved, head cells ovate, oblong, rarely rounded to slightly attenuated at the apex, often truncate at the apex, entire, rarely angular,	<i>Asterediella persiicola</i>
<i>Meliola</i> 31½1.4333	Colonies hypophyllous, sub-dense, velvety; hyphae straight to undulate; appressoria alternate to unilateral, antrorse to sub-antrorse, straight to curved, head cells globose, ovate, slightly angular, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, straight, very few uncinata, simple, acute to obtuse at the tip	<i>Meliola palakkadensis</i>
31½3.4323	Colonies hypophyllous, subdense; hyphae straight to substraight; appressoria alternate, about 40% opposite, antrorse to subantrorse, head cells globose, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, simple, straight, obtuse to dentate at the tip	<i>Meliola kakachiana</i> var. <i>poochiparensis</i>
	<b>LINACEAE</b>	
<i>Meliola</i> 3113.4224	Colonies epiphyllous, subdense to dense, velvety; hyphae straight to substraight; appressoria opposite, about 2% alternate to unilateral, straight to curved, antrorse to spreading; head cells ovate to oblong, entire, broadly rounded at the apex; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse at the tip;	<i>Meliola hugoniae</i>
	<b>LORANTHACEAE</b>	
<i>Irenopsis</i> 3401.4220	Colonies epiphyllous, dense, velvety; hyphae substraight, flexuous to crooked; appressoria alternate to unilateral, antrorse, subantrorse to retrorse, head cells mostly entire, ovate, clavate to cylindrical, rarely angular to sublobate; phialides mixed with appressoria; perithecial setae 2–10 in number, simple, straight to uncinata at the apical portion, acute to obtuse at the tip	<i>Irenopsis loranthicola</i>

	<b>MAGNOLIACEAE</b>	
<i>Asteridiella</i> 3101.2220	Colonies epiphyllous, thin; hyphae substraight; appressoria alternate, antrorse, mostly straight, head cells ovate, oblong, angular to sublobate, phialides mixed with appressoria	<i>Asteridiella micheliae</i>
<i>Meliola</i> 3113.4222	Colonies epiphyllous, dense; hyphae substraight to flexuous to slightly crooked; appressoria alternate, opposite to unilateral, antrorse to subantrorse, straight to variously curved, head cells ovate, oblong to cylindrical, entire, angular, crenately lobate to sublobate; phialides mixed with appressoria; mycelial setae grouped around perithecia, simple, straight, acute at the tip	<i>Meliola cariappaee</i> sp. nov.
	<b>MALPHIGIACEAE</b>	
<i>Irenopsis</i> 3403.5320	Colonies amphigenous, subdense; hyphae straight to substraight; appressoria alternate, unilateral to 3-4% opposite, antrorse to subantrorse, head cells ovate, entire, mostly angular to rarely sublobate; phialides mixed with appressoria; perithecial setae simple, straight, obtuse at the tip	<i>Irenopsis hiptages</i> var. <i>indica</i> var. nov.
	<b>MALVACEAE</b>	
<i>Irenopsis</i> 3401.3220	Colonies amphigenous, thin, hyphae sub straight to flexuous, appressoria alternate to unilateral, antrorse, sub-antrorse to retrorse, straight to curved, head cells globose, ovate, entire to sublobate, phialides mixed with appressoria,	<i>Irenopsis sidae</i> var. <i>abutili</i>
3403.3220	Colonies epiphyllous, thin; hyphae flexuous; appressoria alternate, 5% unilateral, antrorse to spreading, straight to variously curved, head cells ovate to globose, entire, subangular to sublobate, truncate; phialides mixed with appressoria; perithecial setae 10-16 in number, simple, straight, smooth, obtuse at the tip	<i>Irenopsis pavoniae</i>
<i>Meliola</i> 3111.3221	Colonies epiphyllous, dense; hyphae substraight to flexuous; appressoria alternate, unilateral, antrorse, head cells globose, ovate, entire to slightly angular; phialides mixed with appressoria; mycelial setae numerous, scattered to grouped around perithecia, simple, straight to curved, acute to obtuse at the tip	<i>Meliola mutabilidis</i> sp. nov.
	<b>MELIACEAE</b>	
<i>Irenopsis</i> 3401.4220	Colonies epiphyllous, subdense, scattered; hyphae straight to flexuous, appressoria alternate, unilateral, antrorse to subantrorse, head cells globose, angular, sublobate to deeply lobate phialides mixed with appressoria, perithecial setae 0-5 in number, straight, simple, obtuse at the apex	<i>Irenopsis trichiliae</i>
<i>Meliola</i> 31½2.3322	Colonies amphigenous, mostly hypophyllous, dense, velvety; hyphae straight to substraight, appressoria opposite, rarely solitary, straight to curved, antrorse, subantrorse to retrorse, head cells ovate, oblong, cylindrical, entire, angular, sublobate to often bilobed, phialides mixed with appressoria, mycelial setae many, grouped around perithecia, simple, sigmoid, curved to uncinatate at the apical portion, acute, obtuse to bifid at the tip,	<i>Meliola sairandhriana</i>
3111.3232	Colonies epiphyllous, thin, velvety; hyphae straight to substraight; appressoria alternate, straight to curved, antrorse to spreading; head cells straight to curved, ovate, globose, cylindrical, entire; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, acute to obtuse at the tip	<i>Meliola cipadessae</i>
3122.3221	Colonies epiphyllous, subdense, velvety; hyphae straight; appressoria opposite, antrorse, to subantrorse to spreading; head cells ovate, cylindrical, slightly attenuated and broadly rounded at the apex, entire, phialides mixed with appressoria, mycelial setae grouped around perithecia, simple, uncinatate to slightly coiled, acute at the tip	<i>Meliola vazhachalensis</i>
3112.4223	Colonies epiphyllous, subdense; hyphae straight to substraight; appressoria arranged closely by leaving an intermittent gap, part of the mycelium literally devoid of appressoria, opposite, antrorse to subantrorse, closely arranged on the hyphae, head cells oblong, ovate, entire, angular to sublobate; phialides mixed with appressoria; mycelial setae numerous, scattered, simple, straight, acute to obtuse at the tip	<i>Meliola arkevermae</i>
31½3.3231	Colonies epiphyllous, dense, velvety; hyphae substraight to crooked; appressoria alternate, unilateral, opposite, antrorse, subantrorse to retrorse, head cells globose, subglobose, entire to rarely truncate; phialides mixed with appressoria; mycelial setae scattered, simple, straight, acute, 2-3-times dentate at the tip	<i>Meliola dysoxyligena</i>
31½1.4222	Colonies amphigenous, mostly epiphyllous; hyphae straight to substraight; appressoria alternate to unilateral, antrorse to subantrorse, head cells ovate, globose, entire; phialides mixed with appressoria; mycelial setae numerous, scattered, straight, dentate, cristate, bifid to obtuse at the tip	<i>Meliola garugae</i>
	<b>MORACEAE</b>	
<i>Asteridiella</i> 3101.3220	Colonies epiphyllous, dense, hyphae straight, substraight to flexuous, appressoria alternate to unilateral, straight to slightly curved, antrorse to subantrorse, rarely retrorse, head cells straight to slightly curved, globose, ovate, oblong, entire to rarely angular, phialides mixed with appressoria	<i>Asteridiella ficicola</i>
<i>Meliola</i> 3111.4233	Colonies amphigenous, mostly hypophyllous, dense, velvety, hyphae straight to substraight, appressoria alternate to unilateral, distantly placed, antrorse, subantrorse to rarely retrorse, head cells ovate, globose, entire, straight to curved, phialides mixed with appressoria, mycelial setae scattered, simple, straight, acute at the tip	<i>Meliola strebli</i>

31¼3.4223	Colonies epiphyllous, thin to subdense; hyphae straight; appressoria opposite, alternate, antrorse to subantrorse, head cells oblong, ovate, entire to slightly angular; phialides mixed with appressoria; mycelial setae numerous, simple, acute, obtuse to dentate at the tip	<i>Meliola kannurensis</i>
	<b>MYRISTICACEAE</b>	
<b>Meliola</b> 31¼3.5324	Colonies epiphyllous, scattered, thin; hyphae straight to substraight; appressoria opposite (48%), alternate, unilateral, antrorse to sub antrorse; head cells globose, ovate, rarely truncate, entire; phialides mixed with appressoria, mycelial setae simple, straight to slightly curved, acute to 1-3- times dentate at the tip	<i>Meliola manoharacharyi</i>
3111.4223	Colonies epiphyllous, thin; hyphae straight to substraight; appressoria alternate to unilateral, antrorse to subantrorse, head cells ovate to oblong, entire; phialides mixed with appressoria; mycelial setae grouped around perithecia, simple, straight, acute to obtuse at the tip	<i>Meliola knemae</i>
31¼2.4221	Colonies amphigenous, thin, strongly appressed to the host surface, Hyphae straight to substraight, Appressoria opposite, antrorse to subantrorse, head cells narrowly ovate, attenuated and broadly rounded towards the apex, entire, Phialides mixed with appressoria, Mycelial setae scattered, simple, straight	<i>Meliola myristicola</i>
	<b>MYRSINACEAE</b>	
3113.5223	Colonies hypophyllous, dense, velvety; hyphae substraight to crooked; appressoria alternate to opposite, straight to curved, antrorse to spreading, retrorse; head cells ovate, globose to subglobose, cylindrical, clavate, entire, phialides mixed with appressoria, mycelial setae fairly numerous, scattered to grouped around perithecia, straight to curved but not uncinata, acute to obtuse at the tip	<i>Meliola rapanae</i>
3113.5221	Colonies hypophyllous, subdense to dense, Hyphae substraight; appressoria alternate, up to 30% opposite to unilateral, antrorse to subantrorse, head cells ovate, globose, entire, phialides mixed with appressoria; mycelial setae simple, straight, acute to obtuse at the tip,	<i>Meliola ardisiigena</i>
	<b>MYRTACEAE</b>	
<b>Asteridiella</b> 3101.4230	Colonies amphigenous, subdense, hyphae substraight to flexuous, appressoria alternate to unilateral, antrorse to subantrorse, straight to slightly curved, head cells oblong, ovate, globose, entire, phialides mixed with appressoria,	<i>Asteridiella brahmagiriensis</i>
<b>Meliola</b> 31¼1.5324	Colonies amphigenous, sub-dense, hyphae straight to sub-straight, appressoria alternate, unilateral, antrorse to retrorse, straight to curved, head cells oblong, ovate, curved, entire to angular, phialides mixed with appressoria, mycelial setae straight, acute, obtuse, dentate to furcate at the tip	<i>Meliola kukkeensis</i>
	<b>OLACACEAE</b>	
<b>Asteridiella</b> 3111.4220	...	<i>Asteridiella anacolosae</i>
<b>Meliola</b> 3113.5333	Colonies amphigenous, mostly hypophyllous, dense, velvety; hyphae flexuous to undulate; appressoria alternate, opposite to unilateral, antrorse to subantrorse, rarely retrorse, head cells oblong to cylindrical, straight to flexuously curved, entire; phialides mixed with appressoria; mycelial setae straight to curved, scattered, acute at the tip	<i>Meliola strombosiigena</i>
3111.3223	Colonies epiphyllous, dense; hyphae straight; appressoria alternate, antrorse; head cells ovate, oblong, entire, broadly rounded to truncate to attenuate at the apex; phialides mixed with appressoria; mycelial setae scattered, simple, straight, acute at the tip	<b><i>Meliola strombosiicola</i> nom. nov.</b>
	<b>OLEACEAE</b>	
<b>Meliola</b> 3111.4212	Colonies epiphyllous, thin; hyphae flexuous; appressoria alternate, straight to curved, antrorse to retrorse, head cells oblong, ovate, rarely globose, entire; phialides mixed with appressoria; mycelial setae scattered, simple, obtuse at the tip	<i>Meliola daviesii</i> var. <i>kodaikalensis</i>
	<b>PITTOSPORACEAE</b>	
<b>Asteridiella</b> 3101.4220	...	<i>Asteridiella pittosporacearum</i>
	<b>RANANCULACEAE</b>	
<b>Meliola</b> 3111.3222	Colonies epiphyllous, dense; hyphae substraight to flexuous; appressoria alternate to unilateral antrorse, subantrorse to retrorse, head cells, ovate, entire, angular to sublobate; phialides mixed with appressoria; mycelial setae scattered, simple, straight, obtuse at the tip	<i>Meliola knowltoniae</i>
	<b>RHAMNACEAE</b>	
<b>Meliola</b> 31¼1.3222	Colonies epiphyllous, thin; hyphae straight to substraight; appressoria mostly alternate, unilateral, antrorse to subantrorse; head cells ovate, globose, entire, angular to slightly lobate; phialides mixed with appressoria; mycelial setae scattered, simple, straight, obtuse to dentate at the tip	<i>Meliola gouaniae</i> var. <i>indica</i>



<i>Asteridiella</i> 3101.3220	Colonies amphigenous, mostly epiphyllous, thin; hyphae straight, substraight to slightly undulate; appressoria alternate, unilateral, antrorse to subantrorse; head cells globose, ovate, oblong, entire, angular to slightly lobate; phialides mixed with appressoria	<i>Asteridiella emciana</i>
<i>Meliola</i> 3111.3222	Colonies amphigenous, dense, velvety; hyphae substraight to slightly undulate; appressoria alternate to 5% unilateral, antrorse to sub antrorse; head cells globose, subglobose to oblong; phialides mixed with appressoria mycelial setae scattered, grouped around perithecia straight, simple, obtuse at the tip	<i>Meliola gouaniicola</i>
3111.4223	Colonies hypophyllous, subdense to dense; hyphae flexuous to crooked; appressoria alternate, antrorse, subantrorse to retrorse, head cells oblong, ovate, entire; phialides mixed with appressoria; mycelial setae scattered, simple, straight	<i>Meliola colubrinicola</i>
3111.4232	Colonies amphigenous, thin; hyphae flexuous; appressoria alternate, straight to curved, antrorse to retrorse, head cells ovate, globose, truncate to attenuated at the apex, sublobate; phialides borne on a separate mycelial branch, alternate; mycelial setae grouped around perithecia, simple, straight, acute to obtuse at the tip	<i>Meliola hoveniae</i>
<b>RUBIACEAE</b>		
<i>Asteridiella</i> 3101.4220	Colonies amphigenous, subdense, hyphae straight to substraight, appressoria alternate, unilateral, 1% opposite, antrorse, to subantrorse, straight, head cells ovate, oblong, globose, entire to slightly angular, phialides mixed with appressoria,	<i>Asteridiella ixorae</i>
<i>Irenopsis</i> 3401.4220	Colonies epiphyllous, thin; hyphae substraight to flexuous; appressoria alternate, 1% opposite to unilateral, antrorse to subantrorse, head cells ovate, oblong, straight to curved, entire, angular to rarely slightly lobate; phialides mixed with appressoria; perithecial setae 5-8, straight to slightly curved, upright, smooth walled, broadly rounded at the tip	<i>Irenopsis xeromphidis</i>
<i>Meliola</i> 3111.3223	Colonies amphigenous, thin, hyphae straight to substraight, appressoria alternate to unilateral, antrorse to subantrorse, straight to curved, head cells ovate, oblong, entire to slightly angular, phialides mixed with appressoria, mycelial setae simple, straight, acute at the tip	<i>Meliola canthiigena</i>
3111.4221	Colonies amphigenous, thin; appressoria alternate, antrorse to subantrorse, straight to curved, head cells cylindrical, ovate, angular to sublobate; phialides borne on a separate mycelial branch; mycelial setae numerous, grouped around perithecia, simple, straight, obtuse at the tip	<i>Meliola luculiae</i>
3111.3221	Colonies amphigenous rarely hypophyllous, sub-dense; hyphae sub straight; appressoria alternate to unilateral, antrorse, spreading, straight, head cells globose, ovate, straight, entire; phialides mixed with appressoria; mycelial setae numerous, simple, straight to slightly curved, acute to obtuse at the tip	<i>Meliola kanniyakumariana</i> var. <i>brahmagiriense</i>
<b>RUTACEAE</b>		
<i>Asteridiella</i> 3101.4330	Colonies amphigenous, dense, velvety; hyphae straight; appressoria alternate, unilateral, about 10% opposite, antrorse to subantrorse, rarely retrorse, head cells ovate, globose, entire; phialides mixed with appressoria; perithecial wall cells mammiform to conoid	<i>Asteridiella toddaliae</i>
<i>Meliola</i> 3111.2222	Colonies epiphyllous, thin, hyphae straight to substraight, appressoria alternate to unilateral, antrorse, head cells oblong, sublobate, angular, straight to curved, phialides mixed with appressoria, mycelial setae scattered, simple, straight, acute at the tip,	<i>Meliola luvungicola</i>
3111.4221	Colonies amphigenous, dense, velvety; hyphae straight; appressoria alternate, rarely unilateral, often crowded, antrorse, straight; head cells ovate, angular, sinuately lobate to deeply lobate; phialides mixed with appressoria; mycelial setae straight to slightly curved, scattered to grouped around perithecia, obtuse at the tip	<i>Meliola vatsavayae</i>
3113.3221	Colonies amphigenous, dense, velvety; hyphae straight, flexuous; appressoria mostly opposite, rarely unilateral, antrorse to subantrorse, head cells ovate, oblong, rarely globose, straight to curved, entire, often sinuate, truncate at the apex; phialides mixed with appressoria, opposite, alternate to unilateral; mycelial setae simple, straight to uncinuate at the apical portion, acute, obtuse to 2–3-times dentate at the tip	<i>Meliola clausenigena</i>
<b>SANTALACEAE</b>		
<i>Meliola</i> 3113.4222	Colonies amphigenous, mostly epiphyllous dense; hyphae straight to substraight; appressoria opposite to alternate, antrorse; head cells ovate to globose, entire; phialides mixed with appressoria; mycelial setae scattered, straight, simple, obtuse at the tip	<i>Meliola mahamulkarii</i>
<b>SAPOTACEAE</b>		
<i>Amazonia</i> 3101.4230	Colonies hypophyllous, crustose; hyphae substraight; appressoria alternate to unilateral, antrorse, straight to slightly curved, head cells globose, ovate, entire; phialides few, mixed with appressoria	<i>Amazonia palaquii</i>
<b>SAPINDACEAE</b>		
<i>Ectendomeliola</i> 3113.4222	Colonies hypophyllous, subdense, crustose; hyphae substraight to crooked, branching irregular at acute angles, form irregular mycelial net, loosely to closely reticulate, cells and endophytic; phialides few, mixed with appressoria; mycelial setae numerous, simple, straight to uncinuate, acute, obtuse, dentate to furcate at the tip	<i>Ectendomeliola otonephelii</i>

<b>Meliola</b> 31¼3.3222	Colonies hypophyllous, dense, hyphae straight to substraight, appressoria opposite, alternate, antrorse, subantrorse to retrorse, head cells ovate, globose, entire to angular, straight to curved, phialides few, mixed with appressoria, mycelial setae, simple, straight, acute, dentate to furcate at the tip	<i>Meliola filicii</i> var. <i>indica</i>
31¼1.4222	Colonies epiphyllous, subdense to dense; hyphae straight to substraight; appressoria alternate to unilateral, antrorse to subantrorse, head cells ovate, entire; phialides numerous, mixed with appressoria; mycelial setae numerous, scattered, simple, straight to uncinuate, up to 320 µm long, obtuse, 1-3- dentate but predominantly cristate at the tip.	<i>Meliola harpullicola</i> sp. nov.
	<b>SIMAROUBACEAE</b>	
<b>Meliola</b> 31¼1.4222	Colonies hypophyllous, thin, hyphae crooked, appressoria alternate to unilateral, straight to curved, antrorse, subantrorse to retrorse, head cells ovate, globose, truncate to slightly lobate, phialides mixed with appressoria, mycelial setae scattered, simple, straight, acute, obtuse to 2-5 dentate at the tip	<i>Meliola ailanthicola</i>
	<b>SOLANACEAE</b>	
<b>Asteridiella</b> 3101.4230	Colonies mostly epiphyllous, scattered, subdense, velvety; hyphae flexuous; appressoria alternate, straight to curved, subantrorse to closely antrorse, head cells globose, sub-lobate, slightly angular, entire; phialides borne on a separate mycelial branch; perithecial cells larviform, mammiform	<i>Asteridiella solani</i> var. <i>kodaikanalensis</i>
3101.6320	Colonies epiphyllous, thin; hyphae flexuous; appressoria alternate, alternate to rarely opposite, antrorse, straight to curved' head cells ovate to cylindrical, sometimes reniform entire; phialides borne on a separate mycelial branch; perithecial wall cells projected	<i>Asteridiella winteri</i> var. <i>macrospora</i>
	<b>STERCULIACEAE</b>	
<b>Irenopsis</b> 3401.4220	Colonies amphigenous, subdense, hyphae substraight to undulate, appressoria alternate, unilateral, antrorse, subantrorse to retrorse, straight to curved, head cells globose, ovate, oblong, entire to angular, phialides mixed with appressoria, perithecial setae 4-10 in number, simple, straight, pale brown, septate, straight to uncinuate at the apical part, obtuse at the tip,	<i>Irenopsis kleinhoviae</i>
3401.3220	Colonies amphigenous, thin, Hyphae substraight to flexuous; appressoria alternate, straight to curved, antrorse, subantrorse to retrorse, head cells ovate, globose, entire, angular to sublobate; phialides mixed with appressoria, Perithecial setae 2-6, simple, straight, obtuse at the tip	<i>Irenopsis pterigotae</i>
<b>Meliola</b> 31½2.3222	Colonies epiphyllous, dense, velvety; hyphae straight to substraight; appressoria alternate, antrorse to subantrorse; head cells ovate, globose, oblong, mostly entire, often angular to rarely slightly lobate; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, flexuous to rarely curved to very few uncinuate, obtuse at the tip	<i>Meliola pterigotae</i>
3111.4222	Colonies epiphyllous, thin; hyphae straight to substraight; appressoria mostly alternate, unilateral, antrorse to subantrorse; head cells ovate, globose, entire, angular to slightly lobate; phialides borne on a separate mycelia branch; mycelial setae few, simple, straight, acute at the tip	<i>Meliola sterculicola</i>
	<b>SYMPLOCACEAE</b>	
<b>Asteridiella</b> 2101.4230	Colonies amphigenous, mostly epiphyllous, dense, hyphae straight to substraight, appressoria alternate, unilateral, straight to often slightly curved, antrorse to subantrorse, stalk cells mostly unicellular, rarely 1-septate, head cells mostly straight, often curved, oblong, ovate, clavate, mostly entire, often angular, rarely sublobate	<i>Asteridiella shenbaganurensis</i>
3101.4220	Colonies amphigenous, mostly epiphyllous, dense, hyphae straight to substraight, appressoria alternate, unilateral, straight, antrorse, head cells mostly straight, globose, ovate, entire, phialides mixed with appressoria,	<i>Asteridiella kodaikanalensis</i>
3101.3230	Colonies amphigenous, subdense, Hyphae straight to substraight, Appressoria alternate to unilateral, antrorse to subantrorse, head cells globose to ovate, entire, Phialides mixed with appressoria, perithecial wall cells conoid to mammiform, up to 50 µm long;	<i>Asteridiella symploci-microphyllae</i>
	<b>TYPHACEAE</b>	
<b>Meliola</b> 31¼3.4223	Colonies mostly epiphyllous, rarely hypophyllous subdense to dense, confluent and often cover entire upper surface of the leaves. Hyphae straight to substraight, Appressoria alternate, opposite to unilateral, antrorse to subantrorse, head cells globose to ovate, entire, straight to recurved, Phialides mixed with appressoria, alternate to opposite, ampulliform, Mycelial setae scattered, simple, straight to curved, often uncinuate, acute, obtuse to rarely dentate at the tip,	<i>Meliola typhae</i>
<b>Meliola</b> 3112.5323	Colonies epiphyllous, dense, crustose; hyphae straight; appressoria opposite, antrorse; head cells globose, ovate, entire; phialides mixed with appressoria; mycelial setae simple, straight to slightly curved, acute to obtuse at the tip	<i>Meliola rachammae</i>
	<b>VACCINIACEAE</b>	
<b>Meliola</b> 3111.3223	Colonies epiphyllous, dense, velvety, hyphae substraight to undulate, appressoria alternate, antrorse to retrorse, straight to curved, closely placed, head cells ovate, globose to subglobose, entire, phialides few in number, mixed with appressoria, mycelial setae numerous, grouped around perithecia, simple, straight, slightly curved, acute to obtuse at the tip	<i>Meliola shillongensis</i>

	VERBENACEAE	
<i>Asteridiella</i> 3101.3220	Colonies epiphyllous, dense; hyphae flexuous to crooked, closely reticulate; appressoria alternate, closely placed, antrorse to closely antrorse, often appressed to the hyphae, straight to curved, head cells globose, clavate, distinctly angular to truncate, rarely rounded; phialides many, mixed with appressoria, perithecial cells mammiform, broadly rounded at the apex	<i>Asteridiella depokensis</i>
3101.4330	Colonies epiphyllous, dense; hyphae flexuous to crooked, Appressoria alternate, antrorse, subantrorse, retrorse, straight to variously curved, head cells ovate, oblong, globose, angular to variously sublobate; phialides mixed with appressoria; perithecial wall cells conoid to mammiform	<i>Asteridiella madikeriensis</i>
3101.4320	Colonies epiphyllous, dense; hyphae straight, substraight to flexuous; appressoria alternate, antrorse to subantrorse, straight to curved, head cells globose, ovate, clavate to cylindrical, mostly angular, few sublobate, rarely entire, truncate; phialides many, apparently borne on a separate mycelial branch but mixed with appressoria, mostly opposite, often unilateral, ampulliform; perithecial wall cells mammiform to conoid, attenuated at tip	<i>Asteridiella viticis-negundoii</i>
<i>Meliola</i> 3111.3221	Colonies epiphyllous, subdense to dense; hyphae substraight; appressoria alternate to unilateral, antrorse to subantrorse, head cells globose to ovate, entire; phialides mixed with appressoria; mycelial setae straight to curved, simple	<i>Meliola cookeana</i>
3121.3221	Colonies epiphyllous, velvety; hyphae flexuous to crooked; appressoria alternate, unilateral, antrorse to subantrorse, head cells globose, subglobose, entire to sublobate; phialides mixed with appressoria; mycelial setae scattered, simple, straight, slightly curved to uncinata	<i>Meliola premnigena</i>
	VITACEAE	
<i>Meliola</i> 3113.3223	Colonies epiphyllous, scattered; hyphae straight to undulate; appressoria alternate to opposite, antrorse to subantrorse, retrorse to spreading; head cells ovate, globose, entire; phialides mixed with appressoria; mycelial setae straight, simple, acute to obtuse at the tip	<i>Meliola bakeri</i>
3113.4233	Colonies epiphyllous, dense, velvety; hyphae straight to undulate; appressoria opposite, about 20% alternate to unilateral, very closely placed, mostly antrorse, rarely spreading, straight to slightly curved; head cells ovate to oblong, cylindrical, entire, slightly angular, often truncate at the apex; phialides mixed with appressoria; mycelial setae grouped around perithecia, straight, simple, obtuse to broadly rounded at the tip	<i>Meliola cayratiae</i>
	ZINGIBERACEAE	
<i>Asteridiella</i> 3101.4210	Colonies amphigenous, dense, subvelvety; hyphae substraight to slightly crooked; appressoria alternate and unilateral, straight to curved, antrorse to spreading; head cells ovate, globose, angular to sublobate; phialides mixed with appressoria; perithecial cells conoid to mammiform	<i>Asteridiella amomi</i>

## Host-Parasite-Index

1.	<i>Abrus pulchellus</i>	<i>Meliola abri</i>
2.	<i>Abutilon</i> sp.	<i>Irenopsis sidae</i> var. <i>abutili</i>
3.	<i>Aganape thyrsoflora</i>	<i>Meliola aganopes</i>
4.	<i>Aglaia minutiflora</i>	<i>Meliola sairandhrana</i>
5.	<i>Aglaia</i> sp.	<i>Meliola vazhachalensis</i>
6.	<i>Ailanthus malabarica</i>	<i>Meliola ailanthicola</i>
7.	<i>Alangium salvifolium</i>	<i>Meliola alangii</i> var. <i>salvifolii</i>
8.	<i>Amomum subulatum</i>	<i>Asteridiella amomi</i>
9.	<i>Anacolosia</i> sp.	<i>Asteridiella anacolosae</i>
10.	<i>Aporusa</i> sp.	<i>Meliola aporusae</i>
11.	<i>Aralia</i> sp.	<i>Meliola abdulkalami</i>
12.	<i>Ardisia</i> sp.	<i>Meliola ardisiigena</i>
13.	<i>Aristolochia grandiflora</i>	<i>Meliola aristolochigena</i>
14.	<i>Aristolochia tagala</i>	<i>Meliola aristolochigena</i>
15.	<i>Bauhinia purpurea</i>	<i>Meliola bauhiniicola</i> var. <i>brevipoda</i>
16.	<i>Caesalpinia banduc</i>	<i>Meliola caesalpiniiicola</i>
17.	<i>Calycopteris floribunda</i>	<b><i>Meliola calycopteridis</i> sp. nov.</b>
18.	<i>Canavalia</i> sp.	<i>Meliola canavaliae</i>
19.	<i>Canthium</i> sp.	<i>Meliola canthiigena</i>
20.	<i>Castanopsis armata</i>	<i>Asteridiella phukanea</i>
21.	<i>Castanopsis armata</i>	<i>Meliola meghalayensis</i>
22.	<i>Cayratia pedata</i>	<i>Meliola cayratiae</i>
23.	<i>Cayrtia pedata</i>	<i>Meliola bakeri</i>
24.	<i>Cipadessa baccifera</i>	<i>Meliola cipadessae</i>
25.	<i>Clausena</i> sp.	<i>Meliola clausenigena</i>
26.	<i>Clematis</i> sp.	<i>Meliola knowltoniae</i>
27.	<i>Colubrina travancorica</i>	<i>Meliola colubrinicola</i>
28.	<i>Croton caudatus</i>	<i>Asteridiella crotonis-caudati</i>
29.	<i>Cynanchum</i> sp.	<i>Meliola cynanchi</i>
30.	<i>Cyperus</i> sp.	<i>Meliola cyperacearum</i>
31.	<i>Derris</i> sp.	<i>Meliola abrupta</i>
32.	<i>Desmodium laxiflorum</i>	<i>Meliola desmodii-laxiflori</i> Deight. var. <i>indica</i>
33.	<i>Dioscorea</i> sp.	<i>Meliola dioscoreacearum</i>
34.	<i>Dioscorea</i> sp.	<i>Meliola dioscoregena</i>
35.	<i>Diospyros buxifolia</i>	<i>Meliola diospyri-buxifoliae</i>
36.	<i>Diospyros ebenum</i>	<i>Meliola ebeni</i>
37.	<i>Drypetes elata</i>	<i>Meliola erumeliensis</i>
38.	<i>Erythrina variegata</i>	<i>Meliola erythrinae</i> var. <i>indica</i>
39.	<i>Dysoxylum</i> sp.	<i>Meliola dysoxyligena</i>
40.	<i>Elaeocarpus munronii</i>	<i>Amazonia elaeocarpi</i>
41.	<i>Elaeocarpus tuberculatus</i>	<i>Appendiculella elaeocarpi</i>
42.	<i>Eunymous</i> sp.	<i>Meliola euonymi</i>
43.	<i>Euphorbia pulcherrima</i> (Poinsettia pulcherrima)	<i>Asteridiella chowrirae</i>
44.	<i>Exacum</i> sp.	<i>Meliola exacigena</i>

45.	<i>Ficus gibbosa</i>	<i>Meliola kannurensis</i>
46.	<i>Ficus microcarpa</i>	<i>Asteridiella ficicola</i>
47.	<i>Filicium decipiens</i>	<i>Meliola filicii</i> var. <i>indica</i>
48.	<i>Flacourtia</i> sp.	<b><i>Meliola arippaensis</i> sp. nov.</b>
49.	<i>Garuga pinnata</i>	<i>Meliola garugae</i>
50.	<i>Gluta travancorica</i>	<i>Meliola gluticola</i>
51.	<i>Gouania</i> sp.	<i>Meliola gouaniae</i> var. <i>keralica</i>
52.	<i>Gouania</i> sp.	<i>Meliola gouaniicola</i>
53.	<i>Harpullia arborea</i>	<b><i>Meliola harpullicola</i> sp. nov.</b>
54.	<i>Hibiscus mutabilis</i>	<b><i>Meliola mutabilidis</i> sp. nov.</b>
55.	<i>Hiptage</i> sp.	<b><i>Irenopsis hiptages</i> var. <i>indica</i> var. nov.</b>
56.	<i>Homalium zeylanicum</i>	<i>Asteridiella homaligena</i>
57.	<i>Homonoia riparia</i>	<i>Meliola homonoiae</i>
58.	<i>Hovenia acerba</i>	<i>Meliola hoveniae</i>
59.	<i>Hovenia acerba</i>	<i>Meliola hoveniae</i>
60.	<i>Hugonia belli</i>	<i>Meliola hugoniae</i>
61.	<i>Ixora</i> sp.	<i>Asteridiella ixorae</i>
62.	<i>Jasminum brevilobum</i>	<i>Meliola daviesii</i>
63.	<i>Kamettia caryophyllata</i>	<i>Meliola kamettiae</i>
64.	<i>Kleinhovia hospita</i>	<i>Irenopsis kleinhoviae</i>
65.	<i>Knema attenuata</i>	<i>Meliola knemae</i>
66.	<i>Knoxia</i> sp.	<i>Meliola kanniyakumariana</i> var. <i>brahmagiriense</i>
67.	<i>Litsea</i> sp.	<i>Meliola kakachiana</i> var. <i>poochiparensis</i>
68.	<i>Litsea</i> sp.	<i>Meliola palakkadensis</i>
69.	<i>Lophopetalum wightiana</i>	<i>Meliola lophopetaligena</i>
70.	<i>Loranthus</i> sp.	<i>Irenopsis loranthicola</i>
71.	<i>Lucculia grandifolia</i>	<i>Meliola lucculiae</i>
72.	<i>Luvunga</i> sp.	<i>Meliola luvungicola</i>
73.	Meliaceae member	<i>Meliola arkevermae</i>
74.	<i>Quirivelia frutescens</i>	<i>Meliola ichnocarpi-volubili</i>
75.	<i>Mesua ferrea</i>	<i>Meliola mesuae</i>
76.	<i>Michelia champaka</i>	<b><i>Asteridiella michelilifolia</i> nom. nov.</b>
77.	<i>Michelia champaka</i>	<b><i>Meliola cariappae</i> sp. nov.</b>
78.	<i>Myristica</i> sp.	<i>Meliola manoharacharyi</i>
79.	<i>Osyris arborea</i>	<i>Meliola mahamulkarii</i>
80.	<i>Otonophelium stipulaceum</i>	<i>Ectendomeliola otonophelii</i>
81.	<i>Ougeinia oojeinensis</i>	<i>Meliola ougeiniae</i>
82.	<i>Palaquium</i> sp.	<i>Amazonia palaquii</i>
83.	<i>Pavonia</i> sp.	<i>Irenopsis pavoniae</i>
84.	<i>Pittosporum neelgherrense</i>	<i>Asterediella pittosporacearum</i>
85.	<i>Pleurostyliya</i> sp.	<i>Meliola pleurostylicola</i>
86.	<i>Pogostemon travancoricus</i>	<i>Amazonia dikesinghii</i>
87.	<i>Premna glaberrima</i>	<i>Meliola premnigena</i>



88.	<i>Premna</i> sp.	<i>Asteridiella madikeriensis</i>
89.	<i>Pseudarthria viscida</i>	<i>Meliola pseudarthriae</i> var. <i>indica</i>
90.	<i>Psophocarpus tetragonolobus</i>	<i>Meliola psophocarpi</i>
91.	<i>Pterigota alata</i>	<i>Irenopsis pterigotae</i>
92.	<i>Pterygota alata</i>	<i>Meliola pterigotae</i>
93.	<i>Pycnospora lutescens</i>	<i>Meliola pycnosporae</i>
94.	<i>Rapanea</i> sp.	<i>Meliola rapaneae</i>
95.	<i>Salacia</i> sp.	<i>Meliola salaciicola</i>
96.	<i>Scolopia</i> sp.	<i>Asteridiella scolopiae</i> var. <i>indica</i>
97.	<i>Scutia myrtiana</i>	<i>Asteridiella emciana</i>
98.	<i>Sebastiania chamaelea</i>	<i>Asteridiella sebastianiae</i>
99.	<i>Semecarpus travancorica</i>	<i>Meliola sanjappae</i>
100.	<i>Solanum verbasifolium</i>	<i>Asteridiella winteri</i> var. <i>macrospora</i>
101.	<i>Solanum viburnum</i>	<i>Asteridiella solani</i> var. <i>kodaikanalensis</i>
102.	<i>Symplocos macrophylla</i>	<i>Asteridiella symploci-microphyllae</i>
103.	<i>Sterculia</i> sp.	<i>Meliola sterculicola</i>
104.	<i>Streblus asper</i>	<i>Meliola strebli</i>
105.	<i>Streblus taxoides</i>	<i>Meliola strebli</i>

106.	<i>Strombosia ceylanica</i>	<b><i>Meliola strombosiicola</i> nom. nov.</b>
107.	<i>Strombosia</i> sp.	<i>Meliola strombosiigena</i>
108.	<i>Strophathus wightianus</i>	<i>Meliola strophanthicola</i> var. <i>indica</i>
109.	<i>Symplocos anamallayana</i>	<i>Asteridiella kodaikanalensis</i>
110.	<i>Symplocos anamallayana</i>	<i>Asteridiella shenbaganurensis</i>
111.	<i>Symplocos macrocarpa</i> ssp. <i>kanarana</i>	<i>Meliola rachammae</i>
112.	<i>Syzygium</i> sp.	<i>Asteridiella brahmagiriensis</i>
113.	<i>Syzygium</i> sp.	<i>Meliola kukkeensis</i>
114.	<i>Toddalia asiatica</i>	<i>Asteridiella toddaliae</i>
115.	<i>Trichilia</i> sp.	<i>Irenopsis trichiliae</i>
116.	<i>Vaccinium griffithianum</i>	<i>Meliola shillongensis</i>
117.	<i>Vallisneria spiralis</i>	<i>Meliola vallaridis</i>
118.	<i>Vitex leucoxydon</i>	<i>Meliola cookeana</i>
119.	<i>Vitex negundo</i>	<i>Asteridiella depokensis</i>
120.	<i>Vitex negundo</i>	<i>Asteridiella viticis-negundo</i>
121.	<i>Wrightia tinctoria</i>	<i>Meliola tabernaemontanae</i> var. <i>wrightiae</i>
122.	<i>Xeromphis uliginosa</i>	<i>Irenopsis xeromphidis</i>
123.	<i>Zanthoxylum rhetsa</i>	<i>Meliola vatsavayae</i>

