Foliicolous fungi of Silent Valley National Park, Kerala, India
V.B. Hosagoudar & M.C. Riju

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Preface

One of the authors (VBH), after completing the work on diseases of monocot crops and weeds of Satara (Chavan & Hosagoudar 1984, 1985), joined Botanical Survey of India, Southern Circle, Coimbatore in the project entitled, Long Term Environmental and Ecological impacts on the multi-purpose River Valley projects of Idukki Silent Valley with the assignment of the work on “Foliicolous Fungi of Idukki and Silent Valley Hydroelectric Project Area”. However, the work could proceed with Idukki hydroelectric project area by keeping the Silent Valley in silence. Though the thirst and thrust of Silent Valley fungi was hibernating in mind, it became possible to achieve it only after the sanctioning of the Mycorrhizal project by the Ministry of Environment and Forests, New Delhi. The senior author (VBH) visited the area only once but the team members made the collections available and the present work is the outcome of it.

This work, a result of the foliicolous fungal collections made in the Silent Valley National Park, Palghat, Kerala, since 1985, resulted in recording 139 fungal taxa belonging to 30 fungal genera: Acremoniula (1), Acrodicytys (1), Amazonia (3), Aphanopeltis (1), Armataella (4), Asteridiella (12), Asterina (32), Asterostomella (2), Asterostomula (1), Balladyna (2), Didymopsorella (1), Diplacoccium (1), Dysrhynchis (1), Echidnodella (1), Endophyllum (1), Eupelte (1), Irenopsis (1), Leptosphaerulina (1), Meliola (47), Meliolina (1), Oidium (1), Palawaniella (1), Phakopsora (1), Pratoprajella (1), Prillieuxina (1), Puccinia (1), Sarcinella (3), Schiffnerula (4), Spiropes (2) and Teratosperma (1), infected 138 plants belonging to 55 host families. The description of all these taxa are provided with illustrations. This area is the type locality for several fungal taxa.

This would not have been possible without the permission of Forest Department, Government of Kerala and the financial support of Department of Environment and Forests, New Delhi. We gratefully acknowledge Dr. B. Shivaraju, Additional Chief Conservator of Forests, for his consistent interest in the progress of our work. Dr. P.G. Latha, Director and Dr. E. Santhosh Kumar, JNTBGRI are acknowledged here for the facilities and the identification of plants. Our team members, Dr. Jacob Thomas, Dr. P.P. Rajesh Kumar, Messrs. S.S. Shaji, P.J. Robin and Jayakumar are remembered here—Authors
Foliicolous fungi of Silent Valley National Park, Kerala, India

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Abstract: The work is the result of the foliicolous fungal collections made in the Silent Valley National Park, Palghat, Kerala, since 1985, resulted in recording 139 fungal taxa belonging to 30 fungal genera: Acremoniula (1), Acrodictys (1), Amazonia (3), Aphanopeltis (1), Armatella (4), Astereilla (12), Asterina (32), Asterostomella (1), Balladyna (1), Didymopsorella (1), Diplococcium (1), Dysrhynchis (1), Echidiocysta (1), Eupelte (1), Irenopsis (1), Leptosphaerulina (1), Meliola (47), Meliolina (1), Oidium (1), Palawaniella (1), Phakopsora (1), Pratrapella (1), Prillieuxina (1), Puccinia (1), Sarcinella (3), Schiffnerula (4), Sipheps (2) and Teratosperma (1), infected 138 plants belonging to 55 host families. The description of all these taxa are provided with illustrations. This area is the type locality for several fungal taxa.

Keywords: India, Kerala, leaf, microfungi, taxonomy.
INTRODUCTION

Tropical forests are rich in their biodiversity and play an important role in the socio-economic development of the country. Floristic work on flowering plants and ferns of some regions and revisionary work of some flowering plants in India have appeared and Western Ghats region of peninsular India harbour about 4000 flowering plants. However, study of lower groups like fungi are yet to be taken up systematically.

The leaf and other chlorophyll bearing plant parts are the vital and work as a ‘mini industries’ in the preparation of food materials and such parts are subjected to several fungal diseases. Leaves of all types form suitable substrates for many fungi. As and when leaf unfolds, it will be almost clean but provides a landing site for all microbes. Leaf surfaces are differential spore traps. Their efficiency of trapping depends upon their position and nature such as: vertical, wet or dry, hairy or glabrous, glossy or mat, waxy or non-waxy, etc. Though all spores of the obligate parasites will not germinate on all hosts, they never miss to infect the suitable or compatible host because of their host specificity. It is also evidenced in several instances that the plants are identified by using the microbes as tools.

Leaves are one of the most important, vital and precious parts of plants to indicate health of plants. Healthy leaves indicate health of plants and their produce. They are the mini industry for the production of the food materials both for the plants and its dependent animals. However, these green parts of the plants are directly exposed to interact with environment and microbes like algae, fungi, bacteria, virus, etc. The knowledge about this interaction of the plants with other organisms is meager. There are certain instances that fungi erode certain plant community as is evidenced in several cultivated plants infected with rusts, smuts, etc.

Hence, an understanding of the occurrence of different foliicolous fungi on the plants of this area is essential.

Silent Valley forest represents a unique patch of tropical evergreen rain forest very rich in its biodiversity with many new, rare and important species. It is located in Palghat District in Kerala state having high ridges and valleys. Though the floristic wealth of this area is well explored, study on the occurrence and distribution of foliicolous fungi is very much sporadic and fragmentary. Foliicolous fungi are leaf infecting fungi occur on almost all angiosperms with high host specificity. It reduces the photosynthetic efficiency and causes several diseases of the leaves. Hence, the study of leaf infecting microfungi in Silent Valley area has revealed novelties and discoveries.

Silent Valley National Park is important tropical virgin rain forests of India noted for its biodiversity and species richness. It is a much whispering place, located in Palghat District in Kerala State, believed to be more than fifty million years old (Swaminathan 1999), having an area of 8952ha, located at an altitude ranging from 750–2383 m, receives more than 5000mm rain fall annually, temperature ranges from 8–29 °C. It harbours evergreen forests. Manilal (1988) has given an account of 966 species belonging to 559 genera distributed among 134 families of flowering plants. An account of microfungi from water and litter has been studied by Subramanian (1986). The systematic study of the foliicolous fungi of this virgin forest is scanty. The present work is the consolidated account of the foliicolous fungi known from this area.

Origin of Silent Valley: The evolutionary age of the Silent Valley evergreen rain forest is believed to be more than 50 million years. This is a cliff of forest which suddenly descends from the Nilgiri plateau to the plains of Kerala with a sudden drop in altitude from 2500–150 m causes a distance to three to four km.

The name ‘Silent Valley’: Silent Valley forests locally known as Sairandhrivanam, one linked to the mythological character, Droupadi in Mahabharata. Also the river Kunthipuzha named after Kunthi Devi, mother of Pandavas of Mahabharata, runs through the Silent Valley in north-south direction. It is popularly believed that Pandavas lived here with their consort Droupadi. It is also believed that Silent Valley has been given the name due to the absence of cicada insects which usually produce a distinct sound in tropical forests. However, cicadas have started to inhabit in these forests.
Kunthipuzha: Kunthipuzha, commonly known as ‘Karimpuzha’, is the only river in Kerala flowing through undisturbed forests for a distance of 26km, originating from Sispara, having a major tributary, Bharathapuzha. This river is also noted for its aquatic biodiversity, especially fish diversity. The riverine forests, rocky valleys and waterfalls of Kunthipuzha have an aesthetic value for both tourists and researchers.

Physiographic features: Silent Valley is roughly a rectangular table land, located at the southwestern corner of Nilgiris (11°00’–11°15’N & 76°15’–76°35’E). It is closed on all sides with high and continuous ridges along the entire north, northeast and east with steep escarpments along the western and southern border. The whole is thus shielded from the extremes of climate as well as anthropogenic intervention and also it remains an ecological Island with a special microclimate. Along the entire length, the plateau slopes towards Kunthipuzha, which originate at an altitude of about 2400m in the outer rim of Nilgiris, descends rapidly to 1150m of the northern edge of the plateau and flows in the north-south direction. The high peaks in the study area are: Anginda (2383m), Sispara (2206m) and Kozhipara (1904m). Part of the Silent Valley comprises Nilambur and Nilgiris. The southern boundary is with Palghat forest division, while on the east is with Attapadi reserve forests.

Climate: Silent Valley is an example for distinct microclimate. The Attapadi and other areas of Palghat district experience dry climate with high temperature. In contrast to this, just 20km away from Attappadi, Silent Valley receives maximum rain, enjoys mist and low temperature. Both south west and north east monsoons are active in Silent Valley with a precipitation of 3180 mm per annum and the highest rain fall is recorded during the month of July (885.8mm). Average minimum temperature ranges from 8–14 °C and average maximum from 23–29 °C. The highest temperature is experienced during May (30°C) and the lowest during January (7°C). Maximum precipitation during south-west monsoon brings over 500mm annually. Highest rain fall recorded during the month of July.

Biotic features: Silent Valley is an undisturbed maiden forest, is a habitat of many common, vulnerable, rare, threatened, endangered and critically endangered animals and plants. The forests of Silent Valley mainly consist of tropical evergreen, grass land and shola vegetation, with tremendous complexity as well as floral and faunal diversity. Several new species of flora and fauna including amphibian, fish, insects, mosses, ferns, flowering plants and fungi have been described from the valley. The animals comprise 315 species of mammals including monkey, civet, deer, leopard, Nilgiri Thar, Wild Dog, Slender Loris, elephant, tiger; 19 species of amphibians, 35 species of reptiles, 12 species of fishes, six species of bats, 100 species of butterflies, 400 species of moths and 220 species of insects. Among these animals, 14 species of amphibians and 11 species of reptiles are endemic to Silent Valley. It is famous for the highly attractive: Lion-tailed Macaque Macaca silenus. Western Ghats are the only natural habitat for the Lion-tailed Macaque. Tropical evergreen forests are necessary for the life of these monkeys. They eat flowers, fruits and tender leaves of some selected trees of about 92 species of trees. Of these, the fruits of Cullenia exarillata, commonly known as ‘Vedichakka’ or ‘Vediplavu’, form the most delicious food.

Reserve forest notification: The Silent Valley forests with an area of 89.52km² were notified as reserve...
forests in 1914 as per notification number 291 dated 18 May 1914 and published in St. George Gazette dated 9 June 1914. During the course of reservation, a portion of land lying west of Kunthipuzha in survey number 235 of Kundamangalam and survey number 51 of Payyandumdesoms (village) of Walluvanad Taluk aggregating 785.75 acre was acquired. Till 1921, Silent Valley was part of South Malabar Division with head quarters at Nilambur. During 1921, it came under the administrative control of Palghat Forest Division.

**Proposed as National Park:** The first idea of the hydroelectric project came in the year of 1921. However, Government of Kerala declared the Silent Valley Reserve as a National Park as per GO. 5462 FSA/3/82 dated 15 November 1984 under the provision of wildlife (protection) act, 1972. In 1985, 7 September, the Prime Minister Rajiv Gandhi inaugurated the Silent Valley National Park. The entire area of Silent valley national park was made as a part of the area of the Nilgiri Biosphere reserve during the year 1986.

**Review of research work in Silent Valley:** Silent Valley is originated approximately 5 crore years ago. There was no detailed study till the first two decades of 19th century. Since 1840, Robert White, Beddome, Gamble and several others have studied the plant wealth of this area. In 1860, T.C. Jerdon discovered an orchid, Malabar Daffodil (*Ipsea malabarica*), which remained unknown for 120 years. During the period of 1981–1985, Manilal (1988) and Vajravelu (1990) have studied the plant wealth of Silent Valley and reported the diversity of flowering and non flowering plants. 1979–80, Zoological Survey of India described 20 new species from Silent Valley including new frog species, *Alsonia rubijina* and *Micrasalus thambi*. Bhat (2010) has enumerated fungi from this region. Hosagoudar (1985, 1996, 2006a, b, 2007, 2008, 2010), Hosagoudar & Archana (2009a, b), Hosagoudar & Biju (2005, 2006), Hosagoudar & Prabha (2009), Hosagoudar & Riju (2011a,b) and Hosagoudar et al. (1996, 2009, 2010, 2011) have contributed towards the foliicolous fungi of this region. Mohanan (2003, 2011) has studied several macrofungi including mycorrhizal fungi of commercially timber yielding plants in Kerala State but as such there is no study in the compact forest like Silent valley. Hence, the present study has got much importance.

**Forest types of Silent Valley:** Forests are the complex natural ecosystems, form the factory of water recycling and climatic variation. On the basis of ecological characteristics, the forests are classified into four types: Upland region, Riparian region, Slopes and Submersible area. Based on the vegetation, we come across four types of forests, namely, moist evergreen forests, dry evergreen forests, high land grass land, low land grassland and high altitude sholas (Images 2–5).

**Forest Divisions:** Silent Valley National Park has four forest divisions, namely, Sairandhri, Neelikallu, Poochipara and Wallakad. Each forest division has evergreen forests, grass lands and shola forests.

- **Sairandhri forest division:** This is a tourist zone, located 23km away from Mukkali in Palghat District, dominated with evergreen forests. This division comprises the following major forest localities, namely, Aruvupara, Katayaramudi, Punnamala, Parathode, etc.
- **Neelikallu forest division:** Located 10km away from Sairandhri, partially surrounded by Kunthipuzha, comprises grasslands, evergreen and semievergreen forests at higher elevations. Important places of this division are Neelikallu, Ambalappara, Vannampara, Pulippara, Chempatty, etc.
- **Poochipara forest division:** It is 8km away from
Sairandhri, having evergreen forests and grass land. Important places of this forest division are Poochipara Peak, Thondakulam, Thoppimala, Chempatty, etc. **Wallakad forest division:** It is situated 24km away from Sairandhri, having more grasslands and shola forests than the evergreen forests. Sispara, Anginda, Cheriya Anginda, Wallakad, Cheriya Walakad are the high altitudinal places in this section.

In such an interesting forest, persistent efforts have been put along with a team of researchers and the consolidated account of the present work on the foliicolous fungi is the maiden venture (Image 6).

**METHODS**

Infected plant parts were noticed and collected carefully in the field and notes were made regarding their pathogenicity, nature of colonies, nature of infection, locality, altitude, etc. For each collection, a separate field number was given. Each infected plant parts was collected separately in polythene bags along with a host twig (preferably with the reproductive parts) to facilitate the identity of the corresponding host. These collections were pressed neatly and dried between blotting papers. The host plants were identified by matching them with the authentic herbarium materials and also by consulting the experts. However, the knowledge of identification of flowering plants is the pre-requisite for this study.

In the laboratory, nail polish technique (Hosagoudar & Kapoor 1984) was used to study the structural and morphological characters of the fungi. Since the desired quality and quantity of nail polish is difficult to procure from the market, this problem eased by preparing a xylene-thermocol solution. 5ml or desired quantity of xyline poured in a container, very bright and clean thermocol cut into minute pieces, added to xyline, mixed thoroughly till getting it to a particular consistency and poured it into air tight bottle for use. A drop of xyline-thermocol solution applied on the selected colonies, carefully thinned with the help of a fine brush without disturbing the colonies. Colonies with hyperparasites (wooly nature) were avoided. The treated colonies along with their host plants kept in dust free chamber for half an hour. When the applied solution dried, a thin colourless “film” or “flip” was formed with the colonies firmly embedded in it. For soft hostparts, flip was lifted up with a slight pressure on the upper side of the leaves and just below the colonies or an edge of the flip eased and subsequently the entire flip peeled-off by using the thumb nail and ring finger of the left hand. In case of hard host parts, the flip was eased-off with the help of a razor or scalpel. A drop of DPX was added on clear slide and the flip was spread properly on it. Care was taken to avoid air bubbles while mounting. One or two more
drops of DPX was again added on the flip and clean cover glass was placed over it and gentle pressure on the cover glass brings out the excess DPX and it was removed after drying. These slides were labeled and placed in the dust free chamber for one to two days for drying.

In some species, the septa were not visible due to heavy pigmentation. In such cases, scrape was taken directly from the infected host and mounted in 10% KOH solution. After 30 minutes, KOH was replaced by lactophenol (Rangaswamy 1975). Both the mountants worked well as clearing agents and made the septa visible.

The individual material was assigned to its taxonomic rank and prepared for herbarium carrying the details of fungus name, host name, date of collection, locality, name of the collector, expert who identified the specimen and its herbarium number. The envelopes were serially arranged in a rack based on their collection number. Part of the herbarium material is deposited in the Herbarium Cryptogamae Indiae Orientalis (HCIO), IARI, New Delhi and part of it in the Jawaharlal Nehru Tropical Botanic Garden Travancore herbarium (TBGT), Thiruvananthapuram, Kerala.

BLACK MILDEWS

Black or dark mildews, in contrast to Powdery mildews, are obligate but mostly ectoparasites produce black colonies on the surface of the host plants. The term “sooty moulds” was loosely applied to the entire black colony forming fungi. Hughes (1976) clearly made a distinction between “sooty moulds” and “black mildews”. Sooty moulds are totally distinct from these in their nutritional habit, grow on insect secretion or on nectar produced by the plants and spread on entire surface (irrespective of leaf, petiole, stem or dead bark) of plants. When handled, such colonies stick-on to hands and clothes. Close observation of these uniformly spread dense colonies reveal their association with ants, thrips or nectar glands of the plants. In contrast these, black mildews are obligate parasites and are specific in infecting their compatible hosts. In short, black mildews are obligate parasites, while, sooty moulds are saprophytes. These fungi flourish well in tropics and have extended their distribution to sub-temperate to temperate regions of the World. Since these fungi do not cause any appreciable pathogenicity on the staple food producing crop plants, attention has not been paid much to this group. Economically, like other biotrophs, these fungi increase the temperature in the areas covered by the black colonies, initiate more respiration, reduce the efficiency of the chlorophyll, reduce total sugars, etc. Hosagoudar et al. (1997). Hence, Wellman (1972) stated that “nowhere are these black mildews being made a subject of major pathological study, although agriculturists who observe their crops well, know that at times these fungi are very damaging in their effects” (Hosagoudar 2010).

Order Meliolales

Meliolales Gaumann ex Hawksworth & O. Eriksson, Systema Ascomycetum 5: 142, 1986; Hosagoudar, Meliolales of India 2: 28, 2008; Hosagoudar & Agarwal, Taxonomic studies of Meliolales. Identification Manual, p. 3, 2008.

Parasites on vascular plants. Mycelium mostly superficial, appressoriate. Appressoria mostly two celled, rarely many celled. Phialidic (in Meliolaceae), phialides unicellular. Ascomata flattened-globose to globose, ± ostiolate, peridium smooth, surface cells protruded, often supplemented with setae and or appendages; asci born on basal hymenium, unitunicate, 2–8 spored, clavate to cylindrical, evanescent; ascospores 1–4 septate, brown at maturity.

Type family: Meliola

Family Armellaceae

Armillaceae Hosag., Sydowia 55: 162, 2003; Hosagoudar, Meliolales of India 2: 28, 2008; Hosagoudar & Agarwal, Taxonomic studies of Meliolales. Identification Manual, p. 3, 2008.

Leaf parasites, ectophytes, mycelium with appressoria, phialides absent, mycelial setae absent. Perithecia on superficial hyphae, globose, verrucose; asci 4–8–spored; ascospores 1–2–septate, brown at maturity.

Type genus: Armella Theiss. & Syd.

This family comprises of two genera, Armella and Basavamycetes, but is represented here by the former genus.

Family Meliaceae

Meliaceae Martin ex Hansf., Mycol. Pap. 15: 23, 1946; Hosagoudar, Meliolales of India 2: 29, 2008; Hosagoudar & Agarwal, Taxonomic studies of Meliolales. Identification Manual, p. 4, 2008.

Parasitic on vascular plants; mycelium mostly superficial; appressoriate, phialidic. Ascomata flattened-globose to globose, ± ostiolate, peridium with conoid cells, larviform and striated appendages, or with repent or strong setae. Asci unitunicate, 2–4–spored, clavate to cylindrical, evanescent; ascospores 3–4–septate, brown at maturity.
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Type genus: Meliola Fries
To identify the meliolaceous fungi up to species level, it is essential to know: the identity of the host and its family. Further, the description in digital form.

Digital formula
Beeli formula consists of eight digits. The first four 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 and dentate setae is denoted by ⅓, while species having straight and uncinate setae are designated as ½. The Beeli formula is modified here to accommodate the genus Armatella having 1-2 septate ascospores. Further, for Prataprajella, the second digit becomes ¾ 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 uncinate or coiled setae
   4. With straight setae
3. Mycelial setae (often on perithecia and from subiculum)
   0. Absent
   1. Simple
   2. Simple, entire, uncinate or coiled
   3. Dentate or shortly furcate (up to 30µm)
   4. Branched (branches more than 30µm)
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 20µm
   2. 21–30 µm
   3. 31–40 µm
   4. 41–50 µm

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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 by Hansford (1961) and Hosagoudar (1996). The citation is followed by the description based on the present collections, which are deposited in TBGT (Tropical Botanic Garden and Research Institute, Thiruvananthapuram) and HCIO (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 elaeocarpi Hosag., D.K. Agarwal, H. Biju & Archana, Indian Phytopath. 60: 82, 2007 (Fig. 1)
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 µm. Appressoria alternate, unilateral, antrorse to retrorse, straight to curved, 11–24 µm long; stalk cells cylindrical to cuneate, 3–10 µm long; head cells oblong, cylindrical, straight to curved, entire to angular, broadly rounded to truncate at the apex, 8–16x6–11 µm. Phialides mixed with appressoria,
alternate, opposite to unilateral, 9–26x6–10 µm. Perithecia flattened-globose, scattered, up to 130µm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 41–48x14–19 µm.

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

*Amazonia gouaniae* Hosag. & Braun, Crypt. Bot. 1: 56, 1989; Hosag., Meliolales of India, p. 69, 1996 (Fig. 2).

Colonies epiphyllous, subdense, up to 2mm in diam. Hyphae straight to undulate, branching opposite to irregular at acute angles, loosely reticulate, cells 27–30x7–10 µm. Appressoria alternate, straight to curved, antrorse to spreading, 18–25 µm long; stalk cells cylindrical to cuneate, 6–10 µm long; head cells ovate, globose, entire, 12–16 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 15–19x9–13 µm. Perithecia scattered, flattened-globose, up to 161µm in diam.; ascospores obovoidal, 4-septate, constricted, 31–40x12–15 µm.

**Materials examined**: 12.xii.2003, on leaves of *Guoania* sp. (Rhamnaceae), Sairandhri, coll. V.B. Hosagoudar et al. HCIO 46344, TBGT 1990; HCIO 46342, TBGT 1988.

*Amazonia peregrina* Syd. & P. Syd., Ann. Mycol. 15: 238, 1917; Hansford, Sydowia Beih. 2:507, 1961; Hosag. & Goos, Mycotaxon 36: 236, 1989; 42:126, 1991; Hosagoudar, Meliolales of India, p.74; 1996

Meliola peregrina Syd. & P. Syd, Philippine J. Sci. 8: 479, 1913 (Fig. 3).

Colonies amphigenous, mostly hypophyllous, crustose, up to 2mm in diameter, confluent. Hyphae straight to undulating, branching alternate to opposite at acute angles, closely reticulate, forming solid mycelial mat and impart thalloid appearance, cells 13–16.6x6–8 µm. Appressoria alternate to unilateral, very closely arranged, antrorse, straight to curved, 13–16.5 µm long; stalk cells cuneate, 3.5–5 µm long; head cells globose, entire, 10–13 x10–11.5 µm. Phialides mixed with appressoria, alternate, ampulliform, 13–16.5x6.5–8 µm. Perithecia mostly aggregated, flattened–globose, glabrous, black, up to 281µm in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted, 36–43x13–16 µm.

**Materials examined**: 12.ii.2007 on leaves of *Maesa indica* (Roxb.) DC. (Myrsinaceae), Poochipara, coll. M.C. Riju et al. TBGT 5018; 31.vii. 2008, Poochipara, M.C. Riju et al. TBGT 5149; 26.ii.2009, Silent Valley, coll. S.S. Shaji
Amazonia vaccinii Hosag., C.K. Biju & T.K. Abraham, Nova Hedwigia 80: 468, 2005; Hosag., Meliolales of India, 2: 89, 2008 (Fig. 4).

Colonies amphigenous, mostly epiphyllous, thin to subdense, up to 5 mm diam., confluent. Hyphae straight to substraight, branching in opposite to unilateral position at acute angles, loosely to closely reticulate, cells 12–28x6–8 μm. Appressoria alternate, straight to slightly curved, antrorse to spreading, 14–18 μm long; stalk cells cuneate, 4.5–6.5 μm long; head cells oblong to globose, straight to slightly curved, entire to sublobate, 9–13x8–10 μm. Phialides mixed with appressoria but apparently on separate mycelial branches, alternate to opposite, ampulliform, 14–23x6–8 μm. Perithecia hidden in the radiating mycelium, flattened–globose, fringed hyphae appressoriate, up to 120μm diam.; ascospores oblong, 4-septate, constricted at the septa, 33–37x14–16 μm.

Materials examined: 6.iii.2008 on leaves of Vaccinium neilgherrense Wight (Ericaceae), Walakkad, coll. P.J. Robin et al. TBGT 5591.

The genus Armatella

Armatella balakrishnanii Hosag., J. Econ. Taxon. Bot. 15: 196, 1991; Hosagoudar et al., Mycotaxon 56:348, 1995; Hosagoudar & Abraham, J. Mycopathol. Res. 38: 2, 2000; J. Econ. Taxon. Bot. 25: 562, 2001; Hosagoudar, Zoos Print J. 21: 2323, 2006 (Fig. 5).

Colonies hypophyllous, thin, spreading, up to 8 mm in diameter. Hyphae smooth walled, crooked, branching alternate to irregular at acute angles, closely reticulate, cells 9–25x4–7 μm. Appressoria alternate, antrorse to reflexed, 15–115 μm long; stalk cells aseptate to several septate, straight to tortuous, 3–103 μm long; head cells globose, narrowly ovate, angular, entire, 9–13x10–12 μm. Perithecia scattered, globose, verrucose, up to 115μm in diam.; ascospores ellipsoidal, mostly aseptate but few ascospores septate, cells unequal, 43–50x18–22 μm.

Materials examined: 14.xii.2003, on leaves of Cinnamomum alabatrum (Burm.f.) Blume (Lauraceae), Champatty, V.B. Hosagoudar et al. TBGT 1698.
**Armatella cryptocaryae** Hosag., J. Econ. Taxon. Bot. 15: 198, 1991; Hosagoudar et al., Mycotaxon 56: 350, 1995; Hosag., C.K. Bij & T.K. Abraham, J. Econ. Taxon. Bot. 25: 298, 2001; Hosagoudar, J. Econ. Taxon. Bot. 29: 436, 2005; Hosagoudar, Zoos’ Print J. 21: 2323, 2006; Meliolales of India 2: 108, 2008 (Fig. 6).

Colonies epiphyllous, thin, crustose, up to 2mm in diameter. Hyphae smooth walled, straight to substraight, branching alternate to irregular at acute angles, loosely reticulate, cells 12–18.5x4.5–6.5 μm. Appressoria alternate, antrorse to spreading, 15.5–25 μm long; stalk cells single celled, cylindrical to cuneate, 3–6.5 μm long; head cells ovoid, conoid, slightly angular, entire, outer wall crenulated, 12–18.5x 9–12.5 μm. Perithecia scattered, seated on exappressoriate mycelium, up to 140μm in diam.; ascospores ellipsoidal, 1-septate, brown, 31–37x12–13 μm.

**Material examined:** 13.xii.2003, on leaves of *Litsea* sp. (Lauraceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45759, TBGT 1611; HCIO 45774, TBGT 1626; 12.xii.2003, V.B. Hosagoudar et al. TBGT 1973, HCIO 46327; TBGT 1991, HCIO 6345; 3793; Silent valley 26.ii.2009, S.S. Shaji et al. HCIO 49551;7.iii.2009, S.S. Shaji et al. HCIO 49567, TBGT 3809; 1.viii.2008, S.S. Shaji et al. HCIO 49798, TBGT 3950;22 July 2009, Jayakumar et al. HCIO 49856, TBGT 4008; 14.ii.2007, M.C. Riju, Gireesh & S.S. Shaji TBGT 5507; Walakad, Silent Valley, 03.iii.2009, S.S. Shaji et al. TBGT 5561; Neelikal, Silent Valley, 06.viii.2008, M.C. Riju et al. TBGT 5576; 2.iii. 2010, P.J. Robin et al. TBGT 5596;2.iii.2010, P.J. Robin et al. TBGT 5600; Silent Valley National Park, Kerala, 23.vii.2009, Jayakumar et al. HCIO 50050, TBGT 4202; Sairandhri, Silent Valley, Kerala, 13.xii..2003, V.B. Hosagoudar et al. HCIO 45774, 1523; Sairandri, 16.ii.2007, M.C. Riju et al. HCIO 50921, TBGT 4838; Poochhipara, 14.ii.2007, M.C. Riju, Gireesh & S.S. Shaji TBGT 5015; Poochhipara, 14.ii.2007, M.C. Riju et al. TBGT 5073; Valakadu, 4.iii.2008, P.J. Robin et al. TBGT 5103; Sairandhri, 2.viii. 2008, M.C. Riju et al. TBGT 5230; Poochhipara, on leave of *Persea* sp. (Lauraceae), 30.vii.2008, Jacob et al. HCIO 50372, TBGT 4289; 26.ii.2009, S.S. Shaji et al. HCIO 49575 TBGT 3817; Wallakked, on leaves of *Actinodaphne* sp. (Lauraceae), 1.viii.2008, M.C. Riju et al. HCIO 50375, TBGT 4292; on leave of *Cryptocarya* sp., 14.ii.2007, M.C. Riju & S.S. Shaji TBGT 5505; Sairandhri, on leave of *Cinnamomum* sp. (Lauraceae), 24.iv.2007, S.S. Shaji & Harish TBGT 5537.

**Armatella katumotoi** Hosag., Sydowia 40: 113, 1987; J. Econ. Taxon. Bot. 15: 199, 1991; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 25: 564, 2001; Hosagoudar, J. Econ. Taxon. Bot. 29: 436, 2005; Hosagoudar, Meliolales of India 2: 111, 2008 (Fig. 7).

Colonies hypophyllous, thin, scattered, diffused, up to 5mm in diameter. Hyphae smooth walled, flexuous to crooked, branching alternate to irregular at acute angles, loosely reticulate, cells 15.5–46.5x4.5–6.5 μm. Appressoria alternate, variously curved, 18.5–46.5 μm long; stalk cells septate to several septate, flexuous to crooked, 6.5–40.5 μm long; head cells ovate to globose, entire to stellately lobate, 6.5–12.5x12.5–15.5 μm. Perithecia scattered, seated on exappressoriate mycelium, verrucose, up to 217μm in diam.; ascospores brown, ellipsoidal, 1-septate, 28–31x12–16 μm.

**Material examined:** 13.xii.2003 on leaves of *Litsea* sp. (Lauraceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45759, TBGT 1611; HCIO 45774, TBGT 1626; 12.xii.2003, V.B. Hosagoudar et al. TBGT 1973, HCIO 46327; TBGT 1991, HCIO 6345; 3793; Silent valley 26.ii.2009, S.S. Shaji et al. HCIO 49551;7.iii.2009, S.S. Shaji et al. HCIO 49567, TBGT 3809; 1.iii.2008, S.S. Shaji et al. HCIO 49798, TBGT 3950;22 July 2009, Jayakumar et al. HCIO 49856, TBGT 4008; 14.ii.2007, M.C. Riju, Gireesh & S.S. Shaji TBGT 5507; Walakad, Silent Valley, 03.iii.2009, S.S. Shaji et al. TBGT 5561; Neelikal, Silent Valley, 06.viii.2008, M.C. Riju et al. TBGT 5576; 2.iii. 2010, P.J. Robin et al. TBGT 5596;2.iii.2010, P.J. Robin et al. TBGT 5600; Silent Valley National Park, Kerala, 23.vii.2009, Jayakumar et al. HCIO 50050, TBGT 4202; Sairandhri, Silent Valley, Kerala, 13.xii..2003, V.B. Hosagoudar et al. HCIO 45774, 1523; Sairandri, 16.ii.2007, M.C. Riju et al. HCIO 50921, TBGT 4838; Poochhipara, 14.ii.2007, M.C. Riju, Gireesh & S.S. Shaji TBGT 5015; Poochhipara, 14.ii.2007, M.C. Riju et al. TBGT 5073; Valakadu, 4.iii.2008, P.J. Robin et al. TBGT 5103; Sairandhri, 2.viii. 2008, M.C. Riju et al. TBGT 5230; Poochhipara, on leave of *Persea* sp. (Lauraceae), 30.vii.2008, Jacob et al. HCIO 50372, TBGT 4289; 26.ii.2009, S.S. Shaji et al. HCIO 49575 TBGT 3817; Wallakked, on leaves of *Actinodaphne* sp. (Lauraceae), 1.viii.2008, M.C. Riju et al. HCIO 50375, TBGT 4292; on leave of *Cryptocarya* sp., 14.ii.2007, M.C. Riju & S.S. Shaji TBGT 5505; Sairandhri, on leave of *Cinnamomum* sp. (Lauraceae), 24.iv.2007, S.S. Shaji & Harish TBGT 5537.
50922, TBGT 4839; 2.iii.2010, P.J. Robin et al. TBGT 5101; Silent Valley, 6.vii.2008, M.C. Riju & Jacob Thomas TBGT 5548; Sairandhri, 11.vi.2007, P.J. Robin et al. TBGT 5590; Floccicolous fungi of Silent Valley Hosagoudar & Riju 2.iii.2010, P.J. Robin et al. TBGT 5686; TBGT 5688.

**Armatella litseae** (P. Henn.) Theiss. & Syd., Ann. Mycol. 13: 235, 1915; Hansf. & Thirum., Farlowia 3: 286, 1984; Kar & Maity, Norway J. Bot. 19: 250, 1972; Hosagoudar, J. Econ. Taxon. Bot. 15: 200, 1991; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 25: 565, 2001; Hosagoudar, C.K. Biju & Abraham, J. Mycopathol. Res. 40: 192, 2002; Hosagoudar, J. Econ. Taxon. Bot. 29: 436, 2005; Zoos’ Print J. 21: 2324, 2006; Meliolales of India 2: 113, 2008.

**Dimerosporium litseae** P. Henn., Bot. Jahrb. Syst. 32: 42, 1903.

**Artallendea cinnamomi** Bat. & Maia, Atas Inst. Micol. Recife 1: 222, 1960 (Fig. 8).

Colonies hypophyllous, thin, crustose, up to 6mm in diameter, rarely confluent. Hyphae smooth walled, substraight to undulate, branching mostly alternate at wide angles, loosely reticulate, cells 16–30x6–8 μm. Appressoria alternate, about 5% opposite, antrorse, straight to curved, 15–20 μm long; stalk cells single celled, cylindrical to cuneate, 3–6.5 μm long; head cells globose, stellately sublobate, 11–13.5x15-16 μm. Perithecia seated on tortuous exappressoriate mycelium, scattered, verrucose, up to 300μm in diam.; ascospores initially hyaline and continuous, oblong with rounded ends, dumb bell shaped, matured spores 1-septate with unequal cells, 30–37x11–14 μm. During germination, one cell of the spore enlarges to produce appressorium and the other empties into it and collapses.

**Material examined:** 15.xii.2003 on leaves of *Neolitsea scrobiculata* (Meissner) Gamble (Lauraceae), Sairandhri, B.V. Hosagoudar et al. HClO 45912, TBGT 1674; 14.vi.2007, Jacob Thomas, P.P. Rajesh Kumar & S.S. Shaji HClO 48217, TBGT 2953; Pulipara, on leaves of *Neolitsea* sp., 14.ii.2007, M.C. Riju et al. TBGT 5627; Sairandhri, 14.ii.2007, M.C. Riju et al. TBGT 5634; 12.xii.2003, V.B. Hosagoudar et al. HClO 45758, TBGT 1610.

**The genus Asteridiella**

**Asteridiella anastomosans** (Wint.) Hansf., Sydowia Beih. 2: 699, 1961; Hosagoudar, Meliolales of India 2: 119, 2008 (Fig. 9).

Colonies epiphyllous hidden in the sub-dense, up to 1mm, scattered. Hyphae sub straight, branching opposite to irregular, at acute angles, loosely reticulate, cells 12.8–32x6.4–10 μm. Appressoria alternate straight to slightly curved, antrorse to sub-antrorse, 14–29 μm long; stalk cells cylindrical to cuneate, 4–11 μm long; head cells ovate, oblong, cylindrical, entire to slightly angular, 9–18x9–14 μm. Phialides mixed with appressoria, ampulliform, opposite, 12–19x6–10 μm. Perithecia globose, grouped, up to 157μm in diameter; perithecial cells up to 22μm mammiform; ascospores 4-septate, slightly constricted at the septa, obovoidal, 32–37x11–16 μm.

**Material examined:** 14.xii.2000 on leaves of *Leucas* sp. (Lamiaceae), Chempatty, V.B. Hosagoudar et al. HClO 46306, TBGT 1952.

**Asteridiella clerodendricola** Hosag. in Hosagoudar & Goos, Mycotaxon 36:237, 1989; Hosagoudar, Kaveriappa, Raghu & Goos, Mycotaxon 51:109, 1994, Hosagoudar, 1989; Hosagoudar & Goos, Mycotaxon 51:109, 1994; Hosagoudar, Kaveriappa, Raghu & Goos, Mycotaxon 51:109, 1994.
Meliolales of India 2: 82, 1996 (Fig. 10).

Colonies amphigenous, mostly epiphyllous, dense, scattered, up to 10µm in diameter, rarely confluent and cause stretching of the surrounding leaf surface with a yellow; halo surrounding the spots. Hyphae strongly appressed to the leaf surface, not easily separable, tortuous, branching alternate to opposite at wide angles, strongly reticulate, cells 18–38x6–8 µm. Appressoria alternate to unilateral, straight to curved, antrorse to spreading, 20–26 µm long; stalk cells cylindrical to cuneate, 6–8 µm long; head cells globose, entire to angular, 12–18x12–16 µm. Phialides numerous, borne on a separate mycelial branch, opposite, ampulliform, 14–24x4–8 µm, tip occasionally twisted and bent variously. Perithecia scattered, verrucose, up to 170µm in diam.; perithecial cells mammiform, 8–10 µm long; ascospores obovoidal, 4-septate, constricted, 36–42x12–18 µm.

Material examined: 28.ii.2009 on leaves of Clerodendrum viscosum Vent. (Verbenaceae), Silent Valley, S.S. Shaji et al. HCIO 49548, TBGT 3790.

Asteridiella combreti (Stev.) Hansf. var. leonensis Hansf., Sydowia Beih. 20: 160, 1961; Hosagoudar & Goos, Mycotaxon 36: 238, 1989, Hosagoudar, Meliolales of India 2; 83, 1996 (Fig. 11).

Colonies epiphyllous, subdense, up to 4mm in diameter, confluent. Hyphae substraight to slightly undulate, branching alternate to opposite at wide angles, loosely reticulate, cells 20–34x6–8 µm. Appressoria alternate, straight, antrorse, 20–26 µm long; stalk cells cylindrical to cuneate, 6–8 µm long; head cells globose, entire to angular, 12–18x12–16 µm. Phialides numerous, borne on a separate mycelial branch, opposite, ampulliform, 14–24x4–8 µm, tip occasionally twisted and bent variously. Perithecia scattered, verrucose, up to 170µm in diam.; perithecial cells mammiform, 8–10 µm long; ascospores obovoidal, 4-septate, constricted, 36–42x12–18 µm.

Material examined: 13.ii.2007 on leaves of Calycopteris florubunda (Roxb.) Poiret (Combretaceae), Nilakkal, P.J. Robin et al. TBGT 5721.

Asteridiella crotonis-caudati Hosag., Riju & D.K. Agarwal, Indian Phytopath. 63: 76, 2010 (Fig. 12).

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 17–40x3–5 µm. Appressoria alternate, unilateral, antrorse, 13–21 µm long; stalk cells cylindrical to cuneate, 3–8 µm long; head cells globose, ovate, entire, 8–13x8–13 µm. Phialides mixed with appressoria, alternate to opposite, unilateral, ampulliform, 13–23x6–8 µm. Perithecia scattered, up to 110µm in diameter; perithelial wall cells conoid to mammiform, up to 16µm long; ascospores cylindrical, 4-septate, constricted at the septa, 30–34x13–15 µm.

**Material examined:** 3.viii.2008 on leaves of Croton caudatus Geiseler (Euphorbiaceae), Thondakulam, M.C. Riju et al. HCIO 49197, TBGT 3436; 04.viii.2008, M.C. Riju HCIO 50574, TBGT 4491.

**Asteridiella cyclopoda** (Stev.) Hansf., Sydowia 10:47, 1957; Sydowia Beih. 2:419, 1961; Hosagoudar & Goos, Mycotaxon 36: 239, 1989; 42: 127, 1991; Hosagoudar, Meliolales of India 2: 86, 1996.

**Meliola cyclopoda** Stev., Illinois Biol. Monogr. 2:16, 1916.

**Irena cyclopoda** (Stev.) Toro, Mycologia 17: 140, 1925.

**Irenina cyclopoda** (Stev.) Stev., Ann. Mycol. 25: 452, 1927; Hansford & Deighton, Mycol. Pap. 23: 64, 1948; Hughes, Mycol. Pap. 48: 42, 1952 (Fig. 13).

Colonies hypophyllous, rarely amphigenous, subdense to dense, up to 5mm in diameter. Hyphae undulate, branching alternate to opposite at acute angles, loosely reticulate, cells 22–30x8–10 µm. Appressoria alternate and unilateral, antrorse, spreading, 22–28 µm long; stalk cells cuneate to cylindrical, 4–14 µm long; head cells globose, entire and rarely angular, 14–18 x 12–14 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–22 x 8–10 µm. Perithecia scattered and aggregated, up to 200µm in diam.; perithelial cells mammiform, up to 10µm long; ascospores ellipsoidial, 4-septate, constricted, 38–42x12–16 µm.

**Material examined:** 27.ii.2009 on leaves of *Vernonia arborea* Buch.–Ham. (Asteraceae), Silent Valley, S.S. Shaji et al. HCIO 49541, TBGT 3783.

**Asteridiella elaeocarpi-tuberculati** Hosag., Crypt. Bot. 2/3: 183, 1987; Hosagoudar, Meliolales of India 2; 87, 1996 (Fig. 14).

Colonies epiphyllous, subdense, up to 2mm in diameter, confluent. Hyphae substraight to undulate, branching opposite at wide angles, loosely reticulate, cells 31–36x4–6.5 µm. Appressoria alternate, straight to curved, antrorse, 18–28 µm long; stalk cells cylindrical to cuneate, 6–9.5 µm long; head cells globose, ovate, truncate at the apex, entire, 16–18.5x12–15.5 µm. Phialides borne on a separate mycelial branch, mostly opposite, ampulliform, 18–25x6–9.5 µm. Perithecia scattered, seated on exappressoriate mycelia, globose, up to 124µm in diam.; perithelial cells conoid, curved, acute at the apex, up to 15µm long; ascospores obovoidal, 4-septate, slightly constricted, 40–46.5x15–18.5 µm.

**Material examined:** 12.xii.2003 on leaves of *Elaeocarpus tuberculatus* Roxb. (Elaeocarpaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46039, TBGT 1802.

**Asteridiella formosensis** (Yamam.) Hansf., Sydowia 10: 48, 1957; Sydowia Beih. 2: 686, 1961; Hosagoudar &
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Goos, Mycotaxon 36: 240, 1989; 42: 128, 1991; Hosag., Kaveriappa, Raghu & Goos, Mycotaxon 51:109, 1994; Hosagoudar, Meliolales of India 2: 90,1996.

Irene formosensis Yamam., Trans. Nat. Hist. Soc. Taiwan 31: 15, 1941.

Meliola formosensis (Yamam.) Cif., Mycopathologia 7: 87, 1954 (non Yamam., 1941) (Fig. 15).

Colonies epiphyllous, thin, smooth, up to 4mm in diameter, confluent. Hyphae straight to substraight, branching alternate at wide angles, loosely reticulate, cells 30–44x6–8 µm. Appressoria alternate, straight to curved, antrorse, spreading, 26–36 µm long; stalk cells cuneate to cylindrical, 8–12 µm long; head cells ovate, clavate, entire to sublobate, 18–24x12–16 µm. Phialides borne on a separate mycelial branch, mostly opposite, rarely unilateral, often two phialides borne very closely to a single mycelial cells, ampulliform, 16–18x6–8 µm. Perithecia scattered, up to 200µm in diam.; perithecial cells obtusely conoid, 6–10 µm long; ascospores ellipsoidal, 4-septate, constricted, middle cell slightly larger, 42–46x20–26 µm.

Materials examined: 14.xii.2003 on leaves of Callicarpa sp. (Verbenacaeae), Champatty, V.B. Hosagoudar et al. HCIO 45763, TBGT 1512; Walakkad, on leaves of Callicarpa arborea (L.) Murray, 01.viii.2008, M.C. Riju et al. HCIO 5151; Poochipara, 31.vii.2008, M.C. Riju et al. TBGT 5153.

Asteridiella oreocnidecola Hosag., J. Mycopathol. Res. 44: 40, 2006; Meliolales of India 2: 142, 2008 (Fig. 16).

Colonies epiphyllous, thin, smooth, up to 2mm in diameter. Hyphae straight to substraight, branching opposite to alternate at acute angles, loosely to closely reticulate, cells 9–18x7–9 µm. Appressoria alternate to unilateral, closely placed, antrorse to closely antrorse, 17–23 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovate to globose, entire to angular, 14–16x12–14 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–18x7–9 µm. Perithecia loosely grouped at the centre, globose, up to 160µm in diam.; perithecial wall cells conoid to mammiform, up to 15µm long; ascospores obovoidal, 4-septate, constricted at the septa, 33–40x16–18 µm.

Materials examined: 13.xii.2003 on leaves of Oreocnide integrifolia (Gaud. Ex Wedd.) Miq.
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Asteridiella pygei var. microspora Hosag., Meliolales of India 2: 100, 1996 (Fig. 17).

Colonies epiphyllous, dense, scattered, up to 2mm in diameter. Hyphae substraight to crooked, branching irregular at acute angles, loosely reticulate, cells 27–40x5–7 μm. Appressoria alternate, antrorse, subantrorse, spreading, straight to recurved, 18–31 μm long; stalk cells cylindrical to cuneate, 6–12.5 μm long; head cells ovate, globose, entire, angular to irregularly sublobate to lobate, 12–18.5x12–15.5 μm. Phialides mixed with appressoria, scattered, ampulliform, 15–18.5x6–9.5 μm. Perithecium immature. Ascospores curved, ellipsoidal, 3-septate, slightly constricted at the septa, 37–41x11–13 μm.

Material examined: 13.ii.2003 on leaves of Pygium wightianum Blume ex C. Muller (Rosaceae), Sairandhri, V.B. Hosagoudar HCIO 46183, TBGT 1595.

Asteridiella scolopiae Hosag., Meliolales of India 2: 104, 1996 (Fig. 18).

Colonies amphigenous, dense, crustose, up to 3mm in diameter, scattered, rarely confluent. Hyphae straight to substraight, branching mostly opposite at acute angles, loosely to closely reticulate, cells 12–15.5x5–9 μm. Appressoria alternate, about 1% opposite in loosely reticulated colonies while about 5% opposite in densely reticulated colonies, antrorse, 15–28 μm long. Stalk cells cuneate, 3–12.5μm; head cells globose, ovate, oblong, mostly entire, rarely angular, 12–15.5x9–12.5 μm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 15–18.8x5–7 μm. Perithecium scattered, up to 186μm in diam.; perithecial cells mammiform, straight to curved, up to 22μm long; ascospores obovoidal, 4-septat.

Material examined: 13.xii.2003 on leaves of Flacourtia species member, Sairandhri, V.B. Hosagoudar et al. HCIO 45761, TBGT 1510.

Asteridiella strobilanthicola Hosag., H. Biju & Manoj. in Hosagoudar, J. Mycopathol. Res. 43: 19, 2005; Hosagoudar, Meliolales of India 2: 146, 2008 (Fig. 19).

Colonies epiphyllous, subdense to dense, up to 1mm in diameter. Hyphae straight to flexuous, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 25–32x6–8 μm. Appressoria alternate, antrorse, subantrorse to retrorse, straight to curved, 24–28 μm long; stalk cells cylindrical to cuneate, 6–11 μm long; head cells ovate, globose, cylindrical, very few entire, angular, sublobate to rarely deeply lobate, 16–18x11–13 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–21x6–8 μm. Perithecium scattered to loosely to closely grouped, globose, up to 200μm in diameter; perithecial wall cells mammiform, up to 14μm long; ascospores oblong, cylindrical to slightly ellipsoidal, 4-septate, constricted at the septa, 38–42x16–18 μm.

Material examined: 2.iii.2009 on leaves of Strobilanthes sp. (Acanthaceae), Silent Valley, P.P.
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Rajesh Kumar et al. HCIO 49826, TBGT 3978; Walakkad, 2.viii.2008, M.C. Riju et al. HCIO 50373, TBGT 4290.

**Asteridiella toddaliae** Hosag. & Riju, J. Threatened Taxa 3(3): 1615, 2011 (Fig. 20).

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 22–30 x 7–10 μm. Appressoria alternate, unilaterally, about 10% opposite, antrorse to subantrorse, rarely retrorse, 12–25 μm long; 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, 15–23 x 5–8 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, 45–48 x 22–25 μm.

**Figure 19. Asteridiella strobilanthicola**
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

**Figure 20. Asteridiella toddaliae**
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

**Figure 21. Irenopsis triumfettiae var. indica**
a - Appressoriate mycelium; b - Phialides; c - Ascospores, d - Perithecial setae
Material examined: 2.vii.2008 on leaves of Toddalia asiatica (L.) Lam. (Rutaceae), Cherivalakad, M.C. Riju HCIO 50596, TBGT 4513.

The genus *Irenopsis*

*Irenopsis triumfettae* (Stev.) Hansf. & Deight. var. *indica* Hosag. & T.K. Abraham, J. Mycopathol. Res. 36: 98, 1998 (Fig. 21).

Colonies amphigenous, dense, up to 1mm in diameter, confluent. Hyphae straight to flexuous, branching irregular at acute angles, loosely reticulate, cells 24–29x7–9 μm. Appressoria alternate, antrorse to subantrorse, 17–22 μm long; stalk cells cylindrical to cuneate 4–8 μm long; head cells globose to slightly ovate, entire, 12–15x12–15 μm. Phialides numerous mixed with appressoria, alternate to opposite, ampulliform, 14–22x7–9 μm. Perithecia scattered, globose, verrucose, up to 160μm in diameter; Perithecial setae 6–8, simple, straight to slightly curved, tortuous to beaded and granulose towards the apex, obtuse at the apex, up to 140μm long, ascospores oblong, 4-septate, slightly constricted at the septa, 36–46x12–17 μm.

Material examined: 13.xii.2003 on leaves of *Triumfetta* sp. (Tiliaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46231, TBGT 1643.

The genus *Meliola*

*Meliola affinis* Syd. var. *indica* Hosag., Nova Hedwigia 47: 538, 1988; Hosagoudar, Meliolales of India 2: 124, 1996 (Fig. 22).

Colonies hypophyllous, very thin, up to 5mm in diameter, confluent. Hyphae substraight to undulate, branching opposite to irregular at wide angles, loosely reticulate, cells 21–31x6–8 μm. Appressoria alternate, rather distantly arranged, straight to curved, mostly antrorse, 15–22 μm long; stalk cells cuneate 9–12.5μm; head cells ovate, pointed towards the apex with broadly rounded ends, 9–12.5x6–9.5 μm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 21–25x6–9.5 μm. Mycelial setae grouped around perithecia, straight, simple, acute, up to 630μm long. Perithecia scattered, verrucose, up to 120μm in diam.; ascospores obovoidal, 4-septate, constricted, 37–40x15–18 μm.

Material examined: 2.ii.2009 on leaves of Memecylon

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Figure 22. *Meliola affinis* var. *indica*
- a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Figure 23. *Meliola allophyli-concanici*
- a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores
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sp. (Melastomataceae), Silent Valley, Jayakumar et al. HClO 50311, TBGT 4228; Poochipara, 25 July 2009, Jayakumar et al. HClO 50313, TBGT 4230.

**Meliola allophyli-concanici** Hosag. in Hosag., Raghu & Pillai, Nova Hedwigia 58: 535, 1994; Hosagoudar, Meliolales of India 2: 126, 1996 (Fig. 23).

Colonies epiphyllous, scattered, dense, up to 2mm in diameter. Hyphae straight, branching opposite at acute angles, loosely to closely reticulate, cells 15–22x9–11 μm. Appressoria opposite, antorse to subantrorse, rarely recurved, 18–22 μm long; stalk cells cuneate, 6–7 μm long; head cells globose, rarely cylindrical, entire, 12–15.5x12–14 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 18-22 x 9-11 μm. Mycelial setae grouped around perithecia, simple, straight, acute, obtuse to dentate at the tip, up to 550μm long. Perithecia scattered to loosely grouped, verrucose, up to 155μm in diam.; ascospores obovoidal, 4-septate, constricted, 33–36x13–15 μm.

**Material examined:** 1.iii.2009 on leaves of *Ancistrocladus heyneanus* Wallich ex Graham (Ancistrocladaceae), Silent Valley, P.J. Robin et al. TBGT 5597.

**Meliola anodendricola** Hosag., J. Mycopathol. Res. 44: 43, 2006. **Meliola anodendri** Sawada & Yamamoto sensu Patil & Mahamul., Indian Phytopath. 52: 246, 1999 (anodendrae) (Fig. 25).

Colonies amphigenous, dense, velvety, up to 6mm in diam. Hyphae straight to substraight, branching irregular at acute angles, loosely to closely reticulate, cells 24–28x8–10 μm. Appressoria alternate, antrorse, 20–30 μm long; stalk cells cylindrical to cuneate, 8–12 μm long; head cells ovate, clavate, mostly entire, angular, sublobate to lobate, 16–21x11–15 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–25x6–8 μm. Mycelial setae numerous, simple, straight, curved, about 2% unicinate, acute at the tip, up to 450μm long. Perithecia scattered globose, up to 200μm in diameter; ascospores oblong, 4-septate, constricted, 48-52 x 19-21 μm.
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Material examined: 13.xii.2003 on leaves of *Anodendron paniculatum* (Roxb.) DC. (Apocynaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45776 (holotype), TBGT 1525 (isotype).

*Meliola aristolochigena* Hosag. & Archana, J. Threatened Taxa 1: 348, 2009 (Fig. 26).

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 mm. Appressoria alternate to about 3% opposite, antorose to subantorose, 14–20µm long; stalk cells cylindrical to cuneate, 3–7µm 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: 13.xii.2003 on leaves of *Aristolochia tagala* Cham. (Aristolochiaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46376 (holotype), TBGT 1649 (isotype), 15.xii.2003, V.B. Hosagoudar et al. HCIO 46376, TBGT 2022; HCIO 46378, TBGT 2024; HCIO 46376, 46378, TBGT 2022, 2024.

*Meliola atalantiae* Hosag. in Hosag. & Goos, Mycotaxon 37: 220, 1990; Hosagoudar, Meliolales of India 2: 135, 1996 (Fig. 27).

Colonies amphigenous, mostly hypophyllous, crustose, up to 8 mm in diameter, rarely confluent. Hyphae straight to substraight to crooked, branching opposite to irregular at acute angles, loosely reticulate, cells 20–28x6–8 µm. Appressoria alternate, about 20% opposite, straight to curved, subantorose to spreading, 20–30 µm long; stalk cells cylindrical to cuneate, 4–10 µm long; head cells ovate, conoid, rounded at the apex, entire, 14–20x8–10 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 20–26x8–12 µm. Mycelial setae scattered, straight, often curved, simple, acute to 2–3 dentate to cristate, up to 765µm long. Perithecia scattered, immature; ascospores oblong, 4-septate, constricted, 40–44x14–16 µm.

Material examined: 5.vii.2008 on leaves of *Atalantia* sp. (Rutaceae), Silent Valley, 27.ii.2009, S.S. Shaji et al.

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Figure 26. *Meliola aristolochigena*
- a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Figure 27. *Meliola atalantiae*
- a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Figure 28. *Meliola butleri*
- a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores
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**Meliola butleri** Syd., Ann. Mycol. 9: 379, 1911; Hansf., Sydowia Beih. 2: 382, 1961; Srinivasulu, Nova Hedwigia Beih. 47: 423, 1974; Hosagoudar, J. Econ. Tax. Bot. 9: 375, 1987; Hosagoudar, Meliolales of India 2: 148, 1996.

Amazonia butleri Stev., Ann. Mycol. 25: 415, 1927 (Fig. 28).

Colonies amphigenous, mostly epiphyllous, subcrustose, dense, up to 4 mm in diameter. Hyphae straight to undulate, branching opposite to irregular at wide angles, closely reticulate, cells 12–24x6–8 μm. Appressoria alternate to opposite, antrorse, curved, 16–24 μm long; stalk cells cylindrical to cuneate, 4–6 μm long; head cells ovate, clavate, cylindrical, often curved, entire, 12–16x8–10 μm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 16–20x6–8 μm. Mycelial setae scattered, straight, acute to dentate, up to 650μm long. Perithecia closely scattered, verrucose, up to 220μm in diam.; ascospores oblong to subellipsoid, 4-septate, constricted, 32–44x14–18 μm.

Material examined: 8.i.2010 on leaves of Canthium dicoccum (Gaertner) Teijsm. & Binnen. (Rubiaceae), Poochipara, P.J. Robin et al. TBGT 5158.

**Meliola capensis** (Kalch. & Cooke) Theiss. var. indica Hosag., H. Biju & Manoj., Zoos Print J. 18: 1062, 2002 (Fig. 30).

Colonies amphigenous, thin to subdense, velvety, up to 3mm in diameter, confluent. Hyphae straight, branching alternate to opposite at acute to wide angles, loosely to closely reticulate, cells 19–21x4–6 μm. Appressoria opposite, about 5% alternate, scattered, antrorse to subantrorse, 12–16 μm long; stalk cells cylindrical to cuneate, 3–5 μm long; head cells ovate, narrowed towards the tip, often conoid, entire, 9–11x6–8 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–20x6–7 μm. Mycelial setae numerous, scattered to grouped around perithecia, simple, straight, flexuous, about 3% curved to uncinate, acute, bifid, trifid to rarely furcate at the tip, up to 445μm long. Perithecia scattered, up to 120μm in diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 32–36x12–15 μm.

Material examined: 8.i.2010 on leaves of Allophyllus sp. (Sapindaceae), Poochipara, P.J. Robin et al. TBGT 5160.

**Meliola canthii** Hansf., Proc. Linn. Soc. London 157: 22, 1945; Sydowia Beih. 2: 604, 1961; Kapoor, Indian Phytopath. 20: 152, 1967; Hosagoudar, Meliolales of India 2: 153, 1996 (Fig. 29).

Colonies amphigenous, mostly epiphyllous, dense, velvety, up to 3mm in diam. Hyphae straight, branching irregular at acute angles, closely reticulate and radiate, cells 20–30x7–9 μm. Appressoria alternate, straight to curved mostly antrorse, 24–32 μm long; stalk cells cylindrical to cuneate, 2–12 μm long; head cells cylindrical to clavate, entire to angulate, 16–20x14–18 μm. Phialides mixed with appressoria, ampulliform, 20–28x8–12 μm. Mycelial setae scattered to grouped around perithecia, simple, straight, acute, up to 400μm long. Perithecia not seen; ascospores oblong, 4-septate, constricted, 42–46x14–16 μm.

Material examined: 8.i.2010 on leaves of Citrus sp. (Rutaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46282, TBGT 1928; 02.iii.2010, P .J. Robin et al. TBGT 5589.

**Meliola capensis** var. indica

Figure 29. Meliola canthii
a - Appressoriare mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Figure 30. Meliola capensis var. indica
a - Appressoriare mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores
Meliola chandrasekharanii Hosag. in Hosagoudar & Goos, Mycotaxon 37: 225, 1990; 42: 133, 1991; Hosag., Meliolales of India 2: 164, 1996 (Fig. 31).

Colonies amphigenous, caulicolous, mostly hypophyllous, subdense, velvety, up to 3mm diameter, confluent. Hyphae undulate, branching opposite at acute angles, loosely to closely reticulate and form almost solid mycelial mat, cells 16–30x6–8µm. Appressoria alternate (few opposite), straight to curved, spreading, mostly antrorse, 16–24 µm long; stalk cells cuneate to cylindrical, 4–10 µm long; head cells subglobose, ovate, angular to sublobeate, 12–16x14–16 µm. Phialides borne on a separate mycelial branch and also few mixed with appressoria, alternate, mostly opposite, ampulliform, 12–20x6–10 µm. Mycelial setae fairly numerous, straight, simple, acute to subacute at the tip, up to 477µm long. Perithecia scattered, verrucose, up to 153µm in diam.; ascospores obovoidal to cylindrical, 4-septate, 32–42x10–16 µm.

Material examined: 27.ii.2009 on leaves of Nothapodytes nimmoniana (Graham) Mabberley (Icacinaceae), Silent Valley, S.S. Shaji et al. HClO 49546, TBGT 3788; 03.viii.2008, Cheriya Walakkad, Nothapodytes sp., M.C. Riju et al. TBGT 5155.

Meliola cinnamomi Hosag. & T.K. Abraham, Nova Hedwigia 68: 480, 1998; Hosagoudar & Biju, J. Econ. Taxon. Bot. 25: 301, 2001 (Fig. 32).

Colonies hypophyllous, dense, up to 2mm in diameter. Hyphae substraight to slightly flexuous, branching opposite to irregular at wide angles, loosely to closely reticulate, cells 28–32x7–8 µm. Appressoria alternate, subantrorse to rarely retrorse, 17–26 µm long; stalk cells cylindrical to cuneate, 3–8 µm long; head cells ovate to cylindrical, entire to slightly angular, 14–20x9–15 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–24x9–10 µm. Mycelial setae moderately numerous, simple, straight, acute, obtuse to variously dentate at the tip, up to 785µm long. Perithecia scattered, up to 170µm in diameter; ascospores cylindrical to slightly obovoidal, 4-septate, strongly constricted at the septa, 48–50x22–24 µm.

Material examined: 13.ii.2007 on leaves of Cinnamomum camphora (L.) J.S. Presl (Lauraceae), Kunthipuzha, M.C. Riju et al. TBGT 5601.

Meliola citricola Syd. & P. Syd., Ann. Mycol. 15: 183, 1917; Hansf. Sydowia Beih. 2: 246, 1961; Kar & Maity, Norw. J. Bot. 19: 246, 1972; Hosagoudar & Goos, Mycotaxon 37: 326, 1990; 42: 133, 1991; Hosagoudar, Meliolales of India 2: 167, 1996 (Fig. 33).

Colonies amphigenous, caulicolous, mostly hypophyllous, dense, velvety, up to 4mm in diameter, confluent. Hyphae substraight to undulate, branching...
opposite to irregular at wide to acute angles, closely reticulate, cells 14–24x6–10 µm. Appressoria alternate, about 15% opposite, antrorse, spreading, straight to curved, 18–24 µm long; stalk cells cylindrical to cuneate, 6–10 µm long; head cells cylindrical, ovate, entire, straight to curved, 12–16x8–14 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 16–22x6–8 µm. Mycelial setae scattered, straight, simple, obtuse to variously dentate at the tip, up to 576 µm long. Perithecia scattered, verrucose, up to 225 µm in diam.; ascospores ellipsoidal, 4-septate, constricted, 32–42x14–20 µm.

Material examined: 23.vii.2009 on leaves of Citrus sp. (Rutaceae), Silent Valley, Jayakumar et al. HCIO 50054, TBGT 4206.

**Meliola clausenae** Hosagoudar in Hosagoudar & Goos, Mycotaxon 37: 226, 1990; 42: 133, 1991; Hosagoudar, Meliolales of India, p. 168, 1996 (Fig. 34).

Colonies epiphyllous, thin, up to 2 mm in diameter. Hyphae straight to slightly undulate, branching opposite at wide angles, loosely reticulate, cells 10–16x6–8 µm. Appressoria alternate, 20% opposite, straight to curved, subantrorse to antrorse, 16–24 µm long; stalk cells cylindrical to cuneate, 6–8 µm long; head cells cylindrical, ovate, entire, 10–16x8–10 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 12–20x6–8 µm. Mycelial setae scattered, straight, simple, acute to 2–3 dentate, up to 747 µm long. Perithecia scattered, verrucose, up to 180 µm in diam.; ascospores obovoidal, 4-septate, constricted, 32–42x14–16 µm.

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

**Meliola clausenigena** Hosagoudar & Riju, J. Threatened Taxa 3(3): 1617, 2011 (Fig. 35).

Colonies amphigenous, dense, velvety, up to 3 mm in diam., scattered to confluent. Hyphae straight, flexuous, branching opposite at wide angles, loosely to closely reticulate, cells 15–30 x 5–8 µm. Appressoria mostly opposite, rarely unilateral, antrorse to subantrorse, 17–23 µm long; stalk cells cylindrical to cuneate, 5–8 µm long; head cells ovate, oblong, rarely globose, straight to curved, entire, often sinuate, truncate at the apex, 12–15 x 7–10 µm. Phialides mixed with appressoria, opposite, alternate to unilateral, 15–20 x 7–10 µm. Mycelial setae simple, straight to uncinate at the apical portion, acute, obtuse to 2–3 times dentate at the tip, up to 240 µm long. Perithecia scattered to grouped in the colonies, up to 190 µm in diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septum, 37–40 x 15–20 µm.

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

**Meliola clerodendricola** Henn., Hedwigia 37: 288, 1895; Hans. Sydowia Beih. 2: 694, 1961; Hosagoudar & Goos, Mycotaxon 37: 226, 1990; Hosagoudar, Kaveriappa, Raghu & Goos, Mycotaxon 51: 111, 1994; Hosagoudar, Meliolales of India, p. 169, 1996.

**Meliola sakawensis** Henn. var. longispora Beeli, Bull. Jard. Bot. Etat. 7: 98, 1920.
Meliola sakawensis P. Henn., Hedwigia 43: 141, 1904; Stev., Ann. Mycol. 26: 248, 1928 (Fig. 36).

Colonies amphigenous, mostly epiphyllous, dense, scattered, up to 2mm in diameter, confluent. Hyphae undulate to tortuous, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 18–24x4–6 µm. Appressoria alternate to unilateral, straight to curved, antrorse to reflexed, 14–18 µm long; stalk cells cylindrical to cuneate, 6–8 µm long; head cells ovate, globose, entire, 8–10x6–8 µm. Phialides mixed with appressoria, scattered, opposite to alternate, ampulliform, 14–18 µm, occasionally tip twisted. Mycelial setae very few, grouped around perithecia, simple, acute to obtuse at the tip, up to 207µm long. Perithecia grouped, verrucose, up to 130µm in diam.; ascospores obovoidal, 4-septate, constricted, 30–34x12–14 µm.

Material examined: 6.viii.2008, on leaves of Clerodendrum infortunatum L. (Verbenaceae), Neelikkallu, M.C. Riju & Jacob HCIO 50374, TBGT 4291; on leaves of C. Viscosum Vent., Walakkad, S.S. Shaji et al. TBGT 5111; Silent Valley, 3.iii.2009, S.S. Shaji et al. TBGT 5559; Sairandhri, 2.iii.2010, P.J. Robin et al. TBGT 5592; 12.xii.2003, V.B. Hosagoudar et al. TBGT 1803, HCIO 46040.

Meliola commixta Syd., Leafl. Philippine Bot. 9: 3117, 1925; Stev., Ann. Mycol. 26: 209, 1928; Hansford, Sydowia Beih. 2: 434, 1961; Hosagoudar & Goos, Mycotaxon 37: 228, 1990; Hosagoudar, Meliolales of India, p. 172, 1996 (Fig. 37).

Colonies hypophyllous, thin, up to 4mm in diameter. Hyphae crooked, branching mostly opposite at wide angles, loosely to closely reticulate, cells 22–24x8–10 µm. Appressoria opposite and alternate, straight to curved, spreading, antrorse to reflexed, 12–14 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells ovate, globose, angular, truncate to slightly lobate, contorted, 8–10x6–8 µm. Phialides mixed with appressoria,
opposite to alternate, 16–20×8–10 μm. Mycelial setae numerous, mostly grouped around perithecia, simple, straight, acute, up to 315μm long. Perithecia scattered, verrucose, up to 150μm in diam.; ascospores obovoidal, 4-septate, constricted, 34–40×14–16 μm.

Material examined: 12.xii.2003 on leaves of Nephelium sp. (Sapindaceae), Sairandhri, V.B. Hosagoudar et al. 47717, TBGT2739; Sairandhri, 13.xii.2003, V.B. Hosagoudar et al. HCIO 46276, 46341, TBGT 1922, 1987.

**Meliola daviesii** Hansf. var. *longiseta* Hosagoudar, J. Mycopathol. Res. 44: 44, 2006 (Fig. 38).

Colonies hypophyllous, dense, velvety, up to 5mm in diameter. Hyphae straight to flexuous, branching irregular at acute to wide angles, loosely to closely reticulate, cells 24–28×6–8 μm. Appressoria alternate, antrorse to retrorse, often spreading, straight to variously curved, 24–36 μm long; stalk cells cylindrical to cuneate, 9–16 μm long; head cells ovate, oblong, entire, angular, rarely sublobate to lobate, 14–20×9–13 μm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 12–16×6–8 μm. Mycelial setae scattered, simple, straight to curved, acute to obtuse at the tip, up to 850μm long. Perithecia globose, scattered, up to 130μm in diam.; ascospores oblong, 4-septate, constricted, 38–42×11–16 μm.

Material examined: 13.xii.2003 on leaves of *Jasminum rotterianum* Wall. ex A. DC. (Oleaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45775 (holotype), TBGT 1524 (isotype).

**Meliola diospyricola** Hansf., Proc. Linn. Soc. New South Wales 78: 55, 1953; Sydowia Beih. 2: 498, 1961; Hosagoudar, J. Econ. Taxon. Bot. 29: 442, 2005 (Fig. 39).

Colonies hypophyllous, dense, up to 3mm in diameter, confluent. Hyphae straight, substraight to crooked, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 22–35×5–7 μm. Appressoria alternate, about 2–3% opposite, antrorse, subantrorse, closely antrorse to retrorse, straight to curved, 22–26 μm long; stalk cells cylindrical to cuneate, 6–8 μm long; head cells ovate, oblong to cylindrical, entire to rarely angular, 16–18×9–11 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 24–28×4–7 μm. Mycelial setae closely scattered, simple, straight, acute at the tip, up to 882μm long. Perithecia scattered to loosely grouped, verrucose, up to 250μm in diameter; ascospores oblong to cylindrical, 4-septate, middle cell slightly larger, constricted at the septa, 42–45×15–17 μm.

Material examined: 1.vii.2008 on leaves of Diospyros sp. (Ebenaceae), Silent Valley, M.C. Riju et al. HCIO 50371, TBGT 4288

**Meliola dolichi** Hosagoudar, J. Mycopathol. Res. 44: 44, 2006 (Image 7).

Colonies epiphyllous, dense, up to 2mm in diameter, often confluent. Hyphae straight, substraight, flexuous to crooked, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 16–24×5–7 μm. Appressoria alternate, unilateral, about 3% opposite, straight to curved, antrorse, subantrorse to retrorse, 14–21 μm long; stalk cells cylindrical to cuneate, 4–8 μm long; head cells ovate, globose, straight to curved, often attenuated at the apex, entire, 9–15×11–13 μm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–16×8–12 μm. Mycelial setae
scattered to grouped around perithecia, simple, straight, curved to few uncinate, acute to obtuse at the tip, up to 400µm long. Perithecia scattered to loosely grouped, up to 152µm in diam.; ascospores slightly ellipsoidal, 4-septate, constricted at the septa, 36–40x13–15 µm.

Material examined: 12.xii.2003 on leaves of Dolichus trilobus L. (Fabaceae), Sairandhri, Hosagoudar et al. HCIO 45754 (holotype), TBGT 1503 (isotype); 12.xii.2003, V.B. Hosagoudar & al HCIO 47065, TBGT 2282.

**Meliola erythropali** Hosag. in Hosagoudar & Goos, Mycotaxon 37: 232, 1990; Hosagoudar, Meliolales of India, p. 190, 1996 (Fig. 41).

Colonies amphigenous, mostly epiphyllous, dense, velvety, up to 4mm in diameter, confluent. Hyphae slightly undulate, branching opposite to irregular at acute angles, loosely reticulate, cells 12–32x5–8 µm. Appressoria alternate to unilateral, straight, antrorse, spreading, 18–20 µm long; stalk cells cylindrical to cuneate, 4–6 µm long; head cells ovate, globose, entire, 12–14x10–12 µm. Phialides few, mixed with appressoria, alternate to opposite, ampulliform, 14–20x8–10 µm. Mycelial setae scattered, simple, straight, acute at the tip, up to 315µm long. Perithecia scattered, verrucose, up to 180µm in diam.; ascospores oblong, 4-septate, slightly constricted, 38–44x10–16 µm.

Material examined: 13.xii.2003 on leaves of Erythropalum populifolium (Arn.) Mast. (Erythrophalaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46037, TBGT 1800; HCIO 46063, TBGT 1826; 29.vii.2008, P.P. Rajesh Kumar et al. HCIO 49797, TBGT 3949; 5 August 2008, M.C. Riju et al. TBGT 5236; 2.iii.2010, P.J. Robin et al. TBGT 5593; TBGT 5595; Silent Valley, 27.ii.2009, S.S. Shaji et al. HCIO 49561, TBGT 2803; Silent valley, 27.ii.2009, S.S. Shaji et al. HCIO 49563, TBGT 3805.

**Meliola eugeniae-jamboloidis** Hansf., Reinwardtia 3: 98, 1954; Sydowia Beih. 2: 144, 1961; Hosagoudar, J. Econ. Tax. Bot. 11: 157, 1987; Hosagoudar, Meliolales of India, p. 191, 1996 (Fig. 42).

Colonies hypophyllous, subdense, up to 4mm in diameter, rarely confluent. Hyphae substraight to crooked, branching irregular at acute to wide angles, loosely to closely reticulate, cells 28–31x9–11 µm. Appressoria alternate to unilateral, occasionally distantly placed, antrorse to spreading, 18.5–25 µm long; stalk cells cylindrical to cuneate, rarely tortuous, 3–6.5 µm long; head cells ovate, globose, entire to angular, variously curved, 12.5–18.5x12.5–15.5 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 18.5–28x9–12.5µm. Mycelial setae straight, simple, very few curved, acute to obtuse, up to 687µm long. Perithecia scattered, verrucose, up to 155µm in diam.; ascospores obvoidal, 4-septate, constricted, 52–56x18.5–21.5 µm.

Material examined: 12.xii.2003 on leaves of Syzygium munronii (Wight) Chandr. (Myrtaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45909, TBGT 1671.
Meliola flemingiicola
Hosagoudar, Jose & H. Biju in Hosagoudar, J. Mycopathol. Res. 43: 26, 2005 (Fig. 43).

Colonies epiphyllous, dense, crustose to velvety, scattered, up to 2mm in diameter, rarely confluent. Hyphae substraight to flexuous, branching irregular at acute to wide angles, loosely to closely reticulate, cells 17–28x6–8 µm. Appressoria alternate, about 20% opposite, antrorse to rarely recurved, 12–16 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells globose, entire, rarely truncate at the apex, 9–11x10–12 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–21x8–10 µm. Mycelial setae scattered to grouped around perithecia, simple, straight, obtuse, dentate to cristate at the apex, up to 441µm long. Perithecia scattered to loosely grouped, globose, up to 140µm in diameter; ascospores oblong to cylindrical, 4-septate, slightly constricted at the septa, 33–36x11–13 µm.

Materials examined: 14.xii.2003, Champatty, on leaves of Flemingia sp. (Fabaceae), V.B. Hosagoudar et al. TBGT 1696, HCIO 46190; TBGT 1602, HCIO 45934.

Meliola garciniae
Yates, Philippine J. Sci. 13: 369, 1918; Hansf., Sydowia Beih. 2: 167, 1961; Hosagoudar, Meliolales of India, p. 201, 1996.

Meliola kydiae Sacc., Bull. Ort. Bot. Nepoli 6: 13, 1921 (Fig. 44, Image B).

Colonies epiphyllous, dense, crustose to slightly velvety, up to 5mm in diameter, confluent. Hyphae straight to substraight, branching opposite to alternate at wide angles, loosely reticulate, cells 21–25x6–8 µm. Appressoria alternate, straight to curved, mostly antrorse, 15–25 µm long; stalk cells cuneate, 3–9.5 µm long; head cells ovate, globose, cylindrical, entire to slightly angular, 12–18.5x12–15.5 µm. Phialides numerous, mixed with appressoria, alternate to opposite, conoid to ampulliform, 18–25x9–12.5 µm. Mycelial setae numerous, simple, straight, acute at the apex, up to 800µm long. Perithecia scattered, verrucose, up to 155µm in diam.; ascospores obvoidal, 4-septate, slightly constricted at the septa, very rarely middle cells larger, 46–50x12–22 µm.

Material examined: 29.vii.2008 on leaves of Gardneria ovata Wall. (Periplocaceae), Silent Valley, Jacob et al. HCIO 50370, TBGT 4287.

Meliola gemellipoda
Doidge, Bothalia 1: 80, 1920;

Meliola garciniae
Yates, Philippine J. Sci. 13: 369, 1918; Hansf., Sydowia Beih. 2: 167, 1961; Hosagoudar, Meliolales of India, p. 201, 1996.
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Stev., Ann. Mycol. 26: 229, 1928; Hansford, Sydowia Beih. 2: 530, 1961; Hosagoudar & Goos, Mycotaxon 37: 232, 1990; Hosagoudar, Meliolales of India, p. 204, 1996. *Meliola busogensis* Hansf., J. Linn. Soc. Bot. 51: 538, 1938 (Fig. 45).

Colonies amphigenous, mostly epiphyllous, dense, up to 3mm in diameter, confluent. Hyphae straight to slightly undulate, branching opposite at acute angles, loosely to closely reticulate, cells 8–20x6–8 µm. Appressoria opposite (very few unilateral), straight, closely antrorse, 16–20 µm long; stalk cells cuneate, 4–8 µm long; head cells subglobose to ovate, entire, 10–14x8–10 µm. Phialides few, mixed with appressoria, alternate to opposite, ampulliform, 20–28x6–10 µm. Mycelial setae scattered to mostly grouped around perithecial, straight, simple, acute to obtuse, up to 594µm long. Perithecia scattered, verrucose, up to 110µm in diam.; ascospores obovoidal, 4-septate, slightly constricted, 42–50x14–20 µm.

**Material examined:** 17.vi.2007 on leaves of *Jasminum* sp. (Oleaceae), Silent Valley, Jacob Thomas et al. HCIO 48262, TBGT 3001; 27.ii.2009, S.S. Shaji et al. HCIO 49543, TBGT 3785; on leaves of *Jasminum malabaricum* Wight, Sispara, 02.vii.2008, M.C. Riju et al. TBGT 5156; Valakkad, 5.vii.2008, M.C. Riju et al. TBGT 5228; on leaves of *Jasminum rottlerianum* Wall. ex A. DC., Walakkad, 5.iii.2008, P.J. Robin et al. TBGT 5606.

*Meliolagneti* Hansf., Reinwardtia 3: 85, 1954; Sydowia Beih. 2: 751, 1961; Thite & Kulkarni, J. Shivaji Univ. (Sci.) 18: 211, 1978; Hosagoudar & Goos, Mycotaxon 37: 234, 1990; 42: 135, 1991; Hosagoudar, Meliolales of India, p. 207, 1996 (Fig. 46, Image 8).

Colonies amphigenous, mostly hypophyllous, dense, velvety, up to 6mm in diameter, confluent. Hyphae straight to slightly undulate, branching opposite at acute angles, loosely to closely reticulate, cells 18–44x6–8 µm. Appressoria alternate, about 5% opposite, antrorse to reflexed, straight to curved, 16–24 µm long; stalk cells cylindrical to cuneate, 6–8 µm long; head cells ovate, globose, slightly angulose, entire, 10–18x8–12 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 18–28x6–10 µm. Mycelial setae numerous, scattered to grouped around perithecia, straight, simple, acute at the tip, up to 918µm long. Perithecia scattered, verrucose, up to 180µm in diam.; ascospores cylindrical, 4-septate, constricted, 46–54x14–20 µm.

**Figure 45. Meliola gemellipoda**  
*Image 8. Meliola garciniae - infected leaves*
Material examined: 8.iii.2010 on leaves of Gnetumula Brongn. (Gnetaceae), Poochipara, P.J. Robin et al. TBGT 5165; Sairandhri, 13 December 2003, V.B. Hosagoudar et al. HCIO 45981, TBGT 1745.

**Meliola groteana** var. **maesae** Hosagoudar, C.K. Biju & T.K. Abraham, Nova Hedwigia 80: 486, 2005 (Fig. 47).

Colonies mostly hypophyllous, dense, velvety, up to 5mm diam., confluent. Hyphae straight to flexuous, branching mostly opposite at acute angles, loosely to closely reticulate, cells 12–16x5–7 μm. Appressoria alternate, about 30% opposite, antrorse to subantrorse, 12–16 μm long; stalk cells cylindrical to cuneate, 3–5 μm long; head cells predominantly globose, rarely ovate, entire, 9–11x8–11 μm. Phialides few, mixed with appressoria, alternate to opposite, ampulliform, 16–20x8–11 μm. Mycelial setae densely scattered, simple, straight to flexuous to arcuate, obtuse to acute at the tip, up to 300μm long. Perithecia scattered, up to 175μm diam.; ascospores obovoidal to cylindrical, 4-septate, slightly constricted at the septa, 33–40x12–15 μm.

Material examined: 12.xii.2003 on leaves of Maesa indica (Roxb.) DC. (Myrsinaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45982, TBGT 1746; 12.xii.2003, V.B. Hosagoudar et al. HCIO 45984, TBGT 1748; Neelikkallu, 24.iv.2007, M. Harish & S.S. Shaji HCIO 48081, TBGT 2864; 14.ii.2007, M.C. Riju & V. Gireesh Kumar HCIO 51034, TBGT 4951; 5.vii.2008, M.C. Riju et al. TBGT 5232; 13.ii.2007, M.C. Riju et al. TBGT 5630; Valakadu, Silent Valley National Park, Palghat, 4.iii.2008, Robin et al. TBGT 5099.
**Meliola holigarnae** Stev., Mem. Dept. Agric. India, Bot. Ser. 15: 108, 1928; Hansford, Sydowia Beih. 2: 468, 1961; Thite & Kulkarni, J. Shivaji Univ. (Sci.) 6: 162, 1973; Hosagoudar, J. Econ. Tax. Bot. 7: 45, 1985; Hosagoudaroudar & Goos, Mycotaxon 37: 234, 1990; 42: 135, 1991; Hosagoudar et al., Mycotaxon 46: 204, 1993; Hosagoudar, et al., Nova Hedwigia 58: 529, 1994; Hosagoudar, Meliolales of India, p. 217, 1996 (Fig. 48).

Colonies hypophyllous, dense, velvety, up to 10mm in diam., confluent. Hyphae strongly appressed to the host surface, crooked, branching alternate to irregular at acute to wide angles, closely reticulate and forming almost solid mycelial mat, cells 38–56x6–8 µm. Appressoria scattered, alternate to unilateral, antrorse to reflexed, curved variously, 26–50 µm long; stalk cells cylindrical, flexuous, usually elongated, usually 8–22 µm long; head cells ovate, versiform, angulose, entire to lobate, straight to curved, 18–22x14–18 µm. Phialides few, mixed with appressoria, conoid to ampulliform, 12–26x4–8 µm. Mycelial setae numerous, straight, flexuous, simple, acute to obtuse at the tip, up to 810µm long. Perithecia scattered, verrucose, up to 270µm in diam.; ascospores ellipsoidal, 4-septate, constricted, middle cell largest, 64–74x24–30 µm.

*Material examined:* 13.xii.2003 on leaves of Holigarnasp. (Anacardiaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46233, TBGT 1645.

**Meliola ichnocarpi-volubili** Hansf., Sydowia 16: 320, 1963; Hosagoudar, Zoos’ Print J. 18: 1002, 2002.

*Material examined:* 23.vii.2009 on leaves of Ichnocarpus sp. (Apocynaceae), Silent Valley, 23 July 2009, S.S. Shaji et al. HCIO 50043, TBGT 4195.

**Meliola ixorae** var. *psychotriae* Hosagoudar & T.K. Abraham, J. Mycopathol. Res. 36: 101, 1998 (Fig. 50).

**Meliola holigarnae**

![Image 48](image-url)  
*Figure 48. Meliola holigarnae*  
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

**Meliola ichnocarpi-volubili**

![Image 49](image-url)  
*Figure 49. Meliola ichnocarpi-volubili*  
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Colonies mostly epiphyllous, subdense, up to 5mm in diameter. Hyphae straight to flexuous, branching mostly opposite at acute angles, loosely reticulate, cells 19–24x4–6 µm. Appressoria alternate, antrorse to closely antrorse, 12–18 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovate, globose, slightly attenuated to truncate at the apex, mostly entire, rarely sublobulate, 9–12x8–10 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16–22x8–12 µm. Mycelial setae scattered to mostly grouped around perithecia, simple, straight, curved, acute to obtuse at the apex, up to 600µm long. Perithecia scattered, globose, often peridial cells projected, up to 125µm in diameter; ascospores oblong to slightly ellipsoidal, 4-septate, slightly constricted at the septa, 35–37x11–13 µm.

*Material examined:* 23.vii.2009 on leaves of *Ichnocarpus* sp. (Apocynaceae), Silent Valley, 23 July 2009, S.S. Shaji et al. HCIO 50043, TBGT 4195.
opposite to irregular at wide angles, loosely reticulate, cells 20–30x4–5 μm. Appressoria alternate, antrorse to subantrorse, straight to curved, 26–39 μm long; stalk cells cylindrical to cuneate, 7–15 μm long; head cells ovate, globose, entire, sublobate to lobate, 19–24x14–17 μm. Phialides numerous, mixed with appressoria, alternate to opposite, ampulliform, 12–14x4–6 μm. Mycelial setae numerous, scattered to grouped around perithecia, simple, straight, flexuous to curved, obtuse at the tip, up to 914μm long. Perithecia scattered, verrucose up to 124μm in diam.; ascospores ovoidal, 4-septate, 31–34x12–18 μm.

Material examined: 13.xii.2003 on leaves of *Ixora* sp. (Rubiaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46382, TBGT 2028.

**Meliola jasmini** Hansf. & Stev., J. Linn. Soc. London 5: 273, 1937; Hansf., Sydowia Beih. 2: 235, 1961; Hosagoudar, Indian J. Bot. 11: 185, 1988; Hosagoudar & Raghu, New Botanist 20: 70, 1993; Hosagoudaroudar, Meliolales of India, p. 226, 1996 (Fig. 51).

Colonies amphigenous, mostly epiphyllous, dense, velvety, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely to closely reticulate, cells 18.5–25x6–8 μm. Appressoria alternate, straight, antrorse, 15.5–22 μm long; stalk cells cuneate, 4.5–6 μm long; head cells ovate, entire, 12.5–15.5x9–12.5 μm. Phialides borne on a separate mycelial branch, opposite to alternate, conoid to ampulliform, 31–37x9–15.5 μm. Mycelial setae fairly numerous, scattered, straight, simple, acute to obtuse, up to 500μm long. Perithecia scattered, verrucose, up to 124μm in diam.; ascospores obovoidal, 4-septate, 31–34x12–18 μm.

Material examined: 13.ii.2007 on leaves of *Jasminum* sp. (Oleaceae), Kunthipuzha, M.C. Riju et al. HCIO 50923, TBGT 4840;1.iii.2009, S.S. Shaji et al. HCIO 49553, TBGT 3795; 24.iv.2007, M. Harish et al. HCIO 49761, TBGT 3913; on leaves of Jasminum sp., 1.vii.2008, S.S. Shaji et al. HCIO 49799, TBGT 3951; Poochipara, 31.vii.2008, P.P. Rajesh Kumar et al. TBGT 3985, HCIO 49833; Champatty, 14 December 2003, V.B. Hosagoudar et al. HCIO 45932, TBGT 1694; on leaves of *Jasminum cordifolium* Wall. ex G. Don, Poochipara, 14.ii.2007, M.C. Riju et al. TBGT 5628.
**Meliola kakachiana** Hosagoudar, Meliolales of India, p. 228, 1996 (Fig. 52).

Colonies hypophyllous, subdense, crustose, up to 5mm in diameter. Hyphae straight to crooked, branching mostly opposite at acute angles, loosely reticulate, cells 27–31x6–9.5 µm. Appressoria unilateral, alternate and about 10% opposite, antrorse to subantrorse, 12–18.5 µm long; stalk cells cylindrical, 3–6.5 µm long; head cells globose, rounded to truncate at the apex, entire, 9–15.5x12–14 µm. Phialides mixed with appressoria, alternate to opposite, conoid, elongate, 15–18.5x9–12.5 µm. Mycelial setae not many, scattered to grouped around perithecia, simple, straight to furcated at the tip, up to 572µm long. Perithecia scattered, verrucose, up to 155µm in diam.; ascospores oblong, cylindrical, 4-septate, slightly constricted at the septa, 46–50x21–25 µm.

**Material examined:** 2.viii.2008 on leaves of *Litsea* sp. (Lauraceae), Cheriya Walakkad, M.C. Riju et al. TBGT 5204.

**Meliola kakachiana** var. *poochiparensis* Hosagoudar & Sabeena, Plant Pathology & Quarantine 3(1): 12, 2012 (Fig. 53).

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 to cuneate, 2–5 µm long; head cells globose, entire, 10–12x12–15µm. 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.

**Material examined:** 8.iii.2010 on leaves of *Litsea* sp. (Lauraceae), Poochippara, P.J. Robin et al. TBGT 5734.

**Meliola lepianthidis** Hosagoudar & Kamar. in Hosagoudar, et al., J. Econ. Taxon. Bot. 25: 72, 2001 (Fig. 54).

Colonies amphigenous, predominantly epiphyllous, dense, up to 2mm in diameter, confluent. Hyphae straight to flexuous, branching opposite to alternate at acute to wide angles, loosely reticulate, cells 14–18x6–8 µm. Appressoria alternate, antrorse to subantrorse, 16–23 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells globose, minutely and irregularly lobate, 11–16x12–18 µm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 14–21x8–10 µm. Mycelial setae scattered to grouped around perithecia, simple, straight to uncinate, acute to broadly rounded at the apex, up to 300µm long. Perithecia scattered, up to 120µm in diameter; ascospores cylindrical, straight to curved, 4-septate, not constricted at the septa, 40–42x9–12 µm.

**Material examined:** 13.xii.2003 on leaves of *Lepianthes umbellata* (L.) Raf. (Menispermaceae),
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Sairandhri, V.B. Hosagoudar et al. HCIO 45804; HCIO 45698, TBGT 1445.

**Meliola litseae** Syd. & P. Syd. var. *rotundipoda* Hansf., Reinwardtia 3: 88, 1954; Sydowia Bieh. 2: 57, 1961; Hosagoudar & Goos, Mycotaxon 37: 239, 1990; Hosagoudar, Meliolales of India, p. 241, 1996.  
*Meliola litseae* Graff, Mem. Torry Bot. Club 17: 61, 1918 (non Sydow & Sydow, 1917) (Fig. 55).

Colonies epiphyllous, dense, velvety, up to 4 mm diameter, confluent. Hyphae straight to undulate, branching opposite at wide angles, loosely reticulate, cells 14–20x6–8 µm. Appressoria alternate, straight to curved, antrorse, rarely spreading, 24–26 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells versiform, obovate, rarely truncate, entire, 16–20x8–10 µm. Phialides mixed with appressoria, opposite to alternate, ampulliform, 20–24x10–12 µm. Mycelial setae few, straight, simple, acute at the tip, up to 612 µm long. Perithecia scattered, verrucose, up to 200 µm in diam.; ascospores obovoidal, 4-septate, constricted, 32–38x10–16 µm.

**Material examined:** 13.xii.2003 on leaves of *Litsea* sp. (Lauraceae), Sairandhri, V.B. Hosagoudar et al., HCIO 45778, TBGT 1527.

**Meliola malabarensis** Hansf., Proc. Linn. Soc. London 157: 182, 1946; Sydowia Bieh. 2: 531, 1961; Thite & Kulkarni, J. Shivaji Univ. 5: 161, 1973; Hosagoudar & Goos, Mycotaxon 37: 240, 1990; 42: 135, 1991; Hosagoudar et al., Mycotaxon 46: 206, 1993; Hosagoudaroudar, Meliolales of India, p. 246, 1996 (Fig. 56).

Colonies hypophyllous, thin, up to 2 µm in diameter, confluent. Hyphae straight to slightly undulate, branching opposite at wide to acute angles, loosely to closely reticulate, cells 22–42x6–8 µm. Appressoria alternate, straight to curved, antrorse to spreading, 16–24 µm long; stalk cells cylindrical to cuneate, 4–10 µm long; head cells ovate, globose, cylindrical, often curved, slightly truncate at the apex, entire, 10–14x8–10 µm. Phialides mixed with appressoria, opposite to alternate, variously curved, ampulliform, 18–20x6–10 µm. Mycelial setae grouped around perithecia, straight, simple, simple, acute at the tip, up to 480 µm long. Perithecia scattered, verrucose, up to 144 µm in diam.; ascospores obovoidal, 4-septate, constricted, 32–38x10–16 µm.

**Material examined:** 12.xii.2003 on leaves of *Oleadioica* Roxb. (Oleaceae), Sairandhri, V.B. Hosagoudar et al., HCIO 45778, TBGT 1527.

**Meliola manoharacharyi** Hosagoudar, Riju & D.K. Agarwal, Indian Phytopath. 63: 76, 2010 (Fig. 57).

Colonies epiphyllous, scattered, thin, up to 2 µm diameter, confluent. Hyphae straight to substraight, branching mostly opposite, rarely unilateral at acute to wide angles, loosely reticulate, cells 12–38x6–8 µm. Appressoria opposite (48%), alternate, unilateral, antrorse to sub antrorse, 15–23 µm long; stalk cells cylindrical to cuneate, 2–8 µm long; head cells globose, ovate, rarely truncate, entire, 7–18x7–13 µm. Phialides mixed with appressoria, mostly opposite, often unilateral to alternate, ampulliform, 20–25x7–10 µm.
µm. Mycelial setae simple, straight to slightly curved, acute to 1–3 times dentate at the tip, up to 1050µm long. Perithecia scattered, verrucose, up to 163µm in diameter; ascospores cylindrical, 4-septate, constricted at the septa, 50–53x20–23 µm.

**Materials examined:** 01.viii.2008 on leaves of *Myristica* sp. (Myristicaceae), Silent Valley, M.C. Riju et al. HCIO 49198 (holotype), TBGT 3437 (isotype).

*Meliola palakkadensis* Hosagoudar, D.K. Agarwal, H. Biju & Archana, Indian Phytopath. 60: 84, 2007 (Fig. 58).

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 µm. Appressoria alternate to unilateral, antorse to sub-antorse, straight to curved, 14–24 µm long; stalk cells cylindrical to cuneate, 4–7 µm long; head cells globose, ovate, slightly angular, entire, 9–18x8–13 µm. Phialides mixed with appressoria, opposite to unilateral, ampulliform, 13–21x8–10 µm. Mycelial setae numerous, scattered, straight, very few uncinate, simple, acute to obtuse at the tip, up to 700µm long. Perithecia globose, scattered, up to 265µm in diameter; ascospores obovoidal, 4-septate, constricted at the septa, 40–48x16–21 µm.

**Material examined:** 12.xii.2003 on leaves of *Litsea* sp. (Lauraceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46140 (holotype), TBGT 1903 (isotype).

*Meliola paramignyae* Hosagoudar, Indian Bot. Reptr. 7: 58, 1988; Hosagoudaroudar, Meliolales of India, p. 278, 1996 (Fig. 59).

Colonies hypophyllous, crustose, thin, up to 4 mm in diam. Hyphae straight to substraight, branching opposite at acute to wide angles, loosely to closely reticulate,
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Cells 18.5–23x6–8 µm. Appressoria alternate and about 10% opposite, antrorse to spreading, straight to curved, 18.5–22 µm long; stalk cells cylindrical to cuneate, 4–6 µm long; head cells ovate, clavate, cylindrical, entire to angulose, 12–15.5x9–12.5 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 18.5–22x9–12.5 µm. Mycelial setae scattered, straight, simple, acute, obtuse, cristate to dentate, up to 575 µm long. Perithecia scattered, verrucose, up to 171 µm diam.; ascospores obovoidal to cylindrical, 4-septate, constricted, 31–45x12–15.5 µm.

Material examined: 14.xii.2003 on leaves of Paramignya sp. (Rutaceae), Champatty, V.B. Hosagoudar et al. HClO 45777, TBGT 1526.

Meliola prataprajii Hosagoudar & T.K. Abraham,

Seminar on Rec. Adv. Bot. Satara, P.15, 1996 (Fig. 60).

Colonies epiphyllous, rarely amphigenous, dense, up to 2mm in diameter, confluent. Hyphae substraight to slightly crooked, branching alternate, opposite to irregular at acute angles, loosely to closely reticulate, cells 28–32x4–6 µm. Appressoria alternate, antrorse to retrorse, spreading, straight to curved, 21–32 µm long; stalk cells cylindrical to cuneate, 5–12 µm long; head cells ovate to cylindrical, entire, 14–20 x 9–12 µm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 16–27x9–12 µm. Mycelial setae mostly in the centre of the colony, simple, straight, obtuse, mostly bifid or 2–4-fid at the tip, up to 300 µm long. Perithecia loosely grouped, up to 120 µm in diameter; ascospores cylindrical, 4-septate, slightly constricted at the septa, 50–53x14–20 µm.

Materials examined: 2.vii.2008 on leaves of Loranthus sp. (Loranthaceae), Ollampuzha, Wakkad, Jacob Thomas et al. HClO 49041, TBGT 3296.

Meliola pycnosporae Hosagoudar & Archana, J. Threatened Taxa 1: 348, 2009 (Fig. 61).

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 µm. Appressoria alternate, about 2% opposite, antrorse to subantrorse, 11–16µm long; stalk cells cylindrical to cuneate, 3–5µm long; head cells ovate, globose, straight to curved, entire, 8–11x7–10µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 19–24x8–10 µm. Mycelial setae few, scattered, simple,
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Meliola rachammae Hosagoudar, Riju & D.K. Agarwal, Indian Phytopath. 63: 77, 2010 (Fig. 62).

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

Material examined: 30.vii.2008 on leaves of Symplocos macrocarpa ssp. kanarana (Talbot) Nooteb. (Symplocaceae), Cheriy Walakkad, M.C. Riju et al. HCIO 49199 (holotype), TBGT 3438 (isotype); HCIO 50573, TBGT 4490; HCIO 50575, TBGT 4492; HCIO 50577, TBGT 4494.

Meliola sairandhriana Hosag. & Archana, J. Threatened Taxa 1: 348, 2009 (Fig. 63).

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, 3–5µm 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, up to 196µm in diam.; ascospores oval, 4-septate, constricted at the septa, 36–40x20–23 µm.

Material examined: 13.xii.2003 on leaves of Aglaia minutiflora Bedd. (Meliaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46139 (holotype), TBGT 1902 (isotype).

Meliola salaciicola Hosag., D.K. Agarwal, H. Biju & Archana, Indian Phytopath. 60: 85, 2007 (Fig. 64).

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, 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 510µm long. Perithecia globose, grouped, up to 245µm in diameter; ascospores obovoidal, 4-septate, slightly constricted at the septa, 40–48x16–18 µm.

Figure 61. Meliola pycnosporae
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Figure 62. Meliola rachammae
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores
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Material examined: 13.xii.2003 on leaves of *Salacia* sp. (Hippocrataceae), Sairandhi, V.B. Hosagoudar et al. HCIO 46307 (holotype), TBGT 1953 (isotype).

**Meliola serjaniae** Stev. var. major Hansf., Sydowia 9: 49, 1955; Beih. 2: 444, 1961; Hosagoudar et al., Mycotaxon 51: 114, 1994; Hosagoudar, Meliolales of India, p. 309, 1996 (Fig. 65).

Colonies epiphyllous, dense, velvety, up to 5mm in diameter. Hyphae straight to substraight, branching mostly opposite at wide angles, loosely reticulate, cells 24–32.5x6–9.5 µm. Appressoria alternate, about 1% opposite, antrorse to subantrorse, straight to curved, 18–25 µm long; stalk cells cylindrical to cuneate, 6–9.5 µm long; head cells ovoid, clavate, entire to angular, 12–15.5x9–15.5 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 15–22x6–9.5 µm. Mycelial setae evenly scattered over the colonies, straight, simple, acute to obtuse at the tip, up to 510µm long. Perithecia scattered, verrucose, up to 175µm in diam.; ascospores obovoidal to cylindrical, 4-septate, slightly constricted, 40–45x12–16 µm.

**Material examined:** 12.xii.2003, on leaves of *Nephelium* sp. (Sapindaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 47717, TBGT 2739.

**Meliola silentvalleyensis** Hosag., J. Mycopathol. Res. 44: 45, 2006 (Fig. 66).

Colonies amphigenous, mostly epiphyllous, dense, crustose to velvety, up to 5mm in diameter, corresponding opposite surface of the showed water soaked lesion. Hyphae straight to flexuous, branching mostly opposite at acute angles, loosely to closely reticulate, cells 19–24x6–8 µm. Appressoria alternate, antrorse to closely antrorse, 22–26 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells ovoid, oblong, broadly rounded to often attenuated at the apex, entire, rarely angular to sublobate, 16–18x12–14 µm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 16–23x7–9 µm. Mycelial setae few, simple, straight, acute to obtuse at the tip, up to 350µm long. Perithecia loosely grouped at the centre of the colonies, up to 175µm in diam.; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 40–44x18–20 µm.

**Materials examined:** 12.xii.2003 on leaves of Meliaceae member, Sairandhri, near Kunthipuzha, V.B. Hosagoudar et al. HCIO 45764 (holotype), TBGT 1513 (isotype).
Meliola strombosiigena Hosag. & Riju, J. Threatened Taxa 3(3): 1618, 2011 (Fig. 67).

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 μm. Appressoria alternate, opposite to unilateral, antrorse to subantrorse, rarely retrorse, 17–28 μm long; stalk cells cylindrical to cuneate, 5–8 μm long; head cells oblong to cylindrical, straight to flexuously curved, entire, 10–20x5–8 μm. Phialides mixed with appressoria, alternate, opposite to unilateral, ampulliform, 20–30x6–8 μm. Mycelial setae straight to curved, scattered, acute at the tip, up to 720μm long; Perithecia scattered in the colonies, up to 240μm in diam.; ascospores obovoidal, 4-septate, constricted at the septa, 50–55x20–23 μm.

Material examined: 01.vii.2008 on leaves of Strombosia sp. (Olacaceae), Cheriya Walakkad, M.C. Riju et al. TBGT 4515 (holotype), HCIO 50598 (isotype).

Meliola wendlandiae Hosag. in Hosagoudar & Goos, Mycotaxon 37: 251, 1990; Hosagoudar, Meliolales of India, p. 340, 1996 (Fig. 68).

Colonies amphigenous, mostly hypophyllous, subdense, subvelvety, up to 4mm in diameter, confluent. Hyphae sinuous to crooked, branching opposite to irregular at acute angles, to loosely to closely reticulate, cells 18–32x6–10 μm. Appressoria alternate, spreading, antrorse, 20–30 μm long; stalk cells cuneate to cylindrical, 6–12 μm long; head cells ovate, narrow towards apex, slightly angular, entire, 15–18x12–14 μm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 14–20x8–10 μm. Mycelial setae few, grouped around perithecia, simple, straight, acute to subacute at apex, up to 344μm long. Perithecia scattered, verrucose, up to 168μm in diam.; ascospores obovoidal, 4-septate, constricted, 36–46x12–18 μm.

Material examined: 13.xii.2003 on leaves of Wendlandia thyrsoida (Schultes) Steud (Rubiaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45805, TBGT 1554.
The genus Prataprajella

Prataprajella turpiniicola (Hosag.) Hosag., Nova Hedwigia 55: 225, 1992; Hosagoudar, Meliolales of India, p. 343, 1996 (Fig. 69).

Asteridiella turpinnicola Hosag. in Hosagoudar & Goos, Mycotaxon 36: 341, 1989.

Colonies amphigenous, mostly hypophyllous, dense, up to 3mm in diameter. Hyphae straight to substraight, branching alternate to opposite at wide angles, loosely to closely reticulate and form an a solid mycelial mat, cells 16–32x8–12 µm. Appressoria alternate, spreading, antrorse, 26–30 µm long; stalk cells cylindrical to cuneate, 6–10 µm long; head cells globose, stellately sublobate to lobate, 18–20x16–24 µm. Phialides few, mixed with appressoria, alternate to opposite, ampulliform, 20–24x8–10 µm. Mycelial setae larviform, wavy, golden brown, simple, spreading, up to 196µm long and 7–8 µm wide, tip obtuse, simple, twisted, few appendages even longer than 1000µm long; perithecia scattered to grouped, globose, up to 360µm in diameter. Perithecial appendages larviform, straight to curved, twisted, acute to obtuse at the tip, up to 45µm long; ascospores
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fusiform, predominantly 3-septate, constricted at the septa, 46–56x16–20 µm.

Material examined: 13.xii.2003 on leaves of Turpinia malabarica Gamble (Staphyleaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45639, 45770, TBGT 1384, 1519.

Colonies were hyperparasitised by Isthmospora sp.

ASTERINALES

These fungi characterized by the presence of external mycelium; orbicular thyriothecium stellately dehisced at the centre, elongated or X or Y-shaped thyriothecium with central sutures, asci globose to oval.

Type family: Asterinaceae

Description of species

The genus Asterina

Asterina acronychiae Hosag. & Goos, Mycotaxon 59: 150, 1996; Hosag., H. Biju & Appaiah, J. Mycopathol. Res. 44: 5, 2006; Hosag., Chandra. & Agarwal, Asterinales of Kerala, p. 32, 2011 (Fig. 70).

Colonies epiphyllous, dense, crustose, up to 3 mm in diameter, confluent. Hyphae straight to substraight, branching opposite at acute angles, loosely reticulate, cells 13–21x 3–7 µm. Appressoria mostly opposite, rarely solitary, unicellular, ovate, oblong, entire, angular to slightly lobate, 6–9x5–8 µm. Thyriothecia scattered, orbicular, up to 132µm in diameter; margin fringed, stellately dehisced at the centre; asci numerous, globose, octosporous, 35–42 µm in diameter; ascospores brown, conglobate, uniseptate, deeply constricted at the septum, 20–24x9—12 µm, wall minutely echinulate.

Material examined: 6.viii.2008 on leaves of Acronychia pedunculata (L.) Miq. (Rutaceae), Walakkad, M.C. Riju & Jacob Thomas TBGT 5547; Sairandhri, 16.ii.2007, Girish et al. TBGT 5633, 5635; on leaves of Acronychia sp., 01.iii.2009, M.C. Riju & Jacob Thomas TBGT 4516.

Asterina atalantiae Hosagoudar & Agarwal, Indian Phytopath. 56: 98, 2003; Hosag. & Appaiah, J. Mycopathol. Res. 43:168, 2005; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 37, 2011 (Fig. 71).

Colonies amphigenous, minute, thin, up to 2mm
in diameter, confluent. Hyphae straight, flexuous to crooked, branching alternate, opposite to irregular at acute angles, loosely to closely reticulate, cells 10–12×3–5 μm. Appressoria opposite, subopposite, unilateral to rarely alternate, cylindrical, ovate, oblong, entire, rounded at the apex, 8–10×3–5 μm. Thyriothecia scattered to grouped, orbicular, up to 160 μm in diameter, crenate to slightly fimbriate at the margin, fringed hyphae flexuous and devoid of appressoria, thyriothecia initially longitudinally dehisced but later and frequently stellately dehisced at the centre; asci globose to ovate, octosporous, up to 30 μm in diameter; ascospores brown, oblong, conglobate, 1-septate, constricted at the septum, 11–13×4–5 μm, wall smooth.

Material examined: 20.vii.2007 on leaves of Aporusa sp. (Euphorbiaceae), Malakappara, M. Harish et al. HCIO 49763, TBGT 3915.

*Asterina atalantiae* Hosag. & D.K. Agarwal, Indian Phytopath. 56: 98, 2003; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 41, 2011 (Fig. 72).

Colonies hypophyllous, subdense, blackish brown, spreading, up to 10 mm in diameter, confluent. Hyphae straight to substraight, branching opposite, alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 15–18×4–5 μm. Appressoria alternate, unilateral to irregularly placed, unicellular, ovate, oblong, cylindrical, mostly entire, rarely truncate to slightly sublobate and often fuscate, straight to curved, 9–13×6–8 μm. Thyriothecia scattered, orbicular, up to
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200µm in diameter, stellately dehisced at the centre, dehiscence extended up to margin, margin crenate to fimbriate, fringed hyphae very small; asci globose, octosporous, up to 30µm in diameter; ascospores oblong, brown, conglobate, uniseptate, constricted at the septum, 23–26×11–12 µm, wall smooth.

Material examined: 27.ii.2009 on leaves of Atalantia sp. (Rutaceae), Silent Valley, Shaji et al. HCIO 49560, TBGT 3802.

*Asterina chukrasiae* Hosag., J. Mycopathol. Res. 44: 40, 2006; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p.47, 2011 (Fig. 73).

Colonies epiphyllous, thin to subdense, up to 2 mm in diameter, rarely confluent. Hyphae substraight, branching irregular at acute to wide angles, loosely reticulate, cells 19–23×3–5 µm. Appressoria alternate to unilateral, minutely stipitate to mostly broad based, globose, 2–3 times sublobate to lobate, 4–6×6–7 µm. Thyriothecia loosely aggregated to closely aggregated, orbicular, up to 100µm in diameter, margin crenate, stellately dehisced at the centre; asci globose, octosporous, up to 30µm in diameter; ascospores oblong, conglobate, uniseptate, constricted, brown, 20–24×11–13 µm, wall smooth to tubercled.

Material examined: 13.xii.2003 on leaves of Chukrasia tabularis A. Juss. (Meliaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45760 (holotype), TBGT 1509 (isotype).

*Asterina cipadessae* Yates, Philippine J. Sci. 12: 371, 1917; Hosagoudar, Balakrishnan & Goos, Mycotaxon 60: 172, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 574, 2000; Hosagoudar, Zoos’ Print J. 18: 1283, 2003; 21: 2326, 2006; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 44: 6, 2006.

*Parasterina cipadessae* (Yates) Mendoza, Philippine J. Sci. 49: 446, 1932; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p.51, 2011 (Fig. 74, Image 10).

Colonies epiphyllous, dense, up to 2 mm in diameter, confluent. Hyphae straight, flexuous to crooked, branching mostly opposite at acute angles loosely to closely reticulate, cells 12–34×4–6 µm. Appressoria alternate and opposite, sessile, entire to mostly lobate, 9–13×7–10 µm. Thyriothecia scattered to grouped, often connate, orbicular, up to 202µm in diameter, dehisce stellately at the center, margin crenate, rarely slightly fimbriate; asci many, ovate to globose, eight spored, 30–44×30–35 µm; ascospores conglobate, deep brown, 1-septate, slightly constricted at the septum, 24–28×6–14 µm, upper cell ovate and lower cell globose, wall smooth. Pycnothryia many, similar to the thyriothecia,
smaller; pycnothyriospores brown, ovoid to pyriform, 12–16x4–7 µm.  

Material examined: 13.xii.2003 on leaves of *Cipadessa baccifera* (Roth.) Miq. (Meliaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46038, TBGT 1801; 2.viii.2008, M.C. Riju et al. TBGT 5229.

### Asterina claviflori

Asterina claviflori Kar & Maity, Trans. Brit. Mycol. Soc. 54: 441, 1970; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 574, 2000; Hosagoudra, Zoos’ Print J. 18: 1283, 2003; 21: 2326, 2006; Hosagoudar, Chandraprabha & Agarwal, Astereinales of Kerala, p.54, 2011 (Fig. 75, Image 11).

Colonies epiphyllous, dense, up to 2mm in diameter, confluent. Hyphae flexuous, branching alternate to irregular at acute to wide angles, loosely reticulate, cells 25–32x4–8 µm. Appressoria alternate to unilaterial, unicellular, ovate, oblong, cylindrical, antrorse to retrors, straight to curved, entire, 9–18x6–8 µm. Thyrothecia scattered, rarely connate, orbicular, up to 250µm in diameter, margin fimbriate, fringed hyphae flexuous, stellately dehisced at the centre; asci few to many, ovate to globose, octosporous, 30–45 µm in diameter; ascospores oblong, brown, congloante, uniseptate, constricted, 14–18x11–13 µm, wall smooth to slightly verrucose.

Material examined: 8.iii.2010 on leaves of *Syzygium* sp. (Myrtaceae), Poochipara, P.J. Robin et al. TBGT 5162, 5164; Walakkad, 12.iii.2008, P.J. Robin et al. TBGT 5166; Sairandhri, 13.vi.2007, Jacob Thomas et al. HCIO 48844, TBGT 3220; 13.vi.2009, Shaji et al. HCIO 49558, TBGT 3800; 3.iii.2009, Shaji et al. HCIO 49576, TBGT 3818; 27.iv.2007, M. Harish et al. HCIO 49756, TBGT 3908; Sairandhri, 13.xii.2003, V.B. Hosagoudar et al. HCIO 50009, TBGT 4161; Pulippara, 13.ii.2007, M.C. Riju et al. TBGT 5019; Walakkad, 4.iii.2008, Robin et al. TBGT 5100.

### Asterina combreti

Asterina combreti Syd., Engl. Bot. Jahrb. 45: 264, 1910; Hosagoudar & Abraham, Indian Phytopath. 51: 389, 1998; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 564, 2000; Hosagoudar, C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 305, 2001; Hosagoudar, Zoos’ Print J. 18: 1282, 2003; Hosagoudar & Appaiah, J. Mycopathol. Res. 43:172, 2005; Hosag., Zoos’ Print J. 21: 2326, 2006; Hosagoudar, Chandraprabha & Agarwal, Astereinales of Kerala, p.55, 2011 (Fig. 76).

Colonies epiphyllous, dense, crustose to velvety, up to 5mm in diameter, confluent. Hyphae flexuous to rarely crooked, branching irregular at acute to wide angles, loosely reticulate, cells 9–13x1.5–2 µm. Appressoria alternate, two celled, distantly placed, mostly perpendicular to the hyphae, 6–20 µm long; stalk cells cylindrical to cuneate, 3 November 5µm long; head cells oval, globose, irregularly angular to sublobate, straight to uncinate, 4–6.5x7–9 µm. Thyrothecia scattered, orbicular, up to 100µm in diameter, stellately dehisced at the centre, margin mostly crenate, rarely fimbriate, fringed hyphae flexuous; asci globose,
octosporous, 24–30 µm in diameter; ascospores brown, conglobate, 1-septate, constricted at the septum, 11–13x6–7 µm, walls smooth. Pycnothryia smaller and similar to thyriothecia; Pycnothryiospores brown, oval to ellipsoidal, straight to curved, slightly constricted in the middle, often hyaline transverse band visible in the middle, 17–20x8–10 µm.

Material examined: 23.vii.2007 on leaves of Calycopteris floribunda (Roxb.) Poiret (Combretaceae), Silent Valley, 23.vii.2009, Jayakumar et al. HCIO 49858, TBGT 4010; Neelikkallu, 13.ii.2007, P.J. Robin et al. TBGT 5721.

Asterina cryptocarica Hosag., C.K. Biju & T.K. Abraham, Indian Phytopath. 54: 137, 2001; J. Mycopathol. Res. 40: 195, 2002; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p.59, 2011 (Fig. 77).

Colonies amphigenous, dense, up to 4mm in diameter. Hyphae substraight to flexuous, branching mostly opposite at wide angles, loosely reticulate, cells 19–26x34 µm. Appressoria scattered, alternate, unicellular, globose to ovoid, entire, 4–7x4–6 µm. Thyriothecia scattered, orbicular, up to 100µm in diameter, stellately dehisced at the center, margin crenate; ascii not seen; ascospores oblong, conglobate, brown, uniseptate, constricted at the septum, 12–16x6–8 µm. Wall smooth.

Material examined: 06.viii.2008 on leaves of Litsea sp. (Lauraceae), Neelikkallu, M.C. Riju et al. TBGT 5576; 23.vii.2009, Jayakumar et al. HCIO 50050, TBGT 4202.

Asterina deightonii Syd., Ann. Mycol. 36: 172, 1938; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 571, 2000; Hosagoudar, C.K. Biju, Abraham & Agarwal, Indian Phytopath. 55: 497, 2002; Hosagoudar, Zoos’ Print J. 21: 2326, 2006; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 62, 2011 (Fig. 78).

 Colonies amphigenous, mostly epiphyllous, thin to subdense, up to 2mm in diameter, rarely confluent. Hyphae substraight to flexuous, branching irregular at acute angles, loosely reticulate, cells 17–21x4–5 µm. Appressoria unicellular, many, alternate, about 1% opposite, globose to ovate, entire, rarely slightly angular, 6–10x5–7 µm. Thyriothecia scattered, often loosely grouped, orbicular, up to 145µm in diameter, margin crenate to fimbriate, fringed hyphae flexuous, stellately dehisced at the centre; asci few to many, globose, octosporous, up to 40µm in diameter; ascospores brown, oblong, conglobate, uniseptate, constricted, 21–23x11–
13 µm; wall glabrous to minutely echinulate. Pycnothyria similar to thyriothecia, smaller; Pycnothyriospores few, globose to pyriform, brown, 16–18x12–18 µm, wall smooth.

**Material examined:** 2.iii.2009 on leaves of Loranthus sp. (Loranthaceae), Silent Valley, Jayakumar et al. HCIO 49850, TBGT 4002; Onnampuzha, Walakkad, 02.viii.2008, Jacob Thomas et al. HCIO 49041, TBGT 3296.

*Asterina elaeocarpi* Syd. var. *ovalis* Kar & Maity, Indian Phytopath. 39: 218, 1986; Hosagoudar, Balakrishnan & Goos, Mycotaxon 60: 175, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 566, 2000; Hosagoudar, C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 305, 2001; Hosagoudar, Zoos’ Print J. 18: 1282, 2003; Hosagoudar, Zoos’ Print J. 21: 2326, 2006; Hosagoudar, H. Biju & Appaiyah, J. Mycopathol. Res. 44: 7, 2006; Hosagoudar & H. Biju, J. Mycopathol. Res. 44: 41, 2006. Hosag. J. Appl. & Nat. Sci. 1(1): 29, 2009; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 68, 2011 (Fig. 79).

Colonies epiphyllous, thin to subdense, up to 2mm in diameter, confluent and cover the entire upper surface of the leaves. Hyphae straight to substraight, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 8–13x3–4µm. Appressoria alternate, opposite to subopposite, ovate to oblong, long, elongated, unicellular, entire, 4–24x4–5 µm. Thyriothecia scattered to connate, orbicular, up to 160µm in diameter, stellately dehisced at the centre, crenate to fimbriate at the margin, fringed hyphae flexuous; asci few to many, globose to ovate, octosporous, 35–45 µm in diameter; ascospores oblong, conglobate, deep brown, uniseptate, constricted at the septum, 22–24x9–13 µm, wall coarsely echinulate.

**Material examined:** 13.xii.2003 on leaves of *Elaeocarpus tuberculatus* Roxb. (Elaeocarpaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45772, TBGT 1521; 02.iii.2009, P.P. Rajesh Kumar et al. HCIO 49828, TBGT 3980; 02.vii.2008, P.P. Rajesh Kumar et al. HCIO 49830, TBGT 3982; 30.vii.2009, Jayakumar et al. HCIO 49859; 28.vii.2009, Jayakumar et al. HCIO 49867; Sairandhri, Silent Valley, Kerala, 13.xii.2003, V.B. Hosagoudar et al. HCIO 46062, TBGT 1825; Silent Valley, 02.iii.2009, HCIO 50619, TBGT 4536; Walakkad, 06.v.2008, M.C. Riju et al. TBGT 5239; 13.v.2007, M.C. Riju et al. TBGT 5629.

*Asterina elaeocarpicola* Hansf., Reinwardia 3: 131, 1954; Hosagoudar & Goos, Mycotaxon 59:154, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 566, 2000; Hosagoudar, Zoos’ Print J. 18: 1282, 2003; 21: 2327, 2006; Hosagoudar, H. Biju & Appaiyah, J. Mycopathol. Res. 44: 7, 2006; Hosagoudar J. Appl. & Nat. Sci. 1(1): 29, 2009; Hosagoudar, Chandraprabha & Agarwal, Asterinales of
Kerala, p. 67, 2011 (Fig. 80, Image 12).

Colonies amphigenous, mostly hypophyllous, subdense, up to 3mm in diameter, confluent and cover the entire lower surface of the leaves. Hyphae sinuous to crooked, branching irregular at acute angles, loosely reticulate, cells 15–19x3–5 µm. Appressoria mostly unicellular, mostly alternate, rarely opposite, cylindrical, straight, flexuous, mostly uncinate irregularly, rarely forked, 9–19x3–5 µm. Thyriothecia closely scattered and often connate, orbicular, up to 186 µm in diameter margin crenate, rarely fimbriate, dehisce stellately at the center; asci many, octosporous, globose, 40–44 µm in diameter; ascospores conglobate, brown, 1- septate, 24–28x9–13 µm.

Material examined: 05.xi.2009 on leaves of Elaeocarpus munronii (Wight) Masters (Elaeocarpaceae), Silent valley, S.S. Shaji et al. TBGT 5605; Elaeocarpus sp., Cheriy walakkad, 02.viii.2008, Jacob Thomas et al. HCIO 49234, TBGT 3473; Silent Valley, 01.iii.2009, S.S. Shaji et al. HCIO 49557, TBGT 3799; 01.viii.2008, P.P. Rajesh Kumar et al. HCIO 49801, TBGT 3953.

*Asterina erysiphoides* Kalch. & Cooke, Grevillea 9: 32, 1880; emend. Doidge, Trans. Roy. Soc. South Africa 8: 256, 1920; Hansford & Thirumalachar, Farlowia 3: 306, 1948; Hosagoudar, Balakrishnan & Goos, Mycotaxon 59: 175, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 577, 2000; Hosagoudar, Zoos’ Print J. 18: 1284, 2003; 21: 2327, 2006; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 44: 7, 2006; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 72, 2011 (Fig. 81).

Colonies epiphyllous, dense, up to 2mm in diameter, rarely confluent. Hyphae flexuous to crooked, branching mostly opposite at acute angles, loosely to closely reticulate, cells 18–25x2–5 µm. Appressoria opposite and alternate, antorse to reflexed, straight to variously curved, 15–20 long; stalk cells cylindrical to cuneate, 4–13 µm long; head cells straight to curved, entire to lobate, 6–11x7–10 µm. Thyriothecia numerous, scattered, often confluent, initially closed, stellately dehisced at
maturity at the center, margin crenate to fimbriate; asci numerous, ovoid to globose, octosporous, 30–33x27–30µm; ascospores initially hyaline, brown at maturity, conglobate, oblong, rounded at both ends, 1-septate, constricted at septum, 18–22x9–13µm.

Material examined: 03.iii.2009 on leaves of Jasminum sp. (Oleaceae), Silent Valley, Shaji et al. HCIO 49564, TBGT 3806; on leaves of Jasminum cordifolium Wallich ex G.Don, Poochipara, 02.iii.2010, Robin et al. V.B. Hosagoudar 5102; Jasminum sp., Silent Valley, 01.iii.2009, Shaji et al. HCIO 49556, TBGT 3798; Silent Valley National Park, Kerala, 22.vii.2009, Jayakumar et al. HCIO 49862, TBGT 4014; on leaves of Jasminum malabaricum Wight, Valakkad, Silent Valley, Palghat, 05.viii.2008, M.C. Riju et al. TBGT 5228.

Asterina erythropalicola Hosag. & Goos, Mycotaxon 59: 156, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 566, 2000; Hosagoudar, Zoos’ Print J. 18: 1282, 2003; Hosagoudar, Zoos’ Print J. 21: 2327, 2006 (Fig. 82).

Colonies epiphyllous, dense, crustose, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite at acute to wide angles, loosely reticulate, cells 21–28x6–8 µm. Appressoria alternate, unilateral, about 30% opposite, subantrorse to perpendicular to the hyphae, mostly straight, 2-celled, 12–22 µm long; stalk cells cylindrical, 3–10 µm long; head cells ovate, globose, entire, rarely truncate, 9–13x6–8 µm.

Material examined: 30.vii.2009 on leaves of Erythropalum populifolium (Arn.) Masters (Erythropalaceae), Silent Valley, Jayakumar et al. HCIO 49863, TBGT 4015; Sairandhri, 29.vii.2008, Jacob Thomas & M.C. Riju TBGT 5085; 26.ii.2009, S.S. Shaji et al. TBGT 5553.

Asterina flacourtiaearum Hosag. & Ravikumar in Hosagoudar, Balakrishnan & Goos, Mycotaxon 59: 176, 1996 (Fig. 83).

Colonies amphigenous, mostly epiphyllous, up

Thyrothecia closely scattered, orbicular, up to 217µm in diameter, margin fringed, rarely crenate, fringed hyphae flexuous, with appressoria, thyrothecia dehisce stellately at the center and widely opened; asci many, globose, octosporous, 40–46 µm in diameter; ascospores conglobate, 1-septate, constricted at the septum, both cells unequal, 24–28x12–16 µm, wall smooth. Pycnothyria attached or mixed with thyrothecia, slightly smaller; pycnothyriospores oval to pyriform 18–20x12–14 µm.

Material examined: 03.iii.2009 on leaves of Jasminum sp. (Oleaceae), Silent Valley, Shaji et al. HCIO 49564, TBGT 3806; on leaves of Jasminum cordifolium Wallich ex G.Don, Poochipara, 02.iii.2010, Robin et al. V.B. Hosagoudar 5102; Jasminum sp., Silent Valley, 01.iii.2009, Shaji et al. HCIO 49556, TBGT 3798; Silent Valley National Park, Kerala, 22.vii.2009, Jayakumar et al. HCIO 49862, TBGT 4014; on leaves of Jasminum malabaricum Wight, Valakkad, Silent Valley, Palghat, 05.viii.2008, M.C. Riju et al. TBGT 5228.
to 2mm in diameter, frequently confluent. Hyphae straight, branching alternate to irregular at acute angles, loosely reticulate, cells 24–31x5–7 µm. Appressoria scattered, distantly placed, alternate, mostly two celled, occasionally several celled, 9–30 µm long; stalk cells mostly unicellular, rarely up to 3-celled, mostly cylindrical to cuneate, rarely irregularly curved, 3–22 µm long; head cells obpyriform, frequently 2–3 lobate, rarely entire to angular, 6–10x9–13 µm. Thyriothecia orbicular, carbonaceous black, closely grouped to scattered, up to 190µm in diameter, dehiscing stellately at the center, margin crenate to fimbriate, fringed hyphae tortuous; asci many, globose, eight spored, 31–41 µm in diameter; ascospores cinnamon brown conglobate, 1-septate, deeply constricted at the septum, upper cell slightly larger, 24–28x12–16 µm, wall smooth. Pycnothyria similar to thyriothecia, up to 90µm in diameter; pycnothriospores ovate to globose, slightly papillate at one end, cinnamon brown, 15–22x15–19 µm.

Material examined: 14.ii.2007 on leaves of Scolopia crenata (Wight & Arn.) D. Clox. (Flacourtiaceae), Silent Valley, Gireesh & S.S. Shaji TBGT 5510; 26.ii.2009, S.S. Shaji et al. TBGT 5585.

Asterina gamsii Hosag. & C.K. Biju in Hosagoudar, Indian Phytopath. 58: 195, 2005; Hosagoudar, Zoos’ Print J. 21: 2327, 2006; Hosagoudar & H. Biju, J. Mycopathol. Res. 44: 41, 2006; Hosagoudar J. Appl. & Nat. Sci. 1(1): 27, 2009 (Fig. 84).
Colonies epiphyllous, dense, velvety, up to 3mm in diameter and cover an entire upper portion of the leaves. Hyphae straight to substraight, branching irregular at acute angles, loosely to closely reticulate, cells 16–23x4–7 µm. Appressoria alternate, unilateral and about 20% opposite to subopposite, mostly straight, subantrorse to rarely retrorse, ovate to cylindrical, entire, rounded at the apex, 8–13x6–8 µm. Thyriothecia closely scattered, orbicular, up to 300µm in diameter, stellately dehisced at the centre, crenate to fimbriate at the margin, fringed hyphae flexuous; ascii few to many, globose, octosporous, up to 38µm in diam.; ascospores oblong, brown, uniseptate, constricted at the septum, 32–36x11–18 µm, wall smooth. Pycnothyria similar to thyriothecia, smaller; pycnothyriospores pyriform, apiculate, brown, 22–26x16–18 µm.

Material examined: 13.xii.2003 on leaves of *Elaeocarpus tectorius* (Lour.) Poir. (*Elaeocarpus oblongus* auct. non Gaertn.) (Elaeocarpaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45753, TBGT 1502.

*Asterina hakgalensis* Hansf., Proc. Linn. Soc. London 158: 45, 1947; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 566, 2000; Hosagoudar & Shiburaj, Zoos’ Print J. 18: 1193, 2003; Hosagoudar, Zoos’ Print J. 21: 2327, 2006; Hosagoudar, Jacob Thomas & Robin, Indian J. Sci. Technol. 2: 2, 2009 (Fig. 85, Image 13).

Colonies epiphyllous, dense, crustose, orbicular, up to 3mm in diameter, rarely confluent. Hyphae substraight to crooked, branching alternate to irregular at acute angles, loosely to closely reticulate, cells 14–20x4–5 µm. Appressoria moderate to sparse, mostly present in the peripheral hyphae, globose, mammiform, broad based, entire, 6–7 µm high and 7–9 µm broad. Thyriothecia scattered to grouped, discrete to often connate, orbicular, up to 215µm in diameter, margin fringed, fringed hyphae join with the fringed hyphae of the other thyriothecia, carbonaceous black and stellately or irregularly splitted at the centre, radiating cells visible only towards the margin of the thyriothecia; ascii few to many, ovate to globose, octosporous, 30–35 µm in diameter; ascospores conglobate, oblong, brown, 1-septate, slightly constricted at the septum, 20–23x10–12 µm, wall smooth.

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**Figure 87. Asterina jambolana**
- a - Appressoriate mycelium; b - Thyriothecium; c - Ascus;
- d - Ascospores

**Figure 88. Asterina lepianthedis**
- a - Appressoriate mycelium; b - Thyriothecium; c - Ascus;
- d - Ascospores
Material examined: 02.iii.2009 on leaves of *Rhododendron arboretum* J.E. Smith ssp. *nilagiricum* (Zenk.) Tagg. (Ericaceae), Silent Valley, 02.iii.2009, Jayakumar et al. HCIO 49852, TBGT 4004.

*Asterina indica* Syd. in Sydow, Sydow & Butler, Ann. Mycol. 9: 390, 1911; Patil & Thite, J. Shivaji Univ. 17: 152, 1977; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 584, 2000; Hosagoudar, Zoos’ Print J. 18: 1285, 2003; 21: 2327, 2006; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 44: 8, 2006; Hosagoudar, Jacob Thomas & Robin, Indian J. Sci. Technol. 2: 2, 2009 (Fig. 86).

Colonies epiphyllous, thin, up to 2mm in diameter. Hyphae straight to substraight, branching opposite to alternate at acute to wide angles, loosely reticulate, cells 31–38x12 µm. Appressoria 95% alternate and 5% opposite, unicellular, slightly antrorse, 14–22x7–10 µm. Thyriothecia scattered, up to 72µm in diameter, stellately dehisce at the centre; ascospores dark brown, 1-septate, constricted at the septum, 38–43x14–19 µm.

Material examined: 27.iv.2007 on leaves of *Symplocos rosea* Bedd. (Symplocaceae), Silent Valley, M. Harish et al. HCIO 49757, TBGT 3909.

*Asterina jambolana* Kar & Maity, Trans. Brit. Mycol. Soc. 54: 438, 1970; Hosagoudar, Balakrishnan & Goos, Mycotaxon 59: 180, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 576, 2000; Hosagoudar, C.K. Biju & Abrahamb, J. Econ. Taxon. Bot. 25: 306, 2001; J. Mycopathol. Res. 40:195, 2002; Hosagoudar, Zoos’ Print J. 18: 1283, 2003; Hosag., Zoos’ Print J. 21: 2327, 2006 (Fig. 87).

Colonies amphigenous, mostly epiphyllous, dense, crustose to velvety, up to 2mm in diameter, confluent. Hyphae substraight to flexuous, branching irregular at acute angles, loosely to closely reticulate, cells 25–32x4–7 µm. Appressoria scattered, alternate, unilateral, mostly closely antrorse and appressed to the hyphae, often, curved, subantrorse to spreading, 16–20 µm long; stalk cells cylindrical to cuneate, 6–7 µm long; head cells ovate to globose, straight to slightly curved, entire, 9–13x8–10 µm. Thyriothecia scattered to conenate and often fused, orbicular, up to 300µm in diameter, stellately dehisced at the centre, margin crenate to fimbriate, fringed hyphae short; asci globose, octosporous, up to 50µm in diameter; ascospores oblong, conglobate, brown, uniseptate, slightly constricted at the septum, 32–34x13–16 µm.

Material examined: 13.ii.2007 on leaves of Syzygium sp. (Myrtaceae), Silent Valley, M.C. Riju et al. TBGT 5072; 04.viii.2008, M.C. Riju et al. TBGT 5225.

*Asterina lepianthedis* (Hosag., Balakr. & Goos) in Hosagoudar, C.K. Biju, Abraham & Agarwal, Indian Phytopath. 55: 498, 2002; Hosagopudar, Zoos’ Print J. 21: 2328, 2006; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 44: 8, 2006; Hosagoudar & H. Biju, J. Mycopathol. Res. 44: 42, 2006.

Anamorph. Asterostomella lepianthedis Hosag., Balakr. & Goos, Mycotaxon 58: 492, 1996 (Fig. 88).

Colonies amphigenous, mostly epiphyllous, thin to dense, up to 1mm in diameter, confluent. Hyphae st4raight, flexuous to crooked, branching irregular at acute angles, loosely reticulate, cells 12–33x3–5 µm. Appressoria two celled, scattered, alternate to unilateral, straight to curved, 9–15 µm long; basal cells cuneate to cylindrical, 3–8 µm long; head cells ovate, globose, entire to mostly suboblate, 3–10x4–6 µm. Thyriothecia scattered, orbicular, scattered to conenate, up to 150µm in diameter, margin fimbriate, fringed hyphae crooked, stellately dehisced at the centre; asci few to many, globose, octosporous, 25–35 µm in diameter; ascospores brown, oblong, conglobate, 1-septate, constricted at the septum, 16–18x8–10 µm.
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wall smooth. Pycnothyria scattered, orbicular, center, margin crenate; Pycnothryiospores unicellular, globose to ellipsoidal, brown, 9–15x6–9.5 µm.

Material examined: 13.xii.2003 on leaves of Lepianthes umbellata (L.) Raf. (Menispermaceae), Sairandhri, V.B. Hosagoudar et al. HClO 45804; HClO 45698, TBGT 1445; 12.xii.2004, V.B. Hosagoudar et al. HClO 46089, TBGT 1852.

Asterina melicopecola Hosag. & Abraham, Indian Phytopath. 50: 216, 1997; Hosag., C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 305, 2001; Hosagoudar, Zoos’ Print J. 18: 1284, 2003; 21: 2328, 2006; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 44: 9, 2006 (Fig. 89).

Colonies amphigenous, mostly epiphyllous, dense, up to 1mm in diameter, confluent. Hyphae straight, branching opposite at acute angles, loosely reticulate, cells 19–24x3.5–5 µm. Appressoria opposite, about 20% alternate, unicellular, ovate, globose, clavate, pyriform, irregularly sublobate to lobate, 9–12.5x6–7.5 µm. Thyriothecia orbicular, loosely grouped in the center of the colony, scattered to connate, up to 150µm in diameter, stellately dehisce at the center, splitting up to margin, crenate to fimbriate, fringed hyphae small, profusely branched; asci globose, rounded, octosporous, up to 42µm in diameter; ascospores conglobate, brown,1-septumte, deeply constricted at the septum, upper cell globose, lower cell slightly ovate, 31–34x12–13.5 µm.

Material examined: 27.iv.2007 on leaves of Euodialuna ankenda (Gaertner) Merr. (Rutaceae), Silent Valley, M. Harish et al. HClO 49760, TBGT 3912.

Asterina memecylonis Ryan, Mem. Dept. Agric. India 15: 105, 1921; Hosagoudar, Zoos’ Print J. 19: 1386, 2004; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 43:204, 2005; Hosagoudar, Zoos’ Print J. 21: 2328, 2006 (Fig. 90).

Colonies amphigenous, subdense to dense, up to 2mm in diameter, confluent. Hyphae straight, branching alternate, opposite to irregular at acute angles, loosely to closely reticulate, cells 28–32x4–7 µm. Appressoria scattered, alternate, unicellular, broad
based, mammiform, globose, entire, angular, crenately lobate to slightly lobate, 11–13x11–15 µm. Thyriothecia scattered, orbicular, up to 441µm in diameter; crenate at margin, irregularly dehisce at the centre; asci few, globose to ovate, octosporous, 56–62 µm in diameter; ascospores brown, conglobate, uniseptate, constricted at the septum, taper at both the ends, 38–42x14–16 µm.

**Material examined:** 03.iii.2009 on leaves of *Memecylon* sp. (Melastomataceae), Silent Valley, S.S. Shaji et al. HCIO 50600, TBGT 4517; 04.viii.2008, M.C. Riju et al. TBGT 5033; Silent Valley, 07.iii.2009, S.S. Shaji et al. TBGT 5587; Silent Valley National Park, Palghat, 13.ii.2007, S.S. Shaji et al. TBGT 5602.

*Asterina microtropidicola* Hosagoudar & C. K. Biju in Hosagoudar, C.K. Biju, Abraham & Agarwal, Indian Phytopath. 55: 499, 2002; Hosagoudar, Zoos’ Print J. 21: 2328, 2006.

Colonies amphigenous, dense, velvety, up to 5mm in diameter, rarely confluent. Hyphae straight, rarely substraight to slightly flexuous, branching irregular at acute angles, loosely to closely reticulate, cells 12–20x3–5 µm. Appressoria unicellular, alternate, about 30% opposite, straight to slightly curved, conoid, attenuated and broadly rounded at the apex, entire, 11–20x6–8 µm. Thyriothecia closely scattered, often connate, orbicular, up to 125µm in diameter, mostly crenate at the margin, stellately dehisced and widely opened at the centre; asci many, octosporous, globose, up to 40µm in diameter; ascospores oblong, conglobate, uniseptate, deeply constricted at the septum, 30–34x14–16 µm, wall smooth.

**Material examined:** 13.xii.2003 on leaves of *Pleurostylia* sp. (Celastraceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46379, TBGT 2025.

*Asterina myristicacearum* Hosagoudar & Sabeena, J. Threatened Taxa 3: 2144, 1911 (Fig. 91).

Colonies epiphyllous, subdense, up to 3mm in diameter. Hyphae straight to substraight, branching opposite to unilateral at acute to wide angles, loosely reticulate, cells 17–47x2–5 µm. Appressoria often crowded, alternate, opposite to subopposite, unicellular,
often broad based, ovate, globose, entire, angular to sublobate, 7–15x7–10 µm. Thyriothecia scattered to connate, ovate, up to 170µm in diam., margin crenate, stellately dehisced at the centre or the central portion dissolved by exposing the asci; asci globose, octosporous, 37–50 µm in diam.; ascospores conglobate, brown, uniseptate, constricted at the septum, 25–32x12–17 µm, wall echinulate.

Material examined: 01.iii.2009 on leaves of *Myristica* sp. (Myristicaceae), Silent Valley, S.S. Shaji et al. TBGT 5594.

*Asterina nothopegiae* Ryan, Mem. Dept. Agric. India 15: 104, 1928; Patil & Thite, J. Shivaji Univ. 17: 152, 1977; Bilgrami, Jamaluddin & Rizwi, Fungi of India p. 53, 1991; Hosagoudar, Balakr. & Goos, Mycotaxon 59: 182, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 559, 2000; Hosagoudar, C. K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 305, 2001; Hosagoudar, Zoos’ Print J. 18: 1280, 2003; Hosagoudar, Zoos’ Print J. 21: 2328, 2006 (Fig. 92, Image 14).

Colonies amphigenous, mostly epiphyllous, thin, up to 5mm in diameter, confluent. Hyphae straight, branching opposite at wide angles loosely reticulate, cells 9–22x3–5µm; Appressoria alternate and about 40% opposite, unicellular, ovate, globose to conoid, entire to deeply and irregularly shallowly to deeply lobate, 6–13x6–8µm; Thyriothecia scattered, round to slightly ovate, up to 155µm in diameter, dehiscing stellately at the center, margin crenate to fimbriate, fringed hyphae flexuous; asci many, globose to ovate, eight spored, 30–32x21–25 µm.

*Asterina oreocnidecola* Hosagoudar, Balakr. & Goos, Mycotaxon 59: 183, 1996; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 585, 2000; Hosagoudar, Zoos’ Print J. 18: 1285, 2003; 21: 2328, 2006; Hosagoudar & H. Biju, J. Mycopathol. Res. 44: 42, 2006 (Fig. 93).

Colonies amphigenous mostly epiphyllous, rarely hypophyllous, up to 3mm in diameter, confluent, very thin, sometimes difficult to trace. Hyphae brown, straight to undulate, branching alternate to opposite
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at wide angles, loosely reticulate, cells 9–16x3–5 µm. Appressoria pale brown, unicellular, alternate to unilateral, globose, stellately sublobate, rarely entire, 4–6x7–10 µm. Thyriothecia scattered, mostly rounded, up to 100 µm in diameter, dehiscing stellately at the center, margin crenate to fimbriate, fringed hyphae yellow, slightly flexuous; asci many, globose to ovate, eight spored, 27–28x21–25 µm; ascospores brown, conglutate, 1-septate, 18–19x9–11 µm, one cell slightly larger, wall smooth.

Material examined: 01.xii.2003 on leaves of Oreocnide sp. (Urticaceae), Sairandhri, V.B. Hosagoudar et al. HClO 45767, TBGT 1516; HClO 46280, TBGT 1926; HClO 45914, TBGT1676; 14.xii.2003, V.B. Hosagoudar et al. TBGT 1678, HClO 45916; Oreocnide integrifolia (Gaudich) Miq. (Villebrunnea integrifolia Gaudich.) (Urticaceae), 13.xii.2003, V.B. Hosagoudar et al. HClO 45771, TBGT 1520; 11.vi.2007, Jacob Thomas et al. TBGT 5683; Villebrunnia sp., Silent Valley, 26.ii.2009, S.S. Shaji et al. 5586; on leaves of Urticaceae member, Champatty, 14.xii.2003, V.B. Hosagoudar et al. HClO 47729, TBGT 2751.

Asterina oreocnidegena Hosagoudar in Hosagoudar, H. Biju & Appaiah, Mycopathol. Res. 44: 42, 2006 (Fig. 94).

Colonies epiphyllous, thin to subdense, up to 3mm in diameter. Hyphae straight, branching mostly opposite at acute angles, loosely reticulate, cells 19–28x4–7 µm. Appressoria mostly opposite, about 3% alternate to solitary, unicellular, ovate, conoid, broadly rounded at the apex, entire, 9–12x4–7 µm. Thyriothecia scattered to connate, orbicular, up to 180 µm in diameter, stellately dehisced at the centre, margin crenate to fimbriate, fringed hyphae compact; asci globose, octosporous, 30–40 µm in diam.; ascospores conglutate, brown, uniseptate, constricted at the septa, 25–30x14–16 µm, wall smooth.

Material examined: 13.xii.2003 On leaves of Oreocnide integrifolia (Gaud. ex Wedd.) Miq. (Urticaceae), Sairandhri, V.B. Hosagoudar et al. HClO 45771 (holotype), TBGT 1520 (isotype); Silent Valley, Villebrunnia sp. (Urticaceae), 26.ii.2009, S.S. Shaji et al. 5586 p.

Asterina pongalaparensis Hosagoudar, C.K. Biju & Abraham, Indian Phytopath. 54: 138, 2001; Hosagoudar,
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Zoos’ Print J. 21: 2328, 2006 (Fig. 95).

Colonies amphigenous, subdense to dense, up to 4mm in diameter, rarely confluent. Hyphae undulate to crooked, branching alternate to unilateral at acute angles, loosely to closely reticulate, cells 17–23x4–6 µm. Appressoria alternate, unilateral, two celled, straight to variously curved, smooth to variously bulged, entire to lobate, 5–10 µm long; head cells clavate, ovate, cylindrical, hamate, straight to curved, 3–7 times sublobate to lobate, 7–13x11–13 µm. Thyriothecia scattered, orbicular, up to 150µm in diameter, stellately dehisced at the center, margin fringed, fringed hyphae flexuous, exappressoriate; asc globose, octosporous, 22–33 µm in diameter; ascospores oblong, cylindrical, brown, uniseptate, strongly constricted at the septum, 20–25x10–13 µm, wall echinulate.

Material examined: 03.iii.2009 on leaves of Jasminum sp. (Oleaceae), Walakkad, S.S. Shaji et al. TBGT 5560.

Asterina rhodomyrti Hosagoudar, H. Biju & Manoj. in Hosagoudar, Zoos’ Print J. 21: 2335, 2006 (Fig. 96).

Colonies amphigenous, mostly epiphyllous, dense, crustose to velvety, up to 2mm in diameter, rarely confluent. Hyphae straight to substraight, branching irregular at acute angles, loosely to closely reticulate, cells 19–26x4–7 µm. Appressoria alternate, about 2% opposite, closely antorse, subantorse to retrorse, two celled, 12–15 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovate to globose, entire, 8–10x8–9 µm. Thyriothecia scattered, orbicular, up to 275µm in diameter, often 3–5 connate, and often elongated, margin crenate, stellately dehisced or dissolved at the centre; asci few to many, globose, octosporous, up to 60µm in diameter; ascospores oblong, conglobate.
brown, uniseptate, constricted at the septum, 27–30x13–15 µm, wall smooth.

**Material examined:** 02.viii.2008 on leaves of *Rhodomyrtus tormentosa* (Ait.) Hassk. (Myrtaceae), Walakkad, Sispara, Jacob Thomas et al. HCIO 49037, 49038, TBGT 3291, 3292.

*Asterina sarcandrae* Hosagoudar & Kamar. in Hosagoudar, Zoos’ Print J. 21: 2305, 2006 (Fig. 97).

Colonies hypophyllous, very thin, up to 5mm in diameter. Hyphae flexuous, branching irregular at acute to wide angles, form a circularly angular and irregular net, cells 16–21x4–7 µm. Appressoria scattered, alternate to irregular, two celled, antrorse, retrorse, spreading, straight to curved, 12–32 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovate, oblong, mostly curved, hamate, twisted, rarely straight, entire, angular to rarely sublobate, 10–26x6–10 µm. Thyriothecia scattered, orbicular, stellately dehisced at the centre, up to 104µm in diameter, margin crenate; asci few, globose, octosporous, up to 30µm in diameter; ascospores conglobate, uniseptate, strongly constricted at the septa, 20–22x7–9 µm, wall echinulate.

**Material examined:** 13.ii.2007 on leaves of *Sarcandra chloranthoides* Gard. (Chloranthaceae), Silent Valley, M.C. Riju & V. Gireesh Kumar HCIO 51048, TBGT 4965; Sairandhri, 02.iii.2010, Robin et al. TBGT 5598; 13.xii.2003, V.B. Hosagoudar et al. HCIO 46347, TBGT 1993.

*Asterina scleropyri* Hosagoudar & Chandra, Indian J. Sci. & Techn. 2(6):16, 2009 (Fig. 98).

Colonies amphigenous, mostly epiphyllous, dense, up to 2mm in diameter, rarely confluent. Hyphae straight, branching mostly opposite at acute angles, loosely to closely reticulate, cells 15–22x6–9 µm. Appressoria unicellular, opposite (80%) to alternate (20%), ovate, conoid, attenuated and broadly rounded at the tip, entire, 8–18x6–9 µm. Thyriothecia loosely grouped at the center of the colony, orbicular, up to 210µm in diameter, stellately dehisced and the central portion dissolved by exposing inner contents, margin crenate; asci globose, octosporous, up to 30µm in diameter; ascospores oblong, conglobate, brown, uniseptate, constricted at the septum, 26–31x8–13 µm, wall smooth. Pycnothyria
similar to thyriothecia, smaller; pycnothyriospores ovate, pyriform, brown, 8–13x4–7 µm, wall smooth.

Material examined: 01.v.2007 on leaves of *Scleropyrum pentandrum* (Dennst.) Mabb. (Santalaceae), Silent Valley, Rama Subbu HCIO 48240, TBGT 2978.

*Asterina songii* Hosagoudar, Mycosphere 3(5): 753, 2012. *Asterina euryae* Hosag & C.K. Biju, Indian Phytopath. 58: 194, 2005; Hosagoudar, Zoos’ Print J. 21: 2327, 2006 (non Song, 2004) (Fig. 99).

Colonies epiphyllous, dense, crustose, up to 2mm diam.; rarely confluent. Hyphae crooked, branching irregular, often form a loose net, cells 12–21x4–6 µm. Appressoria alternate to unilateral, scattered, ovate, globose, clavate, mostly entire, rarely furcate, 8–13x6–7 µm. Thyriothecia scattered, orbicular, up to 130µm in diameter, stellately dehisced at the centre, margin crenate to fimbriate, fringed hyphae small, flexuous; asci few, octosporous, globose, up to 40µm in diam.; ascospores oblong, conglobate, uniseptate, deeply constricted, brown, 36–39x17–19 µm, wall tubercled.

Material examined: 29.viii.2002, on leaves of *Euryajaponica* Thunb. (Theaceae), Silent Valley, S. Shiburaj HCIO 47588, TBGT 2610.

*Asterina suttonii* Hosagoudar, C. K. Biju & Abraham, J. Mycopathol. Res. 40: 195, 2002; J. Econ. Taxon. Bot. 28: 181, 2004 (Fig. 100).

Colonies epiphyllous, minute, dense, up to 1mm in diameter, rarely confluent. Hyphae straight, branching alternate, opposite to irregular at acute to wide angles, loosely reticulate, cells 12–15x5–6 µm. Appressoria unicellular, alternate, ovate, clavate, cylindrical, entire to rarely angular, 11–13x8–12 µm. Thyriothecia scattered, orbicular, up to 300µm in diameter, stellately dehisced at the center, margin fimbriate, fringed hyphae elongated, crooked; asci ovate to ellipsoidal, octosporous, 60–
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65x28–32 µm; ascospores ellipsoidal, uniseptate, slightly constricted at the septa, taper and broadly rounded at both the apices, 28–32x9–11 µm, wall smooth. Pycnothryria not seen; pycnothryiospores many, mostly pyriform, brown, 12–15x9–11 µm, wall smooth.

Material examined: 01.iii.2009 on leaves of Symplocos sp. (Symplocaceae), Silent Valley, Shaji et al. HCIO 49455, TBGT 3797.

Asterina talacauveriana Hosagoudar, J. Mycopathol. Res. 44: 11, 2006 (Fig. 101).

Colonies hypophyllous, dense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 20–24x3–5 µm. Appressoria opposite, about 2% solitary and subopposite, antorse, subantrorse to rarely retrorse, two celled, 10–16 µm long; stalk cells cylindrical to cuneate, 3–5 µm long; head cells ovate, globose, oblong, shallowly and irregularly lobate, 9–11x6–10 µm. Thyriothecia scattered to connate, orbital, stellately dehisced at the centre, up to 130µm in diameter, margin crenate to fimbriate, fringed hyphae very small; asci globose, octosporous, up to 30µm in diameter; ascospores brown, conglobate, uniseptate, constricted, 19–21x8–10 µm, wall smooth. Pycnothryria mixed with thyriothecia, similar and smaller; pycnothryiospores oval, pyriform, brown, 13–15x11–13 µm.

Material examined: 26.ii.2009 on leaves of Scolopia sp. (Flacourtiaceae), Silent Valley, S.S. Shaji et al. TBGT 5551.

Asterina thotteae Hosagoudar & Hanlin, New Botanist 22: 188, 1995; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 561, 2000; Hosagoudar, Zoos’ Print J. 18: 1281, 2003; Hosagoudar, H. Biju & Appaiah, J. Mycopathol. Res. 44:12, 2006 (Fig. 102).

Colonies epiphyllous, thin to subdense, spreading, up to 3mm in diameter, confluent. Hyphae substraight to rarely crooked, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 31–38x3–4 µm. Appressoria alternate and about 3 % opposite, straight to curved, antorse to recurved, two celled, 9–19 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovoid, globose, entire to sublobate, angular, straight to curved, 6–13x6–10 µm. Thyriothecia scattered, rarely 1–2 connate, circular, up to 155µm in diameter, margin fimbriate, fringed hyphae flexuous to crooked, pale yellow, center carbonaceous black and stellately dehisced at the center; asci many, initially globose, slightly clavate at maturity, octosporous, 30–38x27–31 µm; ascospores conglobate, oblong, deep brown, rounded at both ends,
1-septate, constricted at the septum, 18–20x9–10 µm, wall verrucose.

**Material examined:** 14.ii.2007 on leaves of *Thottea* sp. (Aristolochiaceae), Silent Valley, M.C. Riju et al. TBGT 5506, 5508.

**Asterina toddaliae** Kar & Ghosh, Indian Phytopath. 39: 210, 1986; Hosagoudar & Goos, Mycotaxon 52: 470, 1994; Hosagoudar & Abraham, J. Econ. Taxon. Bot. 4: 581, 2000; Hosagoudar, Zoos’ Print J. 18: 1284, 2003; 21: 2329, 2006 (Fig. 103).

Colonies epiphyllous, thin to subdense, up to 4mm in diam., rarely confluent. Hyphae straight to flexuous. Branching irregular at acute to wide angles, loosely to closely reticulate, cells 19–32x4–6 µm. Appressoria alternate to unilateral, unicellular, antorse, retrorse, straight, flexuous to curved, ovate, oblong, cylindrical, broadly rounded at the tip, 11–18x4–6 µm. Thyriothecia scattered, orbicular, up to 195µm in diam., stellately dehisced at the centre, margin fimbriate, fringed Hyphae small, crooked; asci globose, 8 spored, up to 40µm in diam.; ascospores oblong, brown, uniseptate, constricted at the septum, 27–30x10–12 µm, margin tubercled.

**Material examined:** 04.vii.2008 on leaves of *Toddalia* sp. (Rutaceae), Silent Valley, Jacob Thomas et al. HCIO 49823, TBGT 3975.

**Asterina travancorensis** Syd. & P. Syd., Ann. Mycol. 13: 38, 1915; Hosagoudar & Goos, Mycotaxon 69: 160, 1996 (Fig. 104).

Colonies foliicolous, epiphyllous, often surrounded by yellow haloes, scattered, dense, crustose to velvety, up to 2mm in diameter, rarely confluent. Hyphae straight to flexuous, branching opposite to irregular at acute angles, loosely reticulate, cells 18–25x5–7 µm. Appressoria one to two celled, alternate, about 1% opposite, antorse to spreading, straight to curved, 12–25 µm long; stalk cells cylindrical to cuneate, 3–19 µm long; head cells ovate, globose, entire to sublobate, 6–10x6–13 µm. Thyriothecia scattered to connate up to five numbers, round, up to 110µm in diameter, dehisce stellately at the apex, upper cell radiating, margin crenate; asci globose, octosporous, bitunicate, 27–31 µm in diameter; ascospores conglabate, one septate, upper cell slightly larger, 21–25x9–13 µm, wall smooth.

**Material examined:** 05.viii.2008 on leaves of

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**Image 15. Eupelte emicta**
1 - Infected leaves; 2 & 3 - Thyriothecia; 4 & 6 - Conidiophores and releasing conidium; 5 - Thyriothecium with asci; 7 - Conidia; 8 - Fungal mycelium in epidermal cells

**Figure 106. Prillieuxina jasmini**
a - Thyriothecium; b - Ascus; c - Mycelium; d - Ascospores; e - Pycnothyriospores
Wattakaka sp. (Asclepiadaceae), Silent Valley, P.P. Rajesh
Kumar et al. HCIO 49832, TBGT 3984.

The genus *Echidnodella*

*Echidnodella memecyli* Hosag. & T.K. Abraham, J. Mycol. Res. 102: 185, 1998; Hosagoudar, C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 306, 2001; Hosagoudar, Zoos’ Print.J. 18: 1283, 2003; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 194, 2011 (Fig. 105).

Colonies hypophyllous, subdense, spreading, up to 5mm diameter, widely confluent; Hyphae substraight, flexuous to crooked, branching opposite to irregular at acute to wide angles, cells 24–29x 2.5–3.5 μm. Appressoria absent. Thryrothecia scattered, rarely connate, ovate, elongate, straight, curved, acutely sinuate to variously branched, 530–635x31–36 μm, longitudinally split at the centre, mostly crenate at the margin and rarely fimbriate, fringed hyphae very small. Asci ovate, clavate, globose, 8-spored, 33–36x19–24 μm. Ascospores conglobate, 1-septate, constricted at the septum, lower cell slightly attenuated and upper rounded, 12–14.5x4–6 μm, wall smooth.

Material examined: 13.ii.2007, on leaves of *Memecylon* sp. (Melastomataceae), Silent Valley, S.S. Shaji et al. TBGT 5602.

The genus *Eupelte*

*Eupelte emicta* Syd., Ann. Mycol. 22: 426, 1924; Hosagoudar, Zoos’ Print. J. 21: 2413, 2006; Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 202, 2011. (Image 15)

Colonies epiphyllous, dense, crustose, smooth, up to 10mm in diameter, often causeyellow haloes around the colonies and also yellowing on the corresponding lower surface of the leaves. Hyphae partly superficial and partly immersed, superficial hyphae brown, septate, flexuous, irregularly branched at acute to wide angles, cells 12–35x3–4 μm. External mycelium enters the host through stomata extended up to palisade tissues. Conidiophores arise from the external mycelium, mostly deep brown to rarely dark, 0–1septate, erect, often curved, simple, solitary, smooth, 25–32 μm long; conidiogenous cells terminal, integrated, monoblastic, determinate; conidia brown, 0–3 septate, not constricted, straight to curved, cylindrical, obclavate, broadly rounded at the apex, truncate at the base, wall smooth, 20–48x8–10 μm. Thryrothecia scattered to grouped, initially orbicular, later elliptic to elongated, simple, straight, curved, often X or Y shaped, astomatous, dehisce vertically at the centre, orbicular thryrothecia 100–120x90–100 μm, ellipsoidal thryrothecia 441–700x196–245 μm; asci born on the basal hymenium, clavate, bitunicate, become spherical at maturity, eight spored, 36–40x14–18 μm; ascospores conglobate, oblong, brown, uniseptate, constricted at the sepa, 17–20x9–11 μm, wall smooth but becomes verrucose at maturity.

Material examined: 14.xii.2003 on leaves of *Olea dioica* (Oleaceae), Chempatty, V.B. Hosagoudar et al. HCIO 46291, 46303, TBGT 1937, 1949.

The genus *Prillieuxina*

*Prillieuxina jasmini* (Hosag. & T.K. Abraham) Hosag., Folicolous fungal flora of Peppara and Neyyar Wild life Sanctuaries in Kerala State India, p. 19, 2009.

Asterinella jasmini Hosag. & T.K. Abraham, Indian Phytopath. 50: 220, 1997; Hosagoudar, C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 306, 2001; Singh, Duke, Bhandari & Jain, J. Econ. Taxon. Bot. 30: 74, 2008.

Prillieuxina jasmini (Hosag. & T.K. Abraham) Hosag. in
Hosagoudar, Chandraprabha & Agarwal, Asterinales of Kerala, p. 179, 2011 (Fig. 106).

Colonies hypophyllous, thin to subdense, carbonaceous, confluent and cover most of the leaf portion. Hyphae straight to substraight, branching irregular at acute angles, loosely reticulate, cells 9.5–14.5x2.5–3.5 µm. Appressoria absent. Thyriothecia scattered, round, up to 120µm in diameter, stellately dehisced at the centre or diffused and widely opened, margin fimbriate, fringed hyphae flexuous; asci few, globose to ovate, octosporous, 41–46x29–34 urn; ascospores conglobate, brown, 1-septate, constricted at the septum, 20–22x9–10 µm, upper cell globose, lower cell ovate, wall smooth. Pycnothyria numerous, scattered to rarely connate, orbicular, up to 75µm in diameter, stellately dehisced or widely opened at the centre, margin fimbriate, fringed hyphae flexuous; Pycnothyriospores brown, clavate, apiculate, 17–20x12–15 µm.

Material examined: 02.iii.2009 on leaves of Jasminum sp. (Oleaceae), Silent Valley National Park, Kerala, Rajesh Kumar et al. HCIO 49827, TBGT 3979

Figure 107. Balladyna salaciae
a - Appressoriate mycelium; b - Apical portion of the mycelial setae; c - Perithecium; d - Ascospores; e - Ascus

Image 17. Balladyna salaciae
1 - Infected leaves; 2 - Mycelial colony with perithecia; 3 - Appressoriate branched mycelium; 4 - Mycelial setae; 5 - Stalked perithecium; 6 & 9 - Asci; 10 & 11 - Brown uniseptate ascospores.

Figure 108. Dysrhynchis uncinata
a - Mycelium; b - Apical portion of the mycelial setae; c - Perithecium; d - Ascus; e - Ascospores; f - Mycelium
The genus *Balladyna*

This black mildew fungus is characterized by brown, superficial, appressoriate, setose mycelium, globose perithecium, bitunicate asci with uniseptate brown ascospores.

*Balladyna indica* Hosag., J. Threatened Taxa 1(7): 375, 2009. (Image 16)

Colonies hypophyllous, thin to subdense, spreading, up to 10 mm in diam., confluent. Hyphae straight to substraight, branching alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 19–36x6–8 µm. Appressoria scattered, alternate to unilateral, concolourous, ovate, oblong, cylindrical, entire, straight, curved to uncinate, 11–20x6–8 µm. Mycelial setae dark, simple, straight, acute to obtuse at the tip, up to 144µm long. Perithecia scattered, globose, initially stipitate, later sessile, up to 100µm in diameter. Ascii not seen, Ascospores oblong, conglobate, dark brown, uniseptate, strongly constricted at the septum, 30–32x15–17 µm, wall smooth.

Material examined: 13.xii.2003 on leaves of Rubiaceae member, Sairandhri, Silent Valley, Palghat, Kerala, India, V.B. Hosagoudar et al. HCIO 46695 (type), TBGT 2036 (isotype); HCIO 46696, 46778, TBGT 2037, 2119; Hyper parasitized by *Spiropes effusus* (Pat.) M.B. Ellis.

*Balladyna salaciae* Hosag., Jacob Thomas, Shaji and Rajeshkumar, Indian J. Sci. & Technol. 2(6): 9, 2009 (Fig. 107, Image 17).

Colonies hypophyllous, dense, crustose, up to 4 mm in diam., confluent and cover almost lower surface of the leaves. Hyphae substraight to undulate, branching irregular at acute to wide angles, closely reticulate to form a mycelial net, cells 19–36x6–7 µm. Appressoria numerous, alternate to unilateral, unicellular, antrose to retrose, straight to curved, entire to slightly angular, clavate, straight to variously curved, 12–19x7–10 µm. Mycelial setae numerous, scattered, simple, straight, flexuous, acute to obtuse at the tip, up to 140µm long. Perithecia scattered, fairly numerous, initially stipitate, later become subsessile, ovate, globose, ostiolate, 100–150x60–80 µm; ascii few, globose to ovate, interspersed with hyaline paraphyses, 4–6 spored, bitunicate, 60µm in diam., wall thick; ascospores conglobate, oblong, brown, uniseptate, strongly constricted at the septum, 28–36x14–17 µm, wall smooth.
Materials examined: 17.vi.2007 on the leaves of *Salacia oblonga* Wallich ex Wight & Arn. (Hippochrataceae), Silent Valley National Park, Palghat, Kerala, India, Jacob Thomas et al. HClO 48257 (type), TBGT 2996 (isotype); *Salacia* sp., Kattivaramudi, Silent Valley, Palghat, Kerala, 29.vii.2008, Jacob et al. HClO 50369, TBGT 4286; Poopchipara, Silent Valley, Palghat, 4.viii.2008, M.C. Riju et al. TBGT 5233.

The genus *Dysrhynchis*

This genus differs from *Balladyna* in absence of appressoria.

*Dysrhynchis uncinata* (Syd.) Arx in Müller & Arx, Beitr. Kryptogamenflora der Schweiz 2: 191, 1962; Hosagoudar, Persoonia 18: 125, 2002. (Fig. 108, Image 18).

*Ballydyna uncinata* Syd., Ann. Mycol. 12: 546, 1914.

*Meliolinella uncinata* (Syd.) Hansf., Sydowia 9: 85, 1955.

*Kusanobotrys bambusae* Hino & Katumoto, Bull. Yamaguti Univ. 5: 218, 1954

*Neoballadyna butleri* Boedijn, Persoonia 1: 398, 1961.

Colonies hypophyllous, dense, run parallel along the veins, up to 5mm long and 2mm broad, confluent and cover larger leaf area. Hyphae straight to crooked, branching irregular at acute angles, loosely to closely reticulate, cells 14–29x2–5 μm. Appressoria absent. Mycelial setae numerous, simple, straight, flexuous, uncinate, subacute to obtuse, up to 120μm long. Perithecia slightly stipitate, globose, ovate, ostriolate, 33–38 μm in diameter; asci visible in mature perithecia, 1–2 in numbers, ovate to globose, octosporous, 28–36 μm in diameter; ascospores conglobate, oblong, brown, uniseptate, constricted at the septum, broadly rounded at both ends, 24–29x7–10 μm, wall smooth in young.

Materials examined: 30.iii.2009 on the leaves of *Ochlandra rheedi* (Kunth) Benth. ex Gamble (Gramineae), Neelikal, Silent Valley, M.C. Riju & Gireesh Kumar HClO 51027, TBGT 4944.

The genus *Meliolina*

This is a black mildew, infect predominantly Myrtaceae plants, produces thick, spongy colonies on the lower surface of the leaves.

*Meliolina pulcherrima* (H. Sydow & P. Sydow) H. Sydow & P. Sydow, Ann. Mycol. 12: 553, 1914. (Image 19)

Colonies hypophyllous, black, thick, 3–5 mm in diam., a pinkish or discoloration occurs below the colonies and is sometimes also evident on the upper surface. Superficial hyphae form a cushion of closely interwoven, irregularly branched, brown to dark brown hyphae, septate, 32–43 μm long and 7–10 μm wide. Phialophores arising as branches of the compact superficial hyphae, densely crowded, up to 128μm long, flexuous, simple, or 1 or 2 dichotomously or irregularly branched clearly differentiated in to stalk and branches, 5–7 μm wide, brown towards the base, narrowing slightly.
to 3μm wide and brown to pale brown towards the ends of the branches which bear a single phialides. Phialides are straight to curved, funnel shaped, 30–37x3–6 μm. Phialoconidia scanty and minute. Perthecia Scattered, globose, 500–550 μm in diam. Paraphyses persistent, more or less cylindrical, septate, often in pairs on a short basal cell, 3–5 μm wide towards the base, tapering to 2–3 μm at the rounded apex. Asci are obovoid and eight spored, 45μm long; ascospores are ellipsoidal, brown, 3-septate, scarcely constricted at the septa, 20–36x7–11 μm. Polar caps are hyaline.

Material examined: 06.iv.1984 on leaves of *Syzygium cumini* (L.) Skeels (Myrtaceae), Kunthipuzha river side, A. Diraviadoss DAOM 212013; *Syzygium* sp., Silent Valley National Park, 23.vii.2009, Jayakumar et al. HCIO 50045, TBGT 4197.

The genus *Sarcinella*

This is the form genus of the genus Schiffnerula, producing sarciniform, dark conidia.

*Sarcinella allophyli* Hosag., J. Mycopathol. Res. 44: 20, 2006; Hosagoudar & Riju, Indian J. Sci. & Techn. 2(6): 7, 2009; Hosagoudar, Plant Pathology & Quarantine 1(2): 144, 2011 (Fig. 109).

Colonies amphigenous, mostly hypophyllous, dense, spreading, up to 3mm in diameter. Hyphae straight to flexuous, pale brown, branching irregular at acute to wide angles, loosely reticulate, cells 17–24x3–5 μm. Appressoria scattered, alternate, unilateral, rarely opposite, ovate to mostly globose, entire, 7–9x6–11 μm. Conidiophores produced lateral to the hyphae, simple, branched, straight to flexuous, micronematos to semi-macronematos, 9–32x4–6 μm. Conidiogenous cells terminal, intercalary, monoblastic, integrated, determinate, cylindrical. Sarciniform conidia solitary, dry, simple, subspherical to oval, 2–10 celled, brown to charcoal black, muriform, constricted at the septa, 24–32 μm in diameter; wall smooth.

Materials examined: 13.xii.2003, on leaves of *Allophyllus cobbe* (L.) Raeusch. (Sapindaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 47344, TBGT 2382.

*Sarcinella loranthacearum* Hosag., Jacob- Thomas & D.K. Agarwal, J. Yeast & Fungal Res. 2:85, 2011; Hosagoudar, Plant Pathology & Quarantine 1(2): 157, 2011 (Fig. 110).

Colonies epiphyllous, dense, up to 2mm in diameter, confluent. Hyphae brown, straight to substraight, branching alternate to opposite at acute to wide angles, closely reticulate, cells 16–28x4–7 μm. Appressoria alternate, unicellular, ovate to globose, entire, 9–12x7–
10 μm. Conidiophores micronematous, mononematous, simple, straight, light brown, arise laterally from the hyphae, smooth, 9–14x7–10 μm; conidiogenous cells integrated, mostly terminal, monoblastic, determinate, cylindrical; conidia simple, solitary, dry, acrogenous, globose, smooth, brown to carbonaceous black, constricted, 5–8 celled, sarcinate, 24–29 μm in diameter. Questieriella conidia present, straight to slightly falcate, 3-septate, mostly scattered in the colonies, 20–25x4–6 μm.

Materials examined: 13.xii.2003, on leaves of Aristolochia sp., Aristolochiaceae) Silent Valley, Kerala, V.B. Hosagoudar, HCIO 49475, TBGT 3729.

Schiffnerula camelliae (Syd., P. Syd. & Butler) Hughes, Pleomorphic Fungi. The Diversity and its Taxonomic Implications, p. 133, 1987; Hosagoudar, J. Mycopath. Res. 37: 27, 1999; Plant Pathology & Quarantine 1(2): 173, 2011.

Asterina camelliae Syd., P. Syd. & Butler, Ann. Mycol. 9: 389, 1911.

Clypeolella camelliae (Sydow, Sydow & Butler) Hansf., Reinwardtia 3: 127, 1954 (Fig. 112).

Colonies epiphyllous, rarely amphigenous, caulicolous, dense, velvety, crustose, up to 5mm in width, loosely reticulate, cells 16–20x5–8 μm. Appressoria unilateral, alternate to rarely opposite, ovate, globose, mamiform, broad based, entire, 10–15x7–10 μm. Conidiophores of Questieriella produced lateral to the hyphae, simple, straight, micronematous, mononematous, 0–2 septate, 20–25x4–6 μm; conidiogenous cells terminal, monoblastic, integrated, solitary, ellipsoidal; conidia straight to curved, pale brown, 3-septate, mostly scattered in the colonies, 20–25x4–6 μm.

Materials examined: 12.vii.2008 on leaves of Loranthus sp. (Loranthaceae), Silent Valley National Park, Jacob Thomas et al. HCIO 49041 (holotype), TBGT 3296 (isotype); Onnampuzha, Walakkad, 2.viii.2008, Jacob Thomas et al. HCIO 49041, TBGT 3296.

The genus Schiffnerula

Schiffnerula aristolochiae Hosag., Jagath Thimmaiah & Jayashankara, Journal of Threatened Taxa 3(12): 2269, 2011. Stat.: Questieriella (Image 20).

Colonies epiphyllous, subdense to dense, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching alternate to opposite at acute to wide angles, loosely reticulate, cells 16–20x5–8 μm. Appressoria unilateral, alternate to rarely opposite, ovate, globose, mamiform, broad based, entire, 10–15x7–10 μm. Conidiophores of Questieriella produced lateral to the hyphae, simple, straight, micronematous, mononematous, 0–2 septate, 20–25x4–6 μm; conidiogenous cells terminal, monoblastic, integrated, solitary, ellipsoidal; conidia straight to curved, pale brown, 3-septate, mostly scattered in the colonies, 20–25x4–6 μm.

Materials examined: 13.xii.2003, on leaves of Aristolochia sp., Aristolochiaceae) Silent Valley, Kerala, V.B. Hosagoudar, HCIO 49475, TBGT 3717.
diameter, confluent. Hyphae straight to substraight, outer surface tubercled to crenulated, branching alternate, opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 32–40x7–9 μm. Appressoria scattered, alternate, unilateral, globose, oval, broad based, unicellular, entire, crenulated to rarely sublobate, 12–18x14–16 μm. Questieriella type of conidia were few, fusiform, curved, 3-septate, central cells darker, distal cells paler, attenuated towards the tip and acute to obtusely rounded at the apices, 80–90x9–10 μm. Thyriothecia scattered to coninate, dimidiate, orbicular, up to 150μm in diameter, spreading marginally, dehisce stellately and dissolve at the centre; asci many, cylindrical, octosporous, 100–120x30–35 μm, sessile; ascospores biseriate, 1–septate, brownish, upper cell smaller and globose, lower cell oval and slightly attenuated, 30–37x15–17 μm, wall smooth.

Materials examined: 03.iii.2009, on leaves of *Thea sinensis* (Theaceae) Silent Vally, Shaji et al. HCIO 49549, TBGT 3791; 05.iii.2008, M.C. Riju et al. TBGT 5237. Palghat, Silent Valley National Park, 3.iii.2009, Shaji et al. HCIO 49549, TBGT 3791; Palghat, Silent Valley, Valakkad, 5.viii.2008, M.C. Riju et al. TBGT 5237.

**Schiffnerula lagerstroemiae** Hosag., Archana, Harish, Riju & D.K. Agarwal, Indian Phytopath. 61: 249, 2008.  
**Schiffnerula lagerstroemiae** Hosag. & Riju in Hosagoudar, Plant Pathology & Quarantine 1(2): 186, 2011.  
**Sarcinella lagerstroemiae** Hosag. & Mohanan, New Botanist 22: 31, 1995 (Fig. 113).  
Colonies epiphyllous, dense, confluent, up to 2mm in diameter. Hyphae substaight to undulating, branching opposite to alternate at acute to wide angles, loosely to closely reticulate, cells 11–26x4–7 μm. Appressoria alternate, unilateral, globose, mammiform, entire, 6–9x8–11 μm. Conidia of Questieriella type were few, scattered, attached directly to the hyphae, curved, 3-septate, slightly constricted at the septa, taper towards both ends, 28–37x8–11 μm. Sarcinella conidiophores produced lateral to the hyphae, single, straight, flexuous, macronematous, mononematous, 0–3 septate, 20–31x4–6 μm; conidiogenous cells terminal, monoblastic, integrated, cylindrical. Sarcinella conidia blastic, terminal, mostly sessile, solitary, dry, ovate to globose, sarciniform, 2–8 celled, constricted at the septa, 17–40 μm in diameter, wall smooth. Thyriothecia scattered, globose, orbicular, peridial cells initially radiating, later central portion dissolved by exposing the asci, up to 66μm in diameter, marginal cells radiating; asci 1–2 per thyriothecia, globose, 4–6 spored bitunicate, 17–26 μm in diameter; ascospores cylindrical, oblong, uniseptate, constricted at the septum, 17–22x6–9 μm, remain hyaline for some time but turn brown at maturity.

Materials examined: Silent Valley, on leaves of *Lagerstroemia microcarpa* Wight (Lytheraceae), 5.viii.2008, P.P. Rajesh Kumar et al. HCIO 49831, TBGT 3983.

**Schiffnerula vernoniae** Hosag., Sabeena & Riju, Indian Phytopath. 63: 3231, 2010; Hosagoudar, Plant Pathology & Quarantine 1(2): 198, 2011.  
**Sacinella vernoniae** (Dearn. & Barth.) Hughes, Can. J. Bot. 61: 1748, 1983. Hosagoudar, C.K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 281, 2001.  
**Stigmella vernoniae** Dearn. & Barth., Mycolgia 21: 330, 1929.  
**Piricauda vernoniae** (Dearn. & Barth.) Moore, Rhodora 61:106, 1959 (Fig. 114). Stat.: *Sarcinella*.  
Colonies epiphyllous, thin, up to 2mm in diameter, confluent. Hyphae substaight to undulating, branching alternate, unilateral to opposite at acute to wide angles, loosely reticulate, cells 7–38x5–7 μm. Appressoria scattered, alternate, unilateral, opposite to subopposite, globose, mammiform, entire, 7–13x7–12 μm. Conidia of Questieriella scattered, 3-septate, straight, slightly constricted at the septa, taper towards both ends, 30–35x10–13 μm. Sarcinella conidiophores produced lateral to the hyphae, single, straight, flexuous, micronematous, mononematous, 8–14x5–7, conidiogenous cells...
terminal, monoblastic, integrated, cylindrical. Sarcinella conidia blastic, terminal, mostly sessile, solitary, dry, ovate to globose, sarciniform, 2–7 celled, constricted at the septa, 30–38 μm in diameter, wall smooth.

Materials examined: 13.xii.2003 on leaves of Vernonia sp. (Asteraceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45766, TBGT 1515; HCIO 45818, TBGT 1568.

The genus Aphanopeltis

This is an interesting thyriotheceous genus, known on this host genus. Though we could locate this from different regions of Western Ghats, details are awaited.

* Aphanopeltis lasianthi* Hansf., Reinwardtia 3: 121, 1954.

Colonies hypophyllous, dense to subdense, up to 5mm in diameter, often confluent. Hyphae without appressoria, straight to substraight, branching opposite to irregular at acute angles, closely reticulate, cells 15–27x4–6 μm. Thyriothecia roughly orbicular, often ovate, up to 120μm in diam., central portion dissolved; asci ovate to slightly cylindrical, 20–30x10–14 μm; ascospores hyaline, oblong, 1-septate, constricted at the septum, 9–12x4–6 μm.

Material examined: 13.xii.2003 on leaves of Lasianthus sp., (Rubiaceae), Sairandhri, Silent Valley, Palghat, V.B. Hosagoudar & al HCIO 47362, TBGT 2400.

The genus Palawaniella

This genus possessing aggregated thyriothecia, lacks profuse external mycelium.

* Palawaniella jasmini* (Doidge) Arx & Müller, Studies in Mycology 9: 37, 1975.

* Ferrarisia jasmini* Doidge, Bothalia 4(2): 278, 1942.

Cyclopeltis jasmini (Doidge) Bat., Nascim. & A.F. Vital, Publicações do Instituto de Micologia da Universidade do Recife 1:367, 1960 (Fig. 115).

Colonies hypophyllous, dense, up to 8mm in diameter, confluent. Hyphae absent. Thyriothecia closely scattered, scattered to connate, more or less orbicular, up to 250μm in diameter, stellately dehisced at the centre, margin crenate to fimbriate; asci octosporous, mostly globose, up to 30μm in diameter; ascospores, conglobate, 1-septate, constricted at the septa, 15–20x7–10 μm, wall smooth.

Material examined: 22.ii.2009 on leaves of Jasminum sp. (Oleaceae), Punnamala, Silent Valley National Park, Palghat, Kerala, S.S. Shaji et al. TBGT 5735.

The genus Leptosphaerulina

This is the genus which produces superficial, closely scattered perithecia, causes rolling of the infected leaves marginally or in totality. Infected plants can be noticed even from a distance (Image 21).

* Leptosphaerulina australis* McAlp., Fung. Dis. 103, 1902; Barr, Preliminary studies on the Dothideales in the Temperate North America, p. 541, 1972. Infection epiphyllous. Ascomata superficial, firmly placed on the host epidermis, globose, 40–70μm in diameter; asci few to many, clavate, octosporous, 50–90x30–45 μm, persistent; ascospores hyaline, transversely septate on the host but deep brown with 1–3-septate vertical septa in the middle cells when grown in culture, 25–40x10–15 μm.

Materials examined: 15.xii.2003, on leaves of Crotalaria sp. (Papilionaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46014, TBGT 1778; Chempatty, 14.xii.2003, V.B. Hosagoudar et al. HCIO 46122, TBGT 1885

TAR SPOT FUNGI

The name itself indicates that these are the fungi emit the symptom that as if tar has been sprinkled on the leaves. These dark coloured spots are nothing but stromata. The fungi of this type represent two genera: Phyllichora and Rehmidothis.

The genus Phyllichora

* Phyllichora symploci* Pat. in Sacc., Syll. Fung. 11:
Foliicolous fungi of Silent Valley

Hosagoudar & Riju

371, 1895.

*Phyllachora ectophytica* Tilak, Sydowia 12: 186, 1958.

Stromata mostly epiphyllous, circularly placed, black, raised, shining, up to 1mm in diameter, rarely confluent. Perithecia innate, oval to bowl shaped, 500–700 μm in diameter; asci numerous, paraphysate, borne from the basal hymenium, stipitate, octosporous, 80–90x12–15 μm; ascospores hyaline, oblong, mostly uniseriate, 18–20x7–9 μm.

Materials examined: 13.xii.2003 on leaves of *Symplocos* sp. (Symplocaceae), Sairandhri, V.B. Hosagoudar HCIO 46178, TBGT 1590.

*Phyllachora symplocicola* Sheshadri, Sydowia 19: 129, 1965.

Stromata amphigenous, scattered, black, raised, up to 2mm in diameter, surrounded by yellow haloes. Perithecia innate, 1–3 per stroma, oval to globose, ostiolate, 150–200 μm in diameter; asci numerous, cylindrical, stipitate, paraphysate, 60–80x10–12 μm; ascospores hyaline, uniseriate, often irregular, ellipsoidal, 18–22x7–9 μm.

Materials examined: 14.ii.2007 on leaves of *Symplocos* sp. (Symplocaceae), Poochipara, M.C. Riju et al. TBGT 5013; 7.iii.2010, P.J. Robin et al. TBGT 5169; 3.iii.2010, P.J. Robin et al. TBGT 5171, 5173.

The genus *Rehmidothis*

*Rehmidothis osbeckiae* (Berk. & Broome) Theiss. & Sydow, Ann. Mycol. 12: 192, 1914. *Trabutia osbeckiae* Ramkr. & Sundaram, Proc. Indian Acad. Sci. 40: 19, 1954.

Stromata amphiphyllyous, caulicolous, mostly epiphyllous, black, raised, shining, scattered to often coalesced, up to 2mm diam. Perithecia 1–3 per stroma, oval, 150–220x100–160 μm, ostiolate; asci clavate to cylindrical, unitunicate, flattened at the base, octosporous, 25–52x12–16 μm at the basal portion and 14–22 μm broad at the apical portion, persistent; ascospores uniseriate, biseriate to irregular at maturity, ovoid, hyaline, uniseptate at the basal part, slightly constricted at the septum and give the spore proper pinch-off appearance, 12–18x5–7 μm.

Materials examined: 13.xii.2003 on leaves of *Osbeckia* sp. (Melastomataceae), Sairandhri, V.B. Hosagoudar et al. HCIO 47488, TBGT 2526.

**RUST FUNGI**

These are the highly specialized obligate biotrophic fungi produce five morphologically and cytologically distinct spore producing structures. These produce pustules, which are similar rust produced on metals. Hence, the name.

The genus *Endophyllum*

*Endophyllum kaernbachii* Stev. & Mendiola, Philippine Agriculturist 20: 7–8, 1931; Hirutsuka et al., The Rust Flora of Japan, p. 1021, 1992.

*Aecidium kaernbachii* Henn., 1892; Sydow & Butler, Ann. Mycol. 10: 273, 1912.

Spermogonia amphigenous, orange yellow to brown. Telia hypophyllous, rarely amphigenous, yellowish brown, peridiate, resemble Aecidium. Teliospores globose to broadly ellipsoidal, often angular, 15–19x13–17 μm, wall pale yellow, verrucose; peridial cells ellipsoidal, 20–28x14–18 μm, wall verrucose, up to 3μm thick, striated, 5–8 μm thick at the apex.

Materials examined: 14.xii.2003, on leaves of *Merremia* sp., (Convulvulaceae), Silent Valley, Palghat, V.B. Hosagoudar et al. HCIO 47484, TBGT 2522.

The genus *Phakopsora*

*Phakopsora apoda* (Har. & Pat.) Mains, Mycologia 30: 45, 1938.

Uredinia amphigenous, golden brown, erumpent, often form streaks, periphysate. Uredinospores oval to slightly obovoidal, golden brown, 24–31x16–20 μm, periphyses incurved, pale brown to deep brown, sickle shaped, apically thickened, up to 50μm long. Telia mixed with uredinia, blackish brown, covered by the epidermis, split open by rupture; teliospores ellipsoidal to oval, unicellular, pale yellow to deep yellow, unicellular, in 2–3 rows in irregular fashion, teliospores 15–26x12–18 μm, wall 2–3 μm thick.

Materials examined: 12.xii.2003 on leaves of *Pennisetum polystachyon* (Gramineae), Sairandhri, V.B. Hosagoudar et al. HCIO 47349, TBGT 2387.

The genus *Puccinia*

*Puccinia solmsii* P.Henn., Syll. Fung. 14: 357, 1899; Sydow & Sydow, Monogr. Ured. 1: 568, 1904; Sydow & Butler, Ann. Mycol. 4: 496, 1907; Thirumalachar, Mycologia 37: 307, 1945; Hosagoudar, J. Econ. Taxon. Bot. 12: 270, 1988.
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Telia hypophyllous, deep yellow to brownish black, teliospores golden brown, oblong, uniseptate, 34–55x14–22 µm, rounded at the apex, uniformly thick, 2–3 µm thick, pedicels hyaline, up to 144µm long.

Materials examined: 12.xii.2003 on leaves of Polygonum chinense (Polygonaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 47352 TBGT 2390; Silent valley, 12.xii.2003, V.B. Hosagoudar et al. HCIO 47485 TBGT 2523.

The genus Didymopsorella

Didymopsorella toddaliae (Petch.) Thirum., Sci. & Cult. 16: 210, 1950; Hosagoudar, J. Econ. Taxon. Bot. 12: 266, 1988. Gymnopuccinia pulneyensis Ramkr. T.S., Trans. Brit. Mycol. Soc. 34:141, 1951; Hosagoudar, Indian Phytopath. 38: 278, 1985.

Spermogonia amphigenous, yellow, lenticular, intraepidermal. Aecia uredinoid, aceiospores like urediniospores. Uredinia hypophyllous, urediniospores obovoid, 29–64x29–35 µm, wall yellow, echinulate, pores 4–5, scattered. Telia hypophyllous, caulicolous, teliospores extruded in short columns, brown, two celled, 48–74x22–35 µm, apex rounded to conical, wall yellow, 1–2 µm thick, pedicels short, gelatinising; paraphyses or sterile cells present.

Materials examined: 12.xii.2003 on leaves of Toddalia sp.(Rutaceae), Sairandhri, Silent Valley, V.B. Hosagoudar et al. HCIO 47353, TBGT 2391

Fungi imperfecti

Hyphomycetes
The Genus Spiropes
The Genus Acremoniula

![Figure 116. Acremoniula sarcinellae](image)

Acremoniula sarcinellae (Pat. & Har.) Arn. ex Deight., Mycol. Pap. 118: 3, 1969; Hosagoudar, Biju, C.K. and Abraham, J. Econ.Taxon. Bot. 25: 283, 2001; Hosagoudar, Zoos’ Print J. 21: 2322, 2006.

Acremoniula sarcinellae (Pat. & Har.) Arnaud, Bull. Trimest. Soc. Mycol. France 69: 268. 1954.

Dicoccum pulchrum Thumen, Revu Mycol. 1: 11. 1879.

Domingoella pycnopeltarum Batista, Anais IV congr. Bot. Brasil: 77. 1953 (Fig. 116).

Hyphae hyaline, branched, septate, up to 3µm wide. Conidiophores arise one to many from the single hyphal cells, micronematous, mononematous, mostly straight, hyaline, aseptate, 3–9x3v5 µm; Conidiogenous cells monoblastic, integrated, terminal, determinate, cylindrical; conidia solitary, dry, unicellular, brown to deep black, globose, oval to pyriform, 10–14 µm in diameter, wall smooth, a portion of hyaline conidiophore often attached with the base.

Materials examined: 13.xii.2003, on colonies of Sarcinella vernoniae (Dearn. & Barth.) Hughes, Vernonia sp. (Asteraceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45766, TBGT 1515.

The genus Acrodictys

Acrodictys balladynae (Hansf.) M.B. Ellis, Dematiaceous Hyphomycetes, p. 129, 1971; Hosagoudar, Zoos’ Print J. 18: 1039, 2003.

Acrosperia balladynae Hansf., Proc. Linn. Soc. London 157: 40, 1945 (Fig. 117).

Colonies amphigenous, mostly hypophyllous, dense, crustose to velvety, up to 5mm in diameter. Hyphae superficial, pale, branched, septate, 1–3µm broad. Conidiophores macronematous, mononematous, simple, cinnamon brown, erect, straight, smooth, rarely septate, slightly tapering towards apex, 28–38µm long; 3–5µm broad at the base; 1–3 µm broad at the tip. Conidia solitary, dry, terminal, obpyriform, clavate, broadly triangular, brown to black, upper stratum with 2–3 cells, second stratum with two cells and the lowest basal cell pale, 16–20µm long; 13–16µm broad at the upper portion, 8–12µm broad at the second cell layer and up to 3µm broad at the basal cell.
Materials examined: 13.ii.2007 on the colonies of *Echidnodella memecyli* Hosag. & Abraham on *Memecylon* sp. (Memecylaceae), Silent Valley, S.S. Shaji et al. TBGT 5602.

The genus *Diplococcium*

*Diplococcium atrovelutinum* Braun & Hosag. in Braun, Hosagoudar and Abraham, J. Econ. Taxon. Bot. 25: 284, 2001 (Fig. 118, Image 22).

Colonies confined to spikelets, mostly dense, velvety, blackish, effuse. Mycelium immersed, occasionally partly external, superficial. Hyphae septate, branched, pigmented, smooth. Conidiophores loosely to densely caespitose, arising from internal hyphae, hyphal aggregations or occasionally from creeping, superficial hyphae erect, flexuous, filiform, frequently branched, 200-500µm long and (3-) 4–7 (-10) µm wide, medium to dark medium brown, apex pale brown to almost subhyaline, smooth, wall somewhat thickened, tips some times slightly swollen. Conidiogenous cells integrated, terminal or intercalary, polytretic, (1-) 2 loci per cell, 1.5–2 µm wide. Conidia solitary or in short chains, ellipsoid ovoid, subcylindric, fusiform, 8–23x4–7 µm, 0 (-1) – septate, smooth, subhyaline, pale olivaceous to yellowish brown, thin-walled.

Materials examined: 15.xii.2003 on leaves of *Scleria* sp. (Cyperaceae), Near IB, Sairandhri, V.B. Hosagoudar et al. HCIO 46310, TBGT 1956.

The genus *Teratosperma*

*Teratosperma anacardii* Hansf., Proc. Linn. Soc. London 1942-43: 54, 1943; Hosagoudar & Agarwal, Indian Phytopath. 56 (1): 100, 2003.
Podoconis anacardii (Hansf.) Hughes, Mycol. Pap. 48: 65, 1952 (Fig. 119).

Colonies epiphyllous, thin to dense, up to 1mm in diameter, rarely confluent. Hyphae mostly straight, pale brown, branching irregular at acute to wide angles, loosely reticulate, cells 1–3 μm broad. Conidiophores borne on foot cells. Foot cells sessile to stipitate, borne laterally to the hyphae, enlarged apically with irregularly produced spinules, 7–10x4–9 μm. Conidiophores produced on the foot cells, macronematous, mononematous, erect, dark brown, septate, simple, straight, smooth, 50–73x2–4 μm. Conidiogenous cells pale brown, monoblastic, integrated, terminal, percurrent, annellated. Conidia solitary, dry, acrogenous, obclavate, rostrate at the apex, truncate at the base, pale brown, uniseptate, rostrate above the septum, ovate below the septum, slightly hinged at the base, 24–29 μm long, 6–8 μm broad at the broadest portion, up to 3μm broad at the base, beak 8–16 μm long and up to 1.5μm broad at the tip.

Materials examined: 14.xii.2003 on leaves of Myristica beddomei King. (Myristicaceae), Champatty, Silent Valley, Kerala, V.B. Hosagoudar et al. HCIO 45769, TBGT 1518.

The genus Spiropes

Spiropes armatellicola Hosag. & D.K. Agarwal, J: Econ. Taxon. Bot. 26: 603, 2002 (Fig. 120).

Colonies amphigenous, dense, velvety, up to 3mm in diameter, confluent. Hyphae superficial, pale brown, branched, surrounded around appressoria and mycelium of the host, 1–2 μm broad. Conidiophores solitary, simple, mononematous, erect, straight to flexuous, paler towards the apex, conidial scars scattered, 60–112 x 4–7 μm. Conidiogenous cells polyblastic, integrated, terminal and intercalary, conspicuous. Conidia straight to slightly curved, obclavate, rostrate at the apex, truncate at the base, pale brown, uniseptate, rostrate above the septum, ovate below the septum, slightly hinged at the base, 24–29 μm long, 6–8 μm broad at the broadest portion, up to 3μm broad at the base, beak 8–16 μm long and up to 1.5μm broad at the tip.

Materials examined: 12.xii.2003 on the colonies of Armatella cryptocaryae Hosag. on leaves of Litsea sp. (Lauraceae), Sairandhri, Silent Valley, V.B. Hosagoudar et al. HCIO 46327, TBGT 1973.

Spiropes japonicus (P. Henn.) M.B. Ellis, Mycol. Pap. 114: 22, 1968; Dematiaceous Hyphomycetes p. 256, 1971; Katamoto, Trans. Mycol. Soc. Japan 24: 251, 1983; Hosag., Abraham, and Biju, C.K. New Botanist 23: 213, 1996 (Fig. 121).

Colonies amphigenous, dense, velvety, up to 3mm in diam., confluent. Conidiophores synnematous, compact, erect, cylindrical, 245–520x19–30 μm; conidiophores spread out in the apical and upper half of the synnema, brown to dark brown, paler towards the apex, septate, smooth, 3v4 μm wide; Conidiogenous cells polyblastic, terminal and intercalary, sympodial cylindrical cicatrized, scars numerous and conspicuous; conidia solitary, dry, acroleurogenous, simple, fusiform to obclavate, pale
brown to brown, 3–6 pseudoseptate, 40–70 μm long, 8-9μm wide at the broadest portion, 2–4 μm wide at the apex and 3–5 μm broad at the base, wall smooth.

**Materials examined:** 12.xii.2003 on Meliolaceous fungi on *Mallotus* sp., (Euphorbiaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 46317, TBGT 1675.

**SPHAEROPSIDAE (Anamorphs of Asterina)**

**The genus Asterostomella**

*Asterostomella daphniphylli* Hosag. & Ravikumar in Hosag. & Goos, Mycotaxon 52: 471,1994; Hosag., Chandraprabha & Agarwal, Asterinales of Kerala, p. 229, 2011 (Fig. 123).

Colonies amphigenous, mostly epiphyllous, crustose to velvety, up to 2mm in diameter, confluent and covering the entire upper surface of the leaves. Hyphae straight, flexuous, often crooked when solitary, branching alternate to irregular at acute angles, several hyphae running closely parallel and forming a compact mycelial mat, cells 9–15.5x4.5–7.5 μm. Appressoria alternate and produced only on the outer surface of the compact hyphae, mostly straight but rarely curved, unicellular ovate to globose, entire, 6–12.5x6–9.5 μm. Pycnothyria numerous, loosely crowded, circular in outline, often ovate, 130–190 μm in diameter, covering membrane initially brown, later becoming dark and opaque, splitting stellately at the center or having a wide opening. Pycnothyriospores oval, ellipsoidal, pyriform,
straight to slightly curved, pale brown to deep brown, often with a hyaline band at the center, 18–28x9–12.5 µm.

Material examined: 02.viii.2008 on leaves of Daphniphyllum neilgherrense (Wight) K.Rosenthal (Daphniphyllaceae), Cheriyal Walakkad, Jacob Thomas et al. HCIO 49232, TBGT 3471.

Asterostomella scolopiae-crenatae Hosag. & Abraham, New Botanist 24: 111, 1997; Hosag., C. K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 307, 2003; Hosag., Zoos’ Print J. 18: 1283, 2003; Hosag., Zoos’ Print J. 21: 2412, 2006; Hosag., H. Biju & Appaiah, J. Mycopathol. Res. 44:14, 2006; Hosag. & H. Biju, J. Mycopathol. Res. 44: 43, 2006; Hosag., Chandraprabha & Agarwal, Asterinales of Kerala, p. 237, 2011 (Fig. 124).

Colonies hypophyllous, very thin, spreading, up to 10mm in diameter, confluent. Hyphae flexuous to rarely crooked, branching irregular at acute to wide angles, loosely reticulate, cells 24–30x3–3.5 µm. Appressoria alternate, about 30% opposite, 2-celled, straight, flexuous, curved, uncinate, 12–19.5 µm long; stalk cells cylindrical, 3–5 µm long; head cells cylindrical, straight, curved, uncinate, flexuous, crooked, entire, angular, hamate, 9–14.5x4–5 µm. Pycnothyria scattered, orbicular, up to 75µm in diameter, stellately dehisce at the center, margin crenate to fimbriate, fringed hyphae small, flexuous to crooked; Pycnothyriospores pyriform, acute at one end and broadly rounded at another, cinnamon brown, 19–22.5x14–16 µm, wall smooth, germ pore distinct in some spores.

Material examined: 13.xii.2003 on leaves of Flacourtia member, Sairandhri, V.B. Hosagoudar & Abraham, New Botanist 24: 111, 1997; Hosag., C. K. Biju & Abraham, J. Econ. Taxon. Bot. 25: 307, 2003; Hosag., Zoos’ Print J. 18: 1283, 2003; Hosag., Zoos’ Print J. 21: 2412, 2006; Hosag., H. Biju & Appaiah, J. Mycopathol. Res. 44:14, 2006; Hosag. & H. Biju, J. Mycopathol. Res. 44: 43, 2006; Hosag., Chandraprabha & Agarwal, Asterinales of Kerala, p. 237, 2011 (Fig. 124).

Figure 123. Asterostomella daphniphylli
a - Appressoriate mycelium; b - Pycnothyrium; c - Pycnothyriospores

Figure 124. Asterostomella scolopiae-crenatae
a - Appressoriate mycelium; b - Pycnothyrium; c - Pycnothyriospores

Anamorph of Prillieuxina
The genus Asterostomula

Asterostomula loranthi Theiss., Ann. Mycol. 14: 270, 1916; Hosagoudar, Sabeena & Jacob-Thomas, Plant Pathology & Quarantine 1(1): 7, 2011 (Fig. 125).

Colonies amphigenous, subdense to dense, up to 4mm in diameter, confluent. Hyphae flexuous to crooked, branching irregular at acute to wide angles, closely reticulate, cells 25–40x3–5 µm. Appressoria absent. Pycnothyria many, orbicular, joined together marginally, up to 180µm in diameter, stellately dehisced at the centre, margin crenate to fimbriate, fringed hyphae flexuous; pycnothyriospores unicellular, pyriform, ovate, 17–25x12–17 µm, wall smooth.
Studies on foliicolous New Asterinaceae members Meliolaceae of Kerala, Three new fungi from Silent Valley Hosagoudar & Riju Journal 5555.

Figure 125. Asterostomula loranthi a - Mycelium; b - Pycnothyrium; c - Pycnothyriospores

Material examined: 26.ii.2009 on leaves of Loranthus sp. (Loranthaceae), Sairandhri, S.S. Shaji et al. TBGT 5555.

Unidentified species

Leptosphaerulina sp.: Materials examined: 27.iv.2007 on leaves of Flamingia sp. (Papilionaceae), Silent Valley National Park, M. Harish et al. HCIO 49758, TBGT 3910.

Meliolina sp.: Materials examined: 23.viii.2009 on leaves of Syzygium sp. (Myrtaceae), Silent Valley National Park, Kerala, Jayakumar et al. HCIO 50045 TBGT 4197.

Phyllachora sp.: Materials examined: 13.xii.2003 on leaves of Sterculia sp. (Sterculiaceae), Sairandhri, Palghat, V.B. Hosagoudar et al. TBGT 2688 HCIO 47666.

Phyllachora sp.: Materials examined: 12.xii.2003 on leaves of Scolopia sp. (Flacourtiaceae), Sairandhri, Silent Valley, Palghat, V.B. Hosagoudar et al. HCIO 47670 TBGT 2692.

Phyllachora sp.: Materials examined: 14.xii.2003 on leaves of Fabaceae member, Chempathy, Silent Valley, Palghat, V.B. Hosagoudar et al. HCIO 47594, TBGT 2616; HCIO 47596, TBGT 2618; HCIO 47598 TBGT 2620

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### Key to the species of Meliolales

| Generic name & Digital formula | Name of the host family and synoptic characters of the fungal species | Species |
|-------------------------------|---------------------------------------------------------------|---------|
| **Asteridiella** 3101.4220    | ...                                                             | Asteridiella strobilanthicola |
| **Meliola** 3111.5333         | ...                                                             | Meliola holigarnae |
| **Meliola** 3113.3221         | ...                                                             | Meliola ancistrocladi |
| **Meliola** 31½1.5322         | Colonies amphigenous, dense, velvety; hyphae straight to substraight; appressoria alternate, antrorse, head cells ovate, clavate, mostly entire, angular, sublobate to lobate; phialides mixed with appressoria; mycelial setae numerous, simple, straight, curved, about 2% uncinate, acute at the tip | Meliola anodendricola |
| **Meliola** 3111.3223         | Colonies mostly epiphyllous, subdense; hyphae straight to flexuous; appressoria alternate to closely antrorse, head cells ovate, globose, slightly attenuated to truncate at the apex, mostly entire, rarely sublobate; mycelial setae scattered to mostly grouped around perithecia, simple, straight, curved, acute to obtuse at the apex | Meliola ichnocarpi-volubili |
| **Meliola** 3113.3223         | ...                                                             | Meliola aristolochigena |
| **Asteridiella** 3101.4220    | ...                                                             | Asteridiella cyclopoda |
| **Meliola** 3101.3220         | ...                                                             | Asteridiella combreti var. leonensis |
| **Ebenaceae**                 |                                                                |         |
| **Meliola** 3111.4222         | ...                                                             | Meliola diospyricola |
| **Elaeocarpaceae**            |                                                                |         |
| **Amazonia** 3101.4220        | ...                                                             | Amazonia elaeocarpi |
| **Euphorbiaceae**             |                                                                |         |
| **Meliola** 3111.3222         | ...                                                             | Meliola erythropicalis |
| **Erythropalaceae**           |                                                                |         |
| **Meliola** 3101.3220         | ...                                                             | Asteridiella crotonis-caudati |
| **Fabaceae**                  |                                                                |         |
| **Meliola** 31½3.3222         | Colonies epiphyllous, dense; hyphae straight, substraight, flexuous to crooked; appressoria alternate, unilateral, about 3% opposite, straight to curved, antrorse, subantrorse to retorse, head cells ovate, globose, straight to curved, often attenuated at the apex, entire; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, curved to few uncinate, acute to obtuse at the tip | Meliola dolichi |
| Generic name & Digital formula | Name of the host family and synoptic characters of the fungal species | Species |
|-------------------------------|---------------------------------------------------------------|---------|
| 31⅓3.3222                    | Colonies epiphyllous, dense, crustose to velvety, scattered; hyphae substraight to flexuous; appressoria alternate, about 20% opposite, antrorse, subantrorse to rarely recurved, head cells globose, entire, rarely truncate at the apex; phialides mixed with; appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, obtuse, dentate to cristate at the apex | Meliola flemingiicola |
| 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 | Meliola pycnosporae |

**Flacourtiaceae**

*Asteridiella* 3101.4220

...  

Asteridiella scolopiae

Gnetaceae

*Meliola* 3113.5223

...  

Meliola gneti

**Hippocrataceae**

*Meliola* 31⅓1.4233

...  

Meliola salaciicola

Icacinaceae

*Meliola* 3113.4222

...  

Meliola chandrasekharanii

**Lamiaceae**

*Asteridiella* 3101.3220

...  

Asteridiella anastomosans

**Lauraceae**

*Armatella* 1101.4320

Colonies hypophyllous, thin, spreading; hyphae smooth walled, crooked; appressoria alternate, antrorse to reflexed, stalk cells aseptate to several septate, straight to tortuous, head cells globose, narrowly ovate, angular, entire  

Armatella balakrishnannii

1101.3220

Colonies epiphyllous, thin, crustose; hyphae smooth walled, straight to substraight; appressoria alternate, antrorse to spreading, head cells ovoid, conoid, slightly angular, entire, outer wall crenulated  

Armatella cryptocaryae

1101.3230

Colonies hypophyllous, thin, scattered, diffused; hyphae smooth walled, flexuous to crooked; appressoria alternate, variously curved, stalk cells septate to several septate, flexuous to crooked, head cells ovate to globose, entire to stellately lobate  

Armatella katumotoi

1103.3230

Colonies hypophyllous, thin, crustose; hyphae smooth walled, substraight to undulate; appressoria alternate, about 5% opposite, antrorse, straight to curved, head cells globose, stellately sublobate  

Armatella litseae

*Meliola*31⅓1.4323

Colonies hypophyllous, dense; hyphae substraight to slightly flexuous; appressoria alternate, subantrorse to rarely retorse, head cells ovate to cylindrical, entire to slightly angular; phialides mixed with appressoria; mycelial setae moderately numerous, simple, straight, acute, obtuse to variously dentate at the tip  

Meliola cinnamomi

31⅓3.4323

Colonies hypophyllous, subdense, crustose; hyphae straight to crooked; appressoria unilateral, alternate and about 10% opposite, antrorse to subantrorse, head cells globose, rounded to truncate at the apex, entire; phialides mixed with appressoria; mycelial setae not many, scattered to grouped around perithecia, simple, straight, acute to furcated at the tip  

Meliola kakachiana

31⅓3.4323

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  

Meliola kakachiana var. poochiparensis

3111.4223

Colonies epiphyllous, dense, velvety; hyphae straight to undulate; appressoria alternate, straight to curved, antrorse, rarely spreading, head cells versiform, obovate, rarely truncate, entire; phialides mixed with appressoria; mycelial setae few, straight, simple, acute at the tip  

Meliola litseae var. rotundipoda
| Generic name & Digital formula | Name of the host family and synoptic characters of the fungal species | Species |
|-------------------------------|-------------------------------------------------|---------|
| 3111.4333 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 uncinate, simple, acute to obtuse at the tip | Meliola palakkadensis | |
| **Loranthaceae** Meliola 31½1.5221 | | Meliola prataprajii |
| **Melastomataceae** Meliola 3111.3223 | | Meliola affinis var. indica |
| Meliaceae **Meliola** 31½3.3322 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 uncinate at the apical portion, acute, obtuse to bifid at the tip | Meliola sairandhriana | |
| Meliaceae **Meliola** 3111.4222 Colonies amphigenous, mostly epiphyllous, dense, crustose to velvety, corresponding opposite surface of the showed water soaked lesion; hyphae straight to flexuous; appressoria alternate, antrorse to closely antrorse, head cells ovate, oblong, broadly rounded to often attenuated at the apex, entire, rarely angular to sublobate; phialides borne on a separate; mycelial branch; mycelial setae few, simple, straight, acute to obtuse at the tip | Meliola silentvalleyensis | |
| **Menispermaceae** Meliola 31½1.4221 | | Meliola lepianthedis |
| **Myristicaceae** Meliola 31½3.5324 | | Meliolamanoharacharyi |
| **Myrsinaceae** Meliola 3111.5323 | | Amazonia peregrina |
| **Myrtaceae** Meliola 3111.3222 | | Meliola groteana var. maesae |
| **Olacaceae** Meliola 3113.5333 | | Meliola eugeniae-jamboloidis |
| **Oleaceae** Meliola 3111.4223 Colonies hypophyllous, dense, velvety; hyphae substraight to flexuous; appressoria alternate, antrorse to retrorse, often spreading, straight to variously curved, head cells ovate, oblong, entire, angular, rarely sublobate to lobate; phialides borne on a separate; mycelial branch; mycelial setae scattered, simple, straight to curved, acute to obtuse at the tip | Meliola daviesii var. longiseta | |
| **Oleaceae** Meliola 3112.4223 Colonies amphigenous, mostly epiphyllous, dense; hyphae straight to slightly undulate; appressoria opposite (very few unilateral), straight, closely antrorse, head cells subglobose to ovate, entire; mycelial setae scattered to mostly grouped around perithecia, straight, simple, acute to obtuse | Meliola gemellipoda | |
| Meliaceae **Meliola** 3111.3222 Colonies amphigenous, mostly hypophyllous, dense; hyphae straight to substraight; appressoria alternate, straight, antrorse, head cells ovate, entire; phialides borne on a separate; mycelial branch; mycelial setae fairly numerous, scattered, straight, simple, acute to obtuse | Meliola jasmini | |
| Generic name & Digital formula | Name of the host family and synoptic characters of the fungal species | Species |
|-------------------------------|-------------------------------------------------|---------|
| 3111.3222                    | Colonies hypophyllous, thin; hyphae straight to slightly undulate; appressoria alternate, straight to curved, antrorse to spreading, head cells ovate, globose, cylindrical, often curved, slightly truncate at the apex, entire; phialides mixed with appressoria; mycelial setae grouped around perithecia, straight, simple, acute at the tip | *Meliola malabarensis* |
| *Periplocae*                 |                                                 |         |
| *Meliola* 3111.4323          |                                                 | *Meliola garciniae* |
| *Rhamnaceae*                 |                                                 |         |
| *Amazonia* 3101.3220         |                                                 | *Amazonia gouaniae* |
| *Rosaceae*                   |                                                 |         |
| *Asteridiella* 3101.42x0     |                                                 | *Asteridiella pygei var. microspora* |
| *Rubiaceae*                  |                                                 |         |
| *Meliola* 3111.42x2          | Colonies amphigenous, mostly epiphyllous, dense, velvety; hyphae straight; appressoria alternate, straight to curved mostly antrorse, head cells cylindrical to clavate, entire to angulose; phialides mixed with appressoria; mycelial setae scattered to grouped around perithecia, simple, straight, acute | *Meliola canthii* |
| 3111.3223                    | Colonies hypophylloellus, subdense, spreading; hyphae mostly flexuous; appressoria alternate, antrorse to subantrorse, straight to curved, head cells ovate, globose, entire, sublobate to lobate; phialides numerous, mixed with appressoria; mycelial setae numerous, scattered to grouped around perithecia, simple, straight, flexuous to curved, obtuse at the tip | *Meliola ixoreae var. psychotriae* |
| 3111.4222                    | Colonies amphigenous, mostly hypophyllous, subdense, subvelvety; hyphae sinuous to crooked; appressoria alternate, spreading, antrorse, head cells ovate, narrow towards apex, slightly angular, entire; phialides borne on a separate; mycelial branch; mycelial setae few, grouped around perithecia, simple, straight, acute to subacute at apex | *Meliola wendlandiae* |
| *Rutaceae*                   |                                                 |         |
| *Asteridiella* 3103.4330     |                                                 | *Asteridiella toddaliae* |
| *Meliola* 31⅓3.42x3          | Colonies amphigenous, mostly hypophyllous, crustaceous; hyphae straight to substraight to crooked; appressoria alternate, about 20% opposite, straight to curved, subantrorse to spreading, head cells ovate, conoid, rounded at the apex, entire; phialides mixed with appressoria; mycelial setae scattered, straight, often curved, simple, acute to 2-3 dentate to cristate | *Meliola altantiae* |
| 31⅓4.2233                    | Colonies amphigenous, mostly epiphyllous, subcrustose, dense; hyphae straight to undulate; appressoria alternate to opposite, antrorse, curved, head cells ovate, clavate, cylindrical, often curved, entire; phialides mixed with appressoria, opposite to alternate, ampulliform; mycelial setae scattered, straight, acute to dentate | *Meliola butleri* |
| 31⅓4.2333                    | Colonies amphigenous, caulicolous, mostly hypophyllous, dense, velvety; hyphae substraight to undulate; appressoria alternate, about 15% opposite, antrorse, spreading, straight to curved, head cells cylindrical, ovate, entire, straight to curved; phialides mixed with appressoria; mycelial setae scattered, straight, simple, obtuse to variously dentate at the tip | *Meliola citricola* |
| 31⅓4.2233                    | Colonies epiphyllous, thin; hyphae straight to slightly undulate; appressoria alternate, 20% opposite, straight to curved, subantrorse to antrorse, head cells cylindrical, ovate, entire; phialides mixed with appressoria; mycelial setae scattered, straight, simple, acute to 2-3 dentate | *Meliola clausenae* |
| 31⅓4.3221                    | 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; mycelial setae simple, straight to uncinate at the apical portion, acute, obtuse to 2–3-times dentate at the tip | *Meliola clausenigena* |
| Generic name & Digital formula | Name of the host family and synoptic characters of the fungal species | Species |
|--------------------------------|-------------------------------------------------------------------|---------|
| 31⅓2.3223                    | Colonies hypophyllous, crustose, thin; hyphae straight to substraight; appressoria alternate and about 10% opposite, antrorse to spreading, straight to curved; phialides with appressoria; mycelial setae scattered, straight, simple, acute, obtuse, cristate to dentate | Meliola paramignyae |
| **Meliola** 31⅓2.3223         | Colonies epiphyllous, scattered, dense; hyphae straight; appressoria opposite, antrorse to subantrorse, rarely recurved, head cells globose, rarely cylindrical, entire; phialides mixed with appressoria; mycelial setae grouped around perithecia, simple, straight, acute, obtuse to dentate at the tip | Meliola allophyli-concanici |
| 31⅓3.3222                    | Colonies amphigenous, thin to subdense, velvety; hyphae straight; appressoria alternate, about 5% alternate, scattered, antrorse to subantrorse, head cells ovate, narrowed towards the tip, often conoid, entire; phialides mixed with appressoria; mycelial setae numerous, scattered to grouped around perithecia, simple, straight, flexuous, about 3% curved to uncinate, acute, bifid, trifid to rarely fuscate at the tip | Meliola capensis var. indica |
| 3113.3122                    | Colonies hypophyllous, thin; hyphae crooked; appressoria opposite and alternate, straight to curved, spreading, antrorse to reflected, head cells ovate, globose, angular, truncate to slightly lobate, contorted; phialides mixed with appressoria; mycelial setae numerous, mostly grouped around perithecia, simple, straight, acute | Meliola commixta |
| 3111.4223                    | Colonies epiphyllous, dense, velvety; hyphae straight to substraight; appressoria alternate, about 1% opposite, antrorse to subantrorse, straight to curved, head cells ovoid, clavate, entire to angular; phialides mixed with appressoria; mycelial setae evenly scattered over the colonies, straight, simple, acute to obtuse at the tip | Meliola serjaniae var. major |
| **Prataprajella** 20 ./ 1.5230 | ... | Prataprajella turpiniicola |
| **Meliola** 3113.5323        | ... | Meliola rachammea |
| **Prataprajella** 20 ./ 1.5230 | ... | Meliola rachammea |
| **Tilaceae**                  | ... | Meliola rachammea |
| **Irenopsis** 3401.4220       | ... | Irenopsis triumfettae var. indica |
| **Urticeae**                  | ... | Irenopsis triumfettae var. indica |
| **Asteridiella** 3101.3220    | ... | Asteridiella oreocnidecola |
| **Verbenaceae**               | ... | Asteridiella oreocnidecola |
| **Asteridiella** 3201.4320    | Colonies epiphyllous, thin, smooth; hyphae substraight to undulate; appressoria alternate, straight to curved, antrorse, spreading, head cells ovate, clavate, entire to sublobate; phialides borne on a separate mycelial branch | Asteridiella formosensis |
| 3101.4230                    | Colonies amphigenous, mostly epiphyllous, dense, scattered and cause stretching of the surrounding leaf surface with a yellow ;halo surrounding the spots; hyphae strongly appressed to the leaf surface, not easily separable, tortuous; appressoria alternate to unilateral, straight to curved, antrorse to spreading, head cells globose, angulose, entire to sublobate; phialides few, mixed with appressoria | Asteridiella clerodendricola |
| **Meliola** 3111.3221        | ... | Meliola clerodendricola |
### Table 1. Host family-Hosts-Fungus Index

| Family of the host plant | Host plant | Fungi |
|--------------------------|------------|-------|
| 1. Acanthaceae           | Strobilanthus sp. | Asteridiella strobilanthicola |
| 2. Anacardiaceae         | Nothopegia sp. | Asterina nothopegiae |
|                          | Nothopegia sp. | Asterolibertia nothopegiae |
|                          | Holigarna sp. | Meliola holigarnae |
| 3. Ancistrocladaceae     | Ancistrocladus hayneanus | Meliola ancistrocladi |
| 4. Apocynaceae           | Anodontran paniculatum | Meliola anadendrica |
|                          | Ichnocarpus sp. | Meliola ichnocarpis-volubili |
| 5. Aristolochiaceae      | Thottea sp. | Asterina thotteae |
|                          | Aristolochia tagala | Meliola aristolochigena |
|                          | Aristolochia sp. | Schiffnerula aristolochiae |
| 6. Asclepiadaceae        | Wattakaia sp. | Asterina trovancorensis |
| 7. Asteraceae            | Vernonia arborea | Asteridiella cyclopoda |
|                          | Vernonia sp. | Schiffnerula vernoniae |
| 8. Celastraceae          | Pleunostyla sp. | Asterina microtriplicola |
| 9. Chloranthaceae        | Sarcandra chloranthoides | Asterina sarcandrae |
| 10. Combretaceae         | Calycopteris florubunda | Asteridiella combreti var. leonensis |
|                          | Calycopteris florubunda | Asterina combreti |
| 11. Convolvulaceae       | Merremia sp. | Endophyllum kaernbachii |
| 12. Daphniphyllaceae     | Daphniphyllum neilgherrense | Asterostomella daphniphylli |
| 13. Ebenaceae            | Diospyris sp. | Meliola diospyricola |
| 14. Elaeocarpaceae       | Elaeocarpus tuberculatus | Asterina elaeocarpi var. ovalis |
|                          | Elaeocarpus munronii | Asterina elaeocarpicola |
|                          | Elaeocarpus tuberculatus | Amazonia elaeocarpi |
| 15. Ericaceae            | Vaccinium neilgh | Amazonia vaccini |
|                          | Rhododendron arboreum | Asterina halgolensis |
| 16. Erythrophalaceae     | Erythrolupulum populifolium | Asterina erythrophalica |
|                          | Erythrolupulum populifolium | Meliola erythrapoli |
| 17. Euphorbiaceae        | Croton caudatus | Asteridiella crotonis-caudati |
|                          | Aporusa sp. | Asterina aporusae |
|                          | Mallotus sp. | Spirospes japonicus |
| 18. Fabaceae             | Fabaceae member | Phyllachora sp. |
|                          | Dolichus trilobus | Meliola dolichi |
|                          | Flemingia sp. | Meliola flemingicola |
|                          | Pycnospora lutescens | Meliola pycnosporicae |
| 19. Flacourtiaceae       | Scolicia crenata | Asterina flacourtiaevarnum |
|                          | Scolia sp. | Asterina talacaueriana |
|                          | Flacourtiaceae member | Asteridiella scolopiae |
|                          | Scolia sp. | Asterostomella scolopiae-crenatae |
| 20. | Scolia sp. | Phyllachora sp. |
|  | Foliicolous fungi of Silent Valley Hosagoudar & Riju |
|---|---|
| 22. | Gramineae (Poaceae) |
| | Ochlandra rheedi | Dysryhchis uncinata |
| | Pennisetum polystachyon | Phakopsora apoda |
| 23. | Gnetaceae |
| | Gnetum ula | Meliola gneti |
| 24. | Hippocrataceae |
| | Salacia oblonga | Balladyna salaciae |
| | Salacia sp. | Meliola salaciicola |
| 25. | Icacinaceae |
| | Nothapodytes nimmoniana | Meliola chandrasekharii |
| 26. | Lamiaceae |
| | Leucas sp. | Asteridiella anastomosans |
| 27. | Lauraceae |
| | Litsea sp. | Asterina cryptocaricola |
| | Cinnamomum malabatrum | Armatella balakrishnianii |
| | Litsea sp. | Armatella cryptocaryae |
| | Litsea sp. | Armatella kat motoi |
| | Neolitsea scrobiculata | Armatella litsea |
| | Cinnamomum camphora | Meliola cin namoni |
| | Litsea sp. | Meliola kakachiana |
| | Litsea sp. | Meliola kakachiana var. poochiparensis |
| | Litsea sp. | Meliola palakadensis |
| | Litsea sp. | Spiropes armatellicola |
| 28. | Loranthaceae |
| | Loranthus sp. | Asterina deightonii |
| | Loranthus sp. | Asterostomula laranthi |
| | Loranthus sp. | Meliola prataprajii |
| | Loranthus sp. | Sarcinella lorantheacarum |
| 29. | Lythraceae |
| | Lagerstroemia microcarpa | Scliffnerula lagerstroemiae |
| 30. | Melastomataceae |
| | Memecylon sp. | Asterina memecylonis |
| | Memecylon sp. | Echidnodella memecyl |
| | Memecylon sp. | Meliola affinis var. indica |
| | Memecylon sp. | Acrodictys balladynaec Echidnodella memecyl |
| 31. | Meliaceae |
| | Chukrasia tabularis | Asterina chukrasiae |
| | Cipadessa baccifera | Asterina cipadessae |
| | Aglaia minuti flora | Meliola sairandhriana |
| | Meliaceae member | Meliola silentvalleyensis |
| 32. | Menispermaceae |
| | Lepianthes umbellata | Asterina lepi anthe dis |
| | Lepianthes umbellata | Meliola lepi anthedis |
| 33. | Myristicaceae |
| | Myristica sp. | Asterina myristicacarum |
| | Myristica sp. | Meliola monoharacharyi |
| | Myristica beddomei | Teratosperma anacardi |
| 34. | Myrtaceae |
| | Maesa indica | Amazonia peregrina |
| | Maesa indica | Meliola gratozana var maesa |
| 35. | Myrtaceae |
| | Rhodomyrtus tomentosa | Asterina rhodomyrti |
| | Syzygium sp. | Asterina claviflori |
| | Syzygium munronii | Meliola eugeniae-jambaloidis |
| | Syzygium sp. | Meliolina sp. |
| | Syzygium sp. | Meliolina pulcherrima |
| 37. | Olacaceae |
| | Strombosia sp. | Meliola strombosigena |
| Family          | Genus         | Species/Strain                                                                 |
|-----------------|---------------|-------------------------------------------------------------------------------|
| Oleaceae        | Jasminum sp.  | Asterina pangaalaparensis                                                     |
|                 | Jasminum sp.  | Asterina erysiphoides                                                         |
|                 | Olea dioica   | Eupelte amicta                                                                |
|                 | Jasminum rottlerianum | Meliola daviesii var. longiseta                                               |
|                 | Jasminum sp.  | Meliola gemellipoda                                                           |
|                 | Jasminum sp.  | Meliola jasmini                                                               |
|                 | Olea dioica   | Meliola malabarensis                                                          |
|                 | Jasminum sp.  | Palawanjella jasmini                                                          |
|                 | Jasminum sp.  | Prillieuxina jasmini                                                          |
| Papilionaceae   | Olea dioica   | Leptosphaerulina australis                                                    |
|                 | Flamingia sp. | Leptosphaerulina sp.                                                          |
| Periplocaceae   | Gardneria avate | Meliola garciniae                                                              |
| Polygonaceae    | Polygonum chinense | Puccinia salmsii                                                              |
| Rhamnaceae      | Guoania sp.   | Amazonia gourania                                                             |
| Rosaceae        | Pygium wightianum | Asteridicola pygei var. microspora                                              |
| Rubiaceae       | Lasianthus sp. | Aphanospelis lasianthi                                                        |
|                 | Rubiaceae member | Balladyina indica                                                            |
|                 | Canthium dicoccum | Meliola canthii                                                               |
|                 | Iossa sp.     | Meliola iosa var. psychrotroae                                                |
|                 | Wendlandia thysiodera | Meliola wendlandiae                                                          |
| Rutaceae        | Toddalia asiatica | Asteridicola toddaliae                                                        |
|                 | Acronychia pedunculata | Asterina acronychiae                                                          |
|                 | Atalanta sp.  | Asterina atalantiae                                                           |
|                 | Toddalia sp.  | Didymopsorella toddaliae                                                      |
|                 | Atalanta sp.  | Meliola atalantiae                                                            |
|                 | Citrus sp.    | Meliola butleri                                                               |
|                 | Citrus sp.    | Meliola citricola                                                              |
|                 | Clausena sp.  | Meliola clausenae                                                              |
|                 | Clausena sp.  | Meliola clausenigerina                                                        |
|                 | Paramignya sp. | Meliola paramignyae                                                           |
| Santalaceae     | Scleropyrum pentandrum | Asterina scleropyri                                                          |
| Sapindaceae     | Alliphyllus concanics | Meliola alliphyll-cancanici                                                   |
|                 | Alliphyllus sp. | Meliola capensis var. indica                                                  |
|                 | Neptelim sp.   | Meliola commixta                                                               |
|                 | Neptelim sp.   | Meliola serjania var. major                                                   |
|                 | Alliphyllus cabbe | Sarcinella alliphyll                                                        |
| Staphyleaceae   | Turpinia malabarica | Prataprajella turpinicola                                                    |
| Symplacaceae    | Symplacos sp.  | Asterina suttonii                                                              |
|                 | Symplacos rosea | Asterina indica                                                                |
|                 | Symplacos macrocarpa ssp. Kanarana | Meliola nashammae                                                           |
| Sterculiaceae   | Sterculia sp.  | Phyllachora sp.                                                               |
| Theaceae        | Eurya japonica | Asterina songi                                                                 |
|                 | Thea sinensis  | Schiffnerula camelliae                                                        |
| Tiliaceae       | Triumphfetta sp. | Irenopsis triumfettae var. indica                                             |
|                 | Triumphfetta sp. | Oldium doideae                                                               |

Foliicolous fungi of Silent Valley Hosagoudar & Riju
Key to the groups of fungi

1. Produce black colonies on the host surfaces ........................................................................................................... 1 Black mildews
2. Produce powdery coating on the host surfaces ......................................................................................................... 2 Powdery mildews
3. Produce tar spots the host surfaces .......................................................................................................................... 3 Tar spot fungi
4. Produce rust pustules .................................................................................................................................................. 4 Rust fungi
5. Produce superficial perithecia on leaves ..................................................................................................................... 5 Leptosphaerulina
6. Grow on other fungi .................................................................................................................................................... 6 Hyperparasites
7. Anamorph known ....................................................................................................................................................... 7
6. Anamorph not known .................................................................................................................................................. 6
5. External mycelium present ........................................................................................................................................ 6 Palawaniella
4. Mycelium not appressoriate ....................................................................................................................................... 4 Dysrhynchis
3. Ascospores 3-septate ................................................................................................................................................... 3 Meliolina
2. Appressoria not so ..................................................................................................................................................... 3
1. Fruiting body perithecium ........................................................................................................................................... 1 Meliolales
1. Fruiting body thyriothecium ....................................................................................................................................... 2

Key to the black mildews

1. Hyphae phialidic; asci clavate; ascospores 3-4-septate .............................................................................................. 1 Meliolaceae
2. Hyphae nonphialidic; asci cylindrical to subcylindrical, ascospores 1-2-septate ......................................................... 2 Armatellaceae

Key to the families of meliolales

1. Perithecia flattened globose ........................................................................................................................................ 1 Amazonia
2. Only mycelial setae present ......................................................................................................................................... 2
3. Only perithecial setae present ................................................................................................................................... 3 Irenopsis
4. Perithecial setae and appendages present ................................................................................................................... Pratapraiella
5. Both perithecial setae and appendages absent ........................................................................................................... Asteridiella
Key to the genera of Asterinales

1. Appressoria absent
2. Conidia present
3. Thyriothecia orbicular
4. Appressoria intercalary

Eupelte
Prillieuxina
Echidnodella
Asterolibertia

Key to the species based on the host families

Anacardiaceae
Asterina
Single species
Asterina nothopegiae

Aristolochiaceae
Asterina
Single species
Asterina thotteae

Asclepiadaceae
Asterina
Single species
Asterina travancorensis

Celastraceae
Asterina
Single species
Asterina microtropidicola

Chloranthaceae
Asterina
Single species
Asterina sarcandreae

Combretaceae
Asterina
Single species
Asterina combreti

Elaeocarpaceae
Asterina
1. Apressoria cylindrical and tubular
2. Conidia present
3. Thyriothecia orbicular
4. Appressoria intercalary

Asterina elaeocarpi var. ovalis
Eupelte
Prillieuxina
Echidnodella
Asterolibertia

Asterina elaeocarpicola

Ericaceae
Asterina
Single species
Asterina hakgalensis

Erythopalaceae
Asterina
Single species
Asterina erythropicala

Euphorbiaceae
Asterina
Single species
Asterina aporusae

Flacourtiaceae
Asterina
1. Apressoria alternate only
2. Conidia present
3. Thyriothecia elongated
4. Appressoria lateral

Asterina flacourtiacearum
Prillieuxina
Echidnodella
Asterolibertia

Asterina talacauveriana

Lauraceae
Asterina
Single species
Asterina cryptocariicola

Loranthaceae
Asterina
Single species
Asterina deightonii
Melastomataceae
Asterina
Single species.................................................................................................................................................. Asterina memecylonis
Echidnodella
Single species.................................................................................................................................................. Echidnodellamemecyli

Meliaceae
Asterina
1. On Chukrasia........................................................................................................................................... Asterina chukrasiae
1. On Cipadessa........................................................................................................................................... Asterina cipadessae

Menispermaceae
Asterina
Single species.................................................................................................................................................. Asterina lepianthedis

Myristicaceae
Asterina
Single species................................................................................................................................................... Asterina myristicacearum

Myrtaceae
Asterina
1. On Rhodomyrtus......................................................................................................................................... Asterina rhodomyrti
1. On Syzygium............................................................................................................................................... Asterina claviflori

Oleaceae
Asterina
1. On Jasminum............................................................................................................................................... Asterina pongalaparensis
1. On other plants............................................................................................................................................ Asterina erysiphoides

Eupelte
Single species........................................................................................................................................................... Eupelteamicta

Rutaceae
Asterina
Single species.................................................................................................................................................. Asterina acronychiae

Santalaceae
Asterina
Single species................................................................................................................................................... Asterina scleropyri

Sympliocaceae
Asterina
1. Appressoria slightly stipitate............................................................................................................................ Asterina suttonii
1. Appressoria sessile............................................................................................................................................. Asterina indica

Theaceae
Asterina
Single species................................................................................................................................................... Asterina songii

Urticaceae
Asterina
1. Appressoria mostly opposite .......................................................................................................................... Asterina oreocnidegena
1. Appressoria alternate only ................................................................................................................................ Asterina oreocnidecola

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