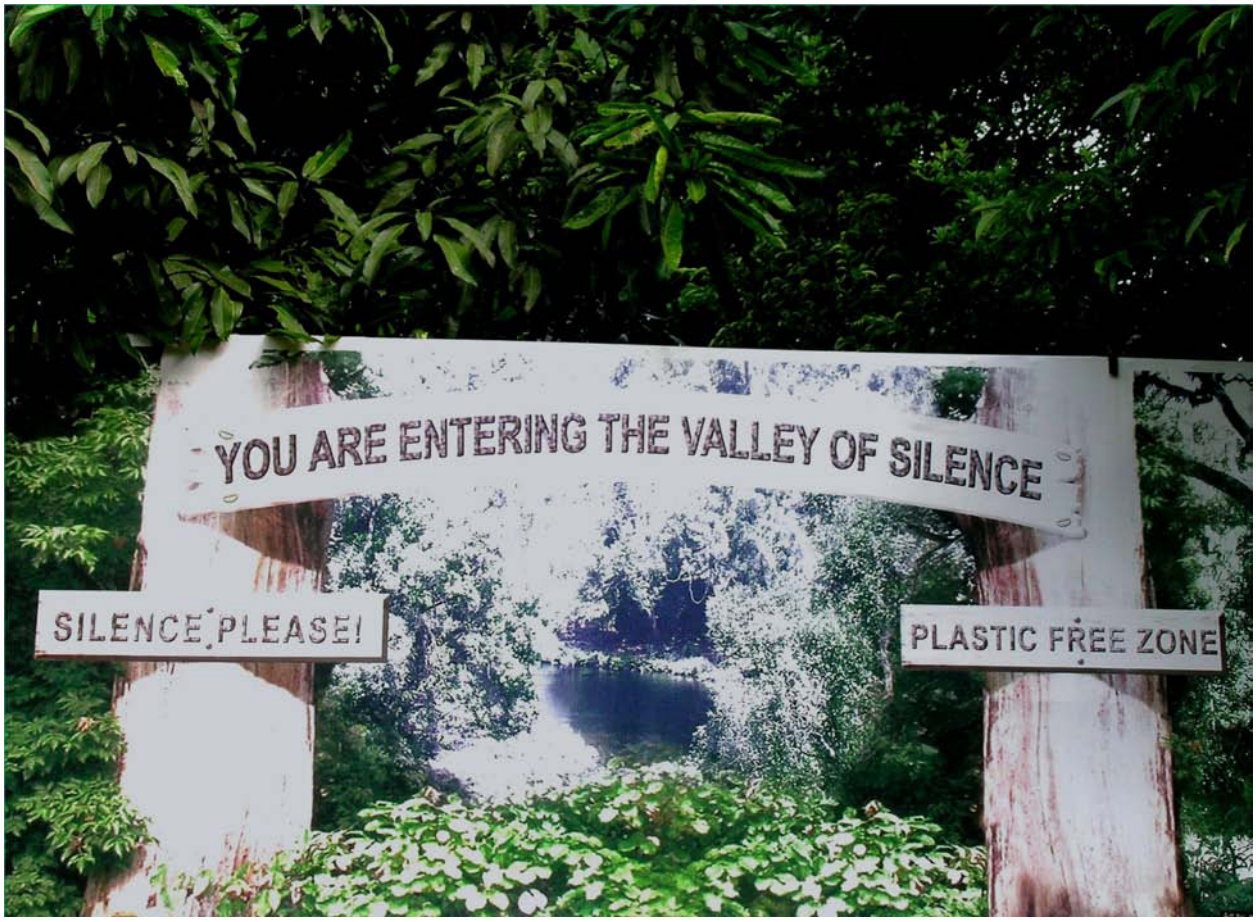
Foliicolous fungi of Silent Valley National Park, Kerala, India

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), *Acrodictys* (1), *Amazonia* (3), *Aphanopeltis* (1), *Armatella* (4), *Asteridiella* (12), *Asterina* (32), *Asterostomella* (2), *Asterostomula* (1), *Balladyna* (2), *Didymopsorella* (1), *Diplococcium* (1), *Dysrhynchis* (1), *Echidnodella* (1), *Endophyllum* (1), *Eupelte* (1), *Irenopsis* (1), *Leptosphaerulina (*1), *Meliola* (47), *Meliolina* (1), *Oidium* (1), *Palawaniella* (1), *Phakopsora* (1), *Prataprajella* (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 consistant 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

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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), Asteridiella (12), Asterina (32), Asterostomella (2), Asterostomula (1), Balladyna (2), Didymopsorella (1), Diplococcium (1), Dysrhynchis (1), Echidnodella (1), Endophyllum (1), Eupelte (1), Irenopsis (1), Leptosphaerulina (1), Meliola (47), Meliolina (1), Oidium (1), Palawaniella (1), Phakopsora (1), Prataprajella (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.

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

Malayalam Abstract: *കേരളത്തിലെ പാലക്കാട് ജില്ലയിൽ 1985 മുതൽ സൈലന്റ് വാലി നാഷണൽ പാർക്കിലെ സ്ഥിതി ചെയ്യുന്ന ഫോലികോലസ്സ് ഫംഗൽ ശേഖരണമാണ് ഈ പഠന ത്തിന്റെ ഇതിവൃത്തം. 139 ഫംഗൽ ടാക്സയിൽ നിന്നും മുപ്പതോളം ഫംഗൽ ജെനറകളെ ഗവേഷകർ സ്ഥിരീകരിച്ചു. അക്രിമോണിയോള (1), അക്രിടിക്ട്സ് (1), ആമസോണിയ (3), അഫാനോപെൽടിസ് (1), അർമാടില്ല (4), അസ്ടിരിടിയില്ല (12), അസ്ടിറിന (32), അസ്ടിരൊ സ്റ്റൊമെല്ല (2), അസ്ടിരോസ്റ്റൊമുല്ല (1), ബെല്ല ഡയ്ന (2), ടിടിമോപ്സൊറല്ല (1), ടിപ്പോകോക്കം (1), ടൈറൈൻചീസ്സ് (1), ഇകറിട്നോടില്ല (1), ഇൻടോഫൈല്ലം (1), യൂപെലട് (1), ഐറൈനോ പസിസ്സ (1), ലെപ്റ്റോസൈഹറുലിന (1), മെലിയോള (47), മെലിയോലിനാ (1), ഓടിയം (1), പാലാവാനി യെല്ല (1), ഫാകോപ്സോറ (1), പ്രതാപരാജല്ല (1), പ്രില്ലുക്സിന (1), പക്സിനിയ (1), സാർസിനെല്ല (3), ഷിഫ്നെറുല്ല (4), സ്പൈനോപ്സ് (2), ടെറാസ്പർമ്മ (1) മുതലായവ ജനറയിൽപ്പെട്ട ഫംഗ സ്സുകൾ അൻപത്തഞ്ച് ഹോസ്റ്റ് കുടുംബത്തിലായി, നൂറ്റിമുപ്പത്തെട്ടോളം സസ്യങ്ങളിൽ രേഖപ്പെടുത്തി. ഫംഗസ്സുകളെ രേഖാചിത്രം വഴി പ്രതിപാദിപ്പിച്ചിട്ടു. ഗവേഷണത്തിന്റെ ഭാഗമായി നിരവധി ഫംഗസ്സുകളെ ആദ്യമായി ഈ സ്ഥലത്ത് നിന്നു സ്ഥിരീകരിച്ചിട്ടു.*

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Author Details: Dr. V.B. Hoagoudar is a Senior Scientist in JNTBGRI, has been working on foliicolous fungi since 1974, published 16 books and more than 400 research papers mostly on foliicolous fungi; proposed three new families, 17 genera and more than 800 species and infra specific taxa.
Dr. M.C. Riju is working both on mycorrhizal and foliicolous fungi since 2004, has published a book on mycorrhizal fungi and credited with more than 25 research papers appeared in the national and international reputes.

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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 ^{0}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.

Image 1. Silent Valley - A symbol of silence

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^{0}00'–11^{0}15'N & 76^{0}15'–76^{0}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.

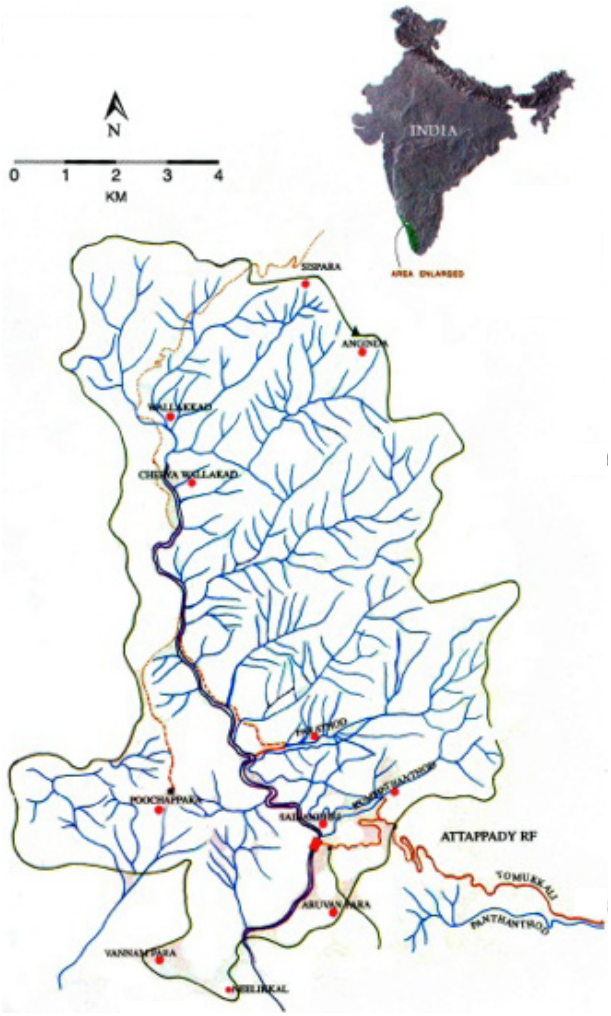

Figure 1. Study area - Silent Valley National Park

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 ^{0}C and average maximum from 23–29 ^{0}C. The highest temperature is experienced during May (30^{0}C) and the lowest during January (7^{0}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, dear, 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 89.52km^2 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 Payyandadumdesoms (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, c, 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, Katyawaramudi, 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

Image 2. A view of evergreen forest

Image 3. Floating clouds on evergreen forests

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).

Image 4. Riparian vegetation

Image 5. High altitude shola forests

Image 6. Research team in the forest

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 lacto phenol (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 to 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: Meliolaceae

Famly Armatellaceae

Armatellaceae 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: *Armatella* Theiss. & Syd.

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

Family Meliolaceae

Meliolaceae 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.

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 subiculam)

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
5. 51–60 µm
6. More than 60µm long

6. Maximum ascospore width

1. Up to 10µm
2. 11–20 µm
3. 21–30 µm
4. More than 30µm

7. Maximum diameter of perithecia

1. Up to 100µm
2. 101–200 µm
3. 201–300 µm
4. More than 301µm

8. Maximum length of mycelial setae

1. Up to 300µm
2. 301–500 µm
3. 501–1000 µm
4. More than 1000µm
0. Absent.

The treatment of species and varieties consists of the original citation of the correct name, citation of the World monograph and Indian monograph, relevant synonyms (if any) based on the monographs 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 ovate, oblong, cylindrical, straight to curved, entire to angular, broadly rounded to truncate at the apex, 8–16x6–11 µm. Phialides mixed with appressoria,

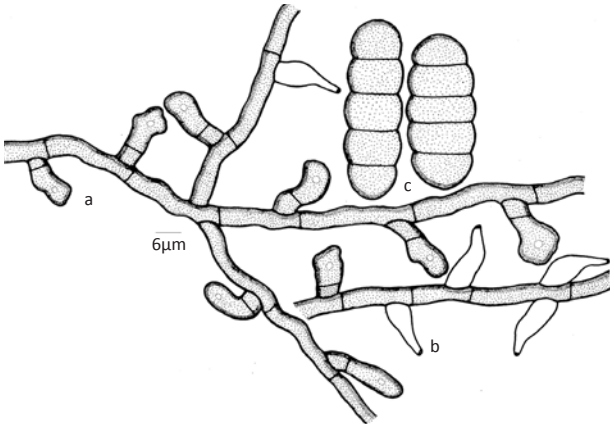

Figure 1. ***Amazonia elaeocarpi***
a - Appressoriate mycelium; b - Phialides; c - Ascospores

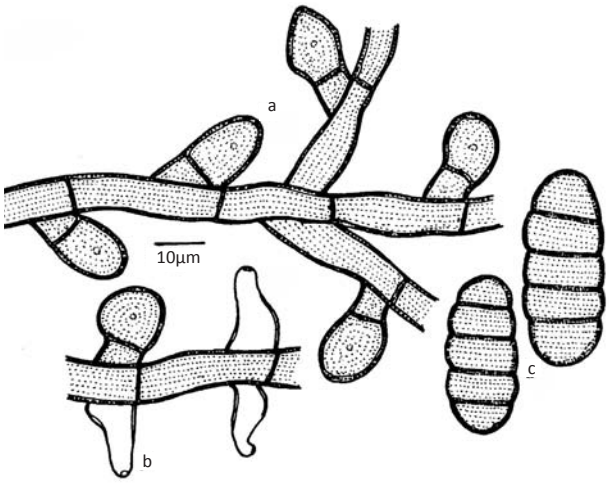

Figure 2. ***Amazonia gouaniae***
a - Appressoriate mycelium; b - Phialides; c - Ascospores

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

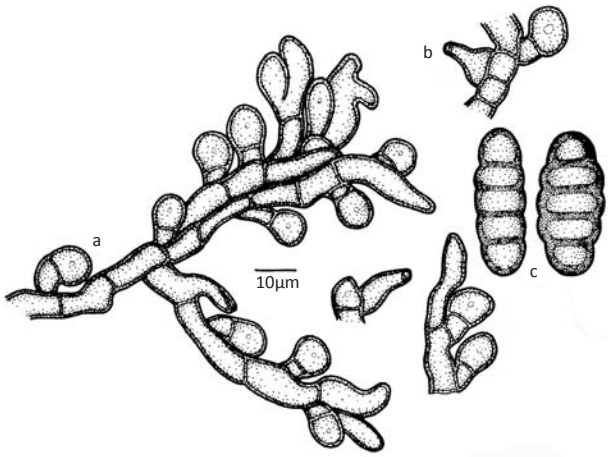

Figure 3. ***Amazonia peregrina***
a - Appressoriate mycelium; b - Phialides; c - Ascosporesdiameter

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

et al. TBGT 5552; Pulipara, coll. 13.ii.2007, M.C. Riju et al. TBGT 5632; 4.iii.2008, Valakadu, coll. P.J. Robin et al. TBGT 5099.

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 5mm 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 *Cinnamomumm alabatrum* (Burm.f.) Blume (Lauraceae), Champatty, V.B. Hosagoudar et al. TBGT 1698.

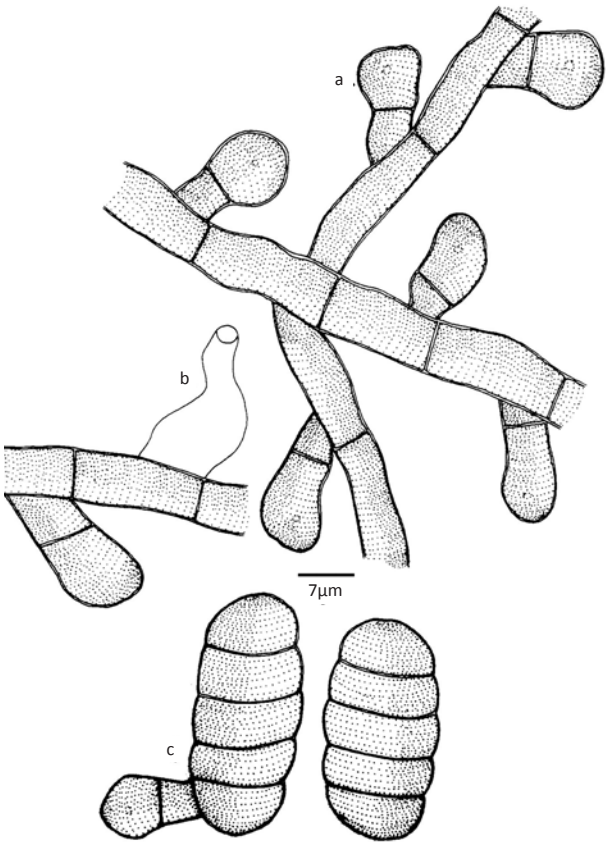

Figure 4. *Amazonia vaccinii*
a - Appressoriate mycelium; b - Phialides; c - Ascospores

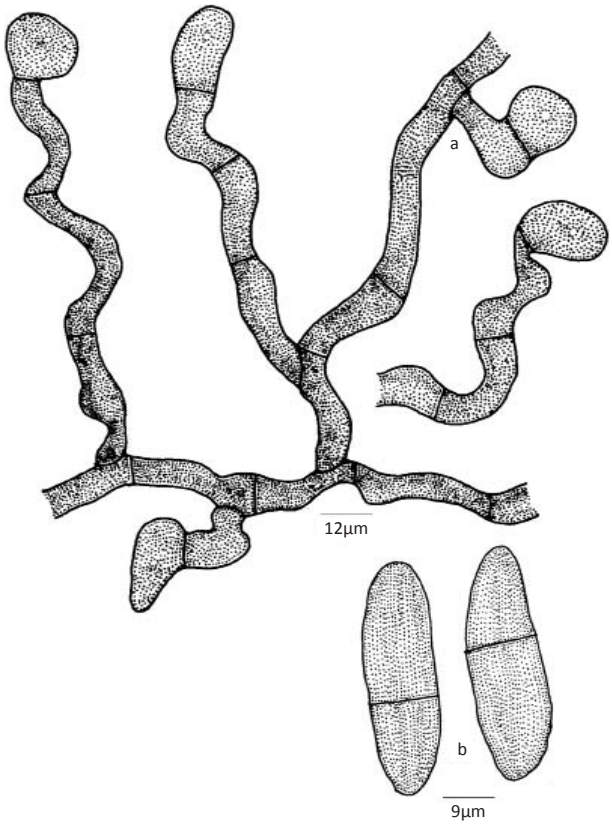

Figure 5. *Armatella balakrishnanii*
a - Appressoriate mycelium; b - Ascospores

Armatella cryptocaryae Hosag., J. Econ. Taxon. Bot. 15: 198, 1991; Hosagoudar et al.., Mycotaxon 56: 350, 1995; Hosag., C.K. Biju & 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; Poochipara, 14.ii.2007, M.C. Riju, Gireesh & S.S. Shaji TBGT 5015; Poochipara, 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; Poochipara, on leave of *Persea* sp. (Lauraceae), 30.vii.2008, Jacob et al. HCIO 50372, TBGT 4289; 26.ii.2009, S.S. Shajiet 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; HCIO 45773, TBGT 1625; HCIO 45774, TBGT1523; HCIO 45773, TBGT 1522; HCIO 46346, TBGT 1992; HCIO 46698, TBGT 2039; HCIO 47680, TBGT 2702; 27.ii.2009, S.S. Shaji et al. HCIO 49545, TBGT 3787; Sairandhri, Silent Valley, Kerala, on leaves of *Persea* sp. (Lauraceae), Silent Valley, 26.ii.2009, S.S. Shaji et al. HCIO 49552, TBGT 3794; 30.vii.2009, Jayakumar et al. HCIO 49864, TBGT 4016; Sairandri, 16.ii.2007, M.C. Riju et al. HCIO

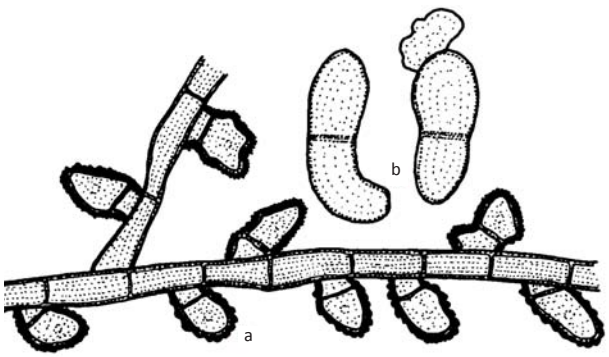

Figure 6. ***Armatella cryptocaryae***
a - Appressoriate mycelium; b - Ascospores

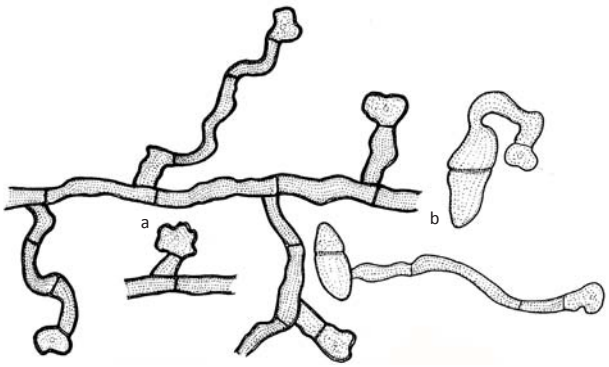

Figure 7. ***Armatella katumotoi***
a - Appressoriate mycelium; b - Ascospores

50922, TBGT 4839;2.iii.2010, P.J. Robin et al. TBGT 5101; Silent Valley, 6.viii.2008, M.C. Riju & Jacob Thomas TBGT 5548; Sairandhri, 2.iii.2010, P.J. Robin et al. TBGT 5590; 11.vi.2007, 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, V.B. Hosagoudar et al. HCIO 45912, TBGT 1674; 14.vi.2007, Jacob Thomas, P.P. Rajesh Kumar & S.S. Shaji HCIO 48217, TBGT 2953; Pulipara, on leaves of *Neolitsea* sp., 13.iv.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. HCIO 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.200 on leaves of *Leucas* sp. (Lamiaceae), Chempatty, V.B. Hosagoudar et al. HCIO 46306, TBGT 1952.

Asteridiella clerodendricola Hosag. in Hosagoudar & Goos, Mycotaxon 36:237, 1989; Hosagoudar, Kaveriappa, Raghu & Goos, Mycotaxon 51:109, 1994, Hosagoudar,

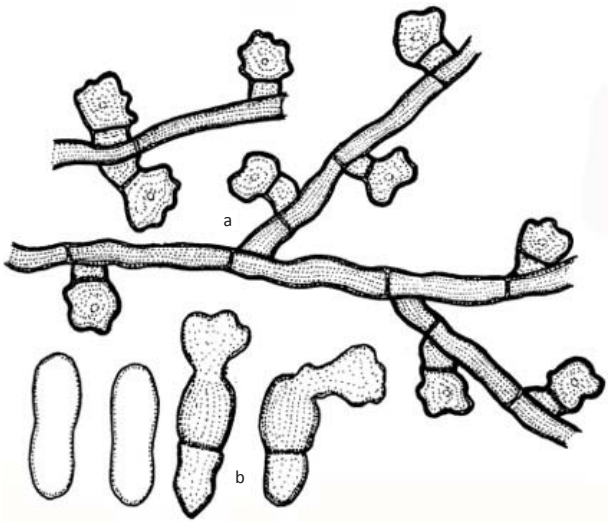

Figure 8. *Armatella litseae*
a - Appressoriate mycelium, b - Ascospores

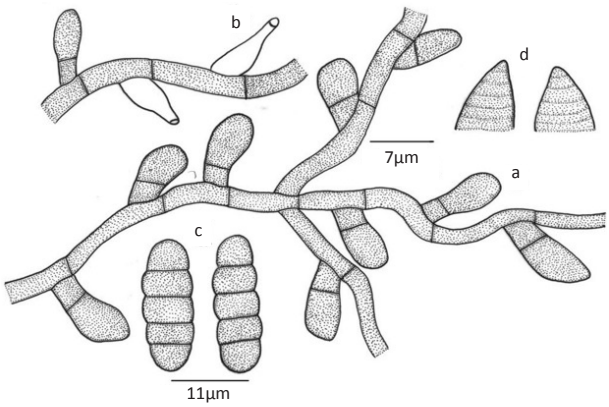

Figure 9. *Asteridiella anastomosans*
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

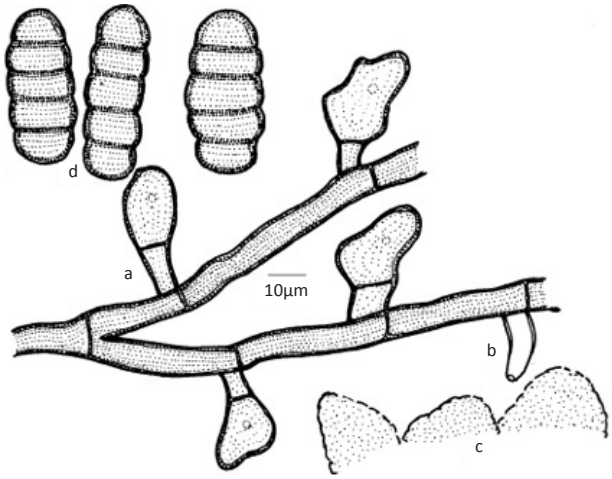

Figure 10. ***Asteridiella clerodendricola***
a - Appressorium; b - Phialide; c - perithecial wall cells; d - Ascospores

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, 22–30 µm long; stalk cells cylindrical to cuneate, 8–16 µm long; head cells globose, angulose, entire to sublobate, 14-16 x 12-16 µm. Phialides few, mixed with appressoria, opposite to alternate, ampulliform, 20-22 x 8-10 µm. Perithecia mostly aggregated, up to 245µm in diam.; perithecial surface cells irregularly protruded, 30–36 µm long; ascospores ellipsoidal, 4-septate, straight to slightly curved, 36–42x14–18 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,

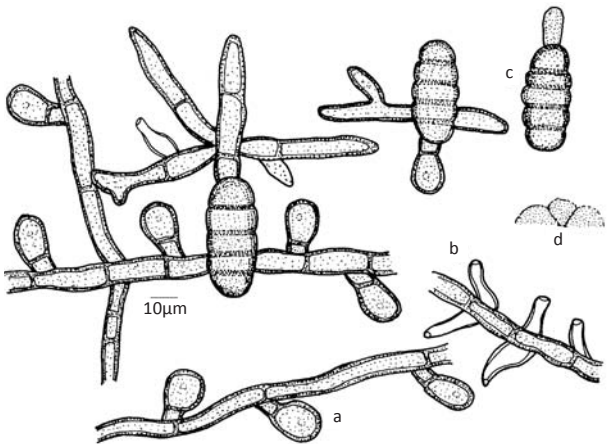

Figure 11. ***Asteridiella combreti*** **var.** ***leonensis***
a - Appressoriate mycelium; b - Phialides; c - Ascospores;
d - Perithecial cells

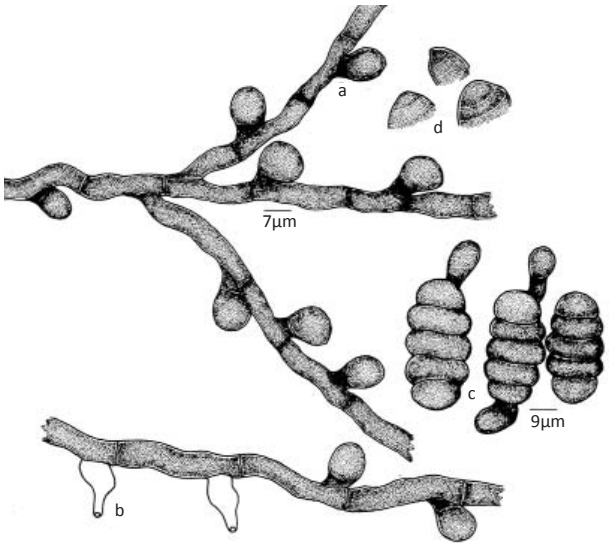

Figure 12. ***Asteridiella crotonis-caudati***
a - Appressoriate mycelium; b - Phialides; c - Ascospores;
d - Perithecial cells

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; perithecial 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.; perithecial cells

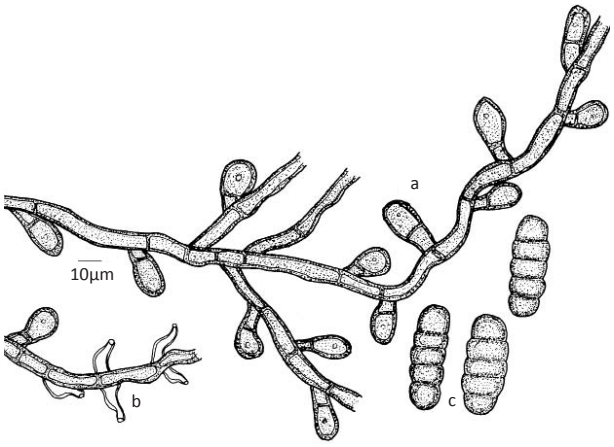

Figure 13. ***Asteridiella cyclopoda***
a - Appressoriate mycelium; b - Phialides; c - Ascospores

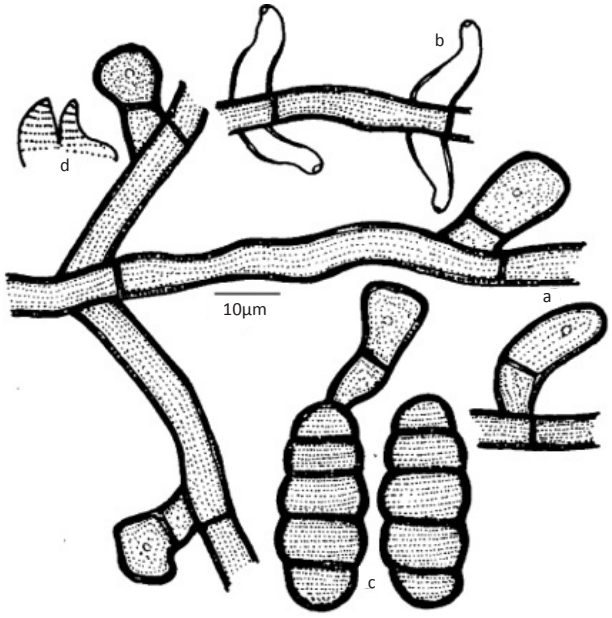

Figure 14. ***Asteridiella elaeocarpi-tuberculati***
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

mammiform, up to 10µm long; ascospores ellipsoidal, 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.; perithecial 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 &

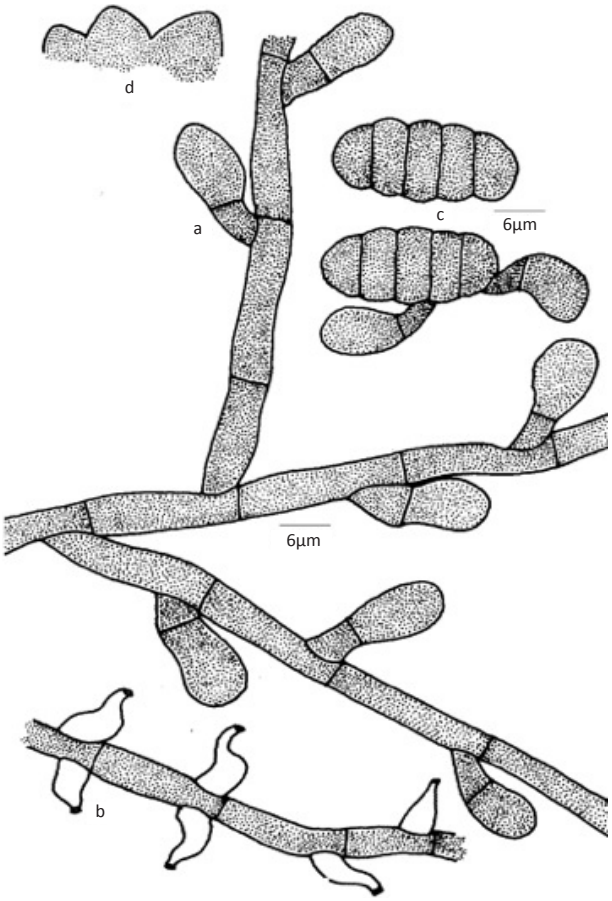

Figure 15. ***Asteridiella formosensis***
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

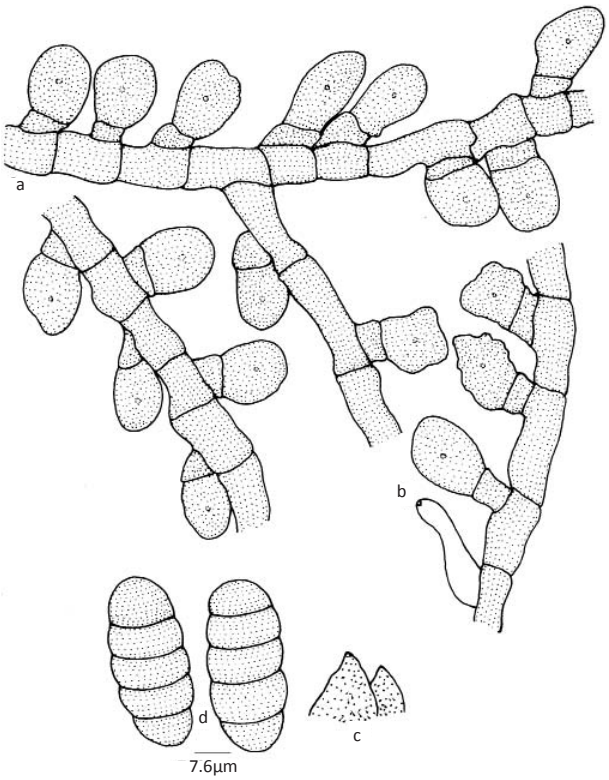

Figure 16. ***Asteridiella oreocnidecola***
a - Appressorium; b - Phialide; c - Perithecial wall cells; d - Ascospores;

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 substraight to undulate, 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, 12–18x6–8 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.

Material 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, 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.

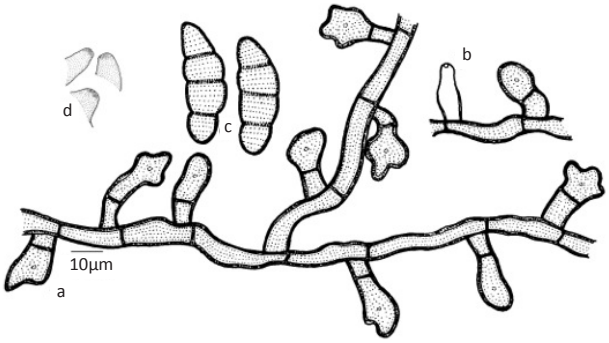

Figure 17. ***Asteridiella pygei*** **var.** ***microspora***
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

(Urticaceae), Sairandhri, Hosagoudar et al. HCIO 45771 (holotype), TBGT (isotype).

Asteridiella pygei Hansf. 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. Perithecia 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. Perithecia scattered, up to 186µm in diam.; perithecial cells mammiform, straight to curved, up to 22µm long; ascospores obovoidal, 4-septat.

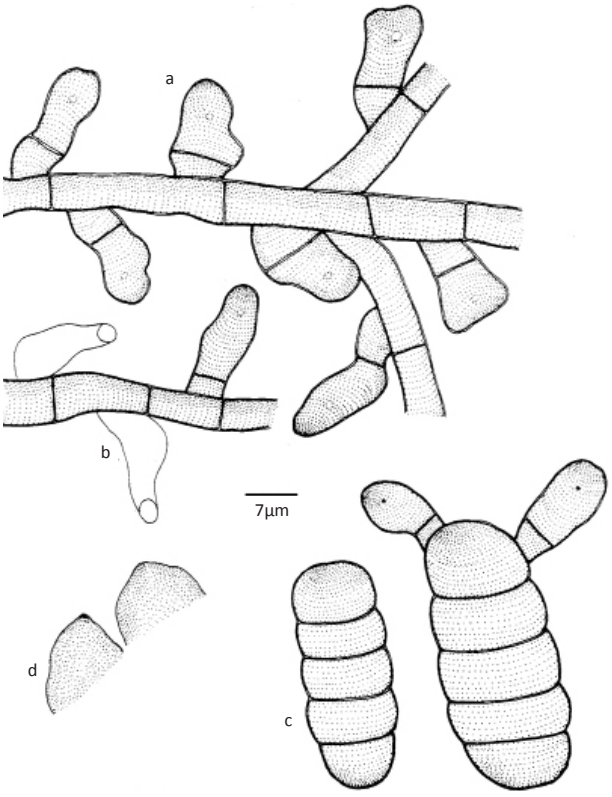

Figure 18. ***Asteridiella scolopiae***
a - Appressorium; b - Phialide; c - Ascospores; d - Perithecial wall cells

Material examined: 13.xii.2003 on leaves of Flacourtiaceae 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. Perithecia 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 Strobilanthus sp. (Acanthaceae), Silent Valley, P.P.

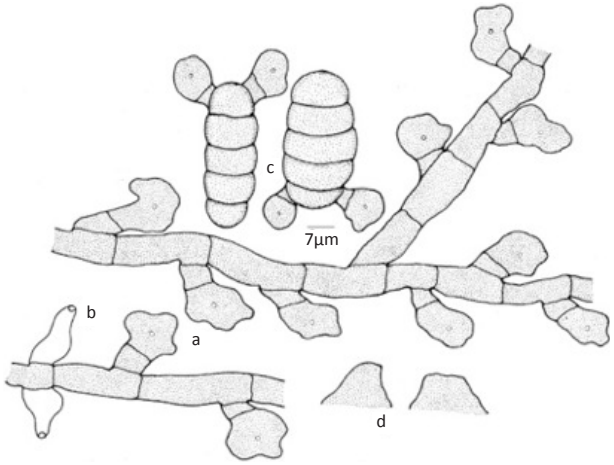

Figure 19. ***Asteridiella strobilanthicola***
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

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, unilateral, 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.

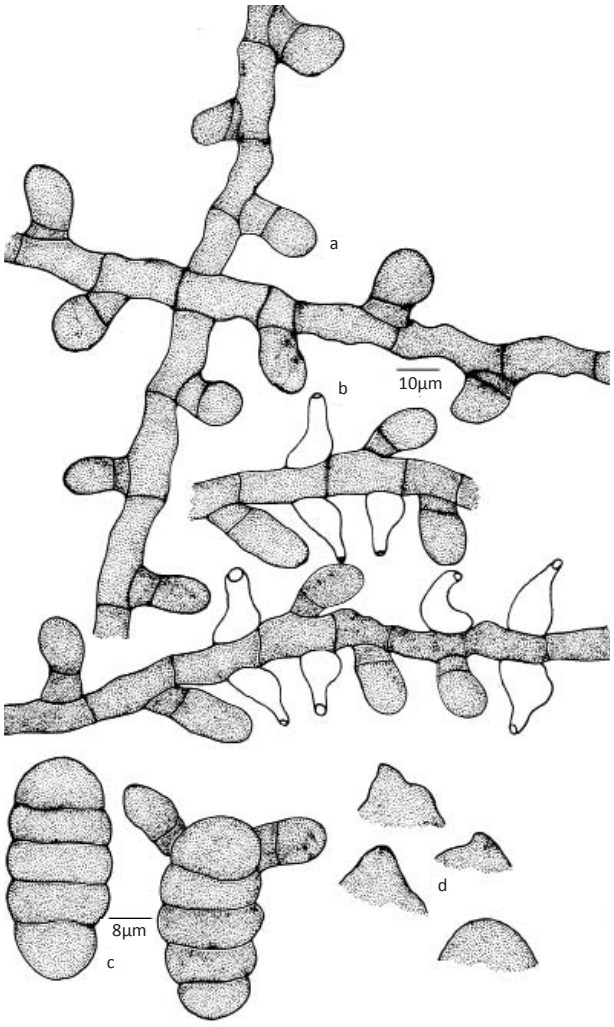

Figure 20. ***Asteridiella toddaliae***
a - Appressoriate mycelium; b - Phialides; c - Ascospores; d - Perithecial cells

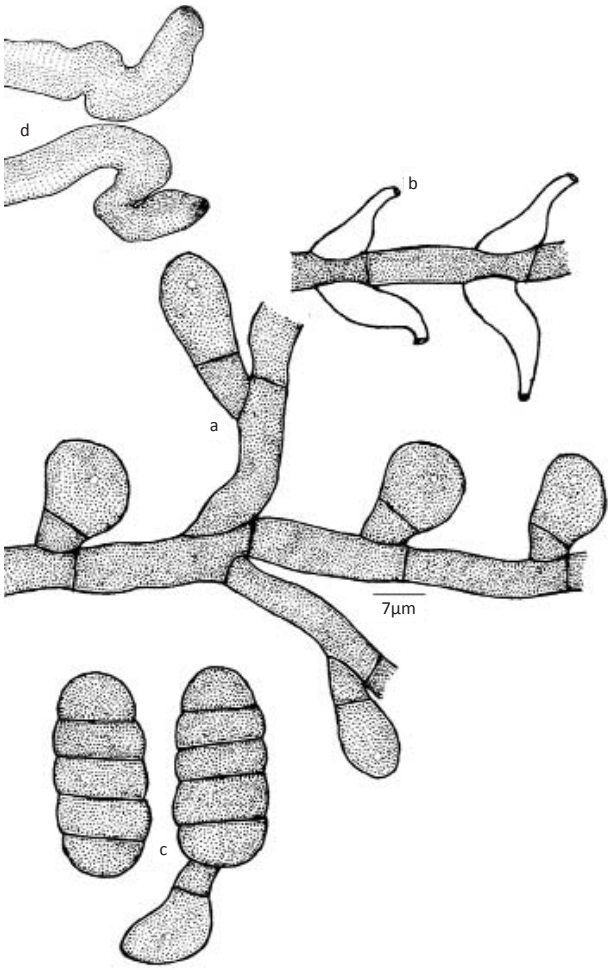

Figure 21. ***Irenopsis triumfettae* var. *indica***
a - Appressoriate mycelium; b - Phialides; c - Ascospores, d - Perithecial setae

Material examined: 2.vii.2008on leaves of Toddalia asiatica (L.) Lam. (Rutaceae), Cheriavalakkad, 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, entire, 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

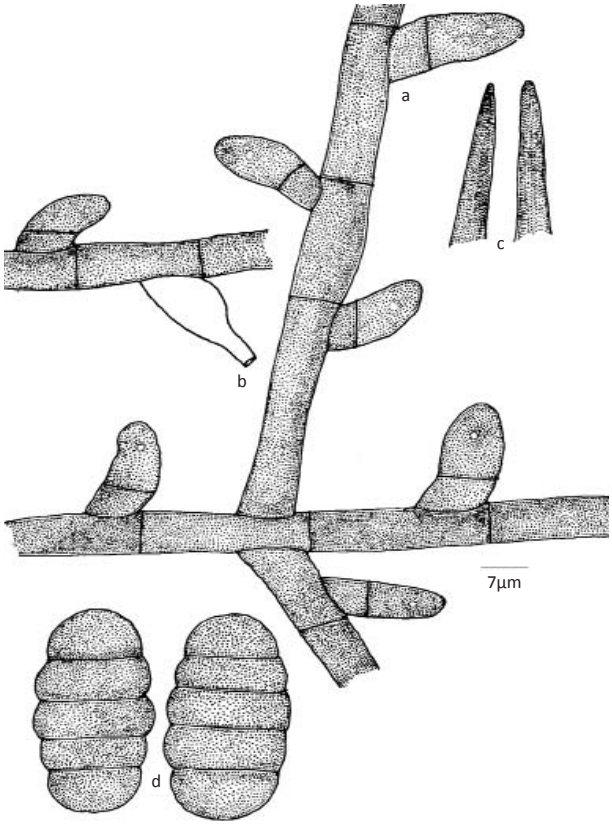

Figure 22. *Meliola affinis* var. *indica*
a - Appressoriate mycelium; b Phialides; c - Apical portion of the mycelial setae; d - Ascospores

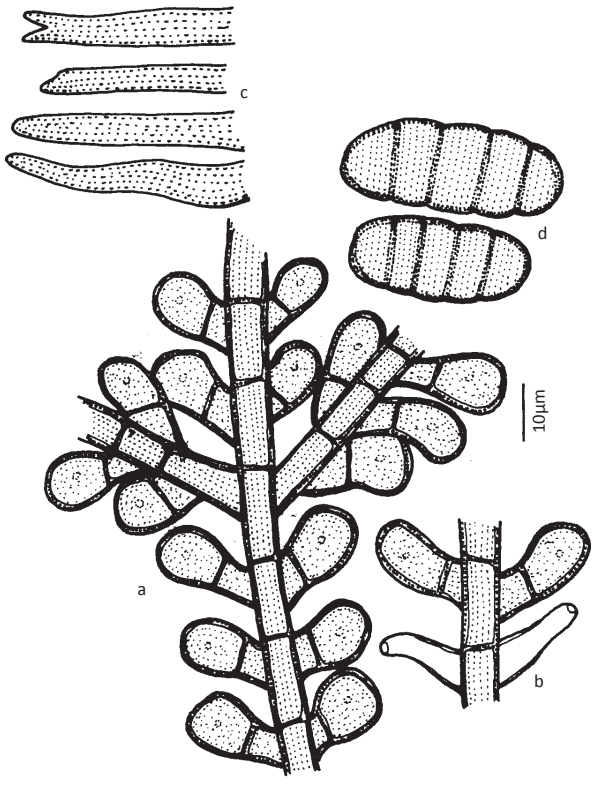

Figure 23. *Meliola allophyli-concanici*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

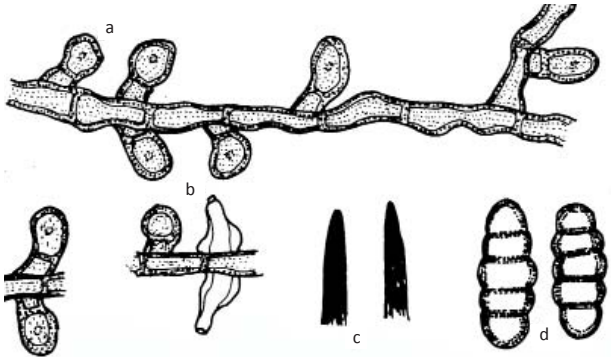

Figure 24. *Meliola ancistrocladi*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

sp. (Melastomataceae), Silent Valley, Jayakumar et al. HCIO 50311, TBGT 4228; Poochipara, 25 July 2009, Jayakumar et al. HCIO 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, antrorse 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, 37–40x15–18.5 µm.

Material examined: 14.xii.2003 on leaves of *Allophyllus concanicus* Radlk. (Sapindaceae), Champatty, V.B. Hosagoudar et al. HCIO 45768, TBGT 1517; on leaves of A*llophyllus cobbe* (L.) Rausch., Sairandhri, 13.xii.2003, V.B.Hosagoudar et al. HCIO 47344, TBGT 2382.

Meliola ancistrocladi Hosag. in Hosag. &Goos, Mycotaxon 37: 218, 1990; Hosag., Meliolales of India, p. 130, 1996 (Fig. 24).

Colonies hypophyllous, rarely epiphyllous, dense, up to 10mm in diameter, confluent. Hyphae substraight to undulate, branching mostly oppositely at acute to wide angles, loosely reticulate, cells 16–20x3–7 µm. Appressoria alternate to 10% opposite, straight to curved, antrorse to spreading, 13–20 µm long; stalk cells cylindrical to cuneate, 3–7 µm long; head cells ovate to

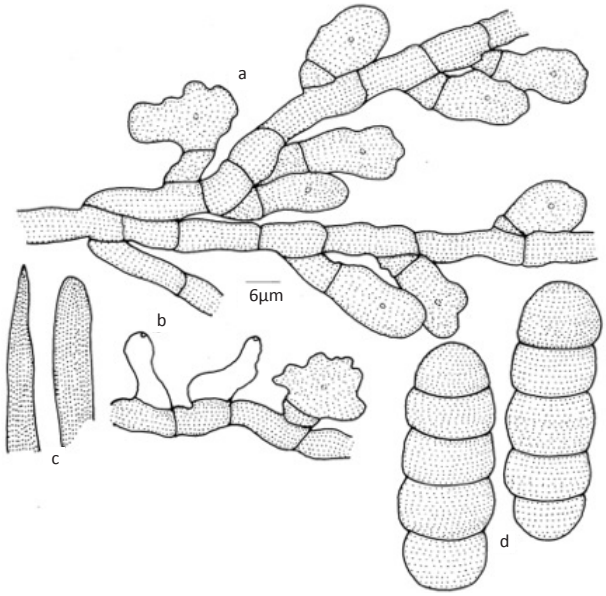

Figure 25. *Meliola anodendricola*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

globose, entire, 10–13µm in diam. Phialides mixed with appressoria, opposite to alternate, ampulliform, 16–27x10–13 µm. Mycelial setae fairly numerous, equally scattered, straight to flexuous, simple, acute to obtuse at the tip, up to 291µm long. Perithecia few, scattered, up to 165µm in diam.; ascospores obovate, 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% uncinate, 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.

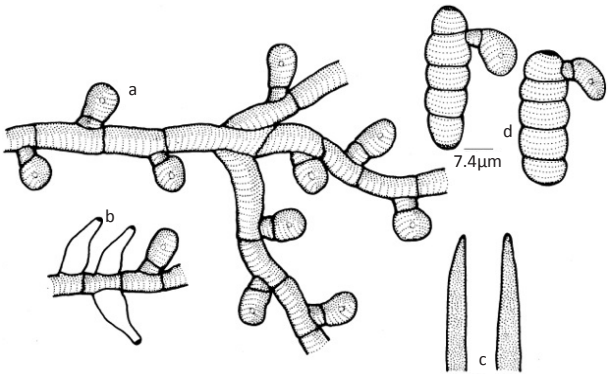

Figure 26. ***Meliola aristolochigena***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 µm. Appressoria alternate to about 3% opposite, antrorse to subantrorse, 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 46237 (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, subantrorse 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.

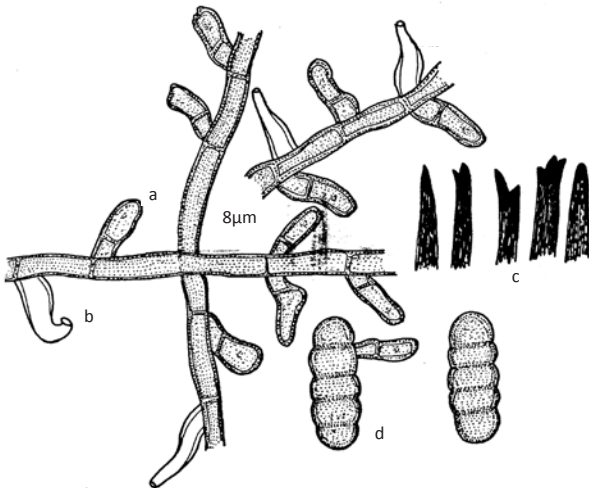

Figure 27. ***Meliola atalantiae***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

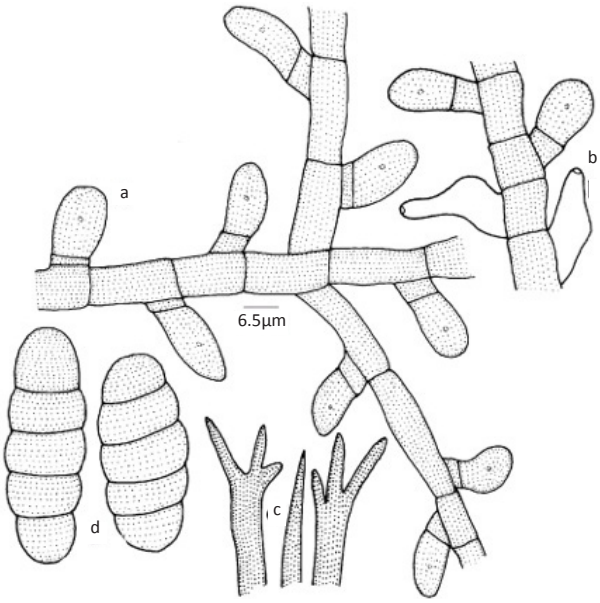

Figure 28. ***Meliola butleri***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

HCIO 49547, TBGT 3789; Walakkad, M.C. Riju et al. TBGT 5231.

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 to4 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: 12.xii.2003 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 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 angulose, 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.iii.2010 on leaves of *Canthium dicoccum* (Gaertner) Teijsm. & Binned. (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.iii.2010 on leaves of *Allophyllus* sp. (Sapindaceae), Poochipara, P.J. Robin et al. TBGT 5160.

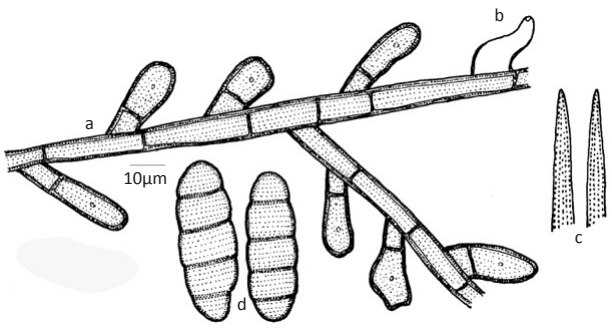

Figure 29. ***Meliola canthii***
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

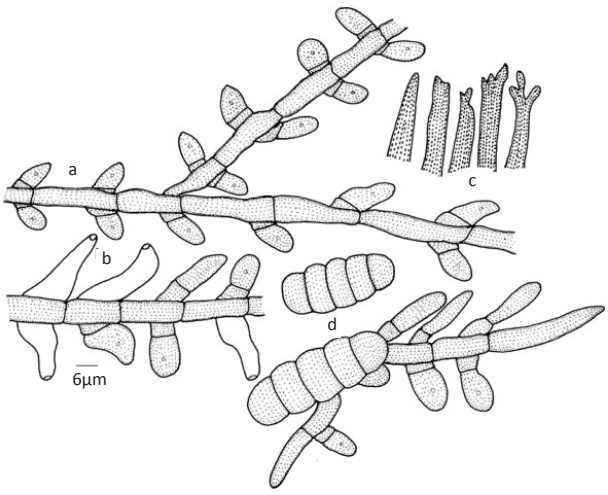

Figure 30. ***Meliola capensis*** **var.** ***indica***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

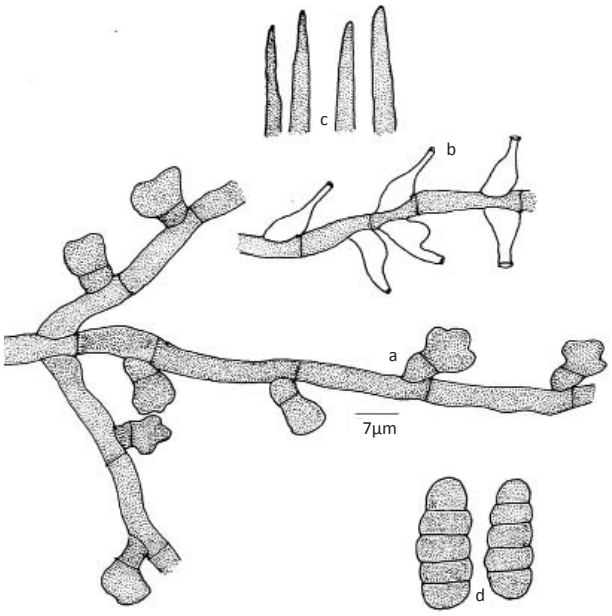

Figure 31. ***Meliola chandrasekharanii***
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

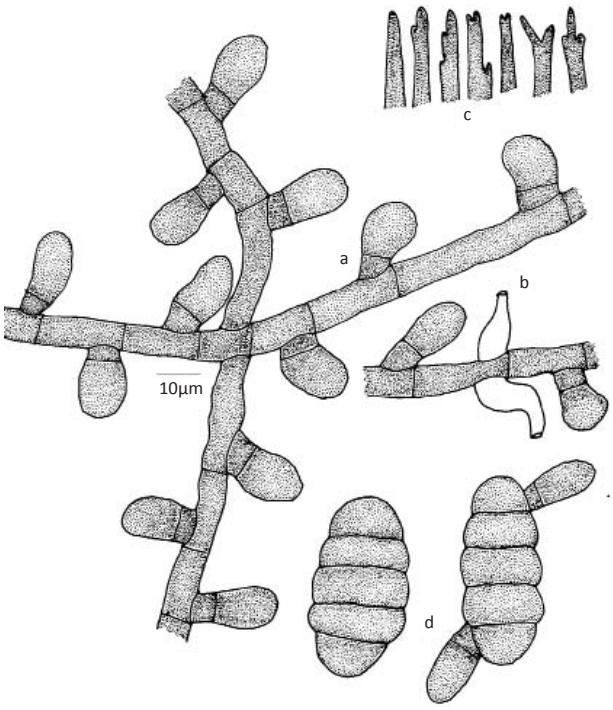

Figure 32. ***Meliola cinnamomi***
a - Appressoriate mycelium; b - Phialides;
c - Apical portion of the mycelial setae; d - Ascospores

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 sublobate, 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. HCIO 49546, TBGT 3788; 03.viii.2008, Cheriya Walakkad, *Nothopodytes* 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

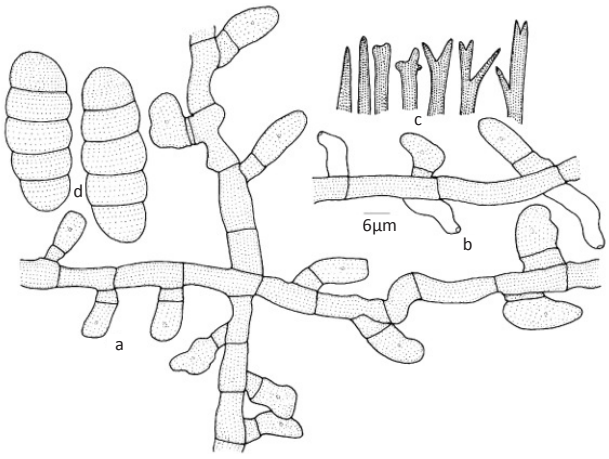

Figure 33. ***Meliola citricola***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

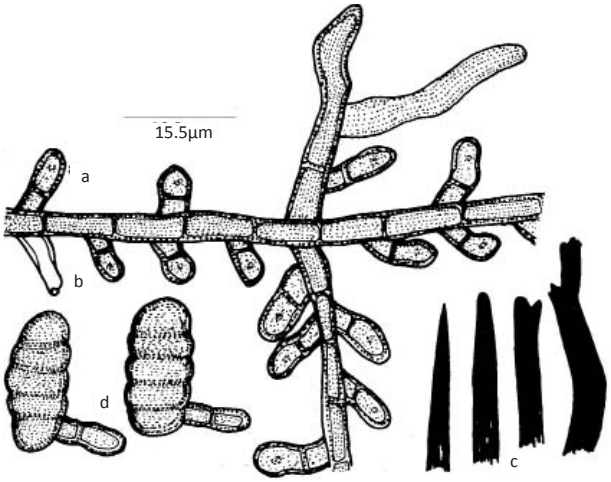

Figure 34. ***Meliola clausenae***
a - Appressoriate mycelium, b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 576µm long. Perithecia scattered, verrucose, up to 225µm 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 2mm in diameter. Hyphae straight to slightly undulate, branching opposite at wide angles, loosely reticulate, cells 10–16x6–8µm. 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 747µm long. Perithecia scattered, verrucose, up to 180µm in diam.; ascospores obovoidal, 4-septate, constricted, 36–42x14–16 µm.

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

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

Colonies amphigenous, dense, velvety, up to 3mm in diam., scattered to confluent. Hyphae straight, flexuous, branching opposite at wide angles, loosely to closely reticulate, cells 15–30 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 240µm long. Perithecia scattered to grouped in the colonies, up to 190µm 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; Hansf. 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.

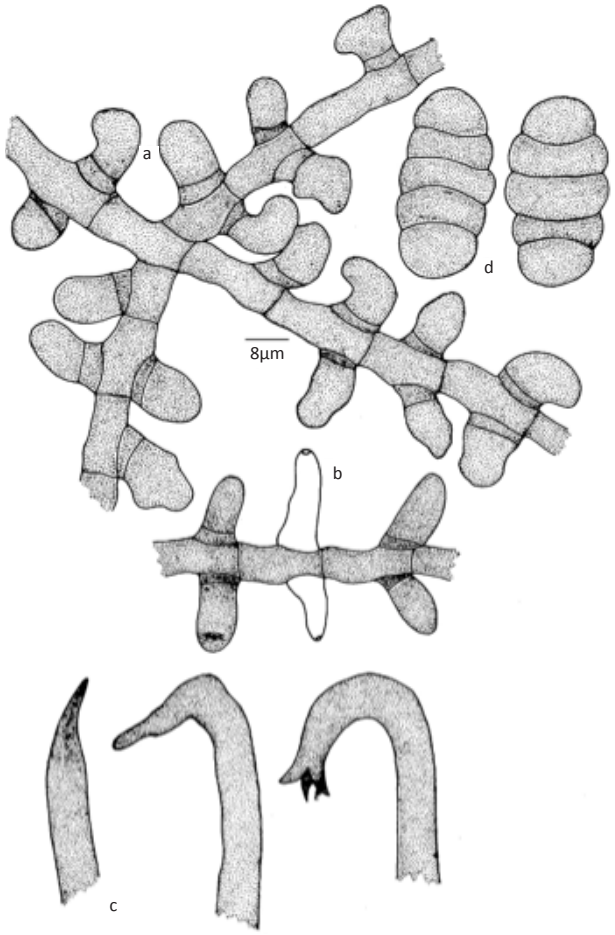

Figure 35. ***Meliola clausenigena***
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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, 5.iii.2008, P.J.

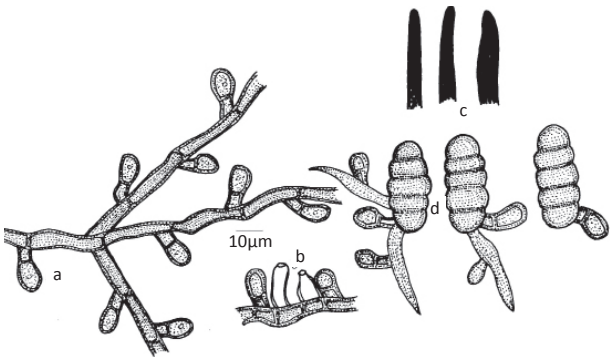

Figure 36. ***Meliola clerodendricola***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Robin 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,

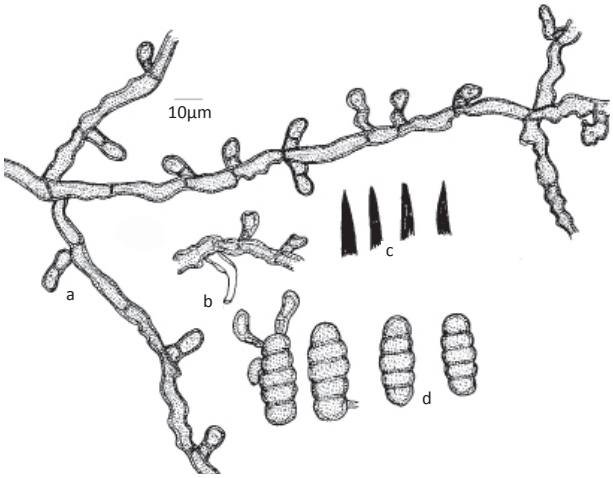

Figure 37. ***Meliola commixta***
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

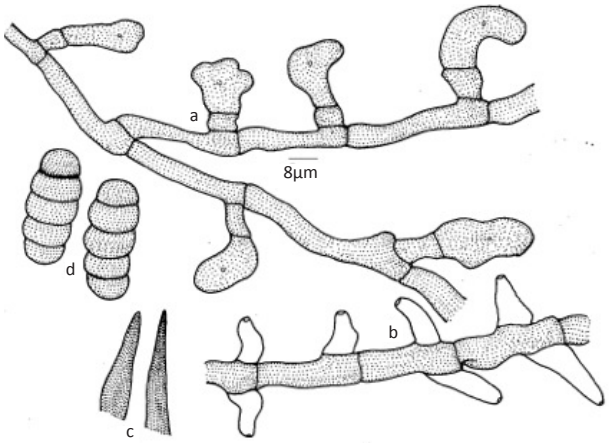

Figure 38. *Meliola daviesii* var. *longiseta*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

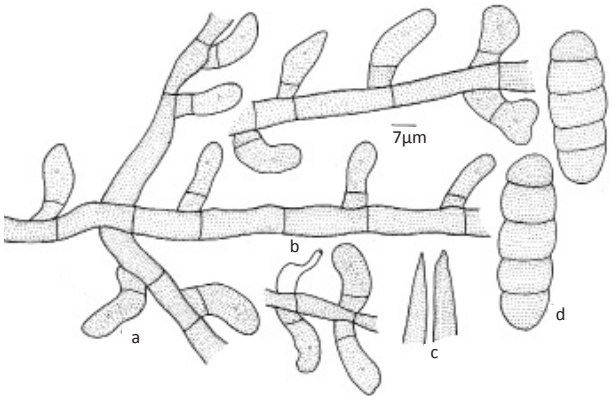

Figure 39. *Meliola diospyricola*
a - Appressoriate; b. Phialide; c - Apical portion of the mycelial setae, d - Ascospores

opposite to alternate, 16–20x8–10 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, 34–40x14–16 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 substraight to flexuous, branching irregular at acute to wide angles, loosely to closely reticulate, cells 24–28x6–8 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, 14–20x9–13 µm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 12–16x6–8 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, 38–42x11–16 µm.

Material examined: 13.xii.2003 on leaves of *Jasminum rottlerianum* 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 22–35x5–7 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, 16–18x9–11 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 24–28x4–7 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, 42–45x15–17 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 16–24x5–7 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, 9–15x11–13 µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 14–16x8–12 µm. Mycelial setae

Image 7. *Meliola dolichi* on *Dolichus trilobus*

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.

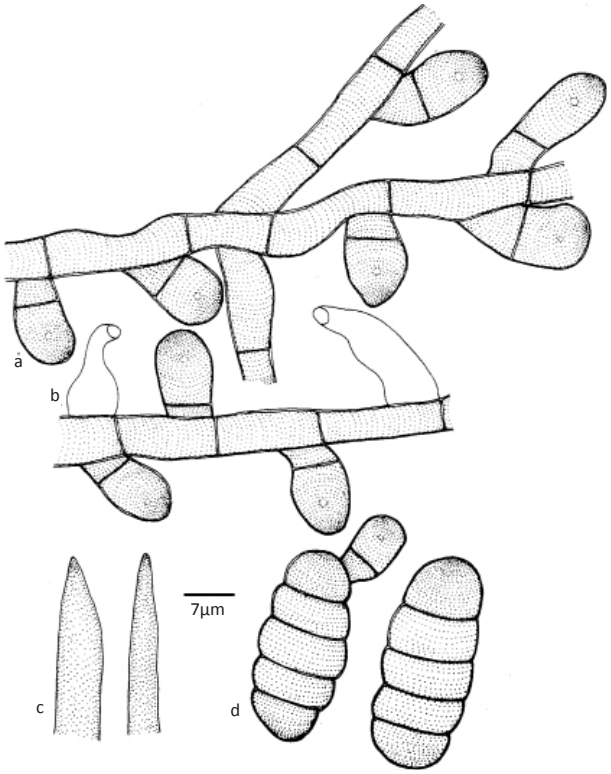

Figure 41. ***Meliola erythropali***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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. (Erythropalaceae), 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. sPhialides 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 obovoidal, 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.

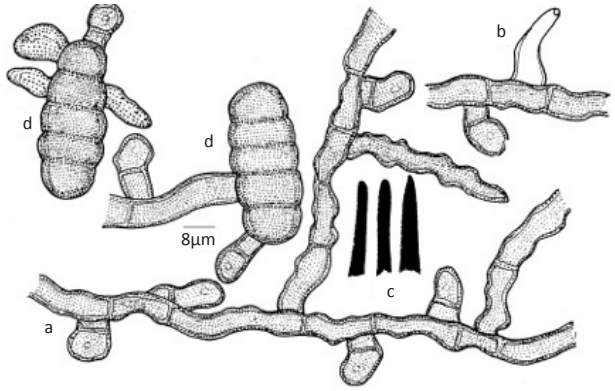

Figure 42. ***Meliola eugeniae-jamboloidis***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

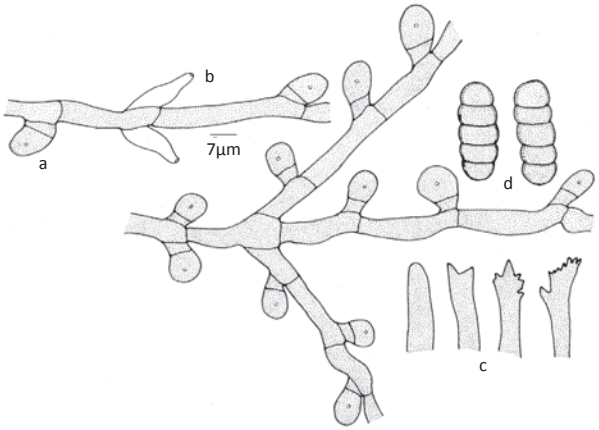

Figure 43. ***Meliola flemingiicola***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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, subantrorse 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 8).

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 obovoidal, 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;

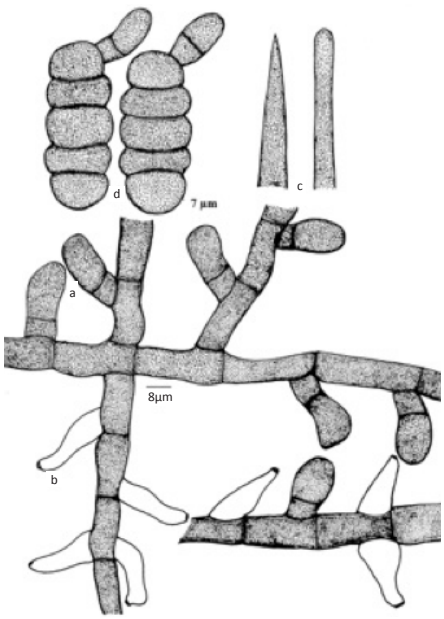

Figure 44. ***Meliola garciniae***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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.

Meliola gneti 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).

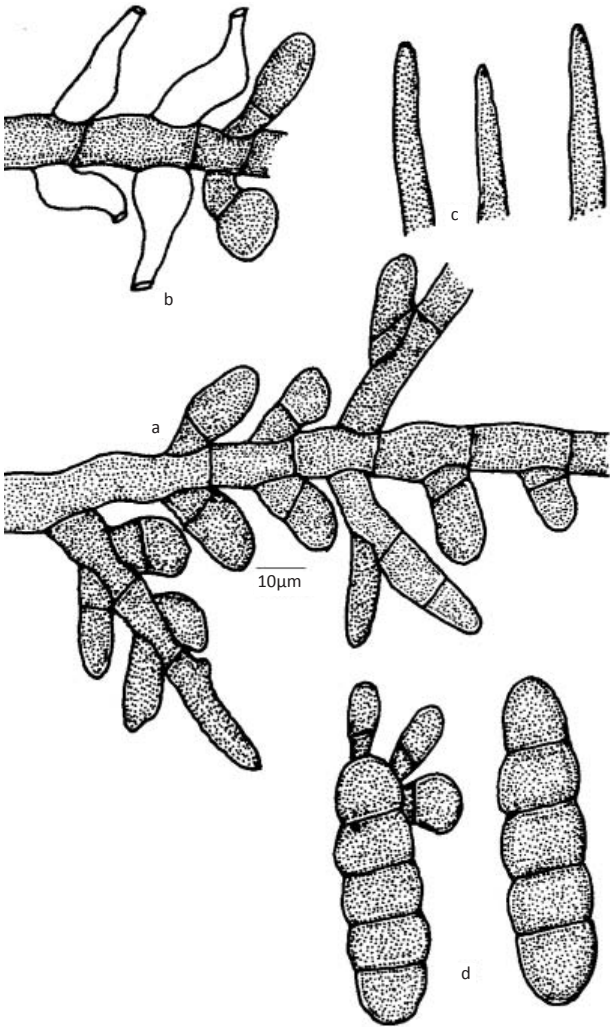

Figure 45. *Meliola gemellipoda*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Image 8. *Meliola garciniae* - infected leaves

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.

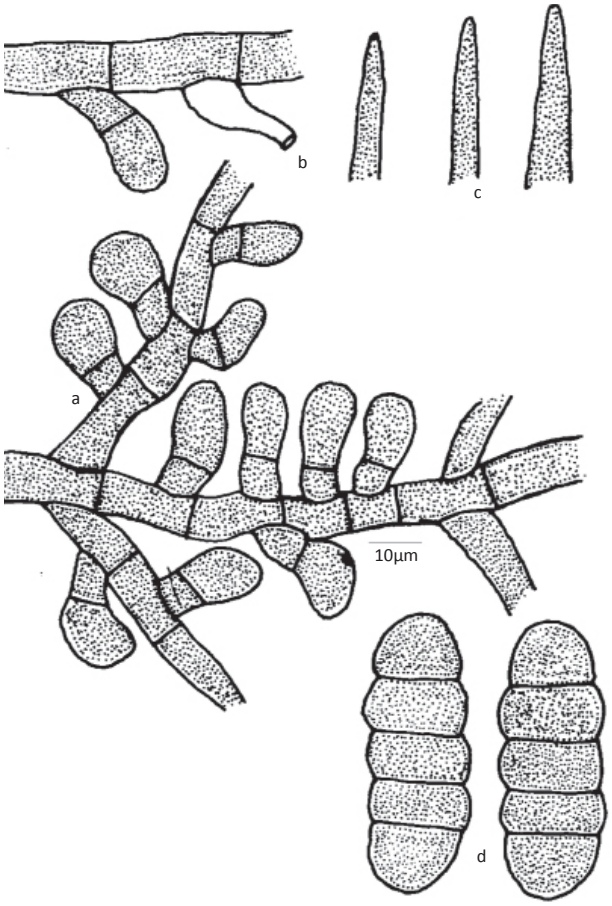

Figure 46. *Meliola gneti*
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Image 9. *Meliola gneti* - infected leaves

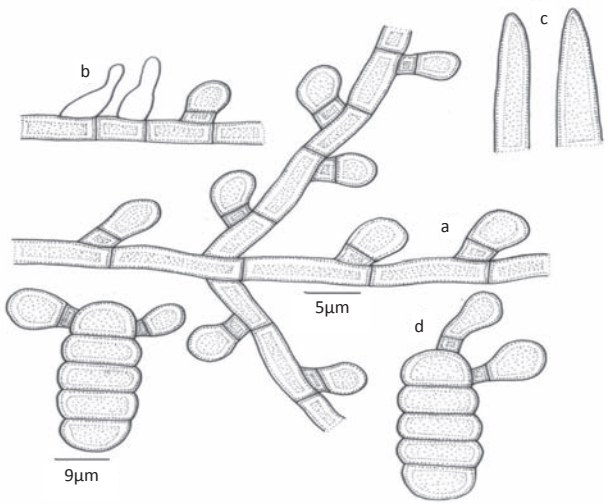

Figure 47. *Meliola groteana* var. *maesae*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 Syd. 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.

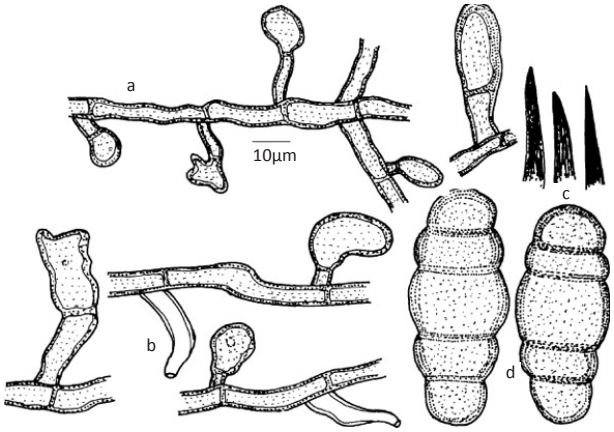

Figure 48. ***Meliola holigarnae***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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.

Meliola ichnocarpi Stev. & Rold., Philippine J. Sci. 56: 66, 1935 (non Hansf. & Thirum., 1948); Hansf., Sydowia Beih. 2: 561, 1961 (Fig. 49).

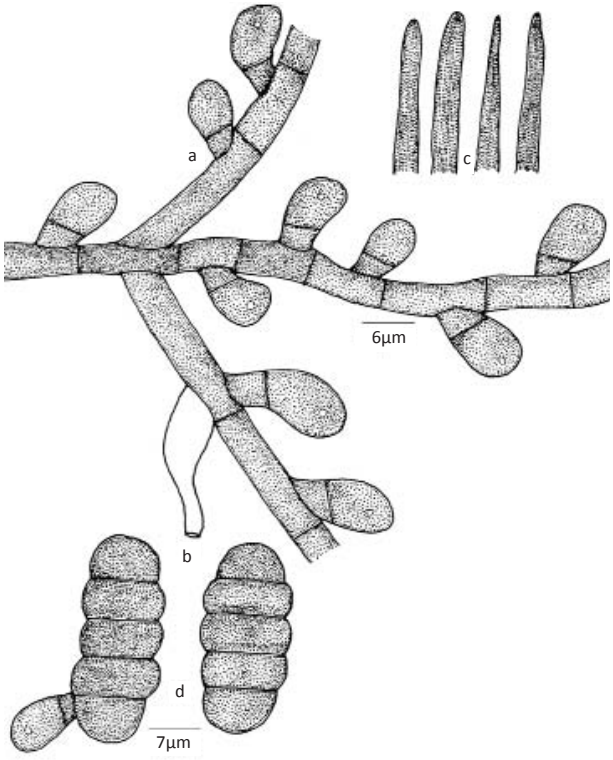

Figure 49. ***Meliola ichnocarpi-volubili***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 sublobate, 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.

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

Colonies hypophyllous, subdense, spreading, up to 5mm in diameter. Hyphae mostly flexuous, branching

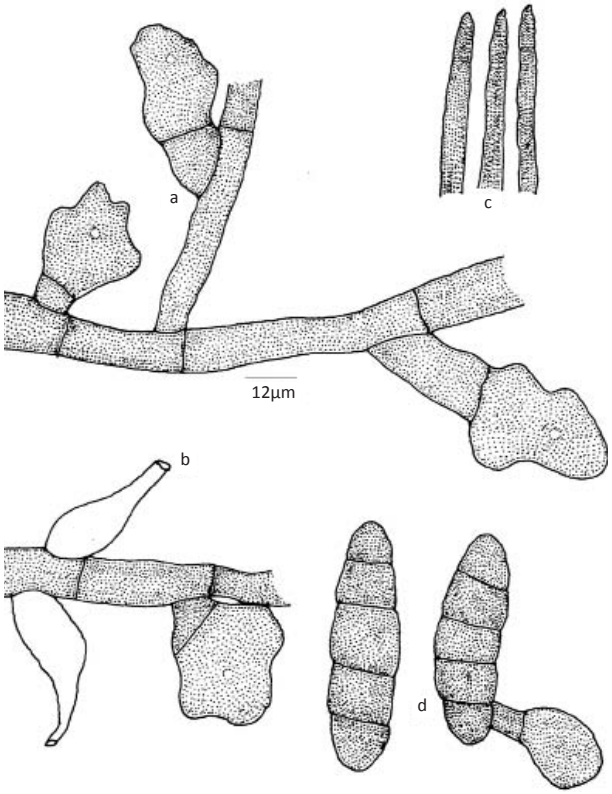

Figure 50. *Meliola ixorae* var. *psychotriae*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

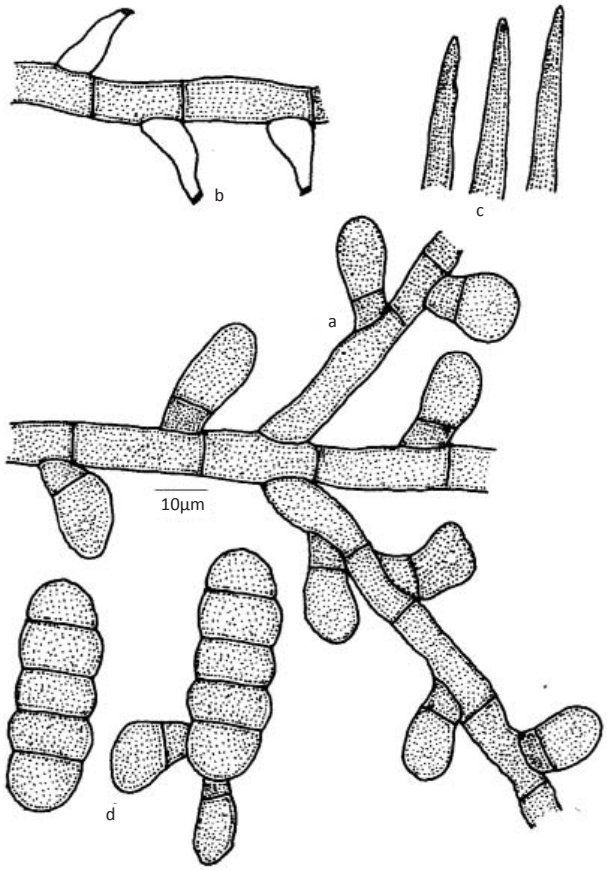

Figure 51. *Meliola jasmini*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 187µm in diameter; ascospores cylindrical, straight to curved, 4-septate, slightly constricted at the septa, 36–40x9–13 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, 2.iii.2010, P.J. Robin & al TBGT 5102; 14.ii.2007, M.C. Riju et al. TBGT 5628.

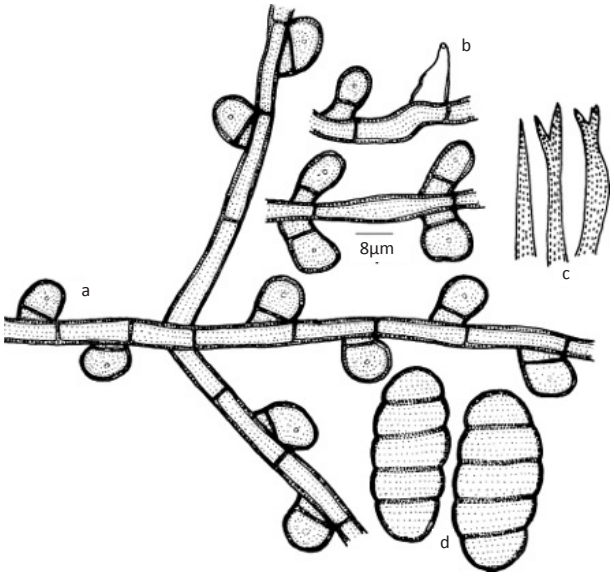

Figure 52. *Meliola kakachiana*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

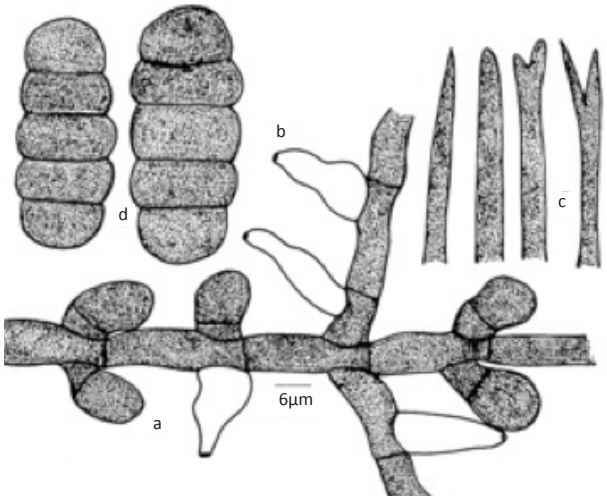

Figure 53. *Meliola kakachiana* var. *poochiparensis*
a - Appressoriate mycelium, b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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, acute 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 Hosagoudar 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 lepianthedis 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),

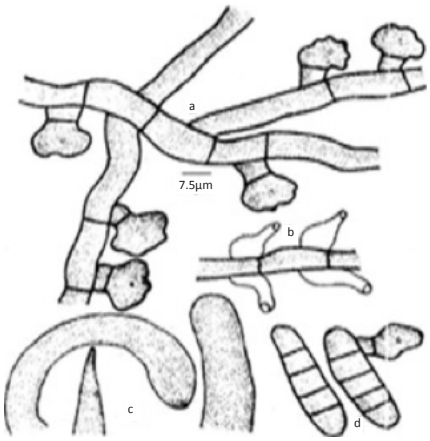

Figure 54. *Meliola lepianthedis*
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

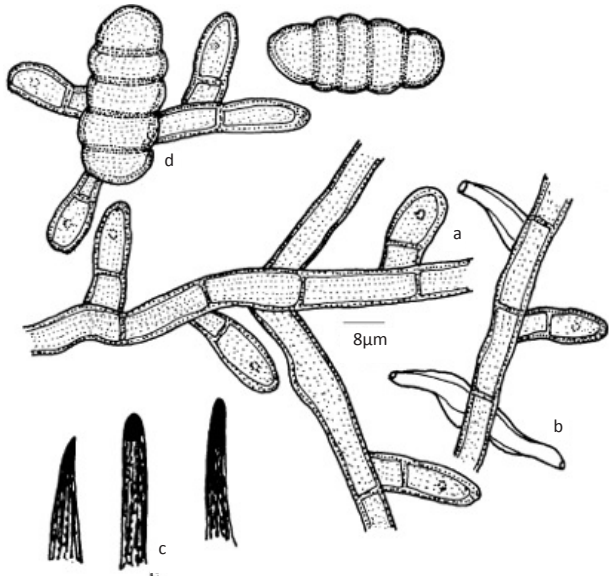

Figure 55. *Meliola litseae* var. *rotundipoda*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 4mm 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 612µm long. Perithecia scattered, verrucose, up to 200µm in diam.; ascospores obovate, 4-septate, slightly constricted, 44–48x18–20 µm.

Material examined: 12.xii.2003 on leaves of *Litsea* sp. (Lauraceae), Sairandhri, 12.xii.2003, V.B. Hosagoudar HCIO 47680, TBGT 2702.

Meliola malabarensis Hansf., Proc. Linn. Soc. London 157: 182, 1946; Sydowia Beih. 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 4mm 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 480µm long. Perithecia scattered, verrucose, up to 144µm in diam.; ascospores obovoidal, 4-septate, constricted, 32–38x10–16 µm.

Material examined: 13.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 2µm 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

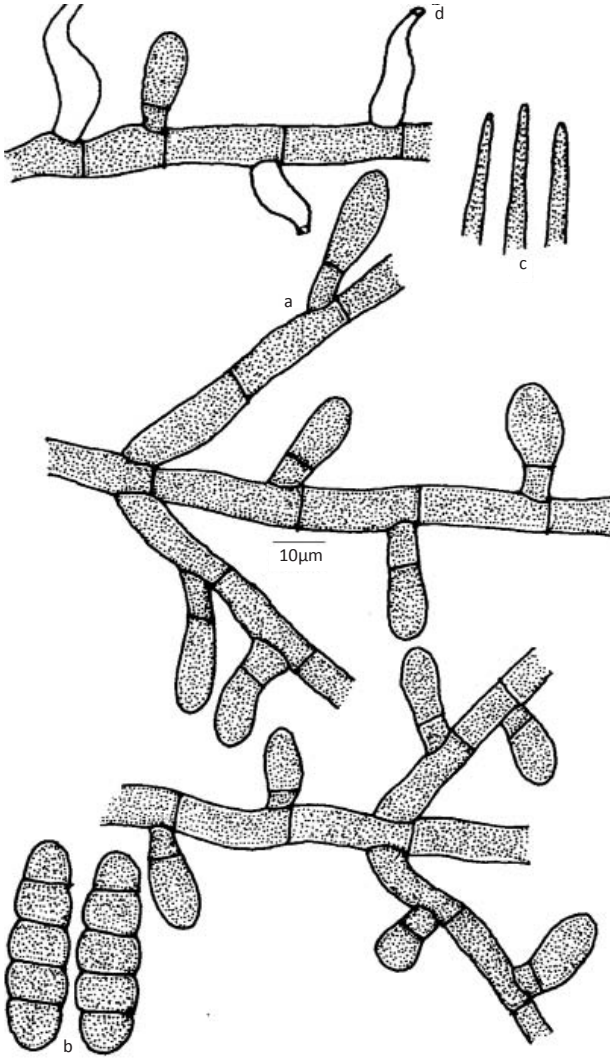

Figure 56. ***Meliola malabarensis***
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

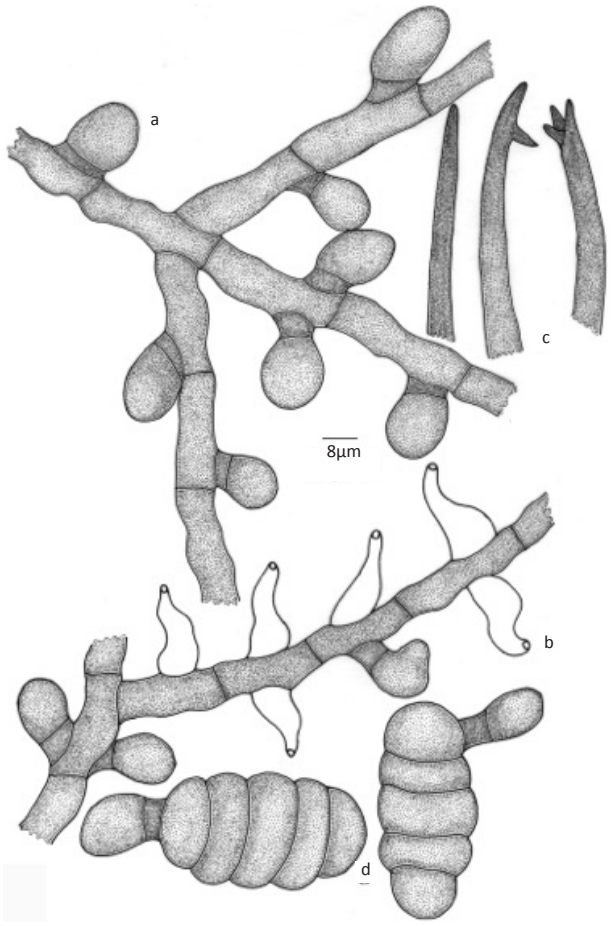

Figure 57. ***Meliola manoharacharyi***
a - Appressoriate mycelium; b. Phialides; c - Apical portion of the mycelial setae; d - Ascospores

µm. Mycelial setae simple, straight to slightly curved, acute to 1–3 times dentate at the tip, up to 1050µm long. Perithecia scattered, varrucose, 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, antrorse to sub-antrorse, 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,

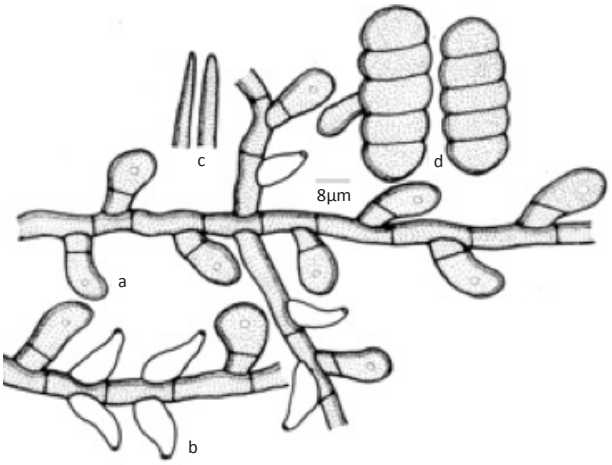

Figure 58. ***Meliola palakkadensis***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

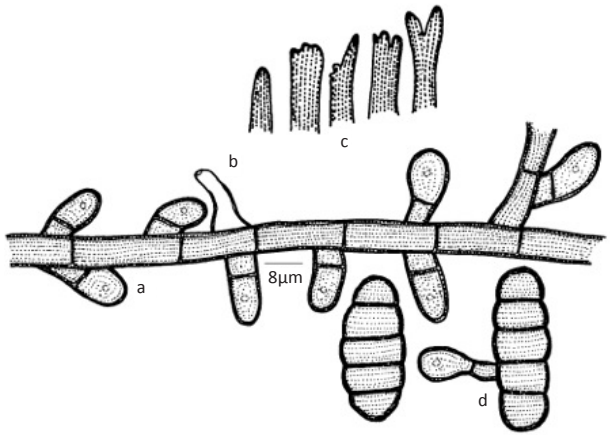

Figure 59. ***Meliola paramignyae***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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 575µm long. Perithecia scattered, verrucose, up to 171µm 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. HCIO 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 300µm long. Perithecia loosely grouped, up to 120µm 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), Onnampuzha, Walakkad, Jacob Thomas et al. HCIO 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,

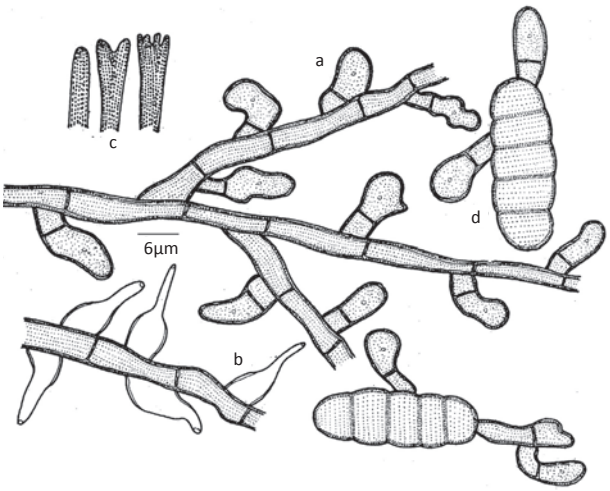

Figure 60. ***Meliola prataprajii***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

straight, obtuse at the tip, up to 300µm long. Perithecia scattered, up to 120µm in diam.; ascospores oblong, cylindrical, 4-septate, very slightly constricted at the septa, 30–32x9–11 µm.

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

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* s.sp. *kanarana* (Talbot) Nooteb. (Symplocaceae), Cheriya 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

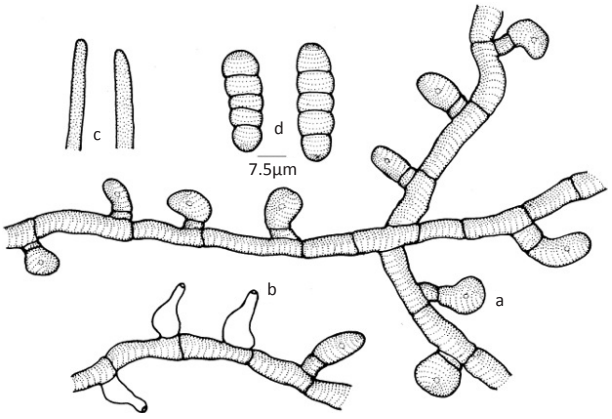

Figure 61. *Meliola pycnosporae*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

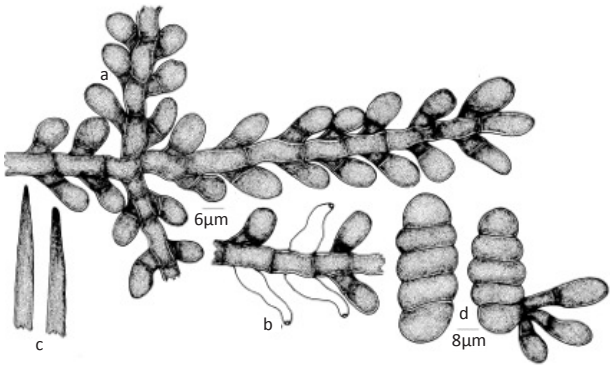

Figure 62. *Meliola rachammae*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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, simple, sigmoid, curved to uncinate at the apical portion, acute, obtuse to bifid at the tip, up to 345µm long. Perithecia loosely grouped, up to 196µm in diam.; ascospores oval, 4-septate, constricted at the septa, 36–40x20–23 µm.

Material examined: 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, up to 1% opposite, unilateral, antrorse to sub-antrorse, straight to slightly curved, 12–19 µm long; stalk cells cylindrical to cuneate, 3–6 µm long; head cells globose, ovate, oblong, entire to slightly angular, straight, 8–16x6–10 µm. Phialides mixed with appressoria, ampulliform, opposite, alternate to unilateral, 12–24x6–11 µm. Mycelial setae numerous, simple, straight, curved to arcuate, acute to obtuse at the tip, up to 510µm long. Perithecia globose, grouped, up to 245µm in diameter; ascospores obovoidal, 4-septate, slightly constricted at the septa, 40–48x16–18 µm.

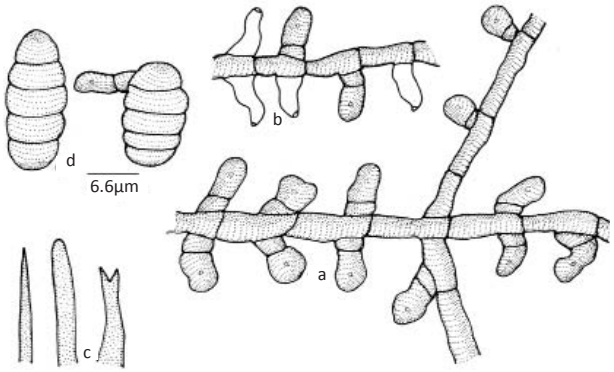

Figure 63. ***Meliola sairandhriana***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

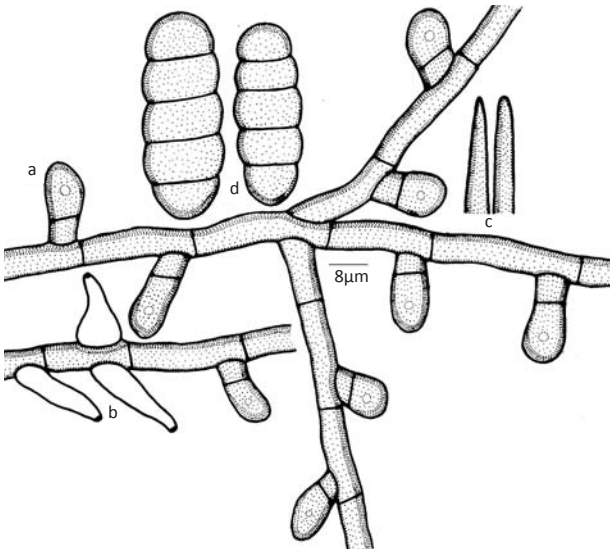

Figure 64. ***Meliola salaciicola***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

Material examined: 13.xii.2003 on leaves of *Salacia* sp. (Hippocrataceae), Sairandhri, 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 19–24x–6–8 µm. Appressoria alternate, antrorse to closely antrorse, 22–26 µm long; stalk cells cylindrical to cuneate, 4–8 µm long; head cells ovate, 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).

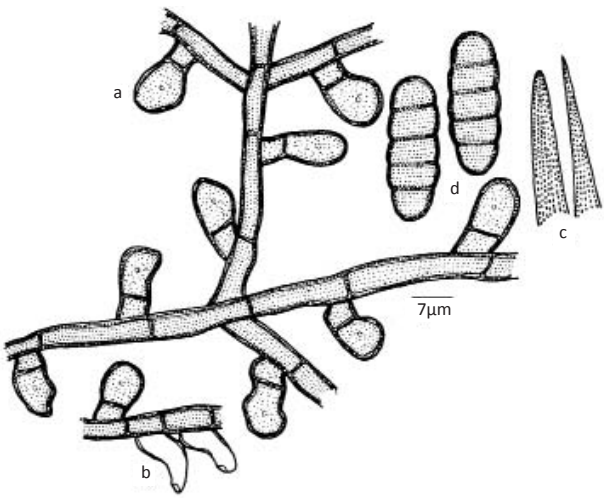

Figure 65.*Meliola serjaniae* var. *major*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

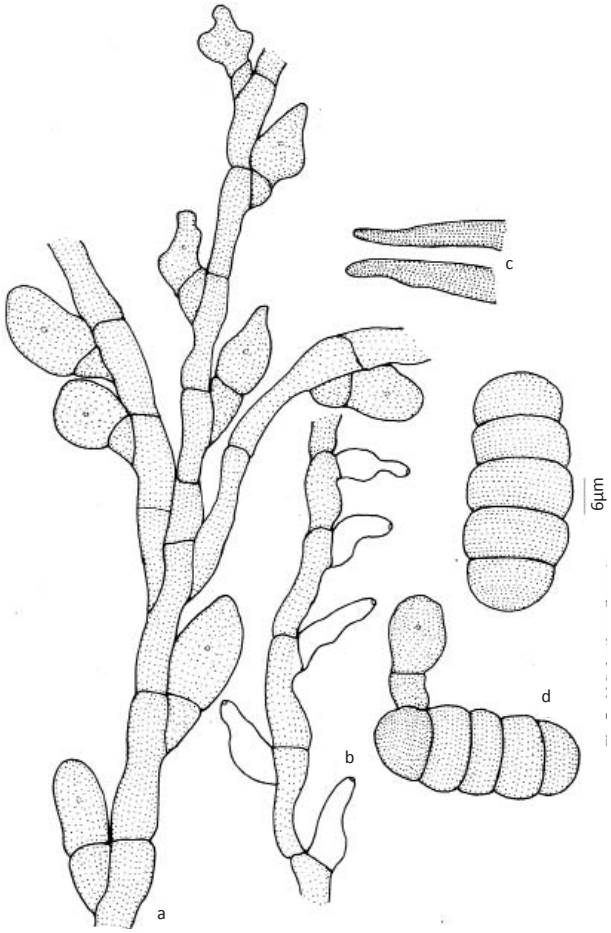

Figure 66. ***Meliola silentvalleyensis***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

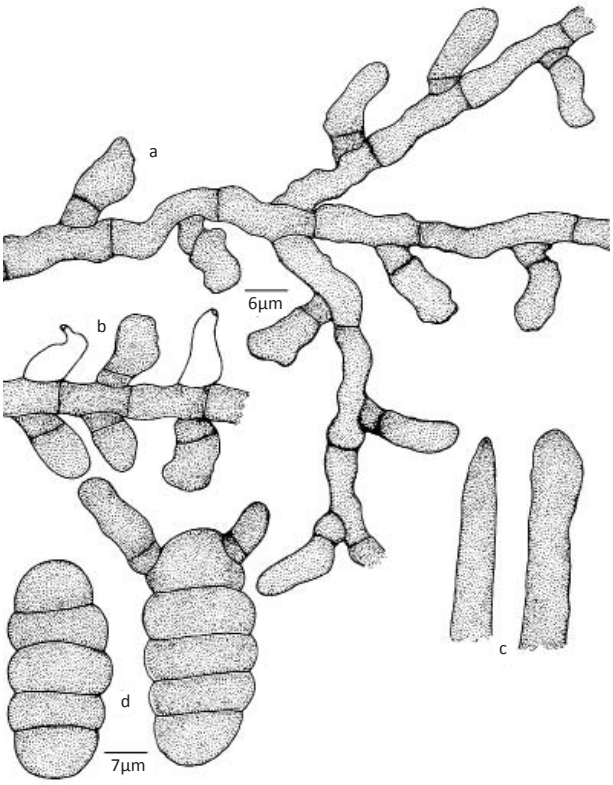

Figure 67. ***Meliola strombosiigena***
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

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, 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 thyrsoidea* (Schultes) Steud (Rubiaceae), Sairandhri, V.B. Hosagoudar et al. HCIO 45805, TBGT 1554.

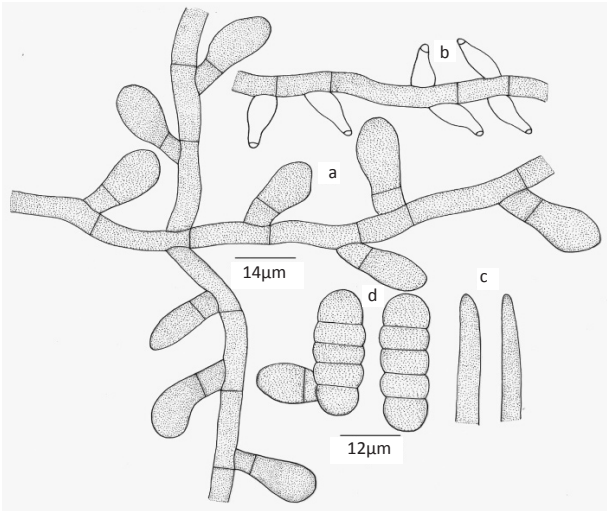

Figure 68. *Meliola wendlandiae*
a - Appressoriate mycelium; b - Phialides; c - Apical portion of the mycelial setae; d - Ascospores

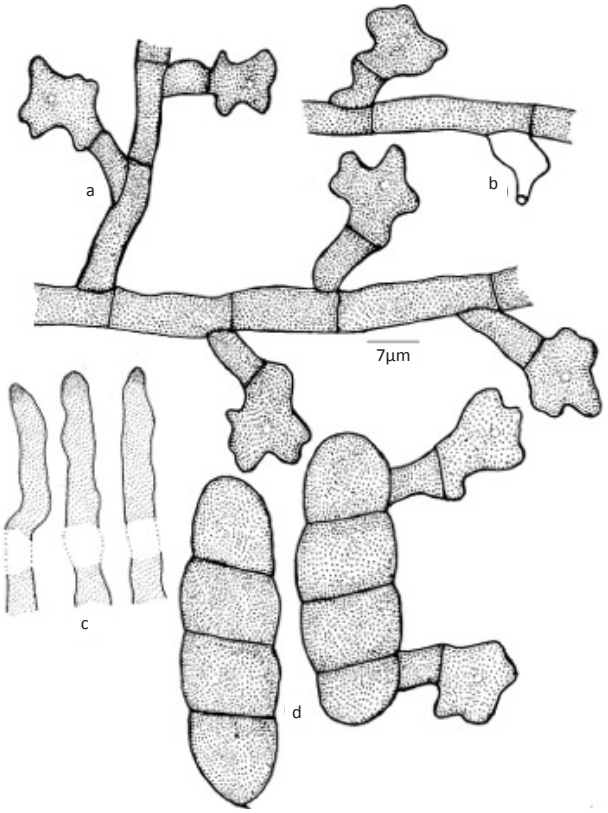

Figure 69. *Prataprajella turpiniicola*
a - Appressoriate mycelium; b - Phialides; c - Repent perithecial setae; d - Ascospores

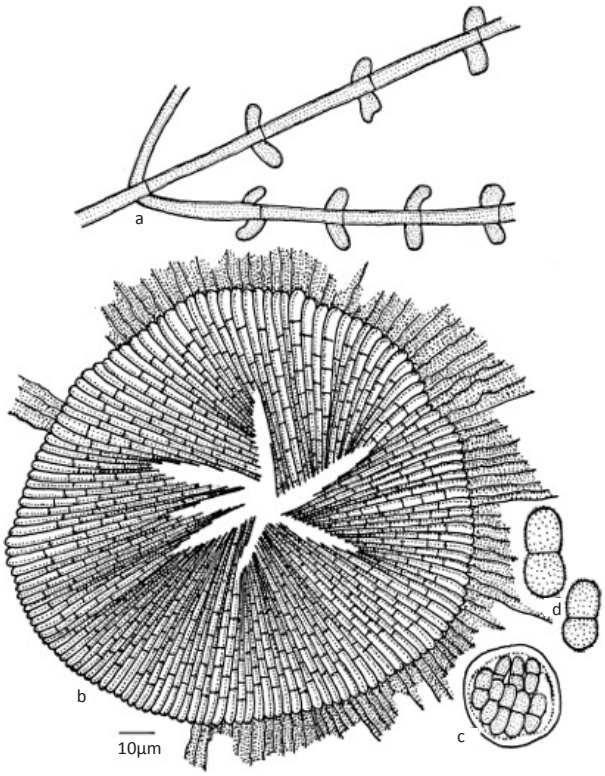

Figure 70. *Asterina acronychiae*
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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

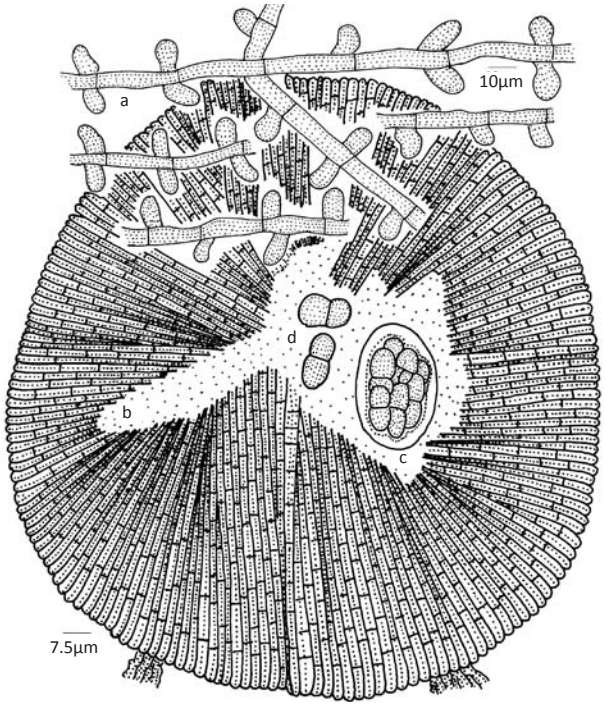

Figure 71. ***Asterina aporusae***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus;
d - Ascospores

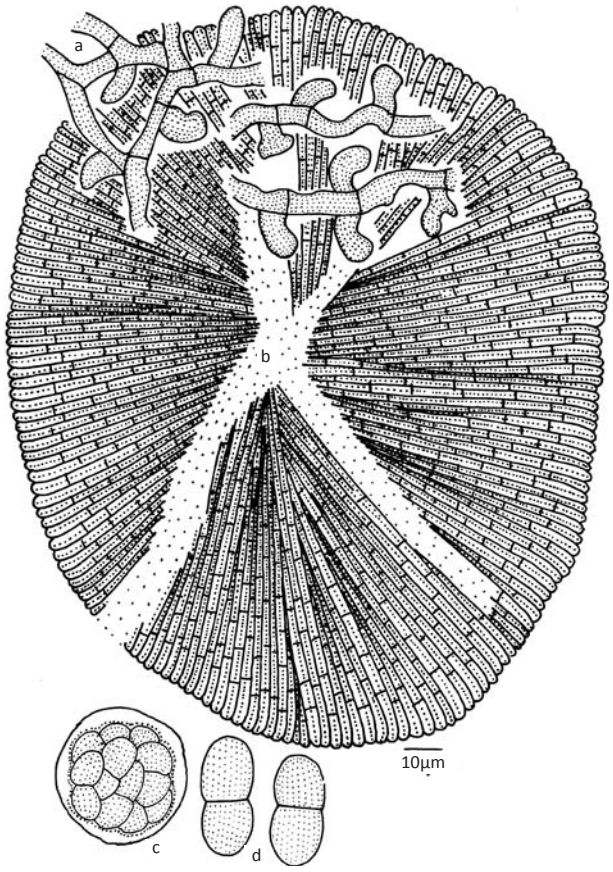

Figure 72. ***Asterina atalantiae***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus;
d - Ascospores

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 aporusae Hansf., Reinwardtia 3: 129, 1954; 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

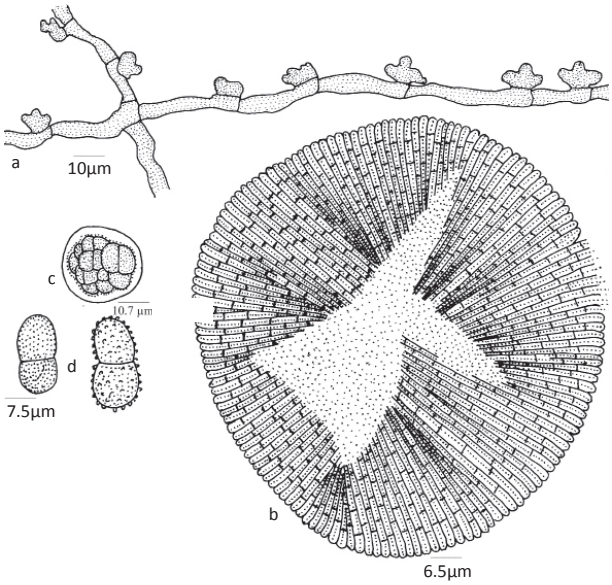

Figure 73. *Asterina chukrasiae*
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

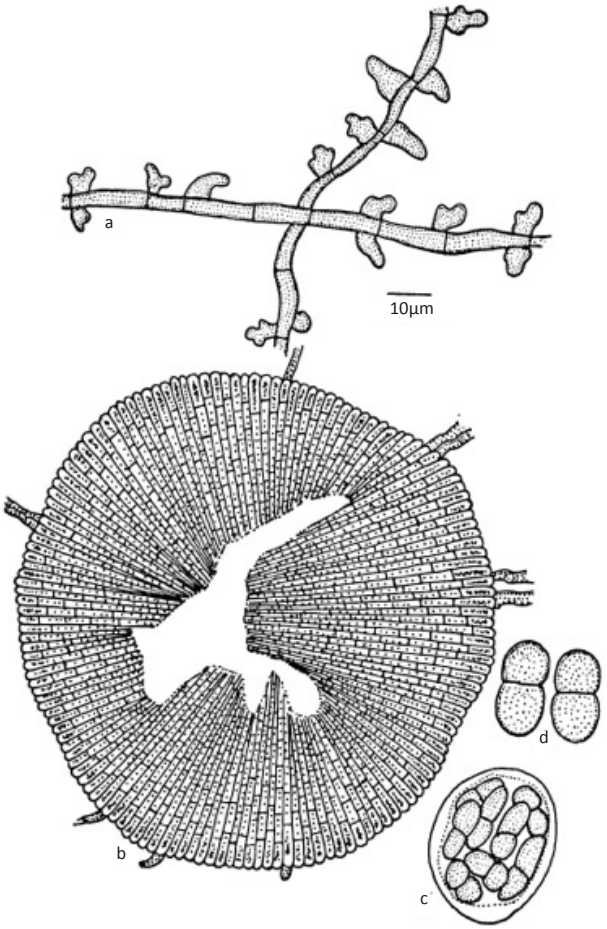

Figure 74. *Asterina cipadessae*
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

in diameter, confluent. Hyphae straight, flexuous to crooked, branching alternate, opposite to irregular at acute angles, loosely to closely reticulate, cells 10–12x3–5 µm. Appressoria opposite, subopposite, unilateral to rarely alternate, cylindrical, ovate, oblong, entire, rounded at the apex, 8–10x3–5 µm. Thyriothecia scattered to grouped, orbicular, up to 160µm 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 30µm in diameter; ascospores brown, oblong, conglobate, 1-septate, constricted at the septum, 11–13x4–5 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 10mm in diameter, confluent. Hyphae straight to substraight, branching opposite, alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 15–18x4–5 µm. Appressoria alternate, unilateral to irregularly placed, unicellular, ovate, oblong, cylindrical, mostly entire, rarely truncate to slightly sublobate and often furcate, straight to curved, 9–13x6–8 µm. Thyriothecia scattered, orbicular, up to

Image 10. *Asterina cipadessae* - Infected leaves

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, 23–26x11–12 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 to2 mm in diameter, rarely confluent. Hyphae substraight, branching irregular at acute to wide angles, loosely reticulate, cells 19–23x3–5 µm. Appressoria alternate to unilateral, minutely stipitate to mostly broad based, globose, 2–3 times sublobate to lobate, 4–6x6–7 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, 20–24x11–13 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 (holoype), 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 2mm in diameter, confluent. Hyphae straight, flexuous to crooked, branching mostly opposite at acute angles loosely to closely reticulate, cells 12–34x4–6 µm. Appressoria alternate and opposite, sessile, entire to mostly lobate, 9–13x7–10 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, 30–44x30–35 µm; ascospores conglobate, deep brown, 1-septate, slightly constricted at the septum, 24–28x–12–15 µm, upper cell ovate and lower cell globose, wall smooth. Pycnothyria many, similar to the thyriothecia,

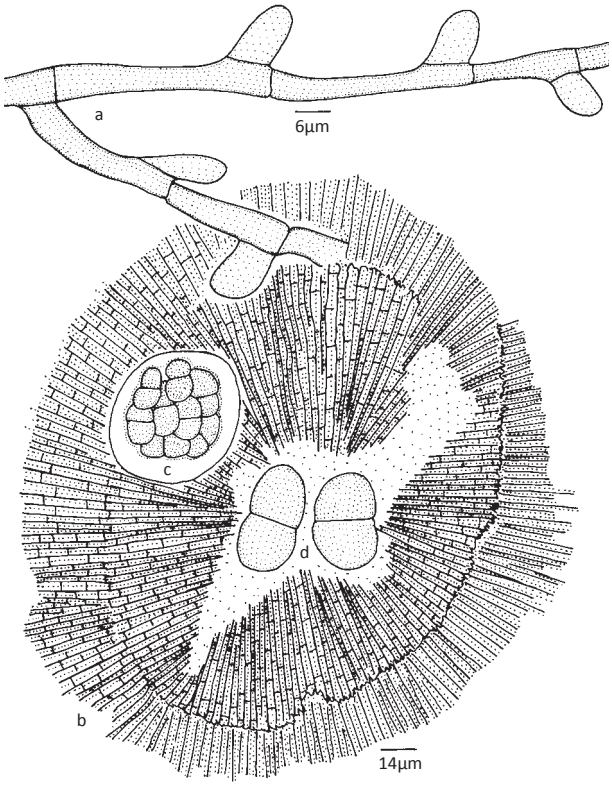

Figure 75. ***Asterina claviflori***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

Image 11. ***Asterina claviflori*** **- Infected leaves**

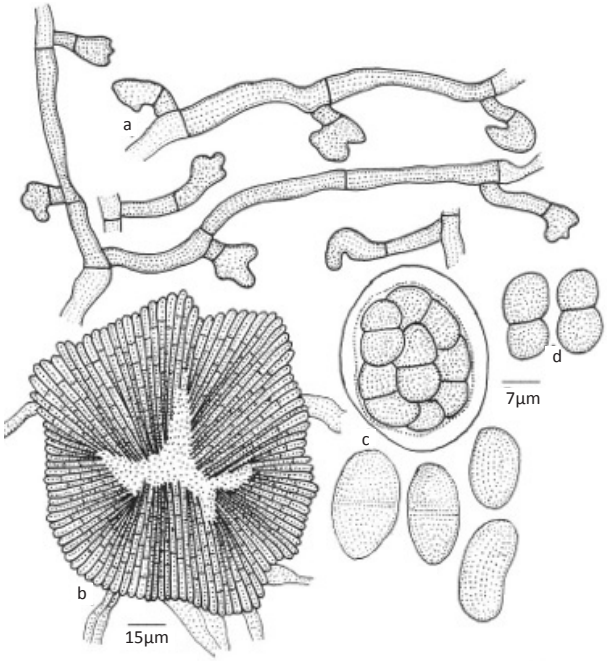

Figure 76. *Asterina combreti*
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

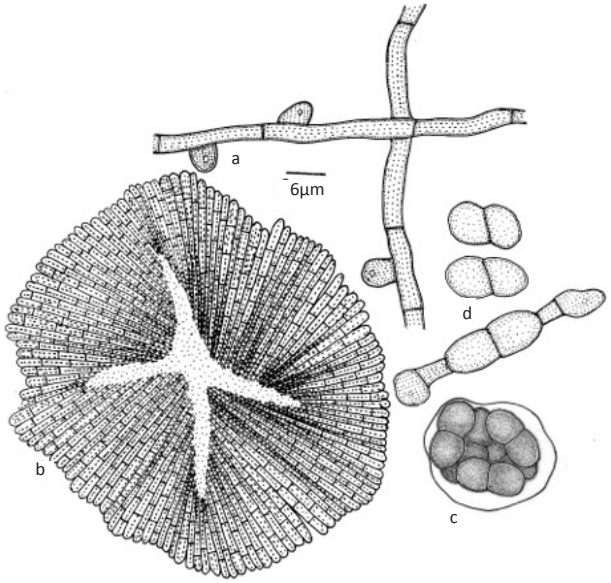

Figure 77. *Asterina cryptocariicola*
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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 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, Asterinales 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 unilateral, unicellular, ovate, oblong, cylindrical, antrorse to retrorse, straight to curved, entire, 9–18x6–8 µm. Thyriothecia 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, conglobate, 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;1.iii.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 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, Asterinales 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. Thyriothecia scattered, orbicular, up to 100µm in diameter, stellately dehisced at the centre, margin mostly crenate, rarely fimbriate, fringed hyphae flexuous; asci globose,

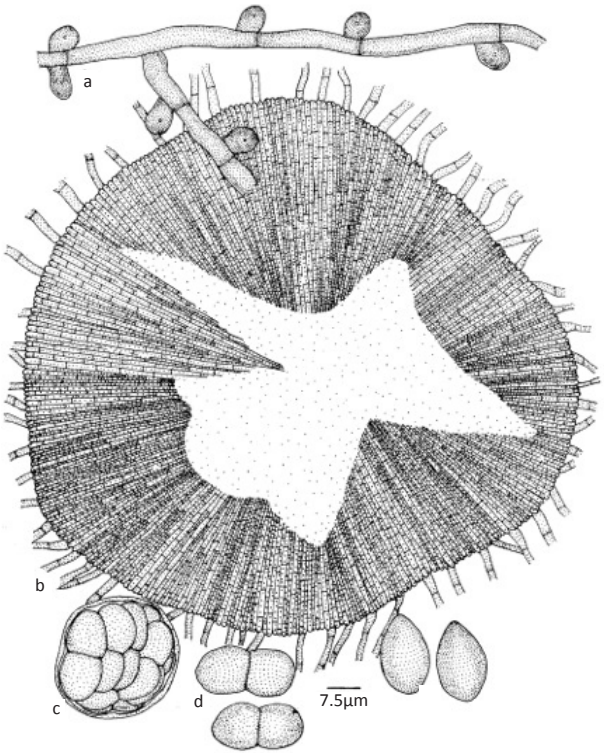

Figure 78. ***Asterina deightonii***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

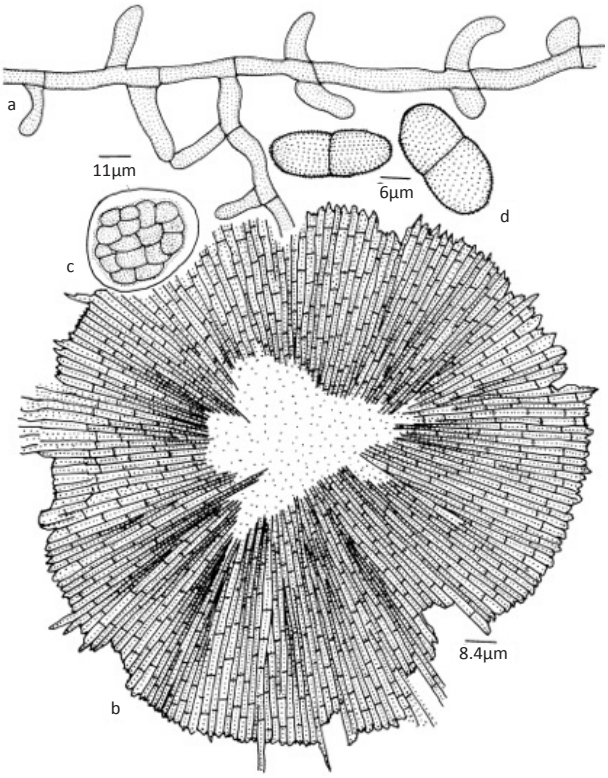

Figure 79. ***Asterina elaeocarpi* var. *ovalis***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

octosporous, 24–30 µm in diameter; ascospores brown, conglobate, 1-septate, constricted at the septum, 11–13x6–7 µm, walls smooth. Pycnothyria smaller and similar to thyriothecia; Pycnothyriospores 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 cryptocariicola 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; asci 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–

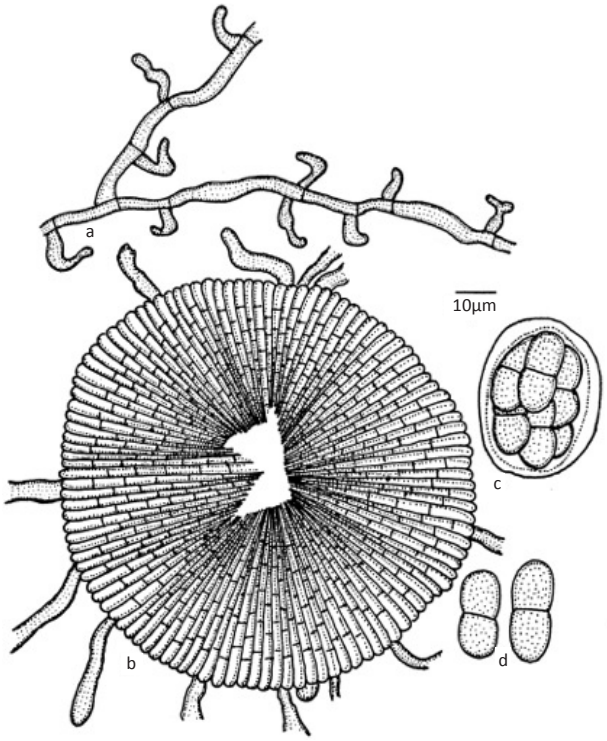

Figure 80. ***Asterina elaeocarpicola***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

Image 12. ***Asterina elaeocarpicola*** **- Infectionpattern**

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 & Appaiah, 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.viii.2008, P.P. Rajesh Kumar et al. HCIO 49830, TBGT 3982; 30.vii.2009, Jayakumar et al. HCIO 49859, TBGT 4011; 28.vii.2009, Jayakumar et al. HCIO 49867, TBGT 4019; 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.viii.2008, M.C. Riju et al. TBGT 5239; 13.ii.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 & Appaiah, 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 15–19x3–5µm. 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 186µm 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., Cheriya 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, antrorse 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

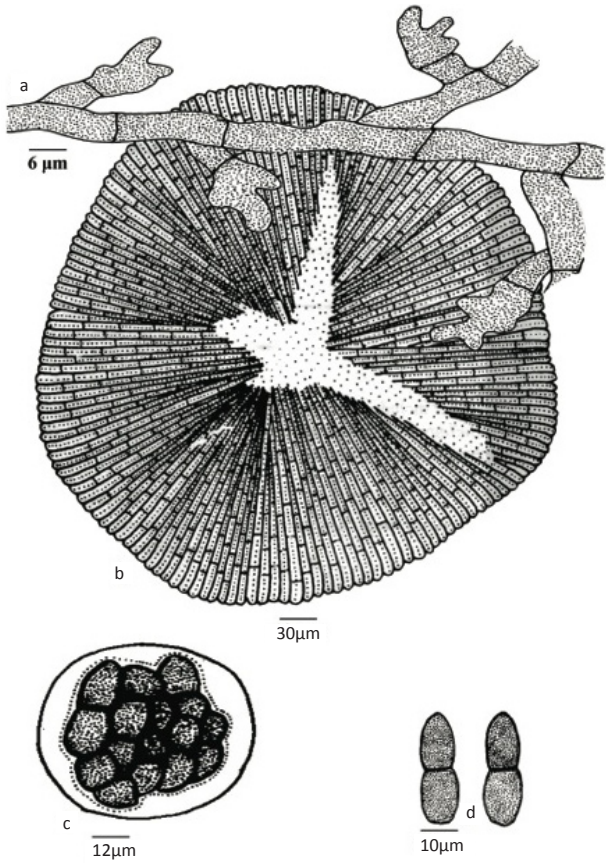

Figure 81. ***Asterina erysiphoides***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

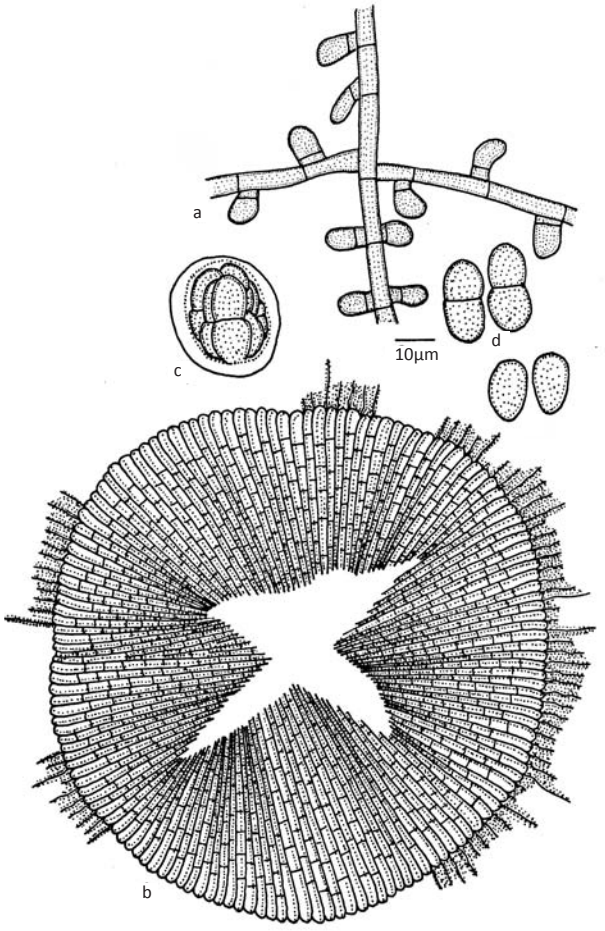

Figure 82. ***Asterina erythropalicola***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

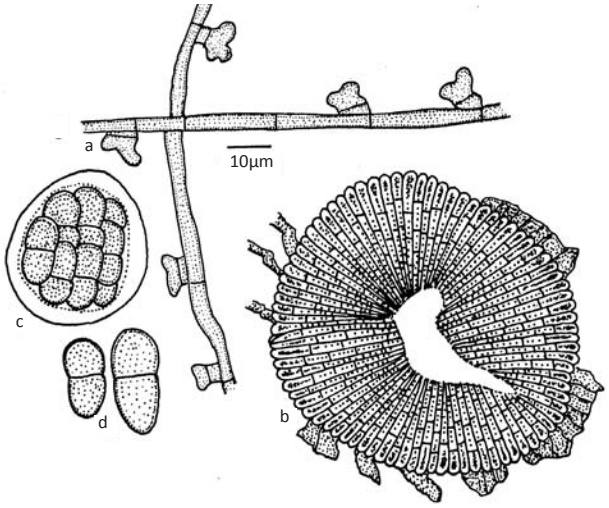

Figure 83. ***Asterina flacourtiacearum***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

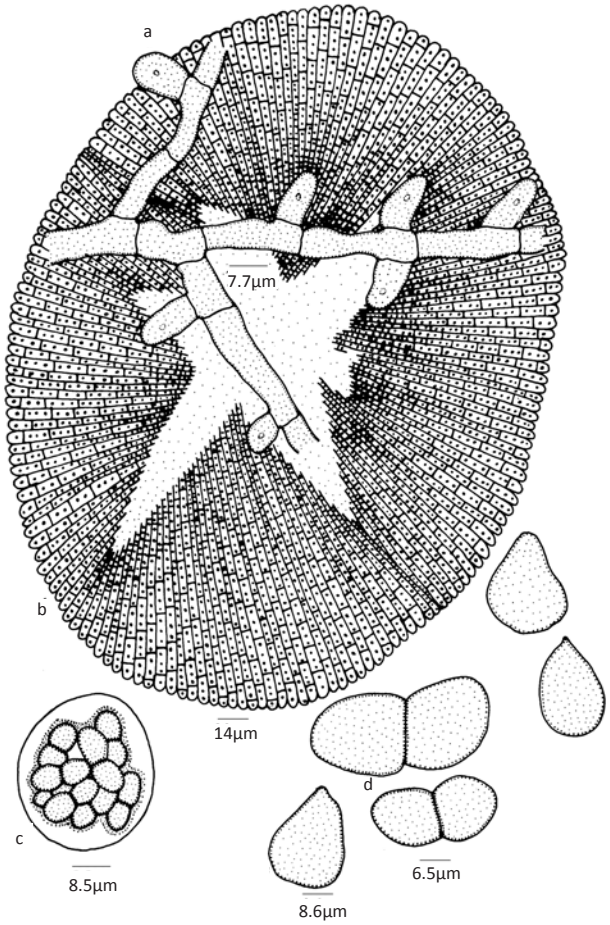

Figure 84. ***Asterina gamsii***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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, 12.ii.2007, M.C. Riju et al. TBGT 5030; 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; Poochipara, 07.viii.2008, P.P. Rajesh Kumar et al. HCIO 49834, TBGT 3986; Poochipara, 14.ii.2007, M.C. Riju et al. 5628; 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. Thyriothecia closely scattered, orbicular, up to 217µm in diameter, margin fringed, rarely crenate, fringed hyphae flexuous, with appressoria, thyriothecia 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 thyriothecia, slightly smaller; pycnothyriospores oval to pyriform 18–20x12–14 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 flacourtiacearum Hosag. & Ravikumar in Hosagoudar, Balakrishnan & Goos, Mycotaxon 59: 176, 1996 (Fig. 83).

Colonies amphigenous, mostly epiphyllous, up

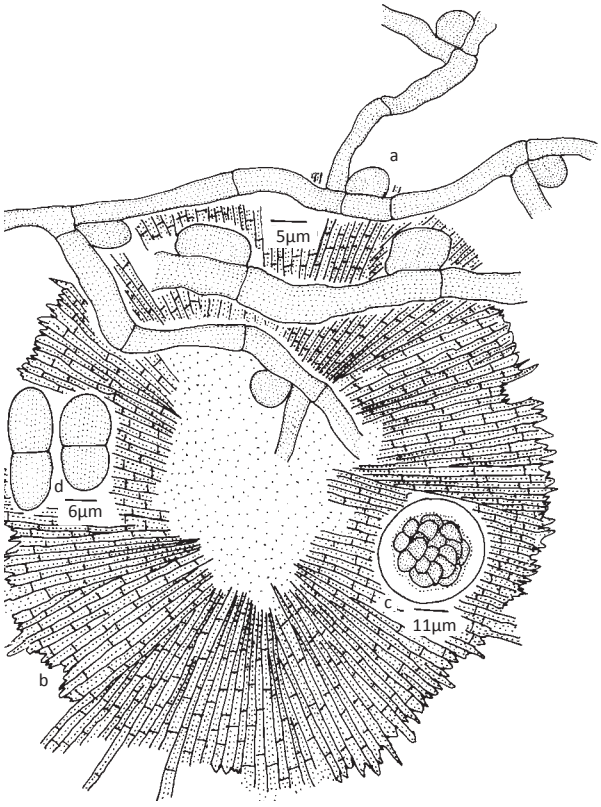

Figure 85. ***Asterina hakgalensis***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

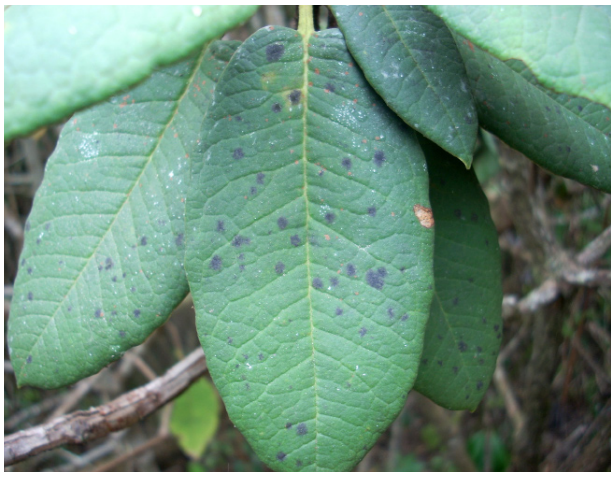

Image 13. ***Asterina hakgalensis*** **- Infected leaves**

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; pycnothyriospores 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).

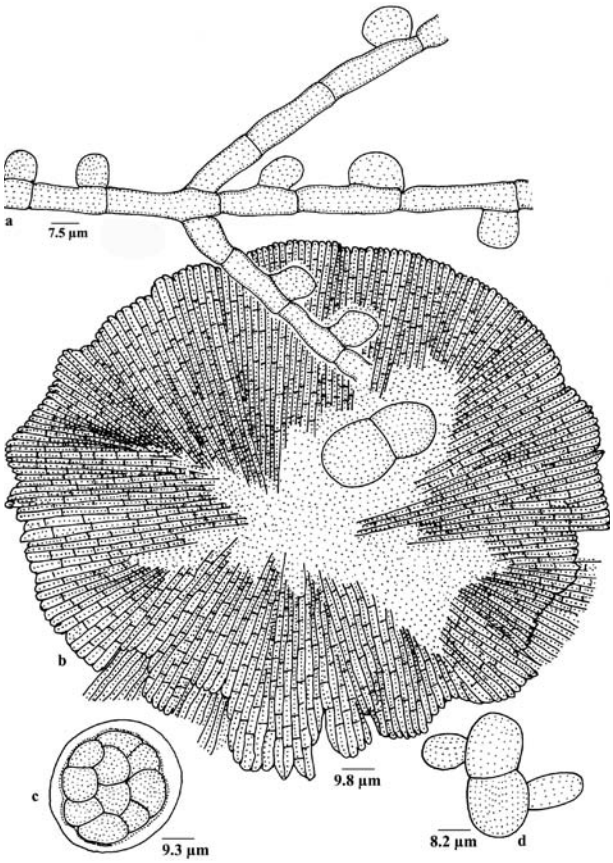

Figure 86. ***Asterina indica***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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; asci 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; asci 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.

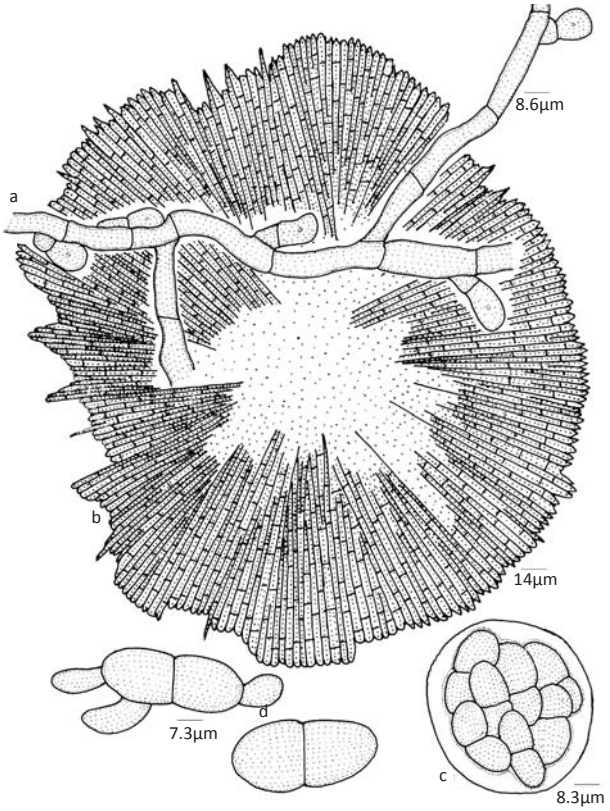

Figure 87. ***Asterina jambolana***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

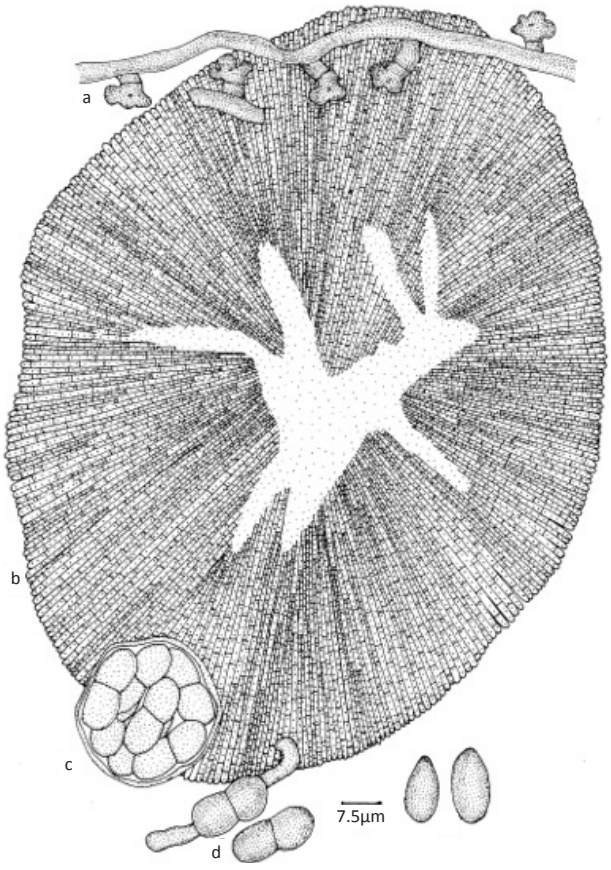

Figure 88. ***Asterina lepianthedis***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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.

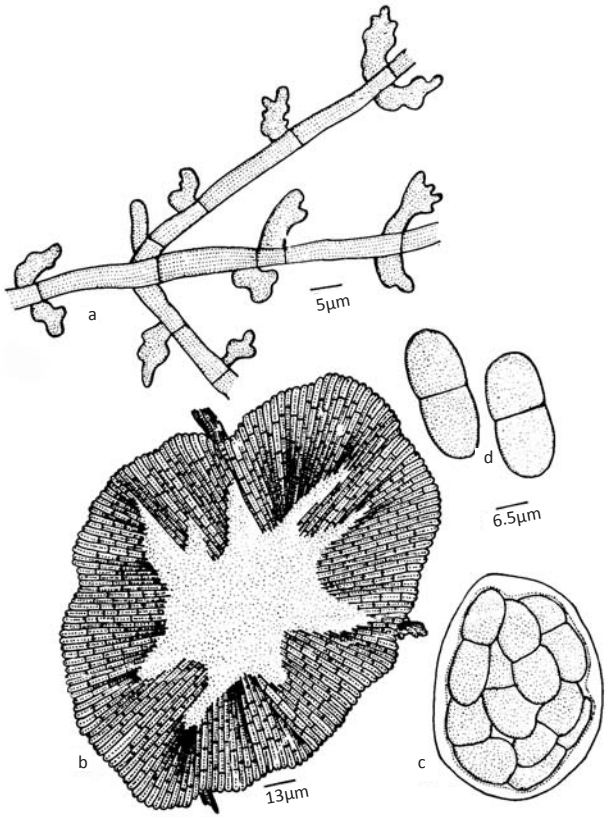

Figure 89. ***Asterina melicopecola***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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 & Abraham, 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 connate 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 sublobate, 3–10x–4–6 µm. Thyriothecia scattered, orbicular, scattered to connate, 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,

wall smooth. Pycnothyria scattered, orbicular, center, margin crenate; Pycnothyriospores 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. HCIO 45804; HCIO 45698, TBGT 1445; 12.xii.2004, V.B. Hosagoudar et al. HCIO 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. HCIO 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

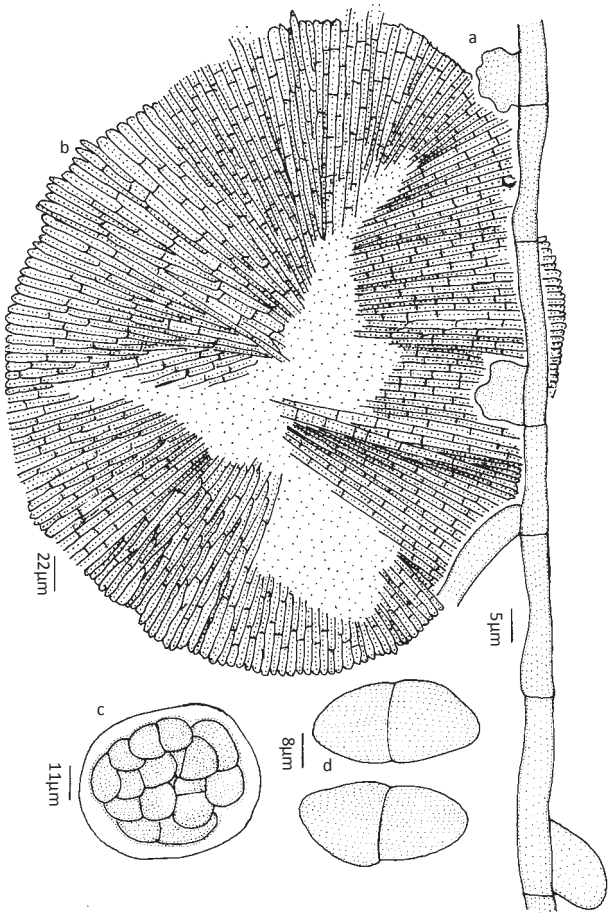

Figure 90. ***Asterina memecylonis***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

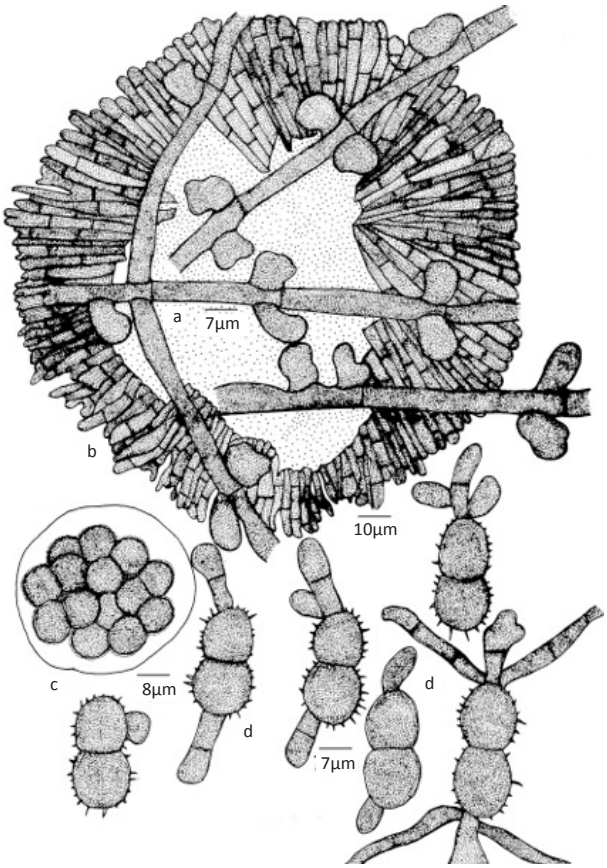

Figure 91. ***Asterina myristicacearum***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

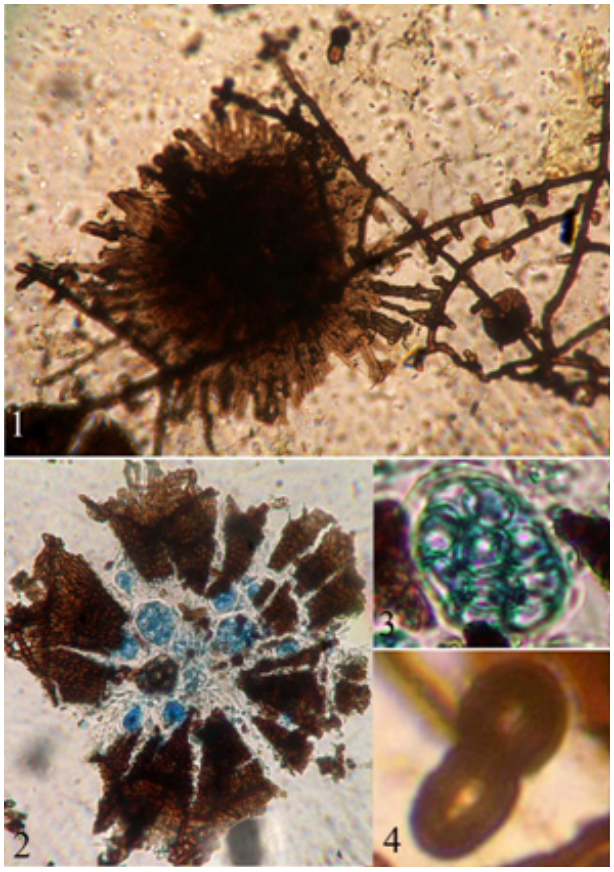

Image 14. ***Asterina nothopegiae***
1 - Appressoriate mycelium; 2 - Thyriothecium; 3 - Ascus;
4 - Ascospores

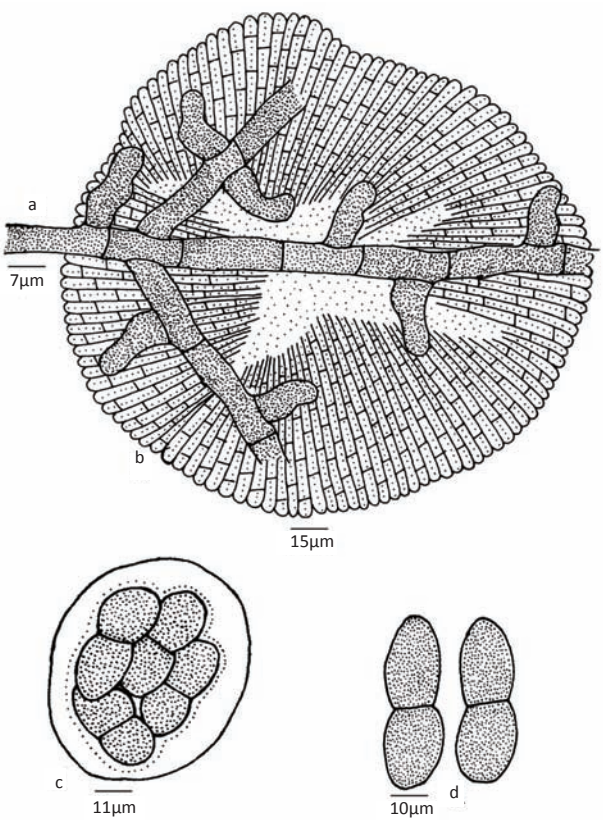

Figure 92. ***Asterina nothopegiae***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus;
d - Ascospores

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,

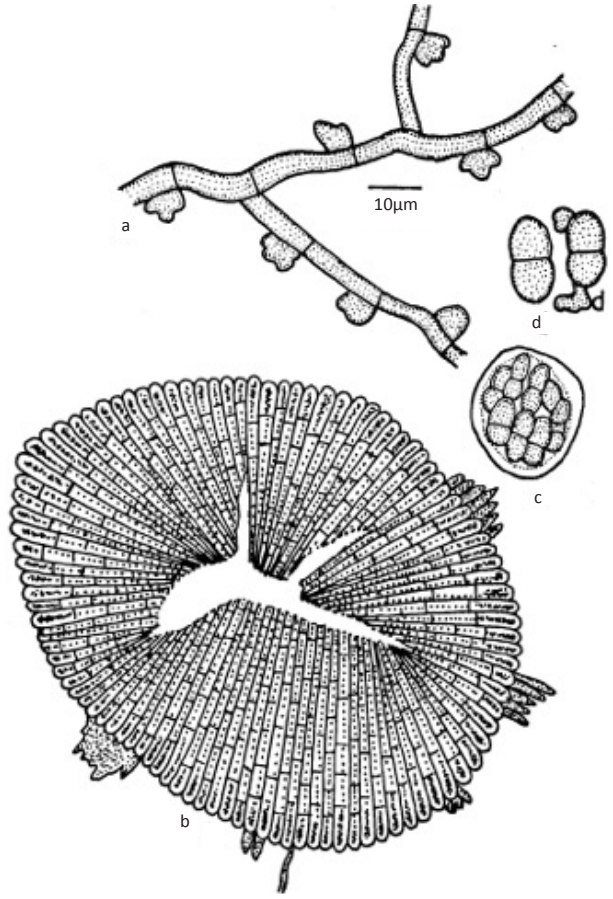

Figure 93. ***Asterina oreocnidecola***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

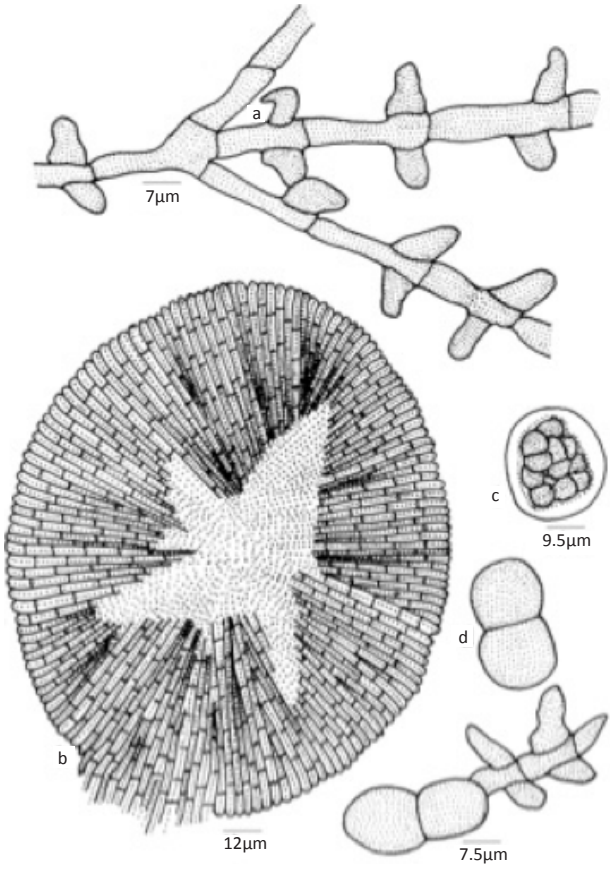

Figure 94. ***Asterina oreocnidegena***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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

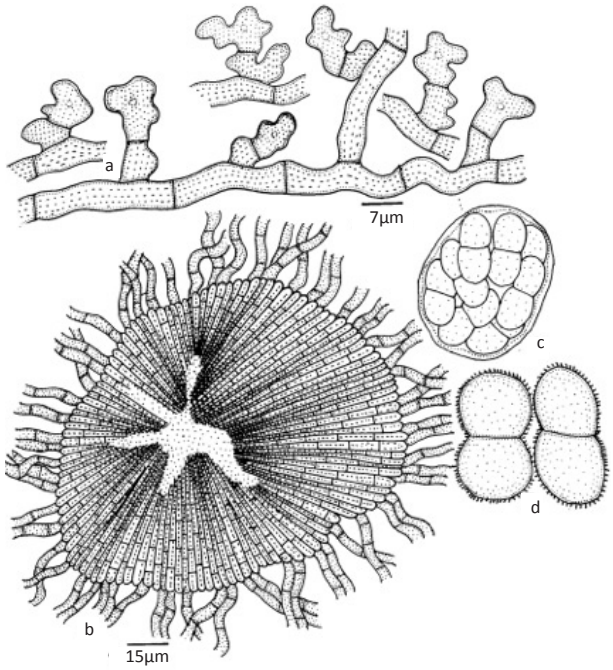

Figure 95. ***Asterina pongalaparensis***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

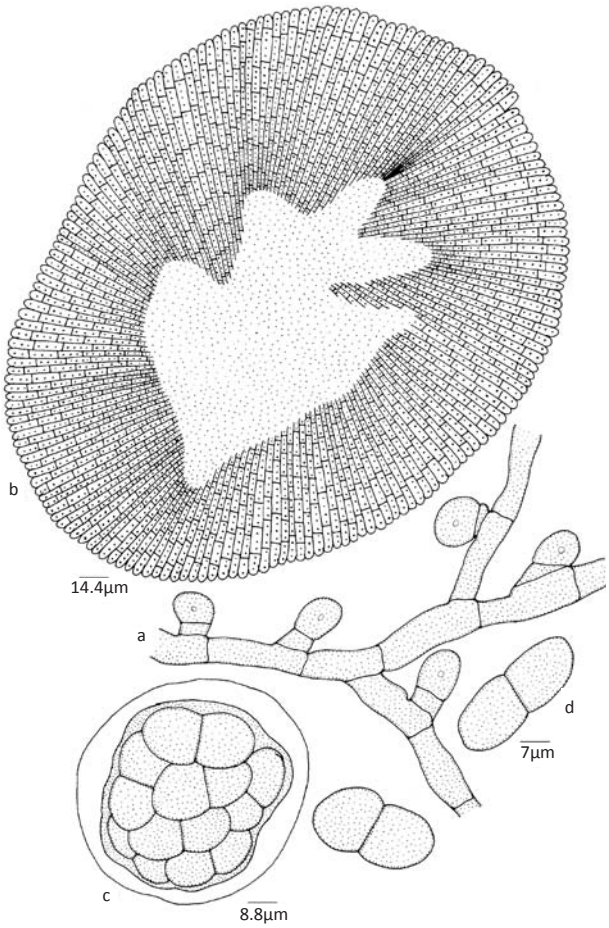

Figure 96. ***Asterina rhodomyrti***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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 100µm 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, conglobate, 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. HCIO 45767, TBGT 1516; HCIO 46280, TBGT 1926; HCIO 45914, TBGT1676; 14.xii.2003, V.B. Hosagoudar et al. TBGT 1678, HCIO 45916; *Oreocnide integrifolia* (Gaudich) Miq. (*Villebrunea integrifolia* Gaudich.) (Urticaceae), 13.xii.2003, V.B. Hosagoudar et al. HCIO 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. HCIO 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 180µm in diameter, stellately dehisced at the centre, margin crenate to fimbriate, fringed hyphae compact; asci globose, octosporous, 30–40 µm in diam.; ascospores conglobate, 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. HCIO 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,

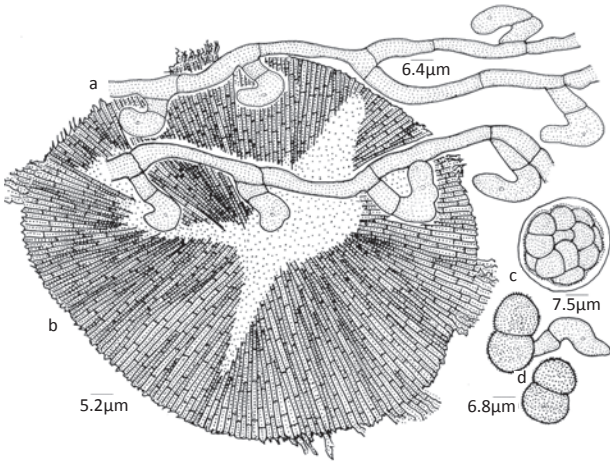

Figure 97. ***Asterina sarcandrae***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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; asci 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 antrorse, subantrorse 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,

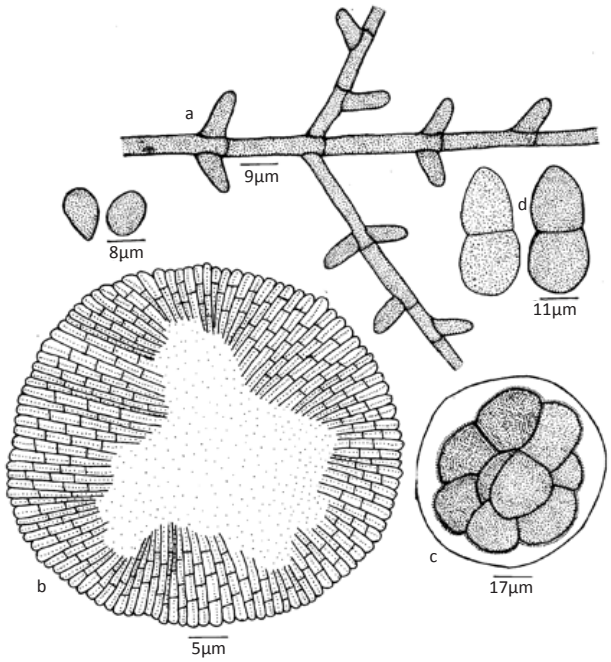

Figure 98. ***Asterina scleropyri***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

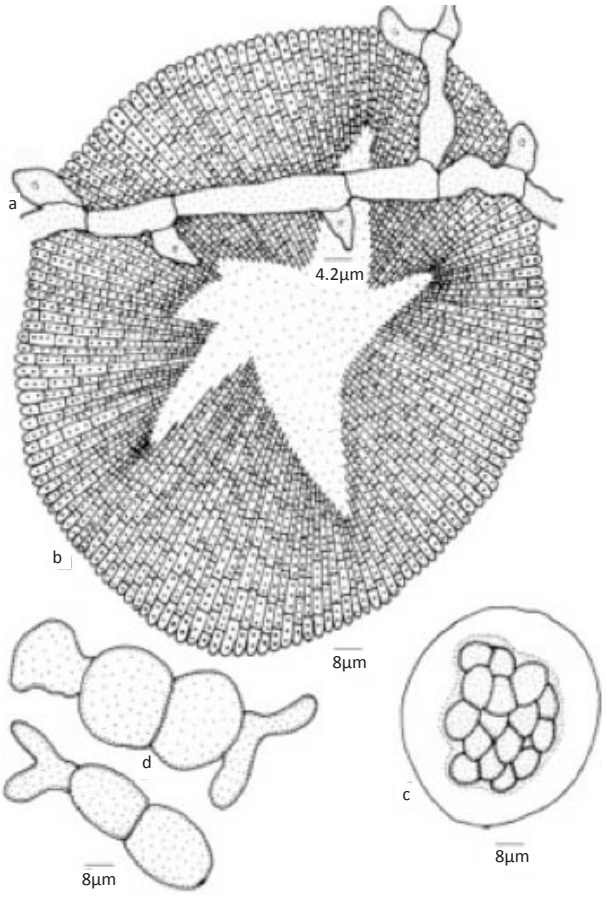

Figure 99. ***Asterina songii***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

brown, uniseptate, constricted at the septum, 27–30x13–15 µm , wall smooth.

Material examined: 02.viii.2008 on leaves of *Rhodomyrtustomentosa* (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

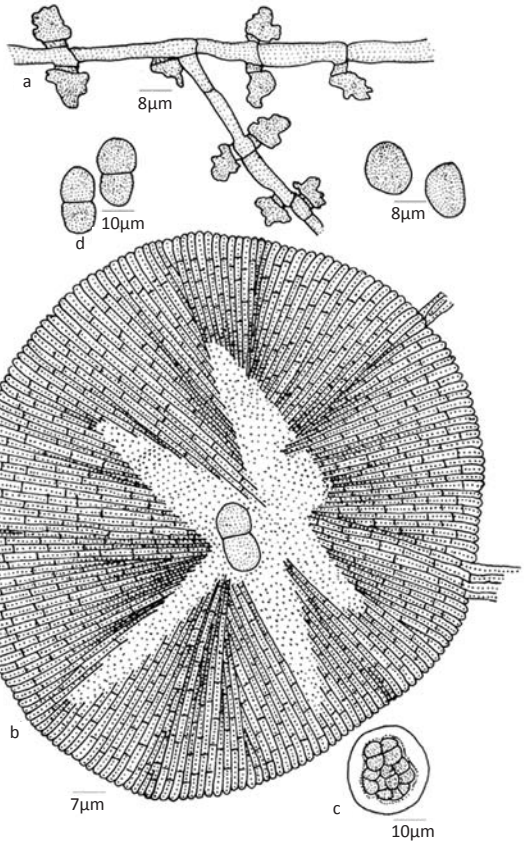

Figure 101. ***Asterina talacauveriana***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

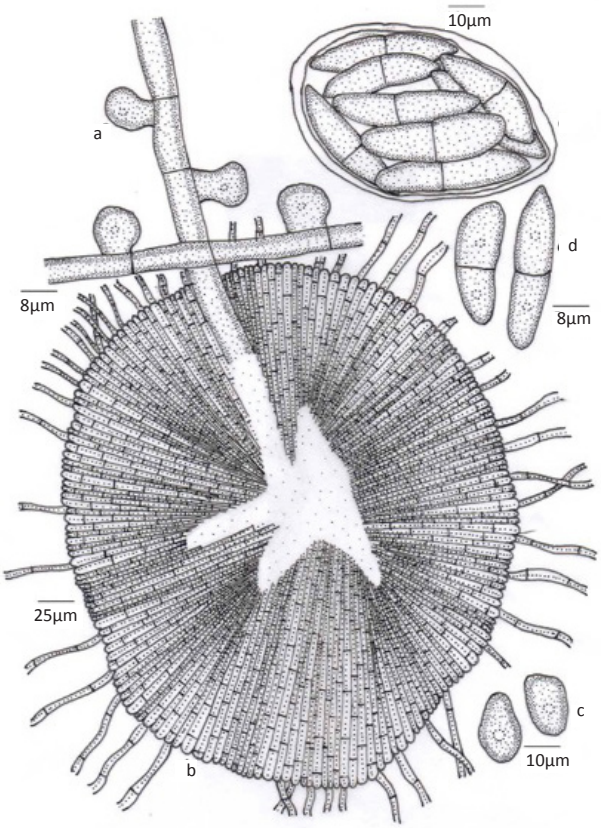

Figure 100. ***Asterina suttonii***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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–

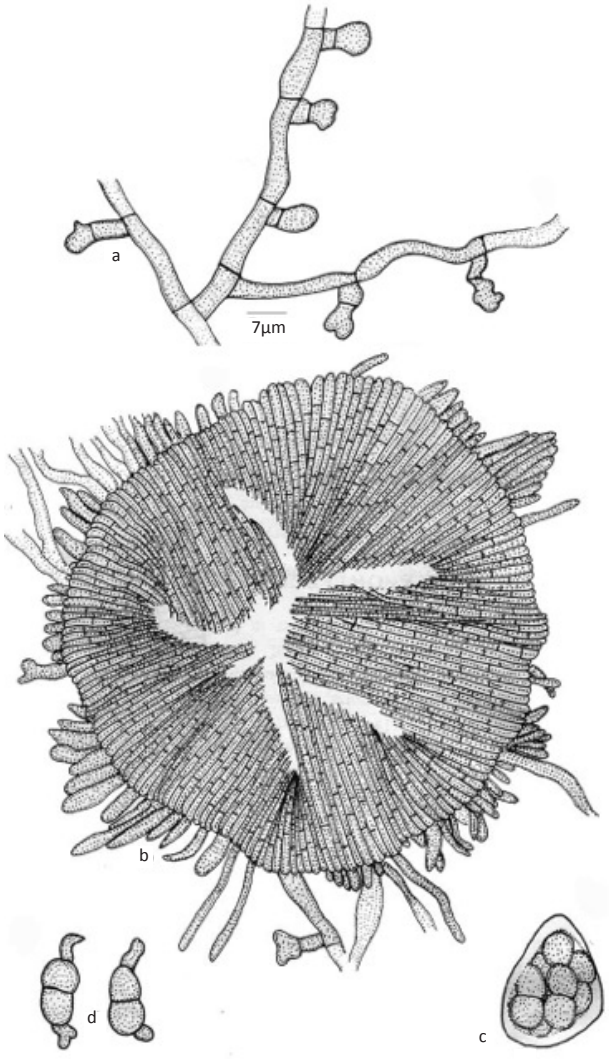

Figure 102. ***Asterina thotteae***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

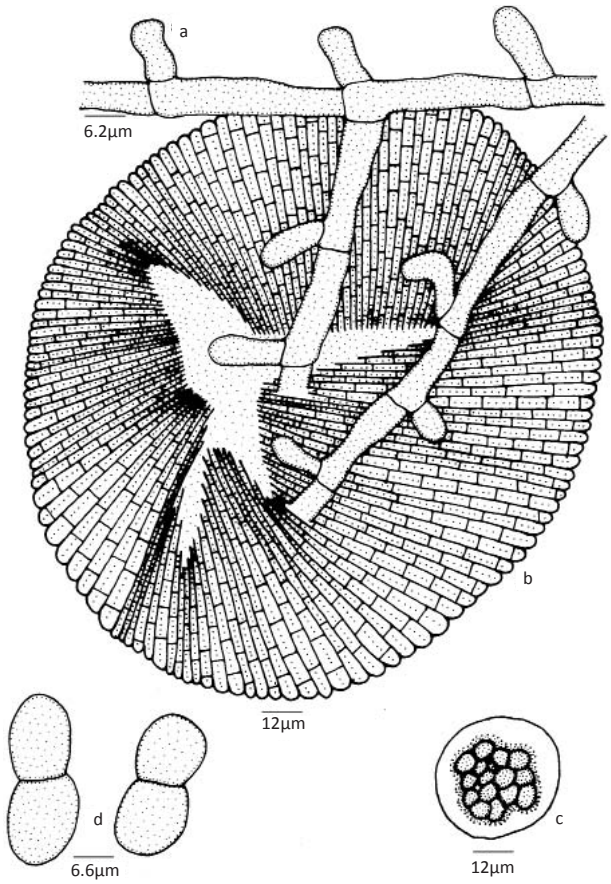

Figure 103. ***Asterina toddaliae***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

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. Pycnothyria not seen; pycnothyriospores 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, antrorse, 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, orbicular, 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. Pycnothyria mixed with thyriothecia, similar and smaller; pycnothyriospores 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, antrorse 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,

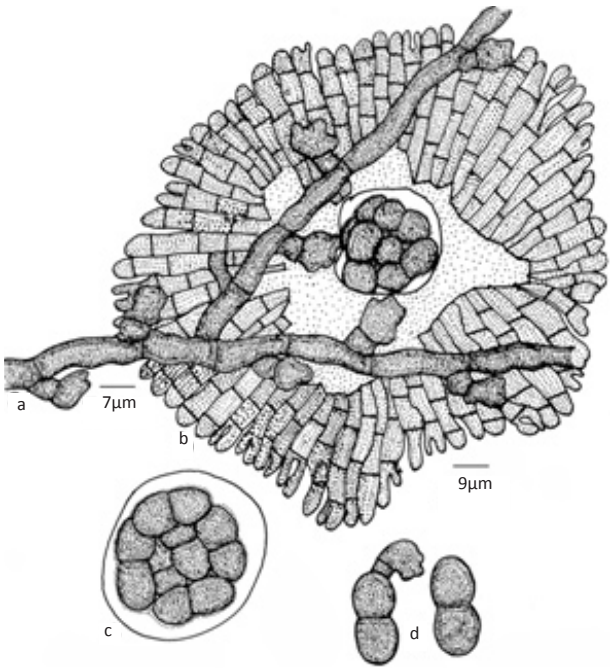

Figure 104. ***Asterina travancorensis***
a - Appressoriate mycelium; b - Thyriothecium; c - Ascus; d - Ascospores

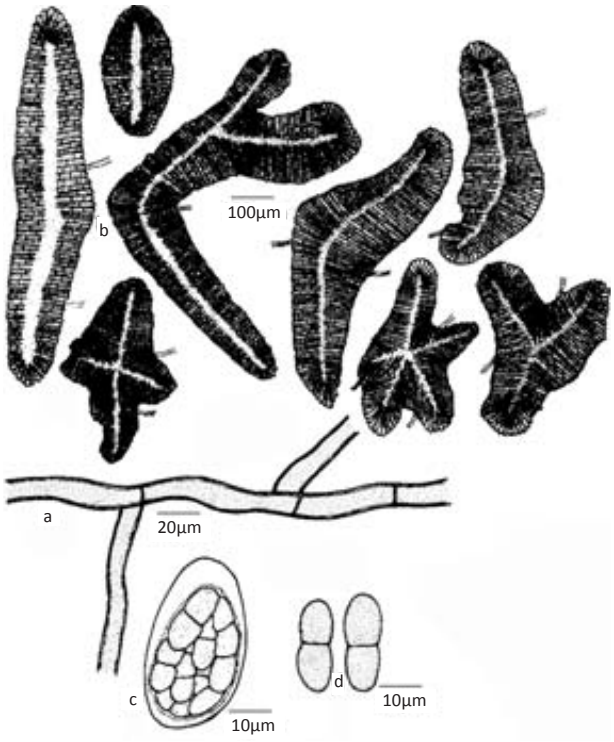

Figure 105. ***Echidnodella memecyli***
a - Mycelium; b - Thyriothecia; c - Ascus; d - Ascospores

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, antrorse, 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, antrorse 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 conglobate, one septate, upper cell slightly larger, 21–25x9–13 µm, wall smooth.

Material examined: 05.viii.2008 on leaves of

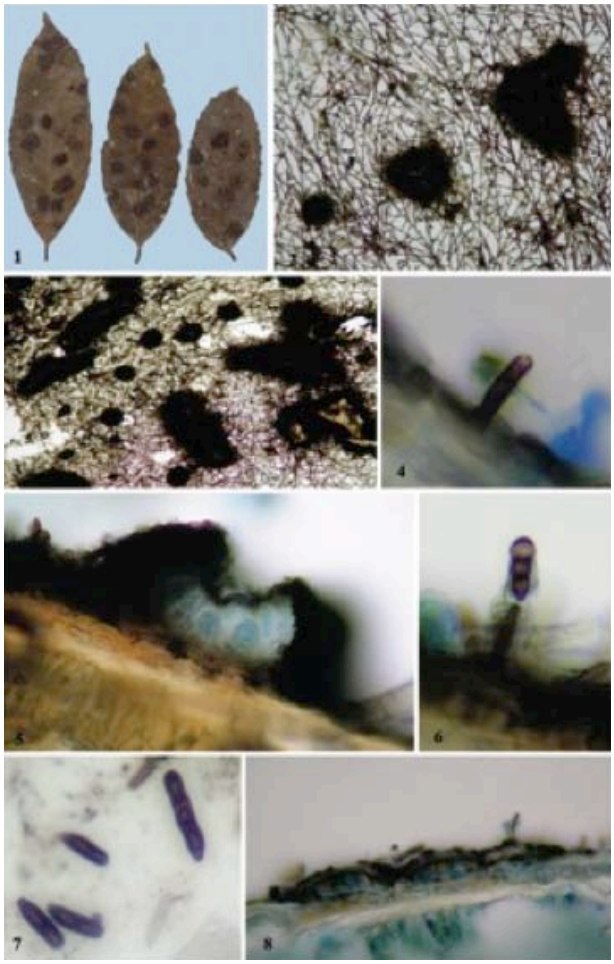

Image 15. *Eupelte emicta*
1 - Infected leaves; 2 & 3 - Thyriothecia; 4 & 6 - Conidiophores and releasing conidium: 5 - Thyriothecium with asci; 7 - Conidia; 8 - Fungal mycelium in epidermal cells

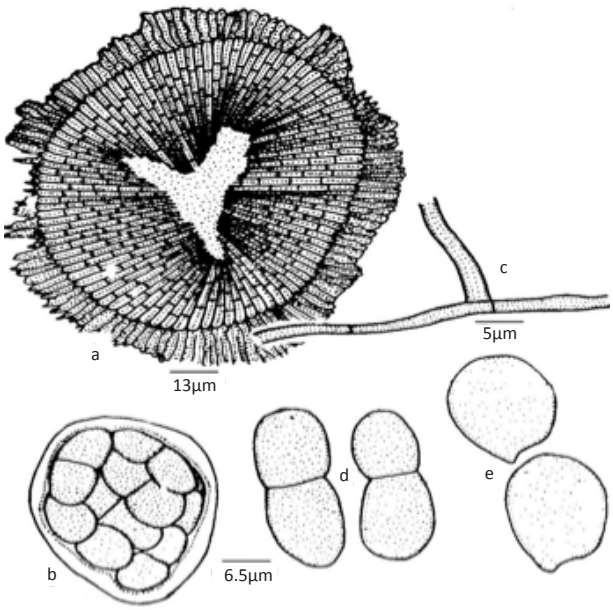

Figure 106. *Prillieuxina jasmini*
a - Thyriothecium; b - Ascus; c - Mycelium; d - Ascospores; e - Pycnothyriospores

Wattakaka sp. (Asclepiacaceae), 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, loosely reticulate, cells 24–29x 2.5–3.5 µm. Appressoria absent. Thyriothecia 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, 12–14.5x–4–6 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 12–35x–3–4 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. Thyriothecia scattered to grouped, initially orbicular, later elliptic to elongated, simple, straight, curved, often X or Y shaped, astomatous, dehisce vertically at the centre,

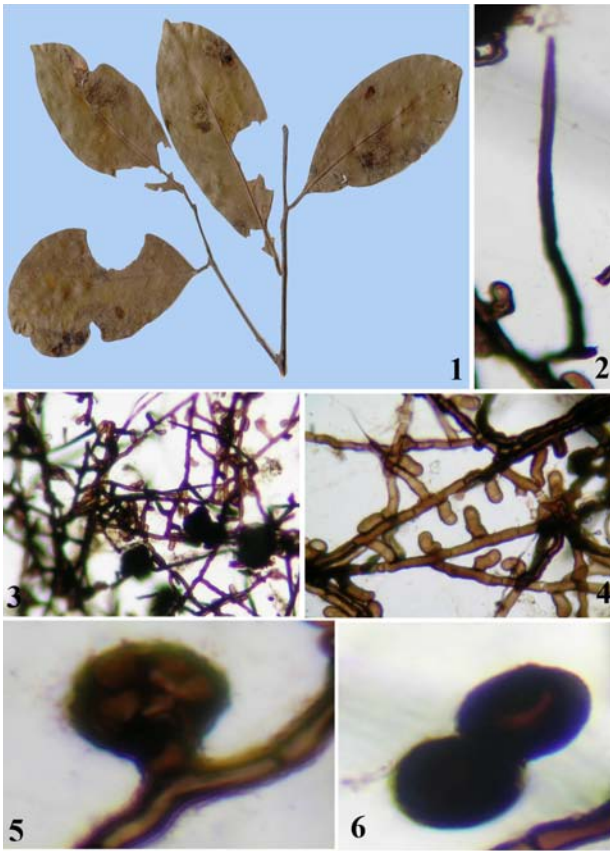

Image 16. *Balladyna indica*
1 - Infected leaves; 2 - Mycelial seta; 3 - Mycelial colony with black perithecia; 4 - Appressoria with hyaline spots; 5 - Developing stipitate perithecium; 6 - Ascospore

orbicular thyriothecia 100–120x90–100 µm, ellipsoidal thyriothecia 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 septa, 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., Foliicolous 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

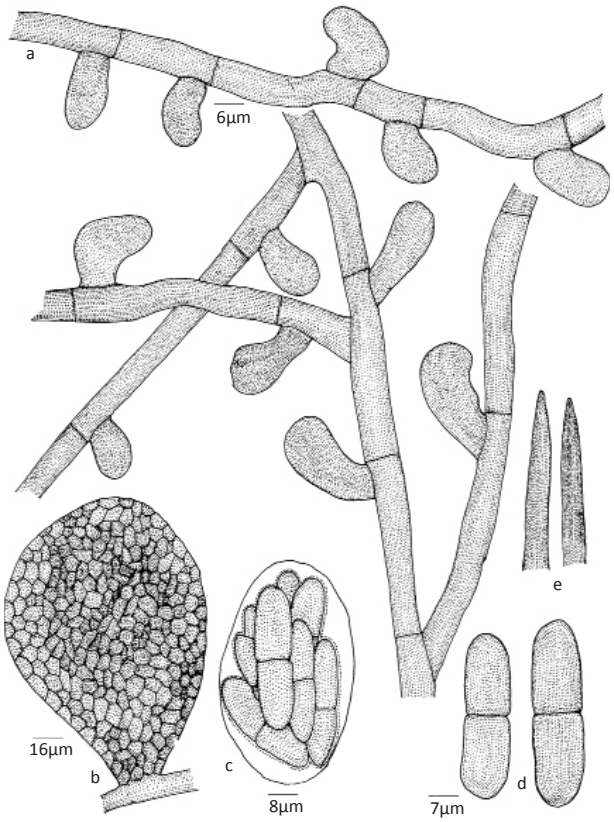

Figure 107. *Balladyna salaciae*
a - Appressoriate mycelium; b - Apical portion of the mycelial setae; c - Perithecium; d - Ascospores; e - Ascus

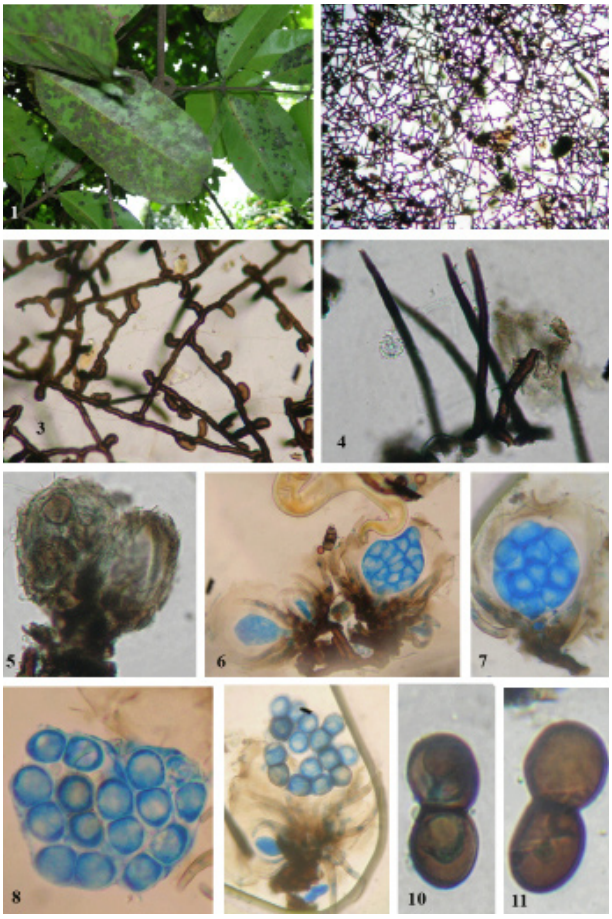

Image 17. *Balladyna salaciae*
1 - Infected leaves; 2 - Mycelial colony with perithecia; 3 - Appressoriate branched mycelium; 4 - Mycelial setae; 5 - Stalked perithecium; 6 & 9 - Asci; 10 & 11 - Brown uniseptate ascospores.

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

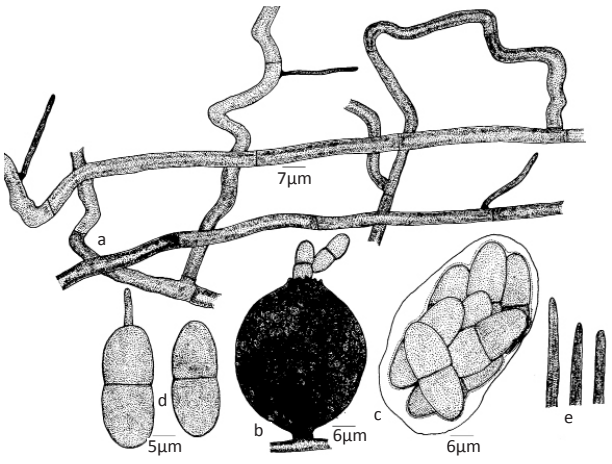

Figure 108. *Dysrhynchis uncinata*
c - Apical portion of the mycelial setae; b - Perithecium; c - Ascus; d - Ascospores; e - Mycelium

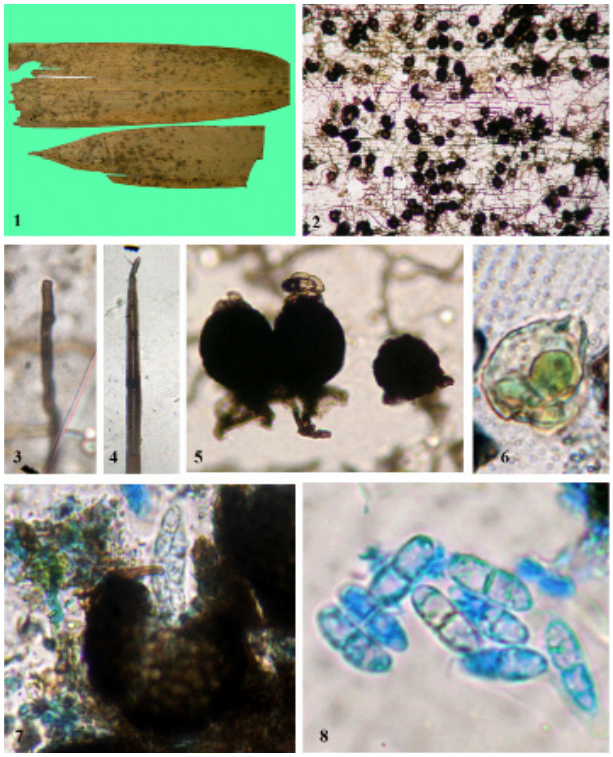

Figure 18. *Dysrhynchis uncinata*
1 - Infected leaves; 2 - Mycelium with scattered perithecia; 3 & 4 - Apical portion of the mycelial setae; 5 - Perithecia (one developing); 6 - Ascus; 7 - Ascus emerging from the perithecium; 8 - Ascospores

Image 19. *Meliolina pulcherrima*- Infected leaves

The genus *Balladyna*

This black mildew fungus is characterized by brown, superficial, appressoriate, setose mycelium, globose peritheciaum, 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 10mm 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. Asci 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, antrorse to retrorse, 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; asci 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 HCIO 48257 (type), TBGT 2996 (isotype); *Salacia* sp., Kattivaramudi, Silent Valley, Palghat, Kerala, 29.vii.2008, Jacob et al. HCIO 50369, TBGT 4286; Poochipara, 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, ostiolate, 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 HCIO 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 some times 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

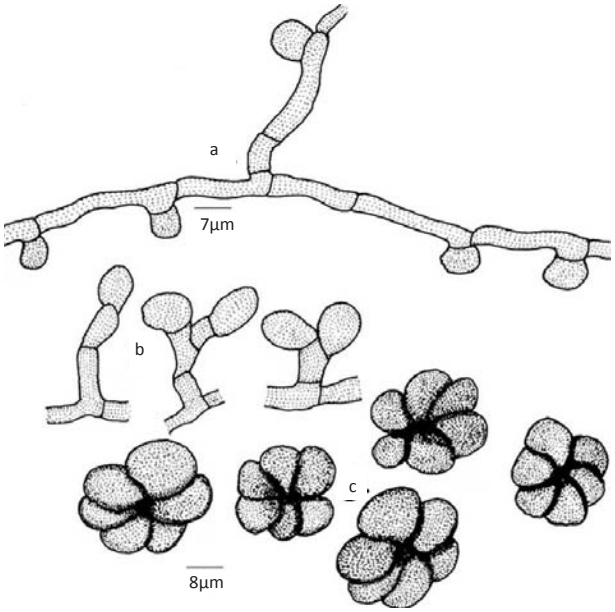

Figure 109. *Sarcinella allophyli*
a - Appressoriate mycelium; b - Conidiophores; c - Conidia

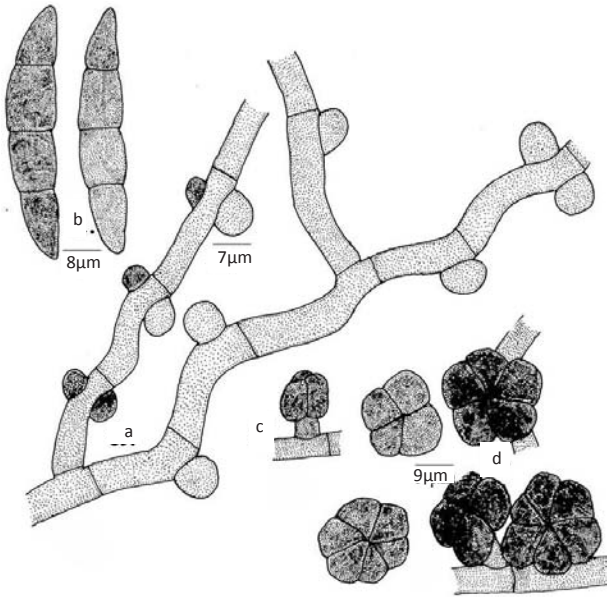

Figure 110. *Sarcinella loranthacearum*
a - Appressoriate mycelium; b - Conidiophores; c - Conidia of *Sarcinella*; d - Coniida of *Questieriella*

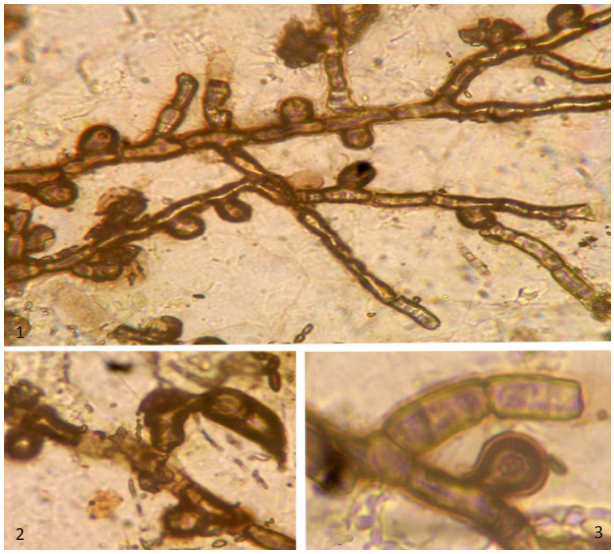

Image 20. ***Schiffnerula aristolochiae***
1 - Appressoriate mycelium; 2 & 3 - Conidia on conidiophores

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,

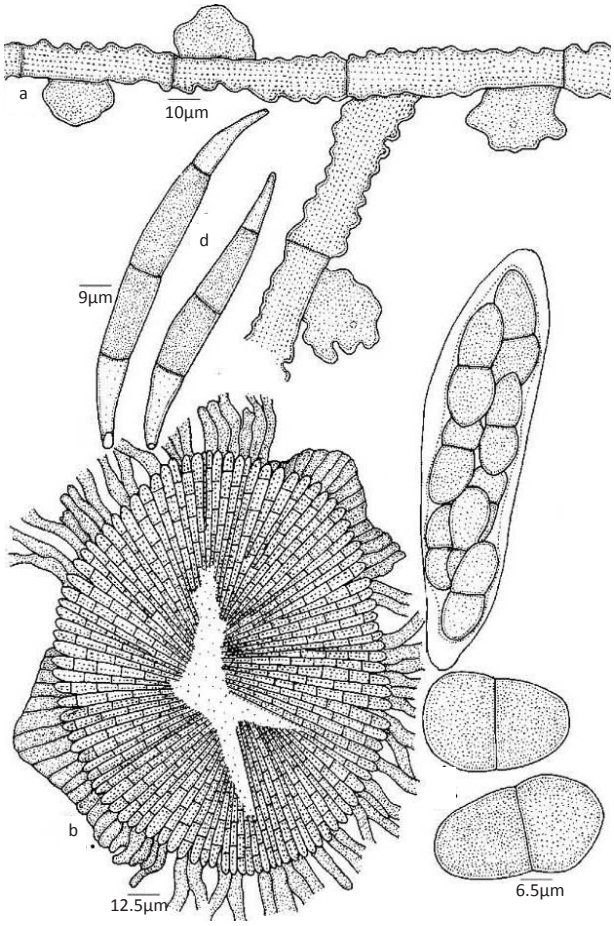

Figure 112. ***Schiffnerula camelliae***
a - Appressoriate mycelium; b - Ascus; c - Conidia of *Questieriella;* d - Ascospores

simple, branched, straight to flexuous, micronematous to semi-macronematous, 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–

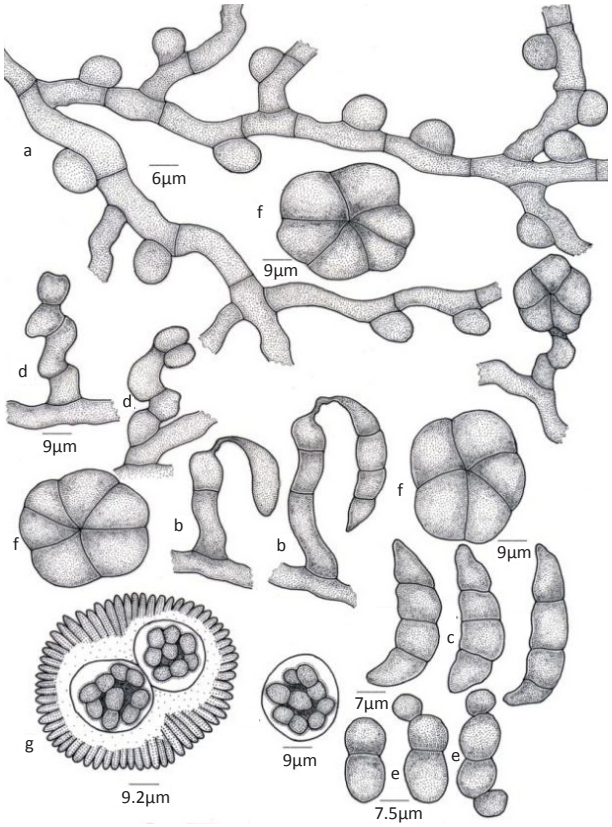

Figure 113. ***Schiffnerula lagerstroemiae***
a - Appressoriate mycelium; b - Thyriothecium; c - Conidiophores of Sarcinella; d - Ascospores; e - Ascus; f - Conidia of *Sarcinella*; g - Conidiophores of *Questieriella*

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. Questeriella conidia present, straight to slightly falcate, 3-septate, brown, 26–36x7–10 µm, wall smooth.

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, mammiform, 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.

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., Rein-wardtia 3: 127, 1954 (Fig. 112).

Colonies epiphyllous, rarely amphigenous, caulicolous, dense, velvety, crustose, up to 5mm in

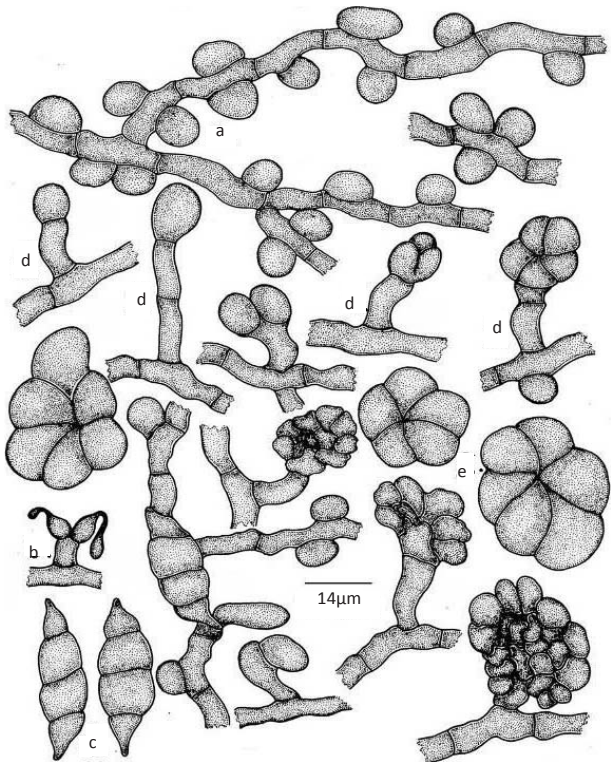

Figure 114. ***Schiffnerula vernoniae***
a - Appressoriate mycelium; b - Conidiogenous cells; c - Conidia of Questieriella; d - Conidiogenous cells on conidiophores; e - Conidia of Sarcienlla

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, 80–93x9–10 µm. Thyriothecia scattered to connate, 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.

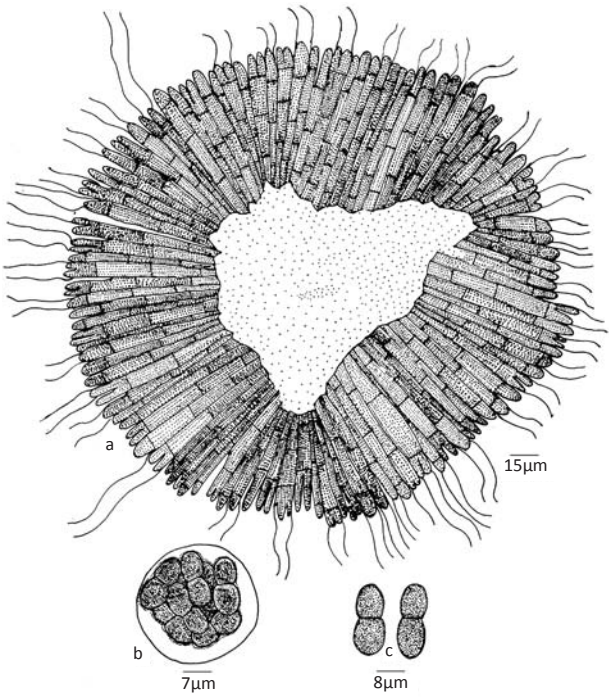

Figure 115. ***Palawaniella jasmini***
a - Ascospores; b - Thyriothecium; c - Ascus

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 substraight 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 substraight 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, cells15–27x4–6 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, Publicaçoes 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. (Papilonaceae), 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: Phyllachora and Rehmidothis.

The genus *Phyllachora*

Phyllachora symploci Pat. in Sacc., Syll. Fung. 11:

Image 21. *Leptosphaerulina australis* on leaves of *Crotalaria* sp.

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* Ramakr. & Sundaram, Proc. Indian Acad. Sci. 40: 19, 1954.

Stromata amphiphyllous, 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., (Convolvulaceae), 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. Urediniospores 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.

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 prosent.

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*

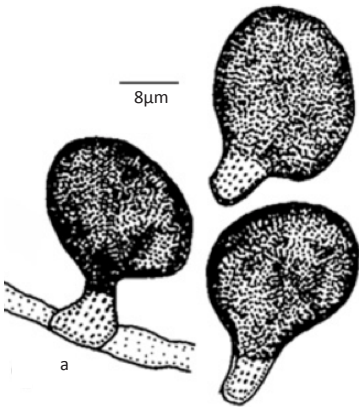

Figure 116. *Acremoniula sarcinellae*
a - Conidia on conidiophores and apiculate conidia

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.

Acremoniela sarcinellae Pat. & Har., J. Bot. Paris 14: 245. 1900.

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.

Acrospeira 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.

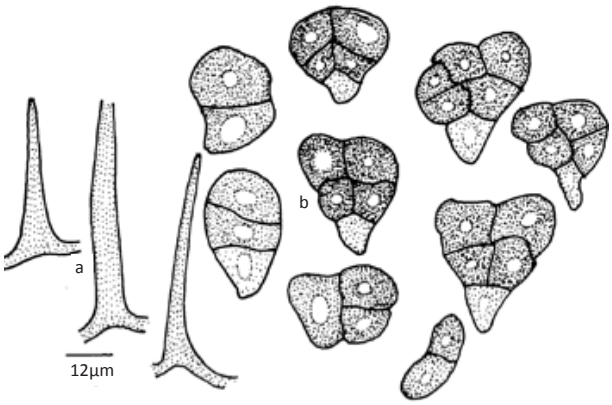

Figure 117. ***Acrodictys balladynae***
a - Conidiophores; b - Conidia

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.

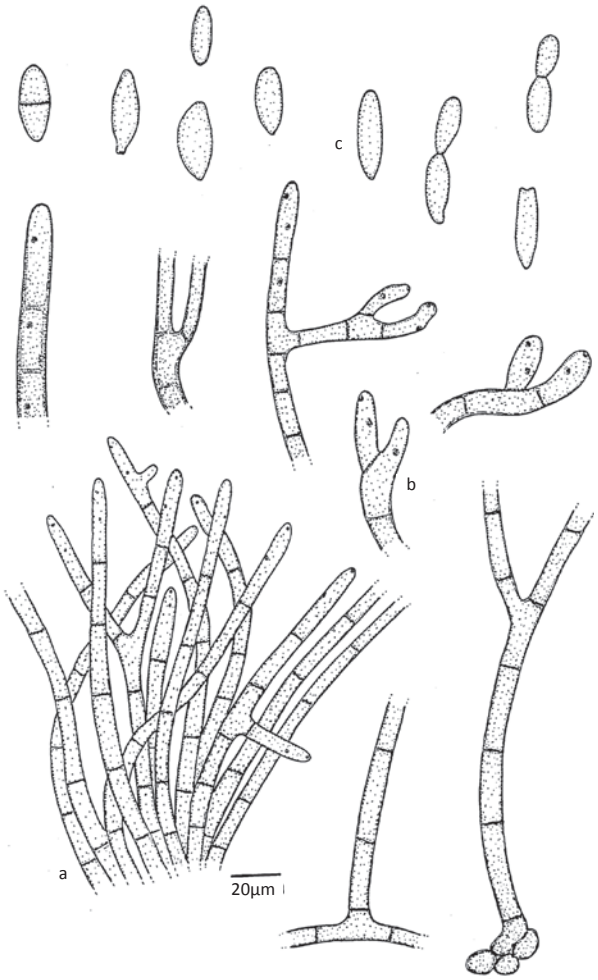

Figure 118. ***Diplococcium atrovelutinum***
a - Fasciculate conidia; b - Conidiophores; c - Conidia

Image 22. ***Diplococcium atrovelutinum*****-Infected spikelets**

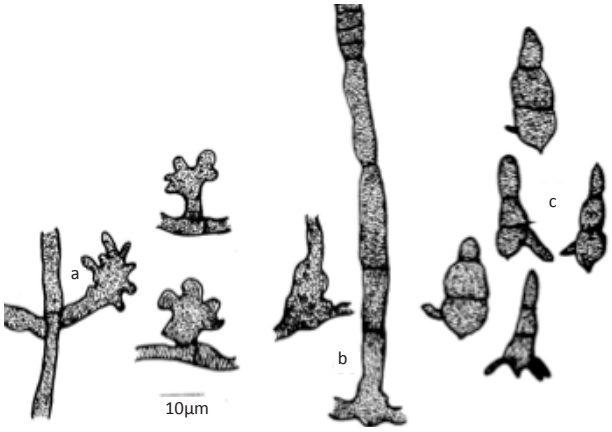

Figure 119. ***Teratosperma anacardii***
a - Foot cell; b - Conidiophore; c- Conidia

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, mostly 2-septate, constricted at the septa, 10–21µm long, truncate at the base, 1–2 appendaged on the basal cell, 4–5 µm broad at the broadest part, apical cell pale and broadly round at the tip, up to 2µm broad.

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 mostly epiphyllous, dense. up to 5mm 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

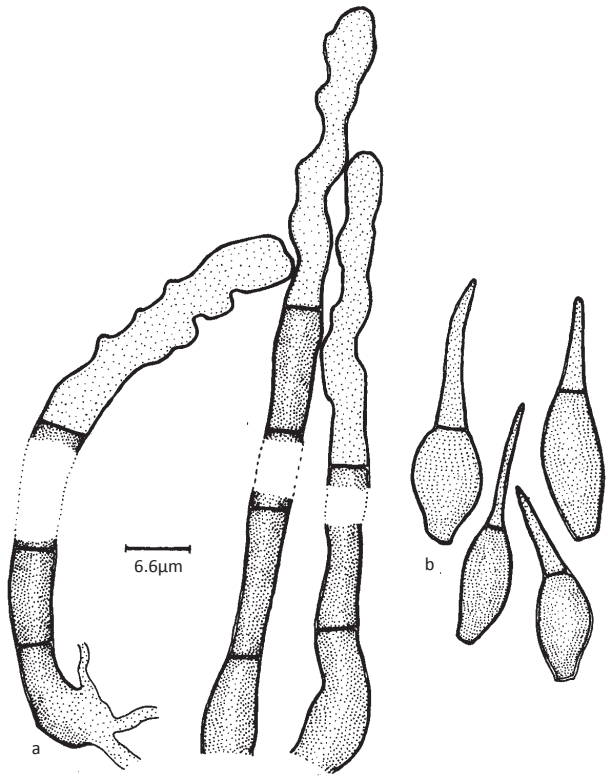

Figure 120. ***Spiropes armatellicola***
a - Conidiophores; b - Conidia

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; Katumoto, 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 synnemata, 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, acropleurogenous, simple, fusiform to obclavate, pale

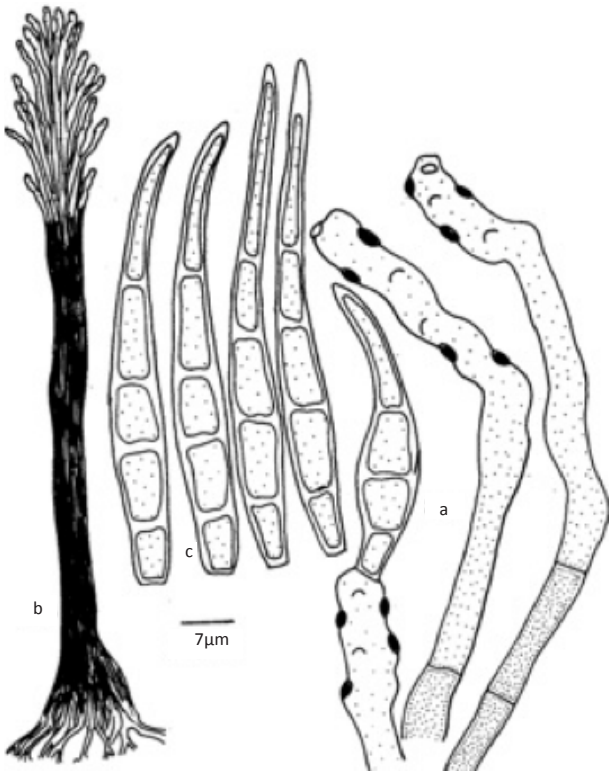

Figure 121. ***Spiropes japonicus***
a - Conidiogenous cells; b - Synnema; c - Conidia

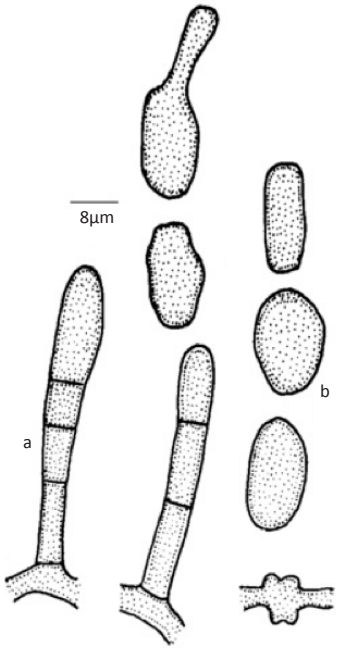

Figure 122. ***Oidium doidgeae***
a - Conidiophores; b - Conidia

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 1963.

POWDERY MILDEWS

The genus *Oidium*

Oidium doidgeae Bapp., Hosag. & Udaiyan, New Botanist 22: 124, 1995 (Fig. 122).

Colonies amphigenous, mostly epiphyllous, dense, confluent, persistent. Hyphae septate, branched, 3.5–7.5 µm wide. Appressoria lobed and oppsite. Conidiophores straight, erect, 57–84 11m long; foot cells straight, cylindrical, slightly flexuous, 22–38x7.5–11.5 11µm, followed by a shorter cell. Conidia solitary, ovoid, ellipsoidal tocylindrical, 22–38x11–19 11µm. Germ tube apical, simple.

Materials examined: 15.xii.2003 on leaves of *Triumfetta* sp., (Tiliaceae), Sairandhri, Silent Valley, Kerala, V.B. Hosagoudar et al. HCIO 45913, TBGT 1675.

SPHAEROPSIDALES (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,

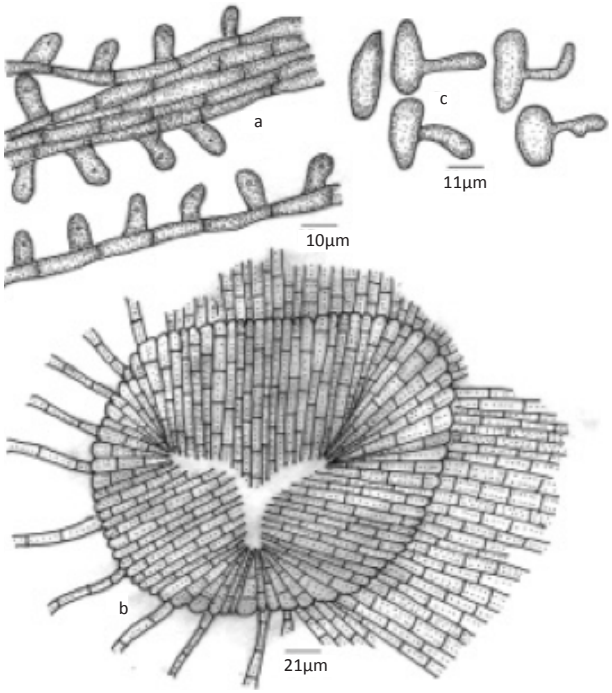

Figure 123. ***Asterostomella daphniphylli***
a - Appressoriate mycelium; b - Pycnothyrium; c - Pycnothyriospores

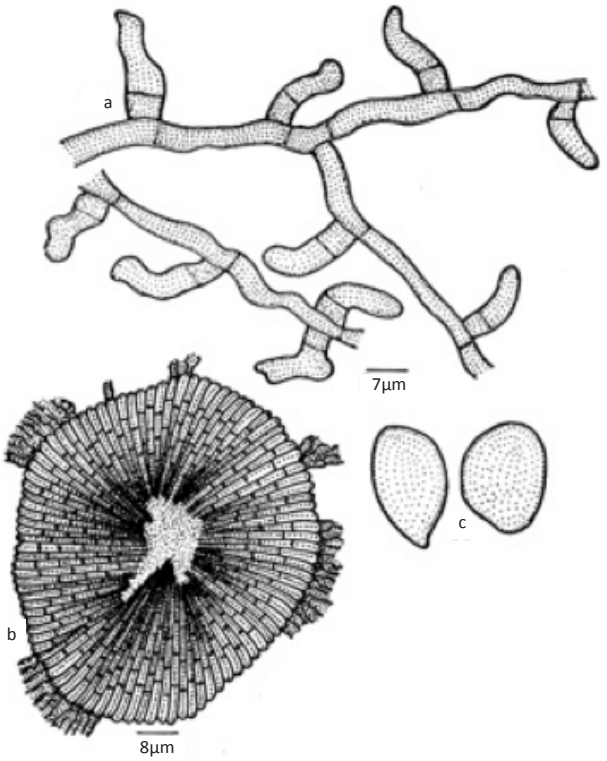

Figure 124. ***Asterostomella scolopiae-crenatae***
a - Appressoriate mycelium; b - Pycnothyrium; c - Pycnothyriospores

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), Cheriya 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, 2001; 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 Flacourtiaceae member, Sairandhri, V.B. Hosagoudar et al. HCIO 45761, TBGT 1510; on leaves of *Scolopia crenata* (Wight & Arn.) D. Clos (Flacourtiaceae), Silent Valley, 14.ii.2007, M.C. Riju, Gireesh & S.S. Shaji TBGT 5511; on leaves of *Scolopia* sp., 26.ii.2009, S.S. Shaji et al. TBGT 5551.

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.

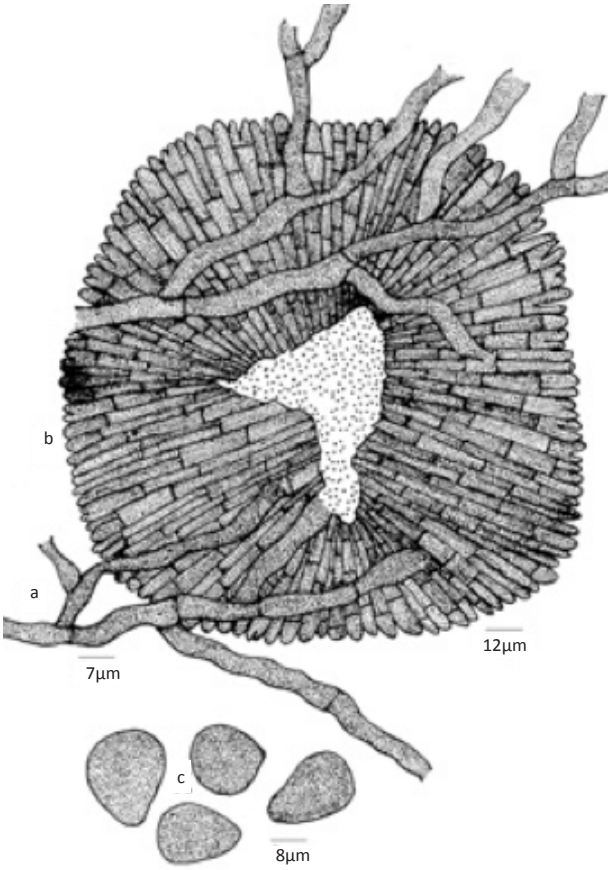

Figure 125. ***Asterostomula loranthi***
a - Mycelium; b - Pycnothyrium; c - Pycnothyriospores

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. (Papilonaceae), 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, Silent Valley, 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

REFERENCES

Bhat, D.J. (2010). *Fascinating microfungi (Hyphomycetes) of Western Ghats, India.* Broadway Book Centre, Goa, 221pp.

Chavan, P.B. & V.B. Hosagoudar (1984). Three new fungi from Satara, Maharashtra, India. *Journal of Economic and Taxonomic Botany* 5: 447–450.

Chavan, P.B. & V.B. Hosagoudar (1985). A preliminary survey of the fungi on monocot crops and weeds of Satara, Maharashtra, India. *Journal of Economic and Taxonomic Botany* 6: 239–243.

Hansford, C.G. (1961). *The Meliolineae. The Monograph*. Sydowia Beih, 2: 1–806

Hosagoudar, V.B. (1985). Miscellaneous fungi from south India. *Journal of Economic and Taxonomic Botany* 7: 45–47.

Hosagoudar, V.B. (1996). *Meliolales of India*. Botanical Survey of India, Calcutta, 363pp.

Hosagoudar, V.B. (2006a). Additions to the fungi of Kerala. *Zoos' Print Journal* 21(7): 2322–2330.

Hosagoudar, V.B. (2006b). Additions to the fungi of Kerala–II. *Zoos' Print Journal* 21(9): 2412–2416.

Hosagoudar, V.B. (2006c). Additions to the fungi of Kerala–IV. *Zoos' Print Journal* 21(11): 2475–2478.

Hosagoudar, V.B. (2007). Additions to the fungi of Kerala–V. *Zoos' Print Journal* 22(9): 2834–2836.

Hosagoudar, V.B. (2008). *Meliolales of India.* Vol. II. Botanical Survey of India, Calcutta, 390pp.

Hosagoudar, V.B. (2010). Anamorphs of Asterinales. *Journal of Theretical and experimental Biology* 6(3&4): 199–211

Hosagoudar, V.B. & G.R. Archana (2009a). Studies on foliicolous fungi–XXVII. *Indian Journal of Science and Technology* 2(6): 1.

Hosagoudar, V.B. & G.R. Archana (2009b). Meliolaceae of Kerala, India–XXVIII. *Journal of Threatened Taxa* 1(6): 348–350.

Hosagoudar, V.B. & H. Biju (2005). *Asteridiella pygei* Hansf. var. *microspora* Hosag., a new record to southern India. *Zoos' Print Journal* 20(6): 1898–1899.

Hosagoudar, V.B. & H. Biju (2006). Studies on foliicolous fungi–XXII. Microfungi of Silent Valley National Park, Palghat District in Kerala State. *Journal of Mycopathological Research* 44: 39–48

Hosagoudar, V.B. & A.C. Prabha (2009). New Asterinaceae members from Kerala, India. Indian *Journal of Science and Technology* 2(6): 15–16.

Hosagoudar, V.B., M.C. Riju (2011a). Some interesting Meliolaceae members from Western Ghats Region of Kerala State. *Plant Pathology & Quarantine* 1(2): 121–129.

Hosagoudar, V.B. & M.C. Riju (2011b). Three new fungi from Silent Valley National Park, Kerala, India. *Journal Threatened Taxa* 3(3): 1615–1619.

Hosagoudar, V.B., T.K. Abraham & P. Pushpangadan (1996). *Fungi of Kerala.* Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, 151pp.

Hosagoudar, V.B., A.C. Prabha & D.K. Agarwal (2011). *Asterinales of Kerala.* Associated Publishing Company, 270pp+pl.23.

Hosagoudar, V.B., J. Thomas, S.S Shaji & P.P.R. Kumar (2009). A new Balladyna species from Kerala, India. *Indian Journal of Science and Technology* 2(6): 9.

Hosagoudar, V.B., M.C. Riju & D.K. Agarwal (2010). Three new meliolaceae members from Silent Valley National Park. *Indian Phytopathology* 63(1): 76–78.

Hughes, S.J. (1993). *Meliolina and Its Eexcluded Species.* IMI Kew, England.

Hughes, S.J. (1976). Sooty moulds. *Mycologia* 68: 693–820.

Manilal, K.S. (1998). *Flora of Silent Valley.* The Mathrubhumi (MM) Press, Calicut, 398pp.

Mohanan, C. (2003). Mycorrhizae in forest plantations: association,

Key to the species of Meliolales

Generic name & Digital formula	Name of the host family and synoptic characters of the fungal species	Species
	Acanthaceae	
Asteridiella 3101.4220	…	*Asteridiella strobilanthicola*
	Anacardiaceae	
Meliola 3111.5333	…	*Meliola holigarnae*
	Ancistrocladaceae	
Meliola 3113.3221	…	*Meliola ancistrocladi*
	Apocynaceae	
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*
3111.3223	Colonies mostly epiphyllous, subdense; hyphae straight to flexuous; appressoria alternate, antrorse 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*
	Aristolochiaceae	
Meliola 3113.3223	…	*Meliola aristolochigena*
	Asteraceae	
Asteridiella 3101.4220	…	*Asteridiella cyclopoda*
	Combretaceae	
Asteridiella 3101.4220	…	*Asteridiella combreti* var. *leonensis*
	Ebenaceae	
***Meliola* 3113.4233**	…	*Meliola diospyricola*
	Elaeocarpaceae	
Amazonia 3101.4220	…	*Amazonia elaeocarpi*
Asteridiella 3101.4220	…	*Asteridiella elaeocarpi-tuberculati*
	Ericaceae	
Amazonia 3101.3220	…	*Amazonia vaccinii*
	Erythropalaceae	
Meliola 3111.4222	…	*Meliola erythropali*
	Euphorbiaceae	
Asteridiella 3101.3220	…	*Asteridiella crotonis-caudati*
	Fabaceae	
Meliola 31⅓3.3222	Colonies epiphyllous, dense; hyphae straight, substraight, flexuous to crooked; appressoria alternate, unilateral, about 3% opposite, straight to curved, antrorse, subantrorse to retrorse, 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 balakrishnanii*
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*
Meliola31⅓1.4323	Colonies hypophyllous, dense; hyphae substraight to slightly flexuous; appressoria alternate, subantrorse to rarely retrorse, 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 31½**1.5221**	…	*Meliola prataprajii*
	Melastomatacea	
Meliola 3111.3223	…	*Meliola affinis* var**.** *indica*
	Meliaceae	
Meliola 31½**3.3322**	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*
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 31½**3.5324**	…	*Meliolamanoharacharyi*
	Myrsinaceae	
Amazonia 3101.4230	…	*Amazonia peregrina*
***Meliola* 31½3.3221**	…	*Meliola groteana* var. *maesae*
	Myrtaceae	
Meliola 3111.5323	…	*Meliola eugeniae-jamboloidis*
	Olacacea	
Meliola 3113.5333	…	*Meliola strombosiigena*
	Oleaceae	
Meliola3111.4223	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*
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 perithecial, straight, simple, acute to obtuse	*Meliola gemellipoda*
3111.3222	Colonies amphigenous, mostly epiphyllous, dense, velvety; 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, simple, acute at the tip	*Meliola malabarensis*
	Periplocaceae	
Meliola 3111.4323	…	*Meliola garciniae*
	Rhamnaceae	
Amazonia 3101.3220	…	*Amazonia gouaniae*
	Rosaceae	
Asteridiella 3101.42x0	…	*Asteridiella pygei* var. *microspora*
	Rubiaceae	
Meliola3111.42x2	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 hypophyllous, 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 ixorae* 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*
	Rutacea	
Asteridiella3103.4330	…	*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 atalantiae*
31⅓3.4233	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*
31⅓3.4233	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*
31⅓3.4223	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*
31⅓2.3221	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
31⅓3.4223	Colonies hypophyllous, crustose, thin; hyphae straight to substraight; appressoria alternate and about 10% opposite, antrorse to spreading, straight to curved; phialides mixed with appressoria; mycelial setae scattered, straight, simple, acute, obtuse, cristate to dentate	*Meliola paramignyae*
	Sapindaceae	
Meliola 31⅓2.3223	Colonies epiphyllous, scattered, dense; hyphae straight; appressoria opposite, antrorse to subantrorse, rarely recurved, head cells globose, rar3ely 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 opposite, 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 furcate at the tip	*Meliola capensis* var. *indica*
3113.3122	Colonies hypophyllous, thin; hyphae crooked; appressoria opposite and alternate, straight to curved, spreading, antrorse to reflexed, 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*
	Staphyleaceae	
Prataprajella 20 $^{2}/_{4}$1.5230	…	*Prataprajella turpiniicola*
	Symplocaceae	
Meliola 3113.5323	…	*Meliola rachammae*
	Tiliaceae	
Irenopsis 3401.4220	…	*Irenopsis triumfettae* var. *indica*
	Urticaceae	
Asteridiella 3101.3220	…	*Asteridiella oreocnidecola*
	Verbenacaea	
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 heyneanus*	*Meliola ancistrocladi*
4.	Apocynaceae	*Anodendron paniculatum*	*Meliola anodendricola*
		Ichnocarpus sp.	*Meliola ichnocarpi-volubili*
5.	Aristolochiaceae	*Thottea sp.*	*Asterina thotteae*
		Aristolochia tagala	*Meliola aristolochigena*
		Aristolochia sp.	*Schiffnerula aristolochiae*
6.	Asclepiacaceae	*Wattakaka* sp.	*Asterina travancorensis*
7.	Asteraceae	*Vernonia arborea*	*Asteridiella cyclopoda*
			Acremoniula sarcinellae
			Schiffnerula vernoniae
		Vernonia sp.	*Schiffnerula vernoniae*
8.	Celastraceae	*Pleurostylia sp.*	*Asterina microtropidicola*
9.	Chloranthaceae	*Sarcandra chloranthoides*	*Asterina sarcandrae*
10.	Combretaceae	*Calycopteris florubunda*	*Asteridiella combreti* var. *leonensis*
		Calycopteris floribunda	*Asterina combreti*
12.	Convolvulaceae	*Merremia* sp.	*Endophyllum kaernbachii*
13.	Cyperaceae	*Scleria* sp.	*Diplococcium atrovelutinum*
14.	Daphniphyllaceae	*Daphniphyllum neilgherrense*	*Asterostomella daphniphylli*
15.	Ebenaceae	*Diospyros* sp.	*Meliola diospyricola*
16.	Elaeocarpaceae	*Elaeocarpus tuberculatus*	*Asterina elaeocarpi* var. *ovalis*
		Elaeocarpus munronii	*Asterina elaeocarpicola*
			Amazonia elaeocarpi
		Elaeocarpus tuberculatus	*Asteridiella elaeocarpi-tuberculati*
17.	Ericaceae	*Vaccinium neilgh*	*Amazonia vaccinii*
		Rhododendron arboreum	*Asterina hakgalensis*
18.	Erythropalaceae	*Erythropalum populifolium*	*Asterina erythropalicola*
		Erythropalum populifolium	*Meliola erythropali*
19.	Euphorbiaceae	*Croton caudatus*	*Asteridiella crotonis-caudati*
		Aporusa sp.	*Asterina aporusae*
		Mallotus sp.	*Spiropes japonicus*
20.	Fabaceae	Fabaceae member	*Phyllachora* sp.
		Dolichus trilobus	*Meliola dolichi*
		Flemingia sp.	*Meliola flemingiicola*
		Pycnospora lutescens	*Meliola pycnosporae*
21.	Flacourtiaceae	*Scolopia crenata*	*Asterina flacourtiacearum*
		Scolopia sp.	*Asterina talacauveriana*
		Flacourtiaceae member	*Asteridiella scolopiae*
			Asterostomella scolopiae-crenatae
		Scolopia sp.	*Phyllachora* sp.

22.	Gramineae (Poaceae)	*Ochlandra rheedi*	*Dysrhynchis 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 chandrasekharanii*
26.	Lamiaceae	*Leucas* sp.	*Asteridiella anastomosans*
27.	Lauraceae	*Litsea* sp.	*Asterina cryptocariicola*
		Cinnamomum malabatrum	*Armatella balakrishnanii*
		Litsea sp.	*Armatella cryptocaryae*
		Litsea sp.	*Armatella katumotoi*
		Neolitsea scrobiculata	*Armatella litseae*
		Cinnamomum camphora	*Meliola cinnamomi*
		Litsea sp.	*Meliola kakachiana*
		Litsea sp.	*Meliola kakachiana* var. *poochiparensis*
		Litsea sp.	*Meliola litseae* var. *rotundipoda*
		Litsea sp.	*Meliola palakkadensis*
		Litsea sp.	*Spiropes armatellicola*
28.	Loranthaceae	*Loranthus* sp.	*Asterina deightonii*
		Loranthus sp.	*Asterostomula loranthi*
		Loranthus sp.	*Meliola prataprajii*
		Loranthus sp.	*Sarcinella loranthacearum*
29.	Lythraceae	*Lagerstroemia microcarpa*	*Schiffnerula lagerstroemiae*
30.	Melastomatacea	*Memecylon* sp.	*Asterina memecylonis*
		Memecylon sp.	*Echidnodella memecyli*
		Memecylon sp.	*Meliola affinis* var. *indica*
		Memecylon sp.	*Acrodictys balladynae Echidnodella memecyli*
31.	Meliaceae	*Chukrasia tabularis*	*Asterina chukrasiae*
		Cipadessa baccifera	*Asterina cipadessae*
		Aglaia minutiflora	*Meliola sairandhriana*
		Meliaceae member	*Meliola silentvalleyensis*
32.	Menispermaceae	*Lepianthes umbellata*	*Asterina lepianthedis*
		Lepianthes umbellata	*Meliola lepianthedis*
33.	Myristicaceae	*Myristica* sp.	*Asterina myristicacearum*
		Myristica sp.	*Meliola manoharacharyi*
		Myristica beddomei	*Teratosperma anacardii*
34.	Myrsinaceae	*Maesa indica*	*Amazonia peregrina*
		Maesa indica	*Meliola groteana* var. *maesae*
35.	Myrtaceae	*Rhodomyrtus tomentosa*	*Asterina rhodomyrti*
		Syzygium sp.	*Asterina claviflori*
		Syzygium munronii	*Meliola eugeniae-jamboloidis*
		Syzygium sp.	*Meliolina* sp.
		Syzygium sp.	*Meliolina pulcherrima*
37.	Olacaceae	*Strombosia* sp.	*Meliola strombosiigena*

38.	Oleaceae	*Jasminum* sp.	*Asterina pongalaparensis*
		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.	*Palawaniella jasmini*
		Jasminum sp.	*Prillieuxina jasmini*
39.	Papilonaceae	*Olea dioica*	*Leptosphaerulina australis*
		Flamingia sp.	*Leptosphaerulina* sp.
40.	Periplocaceae	*Gardneria ovate*	*Meliola garciniae*
41.	Polygonaceae	*Polygonum chinense*	*Puccinia solmsii*
42.	Rhamnaceae	*Guoania* sp.	*Amazonia gouaniae*
43.	Rosaceae	*Pygium wightianum*	*Asteridiella pygei* var. *microspora*
44.	Rubiaceae	*Lasianthus sp.*	*Aphanopeltis lasianthi*
		Rubiaceae member	*Balladyna indica*
		Canthium dicoccum	*Meliola canthii*
		Ixora sp.	*Meliola ixorae* var. *psychotriae*
		Wendlandia thyrsoidea	*Meliola wendlandiae*
45.	Rutacea	*Toddalia asiatica*	*Asteridiella toddaliae*
		Acronychia pedunculata	*Asterina acronychiae*
		Atalantia sp.	*Asterina atalantiae*
		Toddalia sp.	*Didymopsorella toddaliae*
		Atalantia sp.	*Meliola atalantiae*
		Citrus sp.	*Meliola butleri*
		Citrus sp.	*Meliola citricola*
		Clausena sp.	*Meliola clausenae*
		Clausena sp.	*Meliola clausenigena*
		Paramignya sp.	*Meliola paramignyae*
46.	Santalaceae	*Scleropyrum pentandrum*	*Asterina scleropyri*
47.	Sapindaceae	*Allophyllus concanicus*	*Meliola allophyli-concanici*
		Allophyllus sp.	*Meliola capensis* var. *indica*
		Nephelium sp.	*Meliola commixta*
		Nephelium sp.	*Meliola serjaniae* var. *major*
		Allophyllus cobbe	*Sarcinella allophyli*
48.	Staphyleaceae	*Turpinia malabarica*	*Prataprajella turpiniicola*
49.	Symplocaceae	*Symplocos* sp.	*Asterina suttonii*
		Symplocos rosea	*Asterina indica*
		Symplocos macrocarpa ssp. *Kanarana*	*Meliola rachammae*
50.	Sterculiaceae	*Sterculia* sp.	*Phyllachora* sp.
51.	Theaceae	*Eurya japonica*	*Asterina songii*
		Thea sinensis	*Schiffnerula camelliae*
52.	Tiliaceae	*Triumfetta* sp.	*Irenopsis triumfettae* var. *indica*
		Triumfetta sp.	*Oidium doidgeae*

53.	Urticaceae	*Oreocnide integrifolia*	*Asterina oreocnidegena*
		Oreocnide sp.	*Asterina oreocnidecola*
		Oreocnide integrifolia	*Asteridiella oreocnidecola*
54.	Verbenaceae	*Callicarpa* sp.	*Asteridiella formosensis*
		Clerodendrum viscosum	*Asteridiella clerodendricola*
		Clerodendrum infortunatum	*Meliola clerodendricola*

Key to the groups of fungi

1. Produce black colonies on the host surfaces ..... Black mildews
1. Not so 2
2. Produce powdery coating on the host surfaces ..... Powdery mildews
2. Not so 3
3. Produce tar spots the host surfaces.....Tar spot fungi
3. Not so.....4
4. Produce rust pustules.....Rust fungi
4. Not so.....5
5. Produce superficial perithecia on leaves.....*Leptosphaerulina*
5. Not so.....6
6. Grow on other fungi.....Hyperparasites
6. Not so.....Hyphomycetes

Key to the black mildews

1. Fruiting body perithecium.....2
1. Fruiting body thyriothecium.....5
2. Appressoria mostly two celled.....Meliolales
2. Appressoria not so.....3
3. Ascospores 3-septate.....*Meliolina*
3. Ascospores 1-septate.....4
4. Mycelium appressoriate.....*Balladyna*
4. Mycelium not appressoriate.....*Dysrhynchis*
5. External mycelium absent.....*Palawaniella*
5. External mycelium present.....6
6. Anamorph not known.....*Aphanopeltis*
6. Anamorph known.....7
7. Anamorph *Asterostomella*, *Asterostomula*, etc.....Asterinales
7. Anamorph *Sarcinella*, *Questieriella*, etc.....*Schiffnerula*

Key to the families of meliolales

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

Key to the genera

1. Perithecia flattened globose.....*Amazonia*
1. Perithecia globose.....2
2. Only mycelial setae present.....*Meliola*
2. Not so.....3
3. Only perithecial setae present.....*Irenopsis*
3. Not so.....4
4. Perithecial setae and appendages present.....*Prataprajella*
4. Both perithecial setae and appendages absent.....*Asteridiella*

Key to the genera of Asterinales

1. Appressoria absent....2
1. Appressoria present....4
2. Conidia present....*Eupelte*
2. Conidia absent....3
3. Thyriothecia orbicular....*Prillieuxina*
3. Thyriothecia elongated....*Echidnodella*
4. Appressoria intercalary....*Asterolibertia*
4. Appressoria lateral....*Asterina*

Key to the species based on the host families

Anacardiaceae
Asterina
Single species....*Asterina nothopegiae*

Aristolochiaceae
Asterina
Single species....*Asterina thotteae*

Asclepiacaceae
Asterina
Single species....*Asterina travancorensis*

Celastraceae
Asterina
Single species....*Asterina microtropidicola*

Chloranthaceae
Asterina
Single species....*Asterina sarcandrae*

Combretaceae
Asterina
Single species....*Asterina combreti*

Elaeocarpaceae
Asterina
1. Apressoria cylindrical and tubular....*Asterina elaeocarpi* var. *ovalis*
1. Apressoria characteristically uncinate....*Asterina elaeocarpicola*

Ericaceae
Asterina
Single species....*Asterina hakgalensis*

Erythropalaceae
Asterina
Single species....*Asterina erythropalicola*

Euphorbiaceae
Asterina
Single species....*Asterina aporusae*

Flacourtiaceae
Asterina
1. Appressoria alternate only....*Asterina flacourtiacearum*
1. Appressoria alternate and opposite....*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
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*

Symplocaceae
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*

diversity and exploitation in planting improvement. KFRI report no. 252.

Mohanan, C. (2011). *Macrofungi of Kerala.* Handbook No. 27. Kerala Forest Research Institute, Peechi, Kerala, 597pp.

Subramanian, C.V. (1976). *Hyphomycetes - An Account of Indian Species Except Cercosporae*. ICAR, New Delhi.

Subramanian, C.V. (1986). The progress and status of mycology in India. Proceedings of Indian Academy of Sciences. 96: 379–392.

Swaminathan, M.S. (1999). Silent Valley National Park - a biological paradise. In: Manoharan, T.M., S.D. Biju, T.S. Nayar & P.S. Easa (eds.). *Silent Valley - Whispers of Reasons*. KFRI, Peechi, 1–9pp.

Vajravelu, E. (1990). *Flora of Palghat District, including Silent Valley National Park, Kerala*. Botanical Survey of India, Kolkatta, 646pp.

Wellman, F.L. (1972). *Tropical American Plant Disease*. The Scarecrow Press, Metuchen, NJ.