# MELIOLACEAE OF KERALA, INDIA - XIV

**V.B. Hosagoudar**

*Microbiology Division, Tropical Botanic Garden and Research Insitute, Palode, Thiruvananthapuram, Kerala 695562, India.*

## Abstract

This paper gives an account of five taxa of Meliolaceae. Of these, *Asteridiella kombeensis* and *Meliola dysoxyli-malabarici* are new species; *Meliola aethiops* var. *keralica* and *M. hydnocarpi* var. *indica* are new varieties, while *Meliola castlerockensis* is synonymised with *M. cookeana* var. *viticis*.

## Keywords

*Fungi,* Asteridiella, Meliola, *Kerala, new description*

## Abbreviations

HCIO – Herbarium Cryptogamae Indiae Orientalis, New Delhi
TBGT – Tropical Botanic Garden, Thiruvananthapuram

## Introduction

Meliolaceous fungi are commonly called black mildews. These are ectophytic obligate parasites, infecting mainly leaves, rarely petioles and tender stems. These fungi constitute one of the largest group of fungi represented with nine genera and 2200 species in the world (Hansford, 1961; Hosagoudar *et al.*, 1997). However, still they are very little known to mycologists probably due to lack of systematic survey of these fungi in the tropics and also due to diminishing taxonomic work. Contrary to it, their abundance in the southern Western Ghats in Peninsular India has attracted attention and has resulted in the continuing work since more than two decades (Hosagoudar, 1996; Hosagoudar *et al.*, 1997, 1998a,b,c,d, 1999, 2000a,b, 2001).

## Materials and Methods

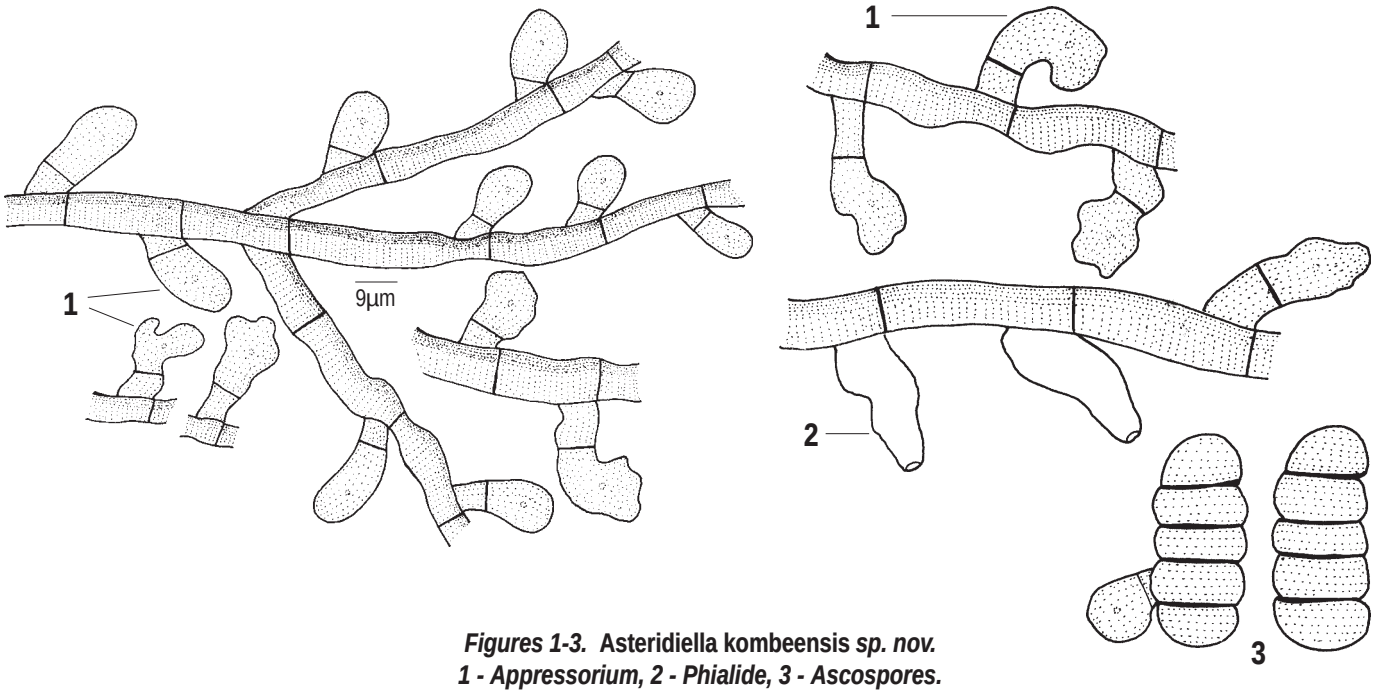
For microscopic studies, scrapes from selected colonies were mounted in 10% KOH solution. After 10 minutes, KOH was replaced by Lactophenol. Both mountants clear melanin pigments and make the septa visible. However, to prepare permanent slides, a drop of transparent nail polish was applied to the selected colonies, thinned carefully and allowed to dry for 10-20 minutes in a dust free chamber. After ensuring dryness, with the help of a blade the dried flip along with the embedded colonies were pealed off, and spread with a drop of D.P.X. mountant on a clean glass slide. A cover glass was placed over it carefully to prevent air bubbles after adding another drop of D.P.X. on the flip. These slides were used for further study after ensuring their dryness in a day or two.

***Asteridiella kombeenisis* sp. nov.**
(Figs. 1-3)

*Coloniae epiphyllae, densae, ad 3mm diameter, raro confluentes, Hyphae subrectae, flexuosae vel raro anfractuae, alternate vel opposite acuteque vel laxe ramosae, laxe vel arcte reticulatae, cellulae 24-26 x 7-9µm. Appressoria alternata, recta vel uncinata, antrorsa, subantrorsa vel retrorsa, 24-28µm longa; cellulae basilares cylindraceae vel cuneatae, 8-13µm longae; cellulae apicales ovatae, globosae, integrae, angularae, sublobatae vel lobatae, 14-16 x 9–13µm. Phialides appressoriis intermixtae, alternatae, oppositae vel unilateralae, ampulliformes, 20-28 x 8-10µm. Perithecia dispersa, globosa, ad 175µm diameter; celluae peritheciales indistinctae; ascosporae oblongae, raro ellipsoideae, quadra septatae, constrictae, 33-40 x 14-18µm.*

Colonies epiphyllous, dense, up to 3mm in diameter, rarely confluent. Hyphae substraight, flexuous to rarely crooked, branching alternate to opposite at acute to wide angles, loosely

*Manuscript received 27 October 2001* *Accepted for publication 15 February 2002*




***Figures 1-3.*** **Asteridiella kombeensis** ***sp. nov.***
***1 - Appressorium, 2 - Phialide, 3 - Ascospores.***

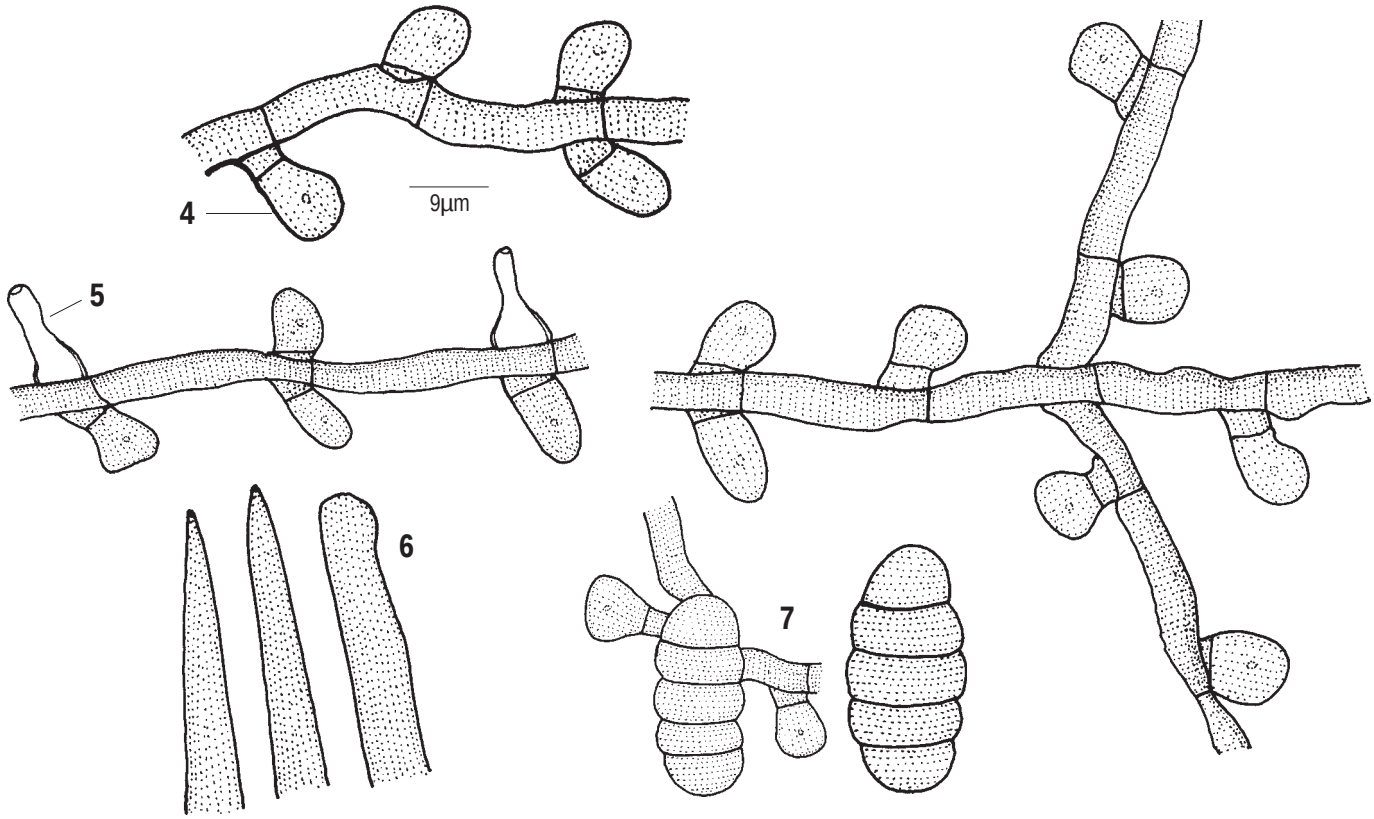



***Figure 4-7.*** **Meliola aethiops** ***Sacc. var.*** **keralica** ***var. nov.***
***4 - Appressorium, 5 - Phialidae, 6 - Mycelial setae, 7 - Ascospores (one germinated)***

to closely reticulate, cells 24-26 x 7-9µm. Appressoria alternate, straight to uncinate, antrorse, subantrorse to retrorse, 24-28µm long; stalk cells cylindrical to cuneate, 8-13µm long; head cells ovate, globose, entire angular, sublobate to lobate, 14-16 x 9-13µm. Phialides mixed with appressoria, alternate, opposite to unilateral, ampulliform, 20-28 x 8-10µm. Perithecia scattered, globose, up to 175µm in diameter; perithecial wall cells indistinct; ascospopres oblong, rarely ellipsoidal, 4-septate, constricted, 33-40 x 14-18µm.

**Material examined**

Holotype: On leaves of *Mallotus philippensis* (Lam.) Muell. Arg. (Euphorbiaceae), Kombe, Peppara and Neyyar Wildlife Sanctuaries, Thiruvananthapuram, Kerala, India, 9.iii.1996, V.B. Hosagoudar, HCIO 44206.
Isotype: TBGT 563.

**Remarks**

According to Beeli formula (3101. 3220), this species is close to *Asteridiella hansfordii* (Stev.) Hansf. but differs from it having antrorse to spreading appressoria with predominantly entire to sublobate head cells (Hansford, 1961). This material was severely infected with synnematous *Spiropes* sp.

***Meliola aethiops* Sacc. var. *keralica* var. nov.**
(Figs. 4-7)

*Differt a var.* aethiops *appressoria 15% opposita, setae myceliales longiorae et ascosporae magniorae.*

Colonies epiphyllous, thin to subdense, up to 3mm in diameter, rarely confluent. Hyphae substraight to flexuous, branching mostly opposite at acute to wide angles, loosely to closely reticulate, cells 20-26 x 4-6.5µm. Appressoria alternate, about 15% opposite, antrorse to subantrorse, slightly recurved, 11-15µm long; stalk cells cylindrical to cuneate, 3-4µm long; head cells ovate to globose, straight to slightly curved, entire, 8-11 x 8-10µm. Phialides mixed with appressoria, alternate to opposite, ampulliform, 16-20 x 6-8µm. Mycelial setae few, grouped around perithecia, simple, straight to slightly flexuous, acute to obtuse at the tip, up to 350µm long. Perithecia globose, up to 112µm in diameter; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 32-40 x 12-16µm.

**Material examined**

Holotype: On leaves of *Cassia* sp. (Mimosaceae), Kombe, Peppara and Neyyar Wildlife sanctuary, Thiruvananthapuram, Kerala, India, 25.ii.1997, V.B. Hosagoudar, HCIO 44183.
Isotype: TBGT 561.

**Remarks**

Based on the Beeli formula 3113.3222 and epiphyllous thin colonies, the present collection is similar to *Meliola aethiops* Sacc. var. *minor* Hansf. & Deight. known on *Cassia siamea* from Africa (Hansford, 1961). However, the new variety differs from it in having 15% opposite appressoria, longer mycelial setae and larger ascospores.

***Meliola dysoxyli-malabarici***
**V.B. Hosagoudar et M. Kamarudeen, sp. nov.**
(Fig. 8-11)

*Coloniae hypophyllae, subdensae, ad 2mm diameter, confluentes. Hyphae subrectae, irregulariter acuteque vel laxe ramosae, laxe vel dense reticulatae, cellulae 22-26 x 4-5µm. Appressoria alternata, unilateralia, ad 30% opposita, antrorsa, subantrorsa vel leniter retrorsa, 11-16µm longa; cellulae basilares cylindraceae vel cuneatae, 2-5µm longae; cellulae apicales ovatae, integrae, rectae vel leniter recurvae, late rotundatae ad apicem, 8-11 x 6-8µm. Phialides appressoriis intermixtae, alternatae vel oppositae, ampulliformes, 16-18 x 6-8µm. Setae myceliales dimorphae; setae myceliales simplices rectae, plerumque obtusae ad apicem, ad 1470µm, longae; setae circa peritheciales simplices, rectae, curvulae, uncinatae, acutae ad apicem, ad 150µm longae. Perithecia dispersa, globosa, ad 175µm diameter; ascosporae obovoidae, quadra septatae, constrictae, 30-32 x 12-16µm.*

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

**Material examined**

Holotype: on leaves of *Dysoxylum malabaricum* Bedd. ex Hiern (Melilaceae), Manjakuzhi, Kulamavu, Idukki, Kerala, India, 5.ix.2001, M. Kamarudeen, HCIO 44202.
Isotype: TBGT 565.

**Remarks**

Based on the uncinate mycelial setae, the present species is closer to *Meliola obvallata* Sysow and *M. dysoxyli-nitidi* Huguenin var. *minor* Huguenin (Hansford, 1961; Huguenin, 1969;

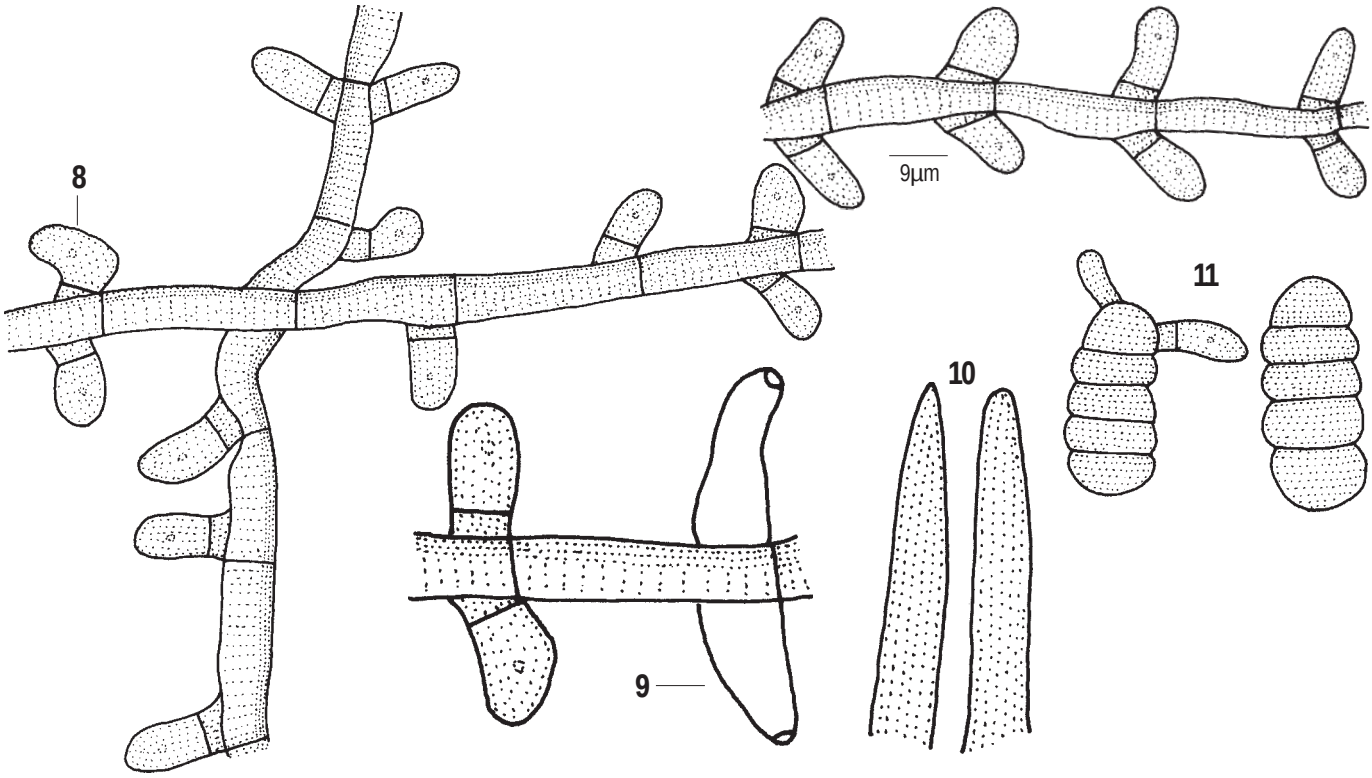



***Figure 8-11.*** **Meliola dysoxyli-malabarica *sp. nov.***
***8 - Appressorium, 9 - Phialide, 10 - Mycelial setae, 11 - Ascospores (one germinating)***

Hosagoudar *et al*. 1997) but differs from both in having two types and longer mycelial setae.

***Meliols hydnocarpi* Hansf. var. *indica***
**V.B. Hosagoudar *et* M. Kamarudeen, var. nov.**
(Figs. 12-15)

*Differt a var.* hydnocarpi, *coloniae hypophyllae, densae, setae myceliales 1% unicinatae et ad apicem acutae.*

Colonies hypopyllous, dense, velvety, up to 3mm in diameter, rarely confluent. Hyphae substraight to crooked, branching irregular at acute to wide angles, loosely to closely reticulate, cells 25-35 x 6-7µm. Appressoria alternate, about 2% opposite, antrorse to subantrorse, straight to curved, 14-18µm long; stalk cells cylindrical to cuneate, 4-6.5µm long; head cells ovate to globose, straight to curved, entire to rarely angular, 9-11 x 7-9µm. Mycelial setae densely scattered on the colonies, simple, straight, rarely about 1% uncinate, acute at the tip, up to 350µm long. Perithecia scattered, globose, up to 163µm in diameter; ascospores oblong to cylindrical, 4-septate, constricted at the septa, 36-40 x 12-15µm.

**Material examined**
Holotype: On leaves of *Hydnocarpus pentandra* (Buch-Ham) Oken (Flacourtiaceae), Idukki, Kerala, India, 6.ix.2001, M. Kamarudeen, HCIO 44199.
Isotype: TBGT 564.

**Remarks**
The present collection can be compared with *Meliola hydnocarpi* Hansf. known on *Hydnocarpus hutchinsonii* from British North Borneo (Hansford, 1961). However, the new variety differs from the var. *hydnocarpi* in having hypophyllous dense colonies, 1% uncinate mycelial setae and all with acute tips.

***Meliola cookeana* Speg. var. *viticis***
**Hansf., Sydowia Beih. 2: 690, 1961**

=*Meliola castlerockensis* Srinivasulu, Nova Hedwigia Beih. 47: 425, 1974.

The protologue of *Meliola castlerockensis* Srinivasulu matches well with that of *M. cookeana* Speg. var. *viticis* Hansf. known on the same host from Java. Further, Hosagoudar *et al.* (1998) have recorded this fungus on the same host from the southern

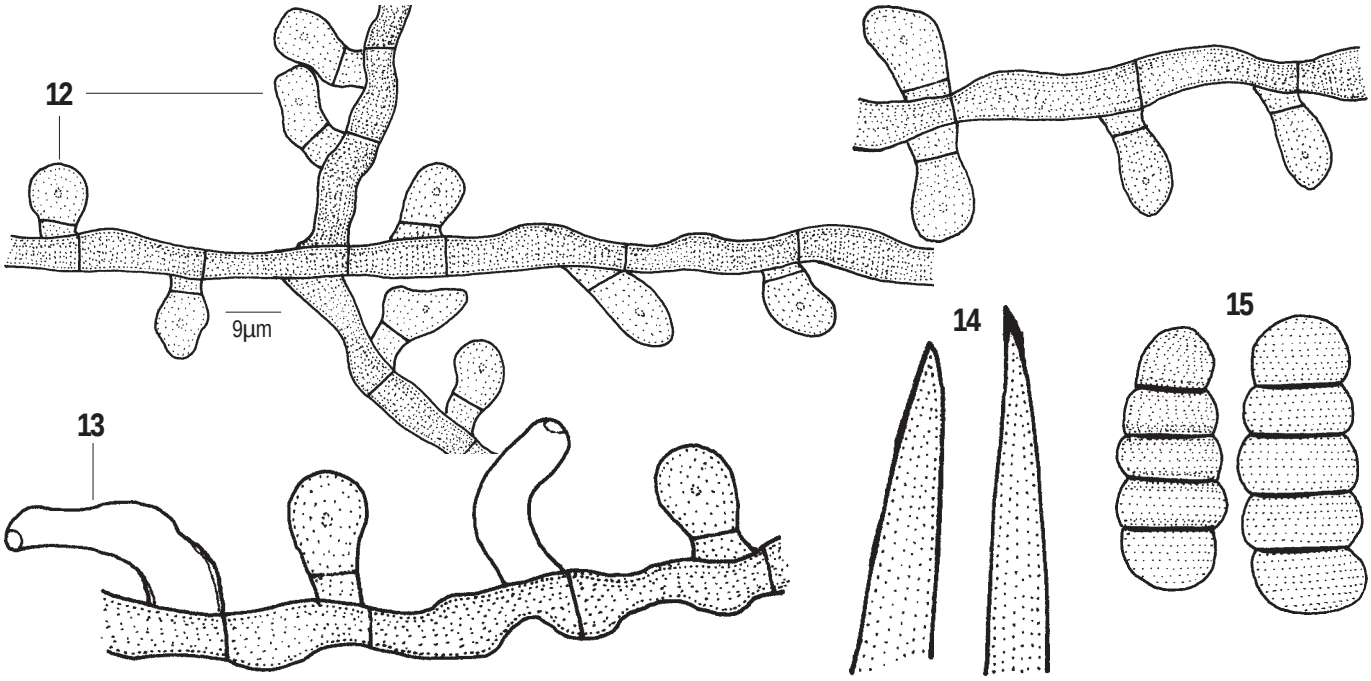



***Figure 12-15*** **Meliola hydnocarpi *Hansf. var.* indica *var. nov.***
***12 - Appressorium, 13 - Phialide, 14 -Mycelial setae, 15 - Ascospores.***

Western Ghats. Hence, *Meliola castlerockensis* Srinivasulu (1974) has been made synonymous.

## Discussion

These fungi flourish well in the Western Ghats of Penisnsular India. Records reveal their presence in the Eastern Ghats. However, few are known from the Himalayan region. Hence, the systematic survey of these in all regions of India will reveal an astonishing number of these fungi.

The biology, cytology, developmental aspects of these fungi are little known or meagre. The colony growth is very slow , ascospores cannot be successfully germinated in vitro or in vivo.

Little study has been carried out regarding their host-pathogen association and biochemical analysis of the host plants. However, the utilitarian aspect is yet to be attempted.

## Acknowledgement

Thanks are due to Dr. G.M. Nair, Director, TBGRI, Palode for the facilities

## References

**Hansford, C.G. (1961).** *The Meliolineae. A Monograph. Sydowia Beihefte.* 2: 1-806.

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

**Hosagoudar, V.B., T.K. Abraham and R.D. Goos (1997).** Three new species of the Meliolaceae from Kerala, India. *Mycotaxon* 63: 493-496.

**Hosagoudar, V.B., T.K. Abraham and P. Pushpangadan (1997).** *The Meliolineae. A Supplement.* TBGRI, Palode, pp. 201.

**Hosagoudar, V.B., T.K. Abraham and J.L. Crane (1998).** Meliolaceae of Kerala, India - V. *Mycotaxon* 69: 391-397.

**Hosagoudar, V.B., T.K. Abraham and J.L. Crane (1999).** Meliolaceae of Kerala, India - VI. *Mycotaxon* 71: 149-153.

**Hosagoudar, V.B., T.K. Abraham and R.D. Goos (1998a).** Meliolaceae from Kerala, India - II. *Mycotaxon* 64: 103-107.

**Hosagoudar, V.B., T.K. Abraham and R.D. Goos (1998b).** Meliolaceae from Kerala, India - III. *Mycotaxon* 66: 109-113.

**Hosagoudar, V.B., T.K. Abraham and R.D. Goos (1998c).** Meliolaceae from Kerala, India - IV. *Mycotaxon* 66: 115-119.

**Hosagoudar, V.B., C.K. Biju, T.K. Abraham and J.L. Crane (2000).** Meliolaceae from Kerala, India - VII. *Mycotaxon* 76: 299-304.

**Hosagoudar, V.B., C.K. Biju and T.K. Abraham (2000).** Meliolaceae from Kerala, India - VIII. *Journal of Economic and Taxonomic Botany,* 24: 474-480.

**Hosagoudar, V.B., C.K. Biju and T.K. Abraham (2001).** Meliolacea from Kerala, India - X. *Journal of Economic and Taxonomic Botany,* 25: 68-73.

**Huguenin, B. (1969).** Micromycetes du Pacifique Sud VII. Meliolinees de Nouvelle- Caledonie. *Revue de Mycologie*, Tome 34: 4-61.

**Srinivasulu, B.V. (1974).** Genus *Meliola* from Maharashtra State. *Nova Hedwigia* 47: 421-437.