The genus *Asterina* and its anamorph on *Elaeocarpus* species in Southern Western ghats of peninsular India

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Abstract: The present study observed that the family Elaeocarpaceae comprises three genera: *Elaeocarpus*, *Sloanea* and *Muntingia*. Of these, *Elaeocarpus munronii*, *E. serratus*, *E. tectorius* and *E. tuberculatus* were found infected with *Asterina gamsii, A. elaeocarpi var. ovalis, A. elaeocarpicola* and *Asterostomella elaeocarpi-serrati* in the Southern Western Ghats of peninsular India. All these species are described and illustrated in detail.

Keywords: Fungi, Black mildews, Asterina, Elaeocarpus, Southern western ghats

INTRODUCTION

The family Elaeocarpaceae comprises three genera, namely, *Elaeocarpus*, *Sloanea* and *Muntingia*. The genus *Sloanea* is distributed in North and North-eastern states, while *Muntingia* is an introduced and cultivated ornamental plant for its profuse showy flowers. The genus *Elaeocarpus* comprises about 200 species, and of which 29 are represented in India. These are confined to north eastern and southern India, while few are in Andaman and Nicobar Islands. They prefer warm humid climate and occur at an altitude between 200 to 2000 m. About twelve species are known from the southern Western Ghats (Murti, 1993) and of which, *Elaeocarpus munronii* (Wight) Masters, *Elaeocarpus serratus* L., *Elaeocarpus tectorius* (Lour.) Poiret and *Elaeocarpus tuberculatus* Roxb. were found infected with *Asterina* species.

The genus *Asterina* belongs to the family Asterinaceae of the order Asterinales. It is characterized by an ectophytic, septate, brown, branched, appressoriate mycelium. Ascoma is flattened with radiating cells is called thyriothecium. Thyriothecium orbicular, flattened, with upper radiating cells, fimbriate to crenate at the margin, dehisce stellately at the centre. Asci globose, bitunicate, upper radiating cells, fimbriate to crenate at the margin, thyriothecium. Thyriothecium orbicular, flattened, with mycelium. Ascoma is flattened with radiating cells is called ectophytic, septate, brown, branched, appressoriate of the order Asterinales. It is characterized by an

The genus *Lembosia* is allied to *Asterina*, belongs to the family Lembosiacae but differs from it in having ellipsoidal to elongated thyriothecia which splits vertically (in contrast to stellately) at the centre (Hosagoudar et al., 2001).

Asterinaceae fungi are obligate biotrophs that cause least apparent damage to the host plants but bring biochemical changes as is evidenced in the case of *Santalum album* infected with *Asterina congesta* Cooke (Hosagoudar et al., 1997). These biochemical changes, which occur in the plants, may be of immense use as in the case of ‘ergot’ caused by *Claviceps purpurea* Cooke. Keeping this in view, the present study has been undertaken with the taxonomic aspect of the *Asterina* spp. infecting the species of the host genus *Elaeocarpus*

KEY TO THE *ASTERINA* SPECIES

1. Present only in anamorph state
   ... *Asterostomella elaeocarpi-serrulati*  
   1. Present in teleomorph state ... 2
   2. Appressoria cylindrical, straight, flexuous, uniciliate, often forked  
      ... *Asterina elaeocarpicola*  
   2. Appressoria not so ... 3
   3. Appressoria cylindrical, tubular, elongated, rounded at the apex  
      ... *Asterina elaeocarpi var. ovalis*  
   3. Appressoria ovate to cylindrical, entire, rounded at the tip ... *Asterina gamsii*

Enumeration of the species

1. *Asterina gamsii* Hosagoudar (2005) (Fig.1).

Colonies epiphyllous, dense, velvety, up to 3 mm 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 16-23 x 4-7 µm. Appressoria alternate, unilateral and about 20% opposite to subopposite, mostly straight, subantrorse to rarely retrorse, ovate to cylindrical, entire, rounded at the apex, 8-13 x 6-8 µm. Thyriothecia closely scattered, orbicular,
Fig. 1. *Asterina gansii* Hosagoudar  
a. Appressoriate mycelium, b. Thyriothecium,  
c. Ascus, d. Ascospores, e. Pycnothyriospores

Fig. 2. *Asterina elaeocarpi* Sydow var. *ovalis* Kar and Maity  
a. Appressoriate mycelium, b. Thyriothecium,  
c. Ascus, d. Ascospores

Fig. 3. *Asterina elaeocarpicola* Hansford  
a. Appressoriate mycelium, b. Thyriothecium,  
c. Ascus, d. Ascospores

Fig. 4. *Asterostomella elaeocarpi-serrati* Hosagoudar  
a. Appressoriate mycelium, b. Pycnothyrium,  
c. Pycnothyriospores

up to 300 µm in diameter, stellately dehisced at the centre,  
crenate to fimbriate at the margin, fringed hyphae flexuous;  
asci few to many, globose, octosporous, up to 38 µm in  
diam.; ascospores oblong, brown, uniseptate, constricted  
at the septum, 32-36 x 11-18 µm, wall smooth. Pycnothyria  
similar to thyriothecia, smaller; pycnothyriospores pyriform,  
apiculate, brown, 22-26 x 16-18 µm.

**Materials examined:** On leaves of *Elaeocarpus tectorius* (Lour.) Poir (*E. oblongus* auct. *non* Gaertn.), Sairandhri, Silent valley, Palghat, Kerala, Dec. 13, 2003,  
V.B. Hosagoudar and al TBGT 1502, HCIO 45753;  
Chempatty, Silent Valley, Palghat, Kerala, Dec. 14, 2003,

There are five species, namely, *Asterina borneensis* Hansf., *A. elaeocarpi* Sydow, *A. elaeocarpicola* Sydow var. ovalis Kar & Ghosh, *A. elaeocarpica* Hansf. and *A. elaeocarpicola-kobanmochi* Yamam., known on the members of the family Elaeocarpaceae (Hosagoudar and Abraham, 2000). *Asterina gamsii* differs from *A. elaeocarpicola* and *A. borneensis* in having octosporous asci and straight appressoria (Hansford, 1954). It differs from *A. elaeocarpi* in having opposite appressoria and larger ascospores. It also differs from *A. elaeocarpi* var. ovalis in having ovate appressoria in contrast to longer and cylindrical ones (Kar and Ghosh, 1986). In *A. elaeocarpicola-kobanmochi* appressoria are predominantly opposite and oblong and ascospores are smaller (Yamamoto, 1957).

2. *Asterina elaeocarpi* Sydow var. ovalis Kar and Maity (1986); Hosagoudar, Balakrishnan and Goos (1996) (Fig. 2).

Colonies epiphyllous thin to subdense, up to 2 mm 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 8-13 x 3-4 µm. Appressoria alternate, opposite to subopposite, ovate to oblong, long, elongated, unicellular, entire, 4-24 x 4-5 µm. Thyriothecia scattered, orbicular, up to 160 µm in diameter, stellately dehisced at the centre, crenate to fimbriate at the margin, appressoria which are broadly rounded at the tip. This taxon is distinct from other *Asterina* species reported on the members of the host genus *Elaeocarpus* in having cylindrical to tubular, short to elongated, unicellular appressoria which are broadly rounded at the tip. This taxon is common on *Elaeocarpus tuberculatus* in the Western Ghats region of Peninsular India.

3. *Asterina elaeocarpica* Hansford (1954); Hosagoudar and Goos (1996) (Fig. 3).

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


Curved to uncinate appressoria are the characters of this species.

4. *Asterostomella elaeocarpi-serrati* Hosagoudar in Hosagoudar, Biju and Anu Appaih (2006) (Fig. 4).

Colonies amphigenous, dense, up to 1 mm in diameter, rarely confluent. Hyphae straight to flexuous, branching mostly opposite at acute angles, loosely to closely reticulate, cells 8-24 x 5-7 µm. Appressoria alternate, about 30% opposite, unicellular, conoid, ovate, entire, straight, attenuated and broadly rounded at the apex, 8-13 x 6-8 µm. Pycnothyria scattered, orbicular, up to 258 µm in diameter, stellately dehisced at the centre, margin crenate; pycnothyriospores pyriform, brown, 20-26 x 19-21 µm, wall smooth.

**Materials examined**: On leaves of *Elaeocarpus serratus* L., Abbe falls, Madikeri, Coorg, Karnataka, Nov. 11, 2003, V.B. Hosagoudar & al. HClO 45817, TBGT 1567.

This is an anamorph of the genus *Asterina* and is close to *A. borneensis* Hansf. in having smaller and alternate to opposite appressoria. However, differs from it in having conoid but 30% opposite appressoria (Hansford, 1954).
ACKNOWLEDGEMENTS

Thanks are due to the Director, TBGRI, Palode for the facilities. Dr. Ganesan, ATREE, Bangalore is acknowledged for his hospitality during the field collection tour to Upper Godayar.

REFERENCES