

RESEARCH ARTICLE

NOVEL TAXA OF BLACK MILDEWS FROM KERALA STATE

*VB Hosagoudar and B. Fathima

Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Palode 695 562, Thiruvananthapuram, Kerala, India

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ABSTRACT

This paper gives an account of six new species belonging to the group black mildews distributed among the genera, *Asterina*, *Bheemamyces* and *Meliola*. Of these, *Asterina acronychigena*, *Asterina cassiifolia*, *Asterina urticacearum*, *Bheemamyces oleae*, *Meliola microtropidis* and *Meliola padmanabhapurica* are the new species described and illustrated in detail.

Key words: *Asterina*, *Bheemamyces*, *Meliola*, Western Ghats, Kerala, New species.

INTRODUCTION

Asterina acronychigena sp.nov. (Figure 1)
Etymology: Based on the host genus

Colonies epiphyllous, scattered, up to 2 mm in diameter. Hyphae straight to substraight, branching opposite to alternate at acute to wide angles, loosely reticulate, cells 29-51 x 5-7 μ m; appressoria alternate to unilateral, up to 1% opposite, antrorse to subantrorse, 18-24 μ m long; stalk cells cylindrical to cuneate, 6-10 μ m long; head cells oblong, entire, angular to slightly sublobate, 11-18 x 6-8 μ m. Thyriothecia scattered to loosely grouped, orbicular, up to 140 μ m in diameter, margin crenate and stellately dehiscent at the centre; asci orbicular, octosporous, up to 29 μ m in diam.; ascospores oblong to cylindrical, uniseptate, slightly constricted at the septa, 19-24x8-10 μ m, wall smooth.

Materials examined: On leaves of *Acronychia* sp. (Rutaceae), Silent Valley National Park, Palghat, Kerala, Aug. 1, 2008, Jacob & al TBGT 6255 (holotype).

Acronychia rhabdodendri Sydow var. *levibus* patil & Pawar and *Asterina toddaliicola* Hosag. *et al.* are having two celled appressoria. However the present species differs from both in having linear and oblong head cells of appressoria in contrast to ovate ones. (Hosagoudar, 2012).

Asterina cassiifolia sp. nov. (Figure 2)
Etymology: Based on the host genus

Colonies epiphyllous, scattered, up to 5 mm in diameter. Hyphae flexuous to crooked, branching opposite, alternate to irregular at acute to wide angles, loosely to closely reticulate,

cells 14-38 x 5-6 μ m. Appressoria alternate to unilateral, antrorse to subantrorse, ovate, entire to angular, 6-11 x 6-10 μ m. Thyriothecia scattered, orbicular, up to 150 μ m in diameter, dissolved at the centre with a wide opening, margin fimbriate, fringed hyphae small; ascospore oblong, cylindrical, straight to mostly curved, uniseptate, slightly constricted at the septum, 24-32 x 13-16 μ m. Pycnidiospores ovate, angular to sinuate, 15-18 x 7-9 μ m.

Materials Examined: On leaves of *Cassia occidentalis* L. (Caesalpinaceae), Arippe, Kollam, Kerala, Jan. 3, 2011, Hosagoudar & al TBGT 6256 (holotype).

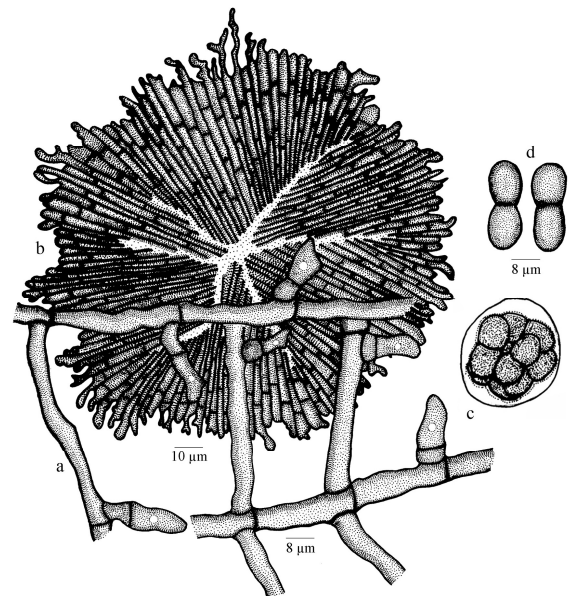


Figure 1. *Asterina acronychigena* sp.nov.

a.Appressoriate mycelium, b.Thyriothecium, c. Ascus, d. Ascospores

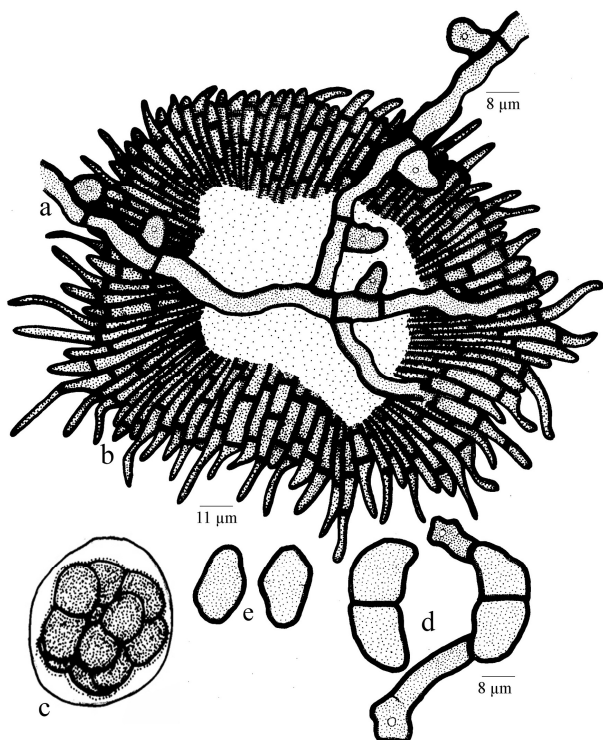


Figure 2. *Asterina cassiifolia* sp. nov.

a.Appressariate mycelium, b.Thyriotheceum, c. Ascus, d. Ascospores

Asterina cassicola Hosag. and Archana known on *Cassia fistula* and *Asterina cassigena* Hosag. et al. on *Cassia glauca* are known from the Western Ghats region of Kerala and Karnataka (Hosagoudar, 2012). However, *Asterina cassiifolia* differs from both in having flexuous to crooked hyphae, and only alternate and ovate appressoria.

***Asterina urticacearum* sp. nov.** (Figure 3)

Etymology: Based on the host genus

Colonies epiphyllous, thin to subdense, scattered, up to 2mm in diameter. Hyphae straight to substraight, branching opposite, alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 10-24 x 4-6 μm. Appressoria alternate to unilateral, up to 1% opposite, sessile, oblong, cylindrical, narrowly ovate, pyriform, straight to slightly irregularly curved, often angular, truncate to slightly lobate, 6-10 x 5-6 μm. Thyriotheceia scattered, orbicular, up to 50 μm in diameter, stellately dehiscent at the centre, margin crenate; asci globose, octosporous, up to 28 μm in diam.; ascospore ellipsoidal, attenuated at both the ends, uniseptate, slightly constricted at the septa, 16-18 x 7-9 μm, wall smooth. Pycnidiospores ovate, attenuated at one end but broadly round at the apex, 10-13 x 5-6 μm.

Materials Examined: On leaves of Urticaceae member, Sairandhri, Silent Valley National Park, Kerala, March 2, 2010, P.J. Robin and al TBGT 6257 (holotype).

This species is similar to *Asterina elatostematis* Hosag & Goos and *Asterina oreocnidecola* Hosag et al. in having unicellular appressoria. However, differs from both in having oblong appressoria with entire margin in contrast to

mammiform to globose appressoria with lobate to crenately lobate margin (Hosagoudar, 2012).

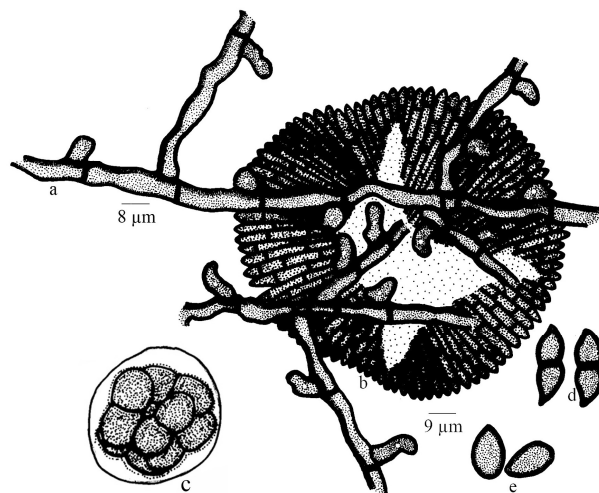


Figure 3. *Asterina urticacearum* sp. nov.

a.Appressariate mycelium, b.Thyriotheceum, c. Ascus, d. Ascospores, e. Pycnothyriospores

***Bheemamyces oleae* sp. nov.** (Figure 4)

Etymology: Based on the host genus

Colonies epiphyllous, thin, spreading, up to 6 mm in diameter. Hyphae flexuous to crooked, branching alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 14-32 x 3-5 μm. Appressoria lateral, sublateral and intercalary. Lateral appressoria alternate to unilateral, antrorse, subantrorse to retrorse, oblong, entire, angular to sublobate, 8-11 x 8-10 μm. Sublateral and intercalary appressoria originate from the whip like hyphal apical portion, which are narrower, curved, slightly elevated from the host surface and sharply pointed at the tip; intercalary and sublateral appressoria oval to globose, sublateral appressoria 10-12 x 7-9 μm, intercalary appressoria 8-10 x 5-7 μm. Thyriotheceia scattered to loosely grouped, orbicular, upto 220 μm in diameter, dissolved at the centre with crenate margin; ascospores oblong to cylindrical, uniseptate, slightly constricted at the septum, 14-15 x 5-7 μm.

Materials Examined: On leaves of *Olea polygama* Wight (Oleaceae), Silent Valley National Park, Kerala, March 2, 2010, M.C. Riju & al TBGT.

Hyphal tips form whip like structures bearing sublateral to intercalary appressoria are the characters of the genus *Bheemamyces*. This is the first species of the genus *Bheemamyces* on the members of the family Oleaceae (Hosagoudar, 2012).

***Meliola microtropidis* sp. nov.** (Figure 5)

Etymology: Based on the host genus

Colonies hypophyllous, scattered, subdense, up to 3 mm in diameter. Hyphae substraight to flexuous, branching opposite at acute to wide angles, loosely to closely reticulate, cells 10-18 x 7-9 μm. Appressoria alternate to unilateral, antrorse to subantrorse, 13-16 μm long; stalk cells cylindrical to cuneate, 3-6 μm long; head cells ovate, oblong to cylindrical, entire,

straight to slightly curved, 10-11 x 6-10 μm . Phialides mixed with appressoria, opposite to alternate, ampulliform, 14-18 x 6-8 μm . Mycelial setae numerous, simple, straight, acute at the tip, up to 310 μm long. Perithecia scattered, up to 140 μm in diameter; ascospore cylindrical, 4-septate, slightly constricted at the septa, 42-44 x 18-20 μm .

Materials Examined: On leaves of *Microtropis* sp. (Celastraceae), Walakkad, Silent Valley National Park, Palghat, Kerala, March 5, 2008, M.C. Riju & al TBGT. Based on the digital formula 3111.4222 and alternate appressoria, the present species is similar to *Meliola chennaiana* Hosag. & Goos but differs from it in having entire head cells of appressoria and phialides mixed with appressoria (Hosagoudar 2008).

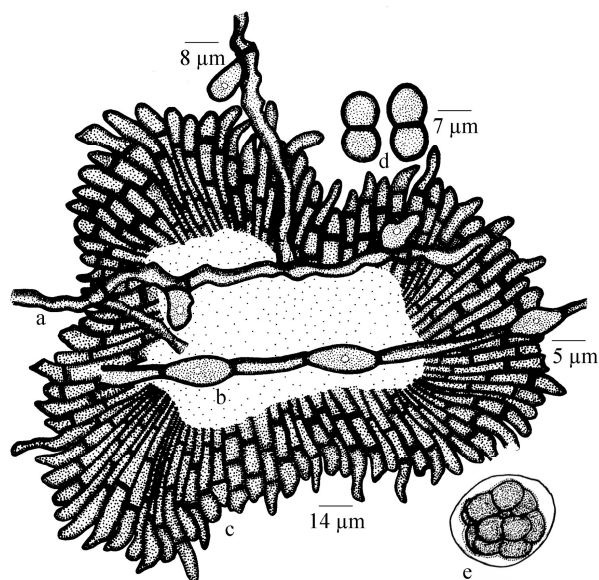


Figure 4. *Bheemamyces oleae* sp. nov.

a. Lateral appressariate mycelium, b. Intercalary appressoria, c. Thyriothecium, d. Ascospores, e. Ascus

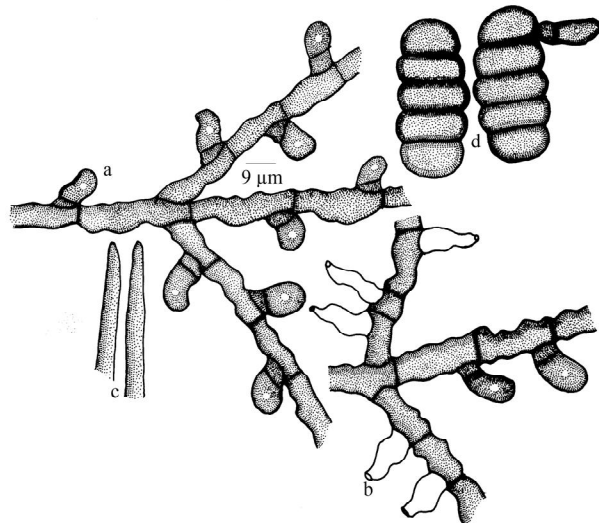


Figure 5. *Meliola microtropidis* sp. nov.

a. Appressorium, b. Phialide, c. Apical portion of the mycelial setae, d. Ascospores

Meliola padmanabhapurica sp. nov. (Figure 6)

Etymology: Based on the locality, Padmanabhapura, a place of Lord Padmanabha

Colonies epiphyllous, subdense, scattered, up to 2mm in diameter; hyphae straight to substraight, branching opposite at acute to wide angles, closely reticulate, cells 14-26 x 8-10 μm . Appressoria alternate to unilateral, antrorse to subantrorse, up to 2% retrorse, straight to curved, 21-22 μm long; stalk cells cylindrical to cuneate, 5-8 μm ; head cells oblong, straight to curved, entire, 14-16 x 10-11 μm . Phialides mixed with appressoria, opposite to alternate, ampulliform, 16-21 x 8-10 μm . Mycelial setae numerous, scattered, dichotomously branched, up to 170 μm long till branching, first ray up to 50 μm long, branchlets up to 50 μm long, acute at the tip. Perithecia scattered, up to 110 μm in diameter; ascospore oblong to cylindrical, 4-septate, slightly constricted at the septa, 26-30 x 11-13 μm .

Materials Examined: On leaves of *Semecarpus travancorica* Bedd. (Anacardeaceae), Ponmudi, Thiruvananthapuram, Kerala, June 19, 2011, V.B. Hosagoudar TBGT 6260 (holotype).

This species is similar to *Meliola abraensis* Petrark known on *Semecarpus* sp. from Philippines (Hosagoudar *et al.* 1997) but differs from it in having only entire head cells of appressoria and distinctly smaller ascospores (26-30 x 11-13 μm vs. 40-50 x 20-24 (14-17) μm).

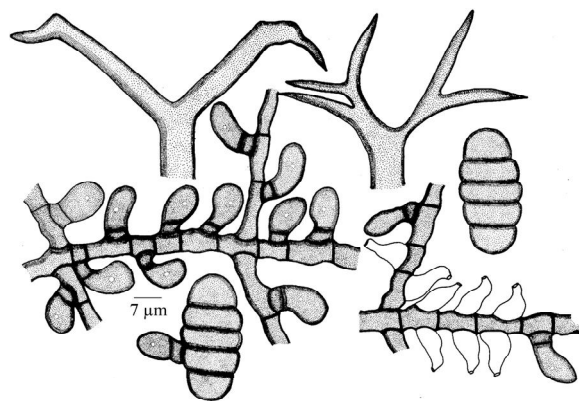


Figure 6. *Meliola padmanabhapurica* sp. nov.

a. Appressorium, b. Phialide, c. Apical portion of the mycelial setae, d. Ascospores

Acknowledgements

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