

Interesting foliicolous fungi from Southern Western Ghats of Kerala, India

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Abstract: An account of five foliicolous fungal taxa are dealt herein. Of these, *Asterina glycosmidigena*, *A. gymnema*, *Irenopsis pavoniae*, *Phyllachora gymnema* infected the leaves of *Glycosmis pentaphylla*, *Gymnema sylvestris* and *Pavonia* sp., respectively, are described as new species while, *Meliola pseudarthria* var. *indica* is described as a new variety on *Pseudarthria viscida*. The detailed description of these taxa is supplemented with line drawings and photo plate.

Keywords: Follicolous fungi, *Asterina*, *Irenopsis*, *Phyllachora*, Kerala, India

INTRODUCTION

Authors have been engaged in the study of foliicolous fungal flora of Western Ghats region of Kerala State and have made several collections of these fungi. Of these, *Glycosmis pentaphylla* and *Gymnema sylvestris* in Wayanad region, *Pavonia* sp. and *Pseudarthria viscida* from Peppara and Neyyar wildlife sanctuaries in Thiruvananthapuram were found infected with black mildew and tar spot fungi. Critical microscopic examination of the fungi revealed that they are hitherto undescribed species.

Taxonomy

1. *Asterina glycosmidigena* sp. nov. (Fig. 1)

Coloniae epiphyllae, tenues, ad 2 mm diam., confluentes. Hyphae pallide brunneae, rectae vel leniter anfractuae, irregulariter acuteque vel laxe ramosae, laxe reticulatae et formans laxe dictyonist, cellulae 12-19 x 2-5 μ m. Appressoria sessilia, plerumque alternata, circa 2% opposita, unicellularis, ovata, subglobosa, integra vel irregulariter sublobata, 4-10 x 4-7 μ m. Thyriothecia dispersa, orbicularis, saepe connata, ad 110 μ m diam., stellatim dehiscentes ad centre, margine crenatae; asci globosi, octospori, 50-60 μ m diam.; ascosporae oblongae, conglobatae, brunneae, uniseptatae, fortiter constrictus ad septatae, 14-19 x 7-10 μ m, parietus glabrus.

Colonies epiphyllous, thin, up to 2 mm in diameter, confluent. Hyphae pale brown, straight to slightly crooked, branching irregular at acute to wide angles, loosely reticulate and form a loose mycelial net, cells 12-19 x 2-5 μ m. Appressoria sessile, mostly alternate, about 2% opposite, unicellular, ovate, subglobose, entire to irregularly sublobate, 4-10 x 4-7 μ m. Thyriothecia scattered, orbicular, often connate, up to 110 μ m in diameter, stellately dehisced at the centre, margin crenate; asci globose, octosporous, 50-60 μ m in diameter;

ascospores oblong, conglobate, brown, uniseptate, strongly constricted at the septum, 14-19 x 7-10 μ m, wall smooth.

Materials examined: On leaves of *Glycosmis pentaphylla* (Retz.) DC. [*G. cochinchinensis sensu* Gamble] (Rutaceae), Thirunelli, Wayanad, Kerala, Feb. 14, 2009, Jacob Thomas and al TBGT 3669 (type).

The present species differs from *Asterina glycosmidis* Hosag. & Rajkumar and *A. banguiensis* Yates known on the host genus *Glycosmis* in having hemispherical, broad based, entire to irregularly sublobate to lobate appressoria (Hosagoudar, 2005; Yates, 1918). Based on the line drawings, Kaul & Nair (1988) have erroneously assigned their collection on this host from Ooty to *A. banguiensis*.

These colonies were mixed with the colonies of *Meliola* sp.

2. *Asterina gymnema* sp. nov. (Fig. 2)

Coloniae epiphyllae, subdensae, ad 1 mm diam., confluentes. Hyphae subrectae vel undulatae, opposite vel irregulariter acuteque vel laxe ramosae, laxe vel arte reticulatae, cellulae 19-34 x 2-5 μ m. Appressoria alternata, bi-cellula, recta vel curvula, antrorsa, 12-14 μ m longa; cellulae basillares cylindratae vel cuneatae, rectae vel anfractuae, 2-5 μ m longae; cellulae apicales ovatae, globosae, angularis, sublobatae vel variae lobatae, 4-7 x 4-10 μ m. Thyriothecia dispersa, orbicularis, ad 150 μ m diam., stellatim dehiscentes ad centre, margine crenatae; asci pauci vel numerosi, globosi, octospori, 40-60 μ m diam.; ascosporae conglobatae, uniseptatae, hyalinae ad initio et brunneae ad maturitatae, constrictus ad septatae, 16-19 x 7-10 μ m, parietus glabrus.

Colonies epiphyllous, subdense, up to 1 mm in diameter, confluent. Hyphae substraight to undulate, branching opposite to irregular at acute to wide angles, loosely to closely reticulate, cells 19-34 x 2-5 μ m. Appressoria

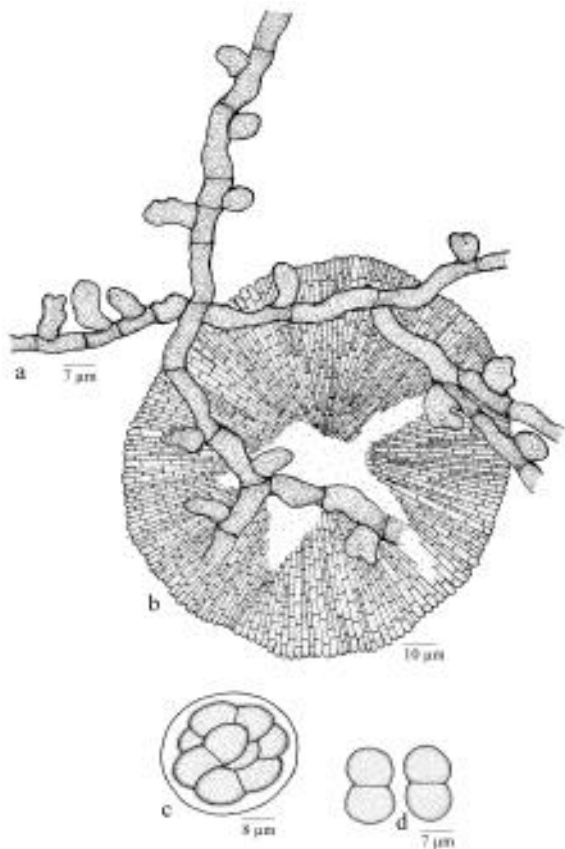


Fig. 1. *Asterina glycosmidigena* sp. nov. a. Appressoriolate mycelium, b. Thyriothecium, c. Ascus, d. Ascospores.

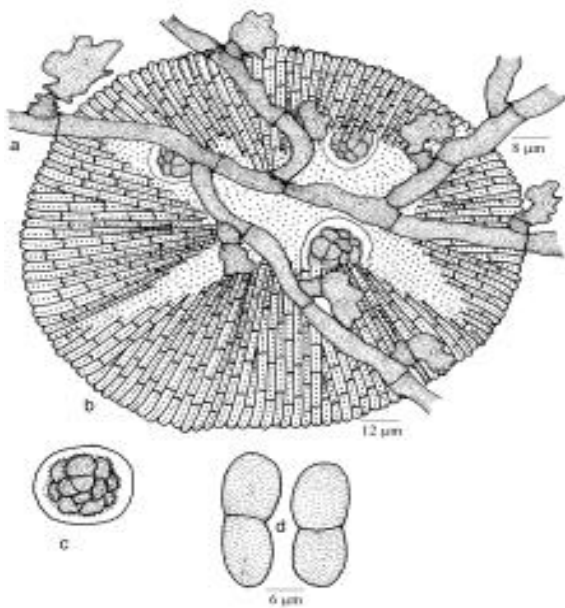


Fig. 2. *Asterina gymnemae* sp. nov. a. Appressoriolate mycelium, b. Thyriothecium, c. Ascus, d. Ascospores.

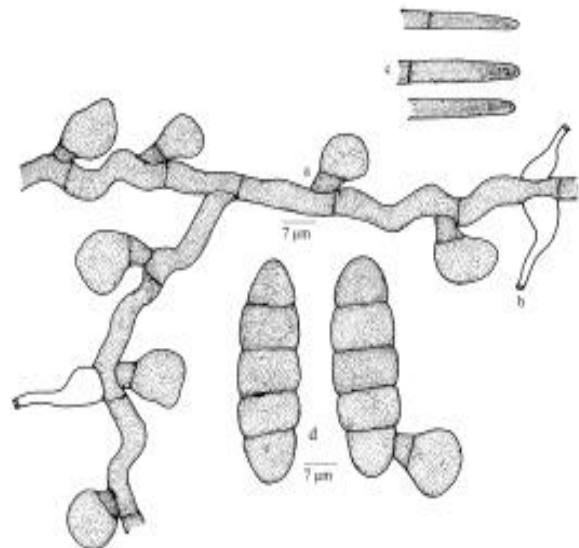


Fig. 3. *Irenopsis pavoniae* sp. nov. a. Appressoriolate mycelium, b. Phialide, c. Apical portion of the perithecial setae, d. Ascospores.

alternate, two celled, straight to curved, antrorse, 12-14 μm long; stalk cells cylindrical to cuneate, straight to crooked, 2-5 μm long; head cells ovate, globose, angular, sublobate to variously lobate, 4-7 x 4-10 μm . Thyriothecia scattered, orbicular, up to 150 μm in diameter, stellately dehiscent at the centre, margin crenate; asci few to many, globose, octosporous, 40-60 μm in diameter; ascospores conglobate, uniseptate, initially hyaline but brown at maturity, constricted at the septum, 16-19 x 7-10 μm , wall smooth.

Materials examined: On leaves of *Gymnema sylvestre* R. Br. (Asclepiadaceae), Thirunelli, Wayanad, Kerala, Feb. 14, 2009, Jacob Thomas and al TBGT 3667a (type).

There are six species of the genus *Asterina* known on the members of the family Asclepiadaceae, namely, *Asterina asclepiads* Hosag. and Goos (Hosagoudar and Goos, 1996), *A. concinna* Sydow (Sydow, 1930), *A. cynanchi* Hosag. and Shiburaj (Hosagoudar, 2002), *A. leonensis* Sydow (1938), and *A. peraffinis* Speg. (Theissen, 1913). Based on the character of angular to sublobate head cells and normal number of appressoria, the present species is closer to *A. cynanchi*, *A. leonensis* and *A. peraffinis*. The present new species differs from *A. peraffinis* in having narrow ascospores and from *A. cynanchi* in having longer ascospores. It also differs from *A. leonensis* in having only alternate appressoria.

3. *Irenopsis pavoniae* sp. nov. (Fig. 3)

Coloniae epiphyllae, tenues, ad 2 mm diam., confluentes. Hyphae flexuosae, opposite vel irregulariter laxae ramosae, arte reticulatae, cellulae 19-58 x 4-7 μm . Appressoria alternata, vel unilateralis, antrorsa vel patentia, recta vel varie curvula, 14-19 μm longa; cellulae basiliares cylindratae vel cuneatae, 4-10 μm longae; cellulae

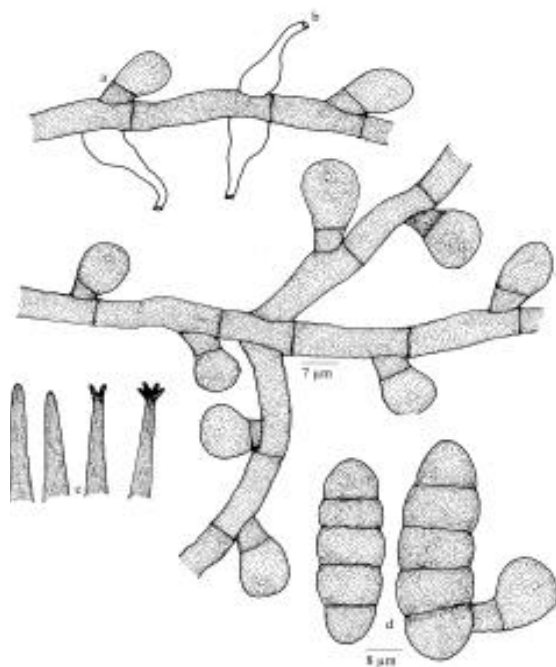


Fig. 4. *Meliola pseudarthriae* var. *indica* var. *nov.* a. Appressoriate mycelium, b. Phialide, c. Apical portion of the mycelial setae, d. Ascospores.

apicales ovatae vel globosae, integrae, subangularis vel sublobatae, truncatae, 9-11 x 9-12 μm . Phialides appressoriis mixtus, alternata vel opposita, ampulliformes, 14-24 x 4-7 μm . Perithecia dispersa vel laxe aggregata, ad 140 μm diam.; setae peritheciales 10-16 numero, simplices, rectae, glabr, obtusae ad apicem, ad 120 μm longae; ascosporeae obovoideae vel ellipsoideae, 4-septatae, constrictus ad septatae, 31-36 x 12-14 μm .

Colonies epiphyllous, thin, up to 2 mm in diameter, confluent. Hyphae flexuous, branching opposite to irregular at wide angles, closely reticulate, cells 19-58 x 4-7 μm . Appressoria alternate, 5% unilateral, antrorse to spreading, straight to variously curved, 14-19 μm long; stalk cells cylindrical to cuneate, 4-10 μm long; head cells ovate to globose, entire, subangular to sublobate, truncate, 9-11 x 9-12 μm . Phialides mixed with appressoria,

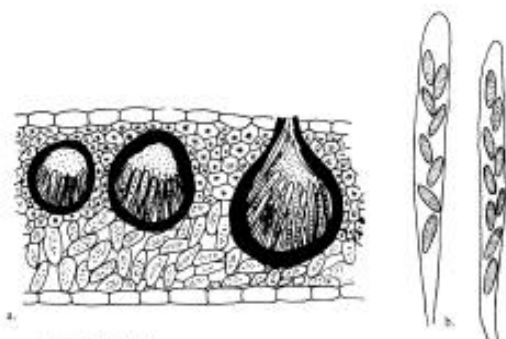


Fig. 5. *Phyllachora gymnemae* sp. *nov.* a. T.S. through the stromata showing perithecia, b. Asci with ascospores.

alternate to opposite, ampulliform, 14-24 x 4-7 μm . Perithecia scattered to loosely grouped, up to 140 μm in diameter; perithecial setae 10-16 in number, simple, straight, smooth, obtuse at the tip, up to 120 μm long; ascospores obovoidal to ellipsoidal, 4-septate, constricted at the septa, 31-36 x 12-14 μm .

Materials examined: On leaves of *Pavonia* sp. (Malvaceae), Peppara Wildlife Sanctuary, Thiruvananthapuram, Kerala, Nov. 18, 2007 Jacob Thomas TBGT 3601 (type).

Based on the digital formula 3401.3220, flexuous to crooked hyphae and entire to sublobate apical cells of appressoria, this species is closer to *Irenopsis aciculosa* (Wint.) Stev., *I. sidae* (Rehim) Hughes (Hansford, 1961). However, entire to angular head cells in contrast to lobate ones and obtuse tip of the perithecial setae are the distinguishing characters of this species.

4. *Meliola pseudarthriae* var. *indica* var. *nov.* (Fig. 4)

Differt a var. *pseudarthriae* setae myceliales cristatae vel dentatae.

Colonies epiphyllous, dense, velvety, up to 4 mm in diameter, confluent. Hyphae substraight to undulate, branching opposite at acute to wide angles, closely reticulate, cells 12-25 x 6-8 μm . Appressoria alternate to opposite, antrorse to spreading, straight to curved, 9-18 μm long stalk cells cylindrical to cuneate, 3-6 μm long; head cells globose to subglobose, ovate, cylindrical, entire, 6-15 x 8-14 μm . Phialides mixed with appressoria, alternate to opposite, ampulliform, 14-21 x 6-8 μm . Mycelial setae numerous, scattered, simple, straight to slightly curved, acute, dentate to cristate at the tip, up to 600 μm long. Perithecia scattered, globose, up to 160 μm in diam.; ascospores cylindrical to obovoidal, 4-septate, constricted at the septa, 35-40 x 12-16 μm .

Materials examined: On leaves of *Pseudarthria viscida* (L) Wight and Arn. (Fabaceae), near Kombe, Neyyar Wild Life Sanctuary, Thiruvananthapuram, Kerala, March 15, 2008, Jacob Thomas TBGT 3603 (type)

Meliola pseudarthriae Hosag. and Manoj. is known on this host genus from the Western Ghats region of Kerala state (Hosagoudar, 2008). However, the new variety differs from var. *pseudarthriae* in having dentate to cristate mycelial setae.

5. *Phyllachora gymnemae* sp. *nov.* (Fig. 5, Plate 1)

Stromata epiphylla, caulicola, ad 5 mm diam., nitida, nigra, elevata; perithecia 1-3 per stromata, ovata, globosa vel crateriformes, ostiolata, 105-220 x 130-180 μm ; asci numerosi, cylindrici, paraphysati, unitunicati, ad 94 μm longi et ad 12 μm crassi; ascosporeae uniseriatae, ovatae, hyalinae, elongatae et leniter acuminatae ad ambi apicem, 9-14 x 4-7 μm .

Stromata epiphyllous, caulicolous, up to 5 mm in diam., shining, black, raised; perithecia 1-3 per stromata, oval, globose to crateriform, ostiolate, 105-220 x 130-180 μm ;

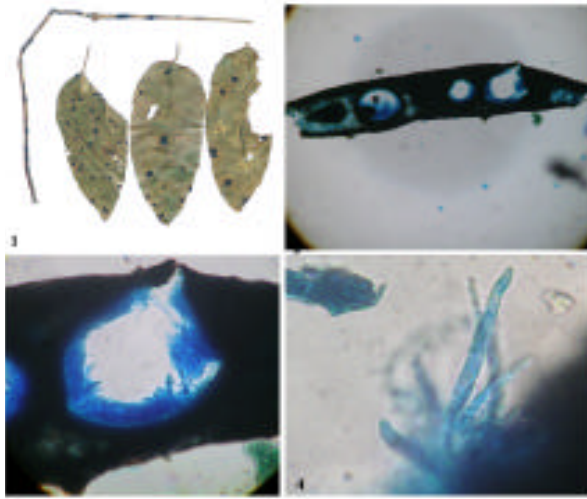


Plate 1

asci numerous, cylindrical, paraphysate, unitunicate, up to 94 μm long and up to 12 μm broad; ascospore uniseriate, oval, hyaline, elongated and slightly pointed at both ends, 9-14 x 4-7 μm .

Materials examined: On leaves of *Gymnema sylvestre* R.Br. (Asclepiadaceae), Thirunelli, Wayanad, Kerala, Feb. 14, 2009, Jacob Thomas and al TBGT 3668 (type).

This species differs from *Phyllachora ajrekari* Sydow and *P. kanyakmariana* Hosag. in having ellipsoidal ascospores tapering towards both ends (Kamat *et al.*, 1978, Hosagoudar, 1995).

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REFERENCES

- Hansford, C. G. (1961). The Meliolineae. A Monograph. *Sydowia*. Beih., 2: 1-806.
- Hosagoudar, V. B. (1995). Two new *Phyllachora* species from Tamil Nadu. *Indian Phytopathol.*, 48: 213-214.
- Hosagoudar, V. B. (2002). Studies on foliicolous fungi – X. Five new species and a new record. *Zoos'Print J.*, 17: 943-948.
- Hosagoudar, V. B. (2005). Studies on foliicolous fungi – XIX. *Indian Phytopathol.*, 58: 94-204.
- Hosagoudar, V. B. (2008). *Meliolales of India*, Vol.-II. Botanical Survey of India, pp. 390.
- Hosagoudar, V. B. and Goos, R. D. (1996). Some foliicolous fungi from southern India. *Mycotaxon.*, 59: 149-166.
- Kamat, M.N., Seshadri, V.S. and Pande, A.A. (1978). *A Monographic study of Indian species of Phyllachora*. University of Agricultural Sciences, Hebbal, Bangalore, pp.100.
- Kaul, V. P. and Nair, L. N. (1988). Some new reports of *Asterina* from India, *Acta Bot. Indica*, 16: 227-229.
- Sydow, H. 1938. Novae fungorum species-XXVI. *Ann. Mycol.*, 36: 156-253.
- Sydow, H. (1930). Fungi Venezuelai. *Ann. Mycol.* 28: 29 – 224
- Theissen, F. 1913. Dei Gattung *Asterina*. *Bibliotheca Mycologica.*, 10:1-130.
- Yates, H. S. (1918). Some recently collected Philippine fungi – II. *Philippine J. Sci.*, 13: 361-384.