

STUDIES ON FOLIICOLOUS FUNGI - X FIVE NEW SPECIES AND A NEW RECORD

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Abstract

This paper gives an account of six species of foliicolous fungi. One new species of genus *Asterina*, *Echidnodella*, *Sarcinella* and two new species of *Lembosia* are described, while *Asterina triumfeticola* is recorded here for the first time from India.

Keywords

New species, micromycetes, new descriptions, *Asterina*, *Echidnodella*, *Sarcinella*, *Lembosia*, India.

Abbreviations

HCIO - Herbarium Cryptogamae Indiae Orientalis, New Delhi

TBGT - Tropical Botanic Garden, Thiruvananthapuram

Asterina cynanchi V.B. Hosagoudar et S. Shiburaj, sp. nov.
(Fig. 1)

Material examined

Holotype: 18.xii.2001, Gravel banks, Munnar, Idukki, Kerala, India, coll. S. Shiburaj, on leaves of *Cynanchum callialatum* Buch.-Ham. ex Wight & Arn. (Asclepiadaceae), HCIO 44294.
Isotype: TBGT 619.

Etymology

Named after the host genus *Cynanchum*.

Diagnostic features

Coloniae amphigenae, plerumque hypophyllae, densae, crustosae vel velutinae, ad 4mm diam., raro confluentes. Hyphae subrectae, flexuosae vel anfractuae, irregulariter acuteque vel laxe angulis ramosae, formans irregulariter rete, laxe vel dense reticulatae, cellulae 16-19 x 3-5µm. Appressoria numerosa, alternata vel unilateralis, recta vel curvula, 11-15µm longa; cellulae basilares cylindratae vel cuneatae, gibbosae, 1.5-5µm longae; cellulae apicales ovatae vel globosae, stellatim vel irregulariter sublobatae vel fortiter lobatae, 8-10 x 6-11µm. Thyriothecia dispersa, laxe aggregata vel connata, orbicularis, ad 140 µm diam., stellatim dehiscentes

ad centro, margine fringiorae, hyphae fringiorum exappressoriatae; asci ovati vel globosi, octospori, 28-35µm diam.; ascosporae conglobatae, brunneae, uniseptatae, constrictae, 14-16 x 7-9µm, parietis glabrus. Pycnothyria pauca, orbicularis, similis thyriotheciis, breviter; pycnothyriosporae piriformes, secundus late rotundatae et ceterus attenuatae, 14-16 x 9-11µm.

Colonies amphigenous, mostly hypophyllous, dense, crustose to velvety, up to 4mm in diameter, rarely confluent. Hyphae substraight, flexuous to crooked, branching irregular at acute to wide angles, form an irregular net, loosely to closely reticulate, cells 16-19 x 3-5µm. Appressoria many, alternate to unilateral, straight to curved, 11-15µm long; stalk cells cylindrical to cuneate, often gibbous, 1.5-5µm long; head cells ovate to globose, stellately to irregularly sublobate to deeply lobate, 8-10 x 6-11µm. Thyriothecia scattered, loosely grouped to rarely connate, orbicular, up to 140µm in diameter, stellately dehiscence at the centre, margin fringed, fringed hyphae flexuous, exappressoriatae; asci ovate to globose, octosporous, 28-35µm in diameter; ascospores conglobate, brown, 1-septate, constricted at the septum, 14-16 x 7-9µm, wall smooth. Pycnothyria few, orbicular, similar to thyriothecia, smaller; pycnothyriospores pyriform, broadly rounded at one end, attenuated at the other side, 14-16

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Table 1. Comparative account of *Asterina* species known on the members of *Asclepiadaceae*

Species name	Appressoria	Thyriothecia (µm)	Asci (µm)	Ascospores (µm)	Pycnothyria
<i>Asterina secamonicola</i>	Unicellular	180-200	30-50 x 24-30	20-23.5 x 6-8	—
<i>A. asclepiadis</i>	Two-celled, numerous, alternate, head cells entire to angular, truncate at the apex	Up to 124	4-6-spored, 31-38	18-22 x 6-8	—
<i>A. concinna</i>	Two-celled, alternate, numerous, head cells entire to sublobate	90-160	4-8-spored, 25-32	16-18.5 x 8-10.5	—
<i>A. heterostemmatiss</i>	Two-celled, not many, head cells 2-4-lobate	112-140	28-38 x 25-28	10-20 x 8-9	Present
<i>A. leonensis</i>	Two-celled, alternate to opposite, head cells lobate	100-150	22-26 x 17-22	15-17.5 x 7-8.5	—
<i>A. peraffinis</i>	Two-celled, not numerous, occasionally one-celled, head cells lobed, often obliquely septate	120-160	30-40 x 22-30	17-20 x 8-12.5	Present
<i>A. cynanchii</i>	Two-celled, numerous, alternate, head cells sublobate to deeply lobate	Up to 140	28-35	14-16 x 7-9	Present

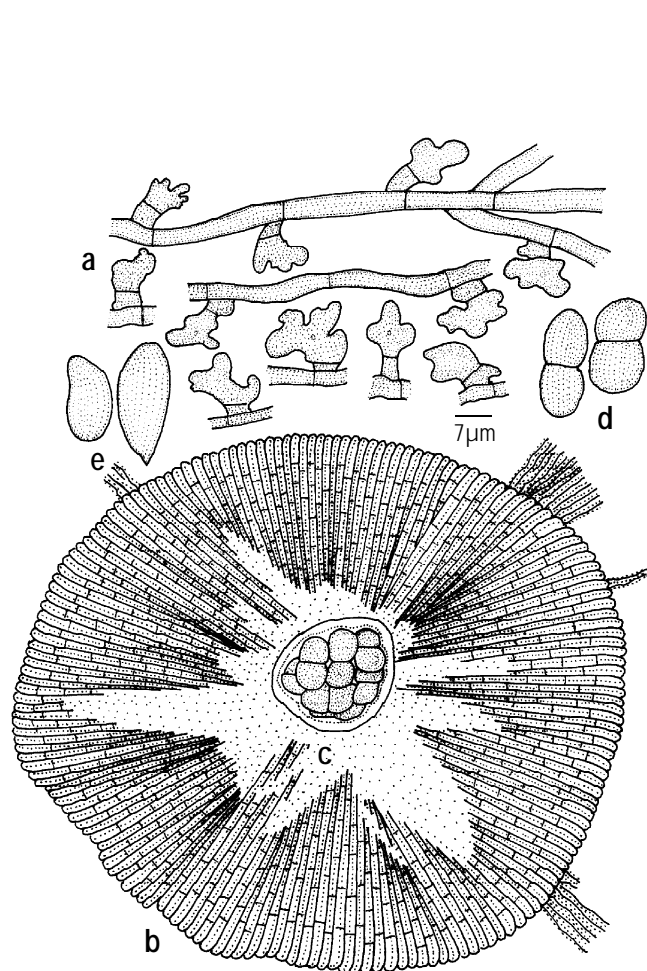


Figure 1. *Asterina cynanchii* sp. nov. a - appressariate mycelium; b - thyriothecium; c - ascus; d - ascospores; e - pycnothyriospores

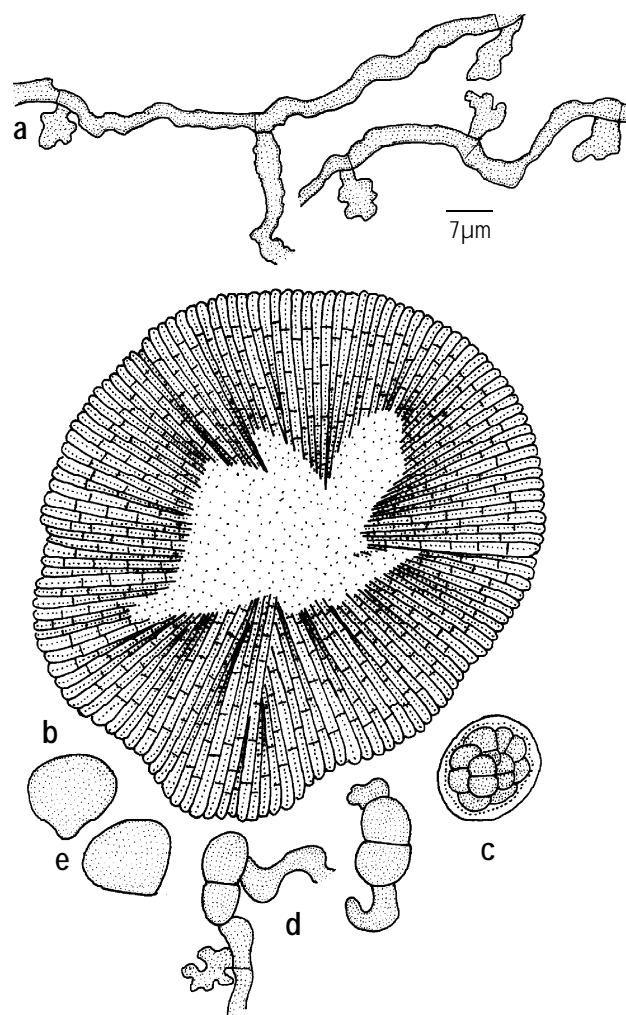


Figure 2. *Asterina triumfeticola* Yamam. a - appressariate mycelium; b - thyriothecium; c - ascus; d - ascospores; e - pycnothyriospores

x9-11µm.

Remarks

Comparative account of *Asterina* species known on the members of Asclepiadaceae is given in Table 1. Having numerous, two-celled and only alternate appressoria, the present species can be compared with *Asterina concinna* Sydow known on *Macrosepis* sp. from Venezuela. The new species, however differs from it in having sublobate to deeply lobate head cells in contrast to entire to sublobate head cells. The present species differs from all in having gibbous basal cells.

***Asterina triumfeticola* Yamam.,
(Fig. 2)**

Sci. Rep. Hyogo Univ. Agric., Agric. Biol. Ser. 3: 29, 1957

Materials examined

27.xii.2001, Sankili Forest, Shendurney Wildlife Sanctuary, Kollam, Kerala, India, coll. V.B. Hosagoudar, on leaves of *Triumfetta* sp. (Tiliaceae), HCIO 44304, 44305, TBGT 679, 681.

Diagnostic features

Colonies epiphyllous, subdense to dense, up to 2mm in diameter, confluent. Hyphae strongly appressed to the host surface, substraight to crooked, branching irregular at acute to wide angles, loosely reticulate, cells 16-24 x 3-4µm. Appressoria alternate to unilateral, unicellular, stipitate to sessile, globose, clavate, angular to deeply lobate, 4-7µm long, 7-9µm broad. Thyriothechia scattered, orbicular, up to 70µm in diameter, stellately dehiscent at the centre, margin crenate; asci globose, octosporous, bitunicate, 20-28µm in diameter; ascospores pale-brown, conglobate, uniseptate, constricted at the septum, 14-16 x 6-8µm, wall smooth to slightly punctate. Pycnothyria numerous, orbicular, smaller than thyriothechia; pycnothyriospores pyriform, deep brown, 14-16 x 11-12µm.

Remarks

This species was known on *Triumfetta bartamia* from Taiwan (Yamamoto, 1956, 1957) and is reported here for the first time from India (Bilgrami *et al.*, 1991; Sarbhoy *et al.*, 1996). This collection was associated with *Irenopsis* sp.

***Echidnodella vateriae* V.B. Hosagoudar
et M. Kamarudeen, sp. nov.
(Fig. 3)**

Material examined

Holotype: 26.vii.2001, Ponmudy, Thiruvananthapuram, Kerala, India, coll. M. Kamarudeen, on leaves of *Vateria indica* L. (Diptocarpaceae), HCIO 44321.

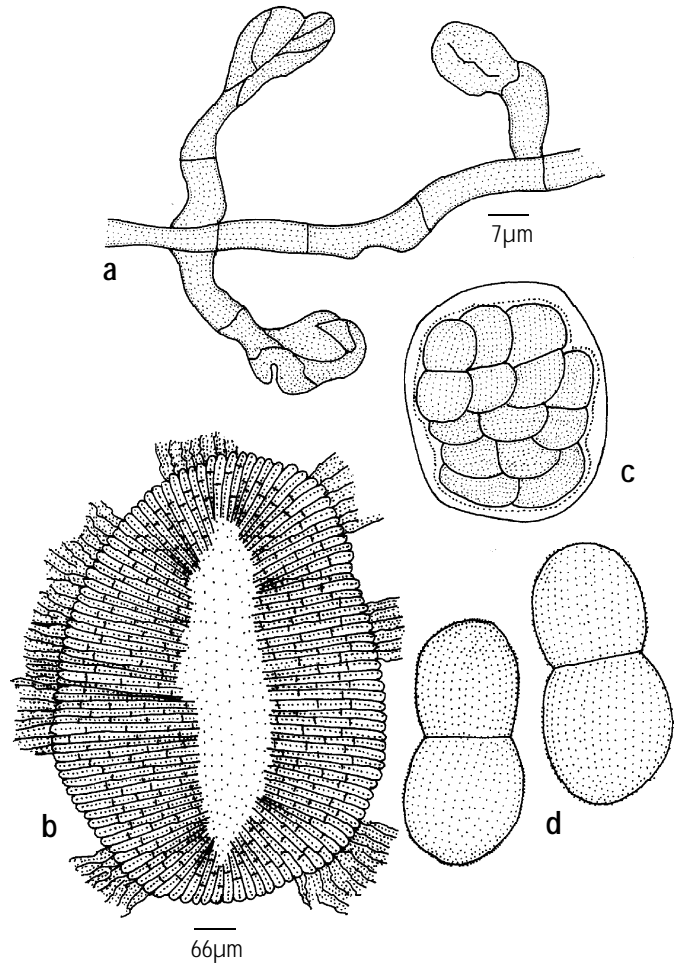


Figure 3. *Echidnodella vateriae* sp. nov.
a - mycelium with initials of thyriothecium at the tip of hyphal branches; b - thyriothecium; c - ascus; d - ascospores

Isotype: TBGT 668

Etymology

Based on the host genus *Vateria*.

Diagnostic features

Coloniae hypophyllae, tenues vel subdensae, subvelutinae, patentiae, ad 10mm diam., confluentes. Hyphae flexuosae vel anfractuae, oppositae acuteque vel laxae ramosae, laxae vel dense reticulatae, cellulae 22-24 x 5-7µm. Appressoria nulla. Thyriothechia orbicularis, ovalis, ellipsoidea vel elongata, verticalis dehiscentes ad centro, 450-784 x 290-400µm, margine fimbriatae, hyphae fringiorum parallelae, compactae; asci ovali vel globosi, octospori, bitunicati, 50-70µm diam.; ascospores conglobatae, brunneae, uniseptatae, fortiter constrictae, 35-40 x 20-24µm, parietus punctatus.

Colonies hypophyllous, thin to subdense, subvelvety, spreading, up to 10mm in diameter, confluent. Hyphae flexuous to crooked, branching opposite at acute to wide angles, loosely to closely reticulate, cells 22-24 x 5-7 μ m. Appressoria absent. Thyriothecia orbicular, oval, ellipsoidal to elongated, dehise vertically at the centre, 450-784 x 290-400 μ m, margin fimbriate, fringed hyphae run parallel, compact; asci oval to globose, octosporous, bitunicate, 50-70 μ m in diameter; ascospores conglobate, brown, uniseptate, deeply constricted at the septum, 35-40 x 20-24 μ m, wall punctate.

Remarks

The tip of the hyphal branches reach the stomata, enlarge and divide to form nutritive hyphae through the stomata. Though many thyriothecia are orbicular to oval the dehiscence is verticle. Hence, this collection has been assigned to the genus

Echinodella. *E. ramosii* (Syd.) Stev. and *E. dipterocarpi* (Henn.) Theiss. and Syd. are known on *Pentacme* sp. and *Dipterocarpus* sp. *Echinodella vateriae* differs from the former species in having larger thyriothecia and from the latter species in having smaller ascospores (Stevens & Ryan, 1939).

***Lembosia araliacearum* V. B. Hosagoudar et M. Kamarudeen, sp. nov.**
(Fig. 4)

Material examined

Holotype: 26.vii.2001, Ponnudy, Thiruvananthapuram, Kerala, India, coll. M. Kamarudeen, on leaves of Araliaceae member, HCIO 44324.

Isotype: TBGT 640.

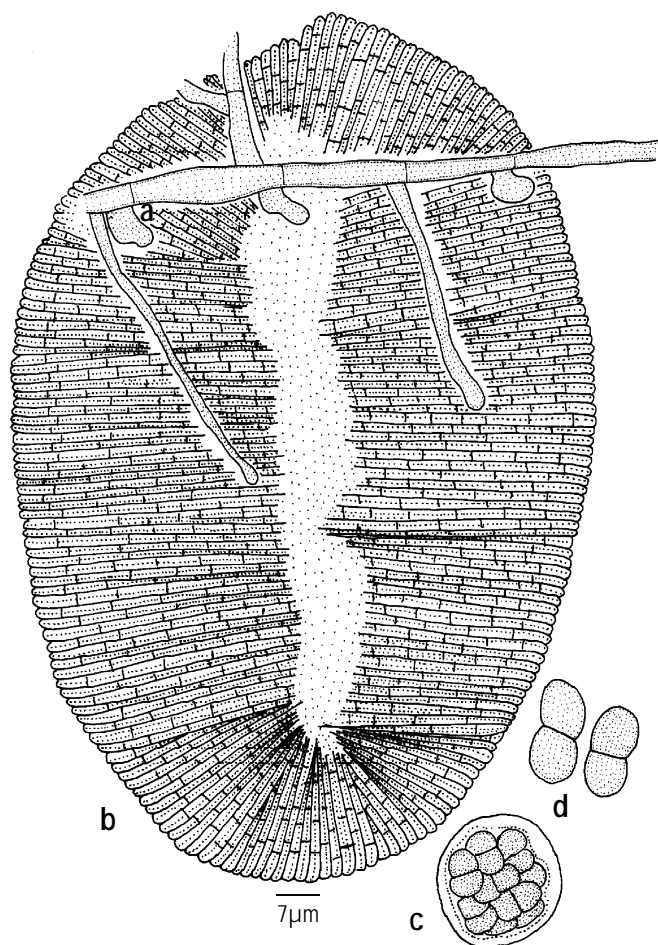


Figure 4. *Lembosia araliacearum* sp. nov. a - appressariate mycelium, b - thyriothecium, c - ascus, d - ascospores,

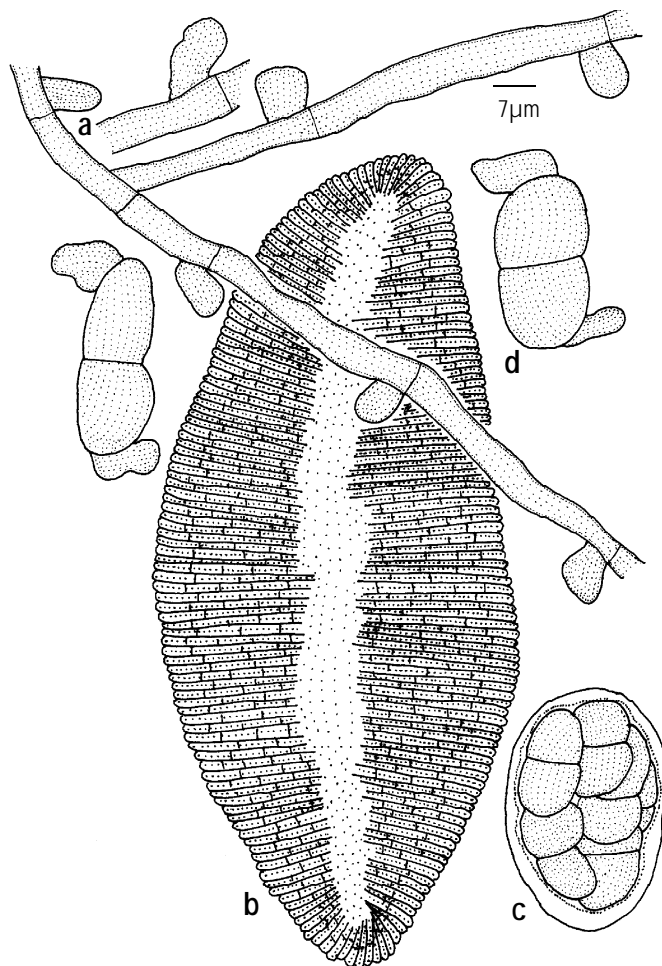


Figure 5. *Lembosia linocierae* sp. nov. a - appressariate mycelium, b - thyriothecium, c - ascus, d - ascospores

Etymology

Based on the host family Araliaceae.

Diagnostic features

Coloniae epiphyllae, tenues, ad 3mm diameter, raro confluentes. Hyphae rectae, alternatae vel irregulariter acuteque ramosae, laxe reticulatae, septa non distincta, hyphae 3-5µm crassae. Appressoria dispersa, plerumque in ramosum axillis, ovalis, oblonga vel globosa, integra vel leniter lobata, 6-10 x 5-7µm. Thyriothecia dispersa, ovala vel ellipsoidea, 146-400 x 140-200µm, verticalis dehiscentes ad centro, margine fimbriatae, hyphae fringiorae parallel, saepe compactae; asci globosi, octospori, 30-35µm diam.; ascospores conglobatae, oblongae, uniseptatae, constrictae, 16-18 x 7-9µm, parietus glabrus.

Colonies epiphyllous, thin, up to 3mm in diameter, rarely confluent. Hyphae straight, branching alternate to irregular at acute angles, loosely reticulate, septa not clear, mycelium 3-5µm wide. Appressoria scattered, mostly in the axils of branches, oval, oblong to globose, entire to slightly lobate, 6-10 x 5-7µm. Thyriothecia scattered, oval to ellipsoidal, 146-400 x 140-200µm, dehisce longitudinally at the centre, margin fimbriate, fringed hyphae run parallel, often compact; asci globose, octosporous, 30-35µm in diameter; ascospores conglobate, oblong, uniseptate, constricted at the septum, 16-18 x 7-9µm, wall smooth.

Remarks

Lembosia heptapluri Sacc. and *L. morototoni* Petrak & Ciferri are known on *Heptaplurum* sp. and *Didymopanax morototoni* from Singapore and San Domingo. *Lembosia heptapluri* does not bear appressoria and has been synonymised with *Lembosina* (Mueller & Arx, 1962). *L. araliacearum* differs from *L. morototoni* in having larger and entire to slightly lobate appressoria and larger ascospores. This species stands distinct from others in having appressoria mostly in an axillary position of the branches.

***Lembosia linocierae* sp. nov.**

(Fig. 5)

Material examined

Holotype: 27.xii.2001, Sankili Forest, Shendurney Wildlife Sanctuary, Kollam, Kerala, India, coll. V.B. Hosagoudar, on leaves of *Linociera* sp. (Oleaceae), HCIO 44325.

Isotype: TBGT 688.

Etymology

Based on the host genus *Linociera*.

Diagnostic features

Coloniae epiphyllae, densae, crustosae, granulosae, ad 2mm diam., confluentes. Hyphae rectae vel subrectae, irregulariter

acuteque ramosae, laxe reticulatae, cellulae 24-32 x 5-7µm. Appressoria unicellularis, valae dispersa, alternata vel unilateralia, ovata, conoidea, globosa, attenuata et late rotundata vel truncata ad apicem, integra vel raro leniter lobata ad lateralis et apicem, recta vel curvula, antrorsa vel retrorsa, 9-16 x 4-11µm. Thyriothecia dispersa vel aggregata, ovata, oblonga vel elongata, X, Y et stellata formes, 350-1400µm longa, 200-300 µm crassa, verticalis dehiscentes ad centro, margine fimbriatae, hyphae fringiorum parallel, exappressoriatae; asci ovati vel globosi, octospori, bitunicati, 40-60 µm diam.; ascospores conglobatae, brunneae, oblongae, uniseptatae, constrictae, 27-30 x 12-15µm, parietus leniter verrucosus.

Colonies epiphyllous, dense, crustose, granulose, up to 2mm in diameter, confluent. Hyphae straight to substraight, branching irregular at acute angles, loosely reticulate, cells 24-32 x 5-7µm. Appressoria unicellular, more scattered, alternate to unilateral, ovate, conoid, globose, attenuated and broadly rounded to truncate at the apex, entire to rarely slightly lobate at sides or at the apex, straight to curved, antrorse to retrorse, 9-16 x 4-11µm. Thyriothecia scattered to aggregated, oval, oblong to elongated, X or Y or star shaped, 350-1400µm long, 200-300µm broad, dehisce vertically at the centre, margin fimbriate, fringed hyphae mostly run parallel and devoid of appressoria; asci ovate to globose, octosporous, bitunicate, 40-60µm in diameter; ascospores conglobate, brown, oblong, uniseptate, constricted at the septum, 27-30 x 12-15µm, wall slightly verrucose.

Remarks

Lembosia rizalensis Petrak is known on *Linociera ramiflora* from Philippines (Petrak, 1955). However, *L. linocierae* differs from it in having larger thyriothecia and ascospores.

***Sarcinella cassiae-fistulae* V.B. Hosagoudar et M.M.**

Shajivaz, sp. nov.

(Fig. 6)

Material examined

Holotype: 29.xi.2001, Anchal, Kollam, Kerala, India, coll. M.M. Shajivaz, on leaves of *Cassia fistula* L. (Caesalpiniaceae), HCIO 44407.

Isotype: TBGT 597

Etymology

Based on host plant *Cassia fistula*.

Diagnostic features

Coloniae hypophyllae, tenues, patentiae, ad 5mm diam., confluentes. Hyphae pallid brunneae, formans rete, cellulae 9-13 x 3-4µm. Appressoria non numerosa, unilateralia vel raro alternata, mammiformes, crassa posita, integra, 6-7µm

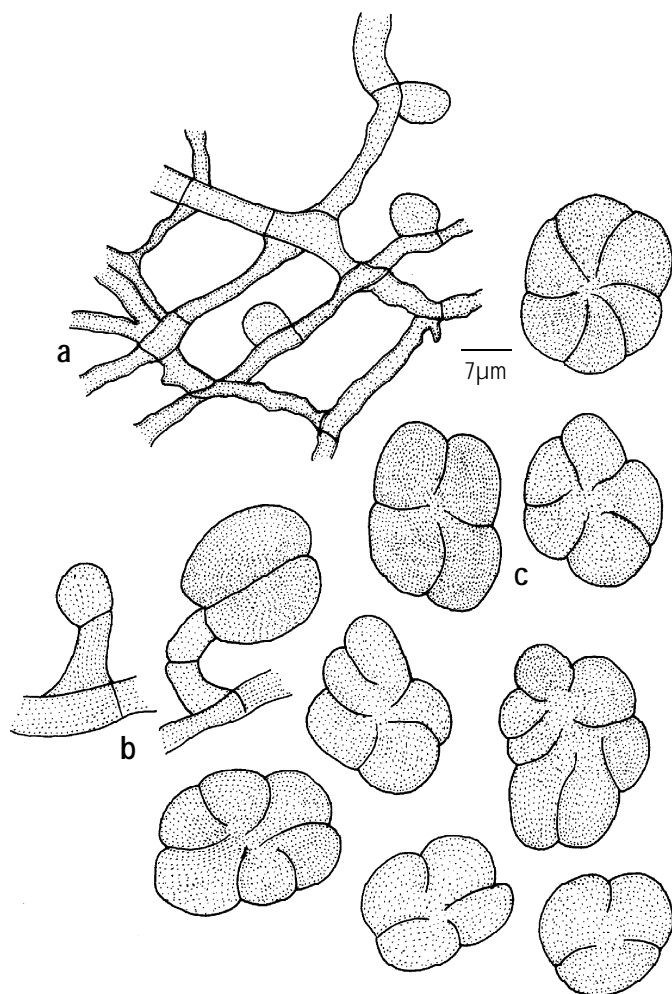


Figure 6. *Sarcinella cassiae-fistulae* sp. nov.

a - Net formed appressoriolate mycelium; b- conidiophore with the conidium initial; c- conidia

diam. Conidiophora producentes hyphis lateralis, erecta, plerumque unicellula, raro septata, gibbosa ad basim, micronemata, mononemata, simplices, recta, 14-16 x 4-7µm. Cellulae conidiogenae terminalis, integratae, monoblasticae, determinatae, cylindratae. Conidia solitaria, simplices, acrogena, spherica vel subspherica, 4-12-cellula, sarciniformes, leniter vel fortiter constricta, nigra, 19-24µm diam., parietus glabrus.

Colonies hypophyllous, thin, spreading, up to 5mm in diameter. Hyphae pale brown, form a net throughout, cells 9-13 x 3-4µm. Appressoria not numerous, unilateral to rarely alternate, mammiform, broad based, entire, 6-7µm in diameter.

Conidiophores borne lateral to the hyphae, become erect, mostly unicellular, rarely a septa is formed, gibbous at the base, micronematous, mononematous, simple, straight, 14-16 x 4-7µm. Conidiogenous cells terminal, integrated, monoblastic, determinate, cylindrical. Conidia, solitary, simple, acrogenous, spherical to subspherical, 4-12-celled, sarciniform, slightly to deeply constricted at the septa, charcoal black, 19-24µm in diameter, wall smooth.

Remarks

Sarcinella cassiae Butler in Munjal and Kapoor (1963) is known on *Cassia tora* and *C. occidentalis* from Belgaum, Karnataka and Bhimtal, Kumaon. However, *S. cassiae-fistulae* differs from it in having thin hypophyllous colonies, having only sarciniform and smaller conidia.

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References

- Bilgrami, K.S., S. Jamaludeen and M.A. Rizwi (1991). *Fungi of India. List and References*. Today and Tomorrow's Printers and Publishers, New Delhi. 798pp.
- Mueller, E. and J.A.V. Arx (1962). Die Gattungen der didymosporen Pyrenomyceten. *Beitrage zur Kryptogamenflora der Schweiz* 11: 1-922.
- Munjal, R.L. and J.N. Kapoor (1963). Hyphomycetes from Himalayas. *Indian Phytopathol.* 16: 86-93.
- Petrak, F. (1955). Beitrage zur Pilzflora von Sud und Ostasien. *Sydowia* 9: 530-538.
- Sarbhoy, A.K., J.L. Varshney and D.K. Agarwal (1996). *Fungi of India* (1982-92). CBS Publishers & Distributors, New Delhi, 350pp.
- Stevens, F.L. and M.H. Ryan (1939). The Microthyriaceae. *Illinois Biological Monographs* 17: 1-138.
- Yamamoto, W. (1956). The Formosan species of the Microthyriaceae - I. *Science Report Hyogo University of Agriculture, Agricultural Biology Series* 2: 33-36.
- Yamamoto, W. (1957). The Formosan species of the Microthyriaceae - II. *Science Report Hyogo University of Agriculture, Agricultural Biology Series* 3: 23-31.