

Studies on Foliicolous Fungi—XXI Microfungi of Subramanya, Karnataka

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This paper gives an account of 28 fungal parasites on the flowering plants. Of these, *Lembosia memecylicola*, *Meliola subramanyaensis* and *Sarcinella theae* are the new species described and illustrated in detail.

Key words : Mycotaxonomy, Western Ghats, fungi, Sybramanya, Sullia, Karnataka

INTRODUCTION

The name of the village Subramanya is derived from the Subramanya abode, located in Sullia taluk of South Canara (Dakshina Kannada or Mangalore) district in Karnataka State. It is also known as "Kukke Subramanya", located on the banks of the river 'Kumara Dhara' or 'Dhara thirtha', originating from Kumara Mountain, harbours rich riparian vegetation. This place is amidst the reserve forest of about five square miles (Anonymous, 2003). An exploration trip was conducted to this area during the month of November, 2003 to study the foliicolous microfungi.

ENUMERATION OF THE SPECIES

Asperisporium pongamiae (H. Sydow) Deight. in Ellis, More Dematiaceous Hyphomycetes, p. 241, 1976.

Fusicladium pongamiae H. Sydow, Ann. Mycol. 11 : 328, 1913.

Passalora pongamiae (H. Sydow) Subram., Hyphomycetes, p. 237, 1971.

Material examined : On leaves of *Pongamia pinnata* (L.) Pierre (Fabaceae), Nov. 15, 2003,

V. B. Hosagoudar & al.
HCIO 45647, TBGT 1393.

Asteridiella combreti (Stev.) Hansf. var. *leonensis* Hansf., Sydowia Beih. 20 : 160, 1961 ; Hosag. & Goos, Mycotaxon 36 : 238, 1989, Hosag, Meliolales of India, p. 83, 1996.

Material examined : On leaves of *Calycopteris florubunda* Lam. (Combretaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45714, TBGT 1463 ; on leaves of *Terminalia* sp. (Combretaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45715, TBGT 1464.

Asterina hopeae Hosag. & Kamar., Zoos' Print J. 17 : 815, 2002.

Material examined : On leaves of *Hopea* sp. (Dipterocarpaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45724, TBGT 1473.

Asterina memecylonis Ryan, Mem. Dept. Agric. India 15 : 105, 1921 (*memecyloinae*); Hosag., Zoos' Print J. 19 : 1386, 2004.

Material examined : On leaves of *Memecylon* sp. (Melastomataceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45684, TBGT 1431.

Asterina tertia Racib. in Thesis Abh. K. K. Zool. Bot. Ges. 7 : 103, 1913.

Material examined : On leaves of *Adhathoda visica* Nees (Acanthaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45746, TBGT 1495.

Echidnodella hopeae Hosag., Balakr. & Goos. Mycotaxon 58 : 497, 1996.

Material examined : On leaves of *Hopea* sp. (Dipterocarpaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45724, TBGT 1473.

Irenopsis crotonis (Stev. & Tehon) Stev., Ann. Mycol. 25 : 441, 1927; Hansf., Sydowia Beih. 2 : 207, 1961.

Meliola crotonis Stev. & Tehon, Mycologia 18 : 20, 1926.

Material examined : On leaves of *Croton* sp. (Euphorbiaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45706, TBGT 1454.

Lembosia memecylica V. B. Hosagoudar, sp. nov.
(Fig. 1)

Coloniae hypophyllae, densae, crustosae, ad 5 mm diam., confluentes. Hyphae rectae vel flexuosae, alternate vel irregulariter acuteque vel laxe ramosae, laxae vel arcte reticulatae, cellulae 28-25 × 6-8 μm. Appressoria dispersa, laxae posita, antrorsa,

subantrorsa vel raro recurvata, unicellula, cylindracea, ovata, oblonga, clavata, integra, ad apicem attenuata vel late rotundata, 4-12 × 6-8 μm. Thyriothechia dispersa, ovata, oblonga, elongate, elliptica recta vel curvula, dehiscentes verticilater ad centre, 294-882 × 176-300 μm, margine fimbriatae, hyphae fringiorum longae, flexuosae et compactae; asci globosi, octospori, ad 45 μm diam.; ascosporae oblongae, conglobatae, brunneae, uniseptatae, leniter constrictae, 22-26 × 11-13 μm, parietus glabrus.

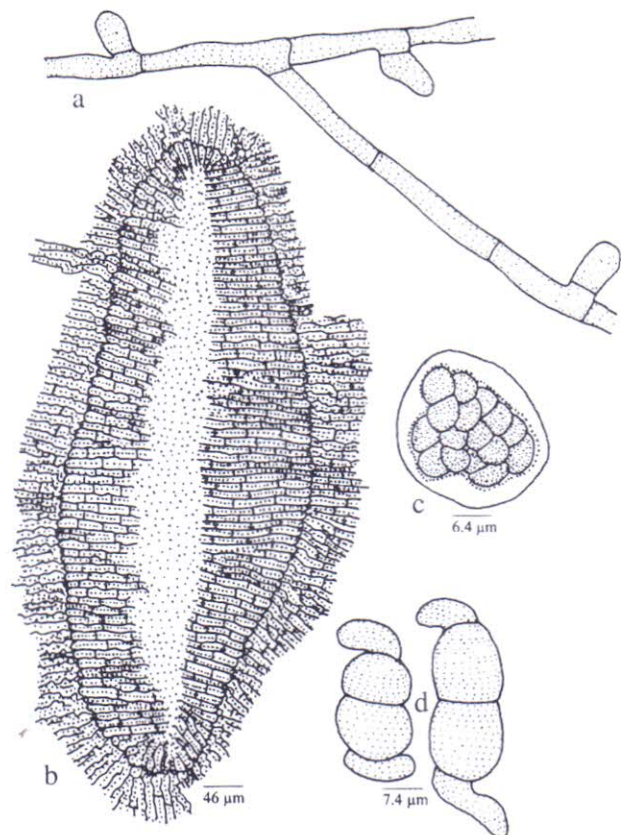


Fig. 1 : *Lembosia memecylica* sp. nov.
a-Appressariate mycelium, b-Thyriothecium,
c-Ascus, d-Ascospores

Colonies hypophyllous, dense, crustose, up to 5 mm in diameter, confluent. Hyphae straight to flexuous, branching alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 28-35 × 6-8 μm. Appressoria scattered, distantly placed, unicellular, cylindrical, ovate, oblong, clavate, antrorse, subantrorse to rarely recurved, entire, attenuated to broadly rounded at the apex, 4-12 × 6-8 μm. Thyriothechia scattered, oval, oblong, elongated, elliptical, straight to curved, dehisce

vertically along the centre, 294-882 × 176-300 µm, margin fimbriate, fringed hyphae long, flexuous and compact; asci globose, octosporous, up to 45 µm in diameter; ascospores oblong, conglobate, brown, uniseptate, slightly constricted, 22-26 × 11-13 µm, wall smooth.

Material examined : On leaves of *Memecylon* sp. (Melastomataceae), Nov. 15, 2003, V. B. Hosagoudar HCIO 45783 (type), TBGT 1532 (isotype).

Morenoella memecyli Sydow and *Lembosia memecyli* Sydow & Sydow are known on this host genus (Sydow & Sydow, 1914; Sydow & Petrak, 1931; Song & Hosagoudar, 2003). Since the genus *Morenoella* is synonymous to *Lembosia*, Stevens & Ryan (1939) synonymised the former species with the latter. *Lembosia memecyli* Sydow is the only species known on the host genus *Memecylon*, *Lembosia memecyli* differs from *L. memecylicola* in having larger thyrtothecia and ascospores.

Meliola alstoniae Koord., Verh. Akad. Wetensch. Amsterdam 13 : 170, 1907; Hansf., Sydowia Beih. 2 : 556, 1961; Thite & Kulkarni, J. Shivaji Univ. (Sci.) 18 : 211, 1978; Hosag. & Goos, Mycotaxon 37 : 218, 1990; 42 : 129, 1991; Hosag., Meliolales of India, p. 128, 1996.

Meliola alstoniicola Hansf., Recueil I. N. E. A. C. 2 : 35, 1945.

Material examined : On leaves of *Alstonia scholaris* (L.) R. Br. (Apocynaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45786, TBGT 1535.

Meliola altissimae Hosag. in Hosag. & Goos, Mycotaxon 42 : 29, 129, 1991; Hosag., Raghu & Pillai, Nova Hedwigia 58 : 536, 1994; Hosag., Meliolales of India, p. 128, 1996.

Material examined : On leaves of *Vitex altissima* L. (Verbenaceae), Nov. 15,

2003, V. B. Hosagoudar & al. TBGT 1409, HCIO 45673, TBGT 1420.

Meliola cadigensis Yates var. *glycosmidis* (Kapoor) Hosag., Crypt. Bot. 213 : 186, 1991; Hosag., Meliolales of India, p. 149, 1996.

Meliola glycosmidis Kapoor, Indian Phytopathol. 20 : 153, 1967;

Material examined : On leaves of *Glycosmis mauritiana* (Lam.) Tanaka (*G. pentaphylla* Correa) (Rutaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45716, TBGT 1465.

Meliola clerodendricola Henn., Hedwigia 37 : 288, 1895; Hansf., Sydowia Beih. 2 : 694, 1961; Hosag. & Goos, Mycotaxon 37 : 226, 1990; Hosag., Kaveriappa, Raghu & Goos, Mycotaxon 51 : 111, 1994; Hosag., Meliolales of India, p. 169, 1996.

Meliola sakawensis Henn. var. *longispora* Beeli, Bull. Jard. Bot. Etat. 7 : 98, 1920.

Meliola sakawensis P. Henn., Hedwigia 43 : 141, 1904; Stev., Ann. Mycol. 26 : 248, 1928.

Material examined : On leaves of *Clerodendrum viscosum* Vent. (Verbenaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45719, TBGT 1468.

Meliola cranei Hosag. & Goos Mycotaxon 66 : 419, 1998.

Meliola atalantiae Hosag. in Hosag. & Goos, Mycotaxon 37 : 220, 1990; Hosag., Meliolales of India, p. 135, 1996.

Material examined : On leaves of *Atalantia monophylla* (Roxb.) DC. (Rutaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45646, TBGT 1392.

Meliola frutescentis Hosag., Abraham & Crane, Mycotaxon 71 : 152, 1999.

Material examined : On leaves of *Ichnocarpus frutescens* (L.) R. Br. (Apocynaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45787, TBGT 1536.

Meliola gamsii Hosag. & S. Shiburaj, Nova Hedwigia 74 : 411, 2002.

Material examined : On leaves of *Strychnos nuxvomica* L. (Loganiaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45748, TBGT 1497.

Meliola gliricidicola Hosag. & Agarwal, Indian Phytopathol. 56 : 103, 2003.

Material examined : On leaves of *Gliricidia sepium* (Jacq.) Walp. (Fabaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45747, TBGT 1496.

Meliola heudelotii Gaill., Le Genre *Meliola*, p. 49, 1892 ; Bal., J. Dept. Agric. Univ. Calcutta 4 : 1, 1922 ; Hansf., Sydowia Beih. 2 : 156, 1961 ; Hosag., J. Econ. Tax. Bot. 11 : 157, 1987 ; Hosag., Meliolales of India, p. 215, 1996.

Material examined : On leaves of *Memecylon* sp. (Melastomataceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45684, TBGT 1431.

Meliola malacotricha Speg. var. *major* Beeli, Bull. Jard. Bot. Etat. 7 : 89, 1920 ; Hansf., Sydowia Beih. 2 : 649, 1961 ; Hosag. & Goos Mycotaxon 37 : 240, 1999 ; 42 : 137, 1991 ; Hosag., Crypt. Bot. 2/3 : 186, 1991 ; Hosag., Raghu & Pillai, Nova Hedwigia 58 : 540, 1994 ; Hosag., Meliolales of India, p. 249, 1996.

Material examined : On leaves of *Merremia* sp. (Convolvulaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45608, TBGT

1351 ; on leaves of *Argyria* sp. (Convolvulaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45705, TBGT 1453 ; on leaves of *Lettsomia* sp. (Convolvulaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45721, TBGT 1470.

Meliola mangifeare Earle, Bull. New York Bot. Gard. 3 : 307, 1905 ; Hansf., Sydowia Beih. 2 : 464, 1961 ; Hansf. & Thirum., Farlowia 3 : 296, 1948 ; Hansf., Sydowia Beih. 2 : 464, 1961 ; Hosag. & Goos, Mycotaxon 37 : 240, 1990 ; Hosag., Crypt. Bot. 2/3 : 186, 1991 ; Hosag. & Ansari, J. Andaman Sci. Assoc. 7 : 89, 1991 ; Hosag., Meliolales of India, p. 250, 1996.

Material examined : On leaves of *Mangifera indica* L. (Anacardiaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45708, TBGT 1457.

Meliola pepparaensis Hosag. & Abraham, Sydowia 50 : 18, 1998.

Material examined : On leaves of *Tabernaemontana* sp. (Apocynaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45743, TBGT 1492.

Meliola premnicola Hosag. in Hosag. & Goos Mycotaxon 37 : 243, 1990 ; Hosag., Meliolales of India, p. 288, 1996.

Material examined : On leaves of *Premna* sp. (Verbanaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HClO 45720, TBGT 1469.

Meliola pterospermis Stev. var. *microspora* Hosag. & Raghu, New Botanist 20 : 70, 1993 ; Hosag., Meliolales of India, p. 291, 1996.

Material examined : On leaves of *Sterculia urens* Roxb. (Sterculiaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45742, TBGT 1491.

Meliola scleropyri Hosag. in Hosag. & Goos, Mycotaxon 37 : 247, 1990 ; Hosag., Meliolales of India, p. 307, 1996.

Material examined : On leaves of *Scleropyrum pentandrum* (Dennst.) Mabblerley (*S. wallichianum* (Wight & Arn.) (Santalaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45619, TBGT 1362 ; HCIO 45713, TBGT 1462.

Meliola subramanyaensis V. B. Hosagoudar, sp. nov.

(Fig. 2)

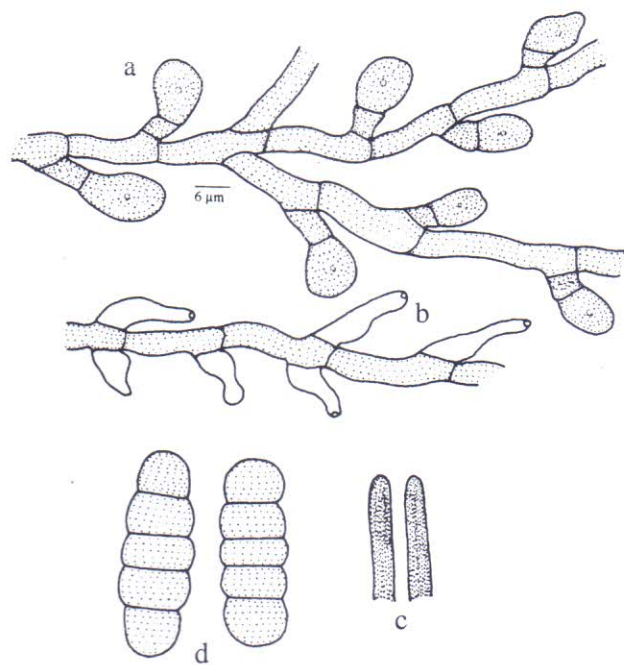


Fig. 2 : *Meliola subramanyaensis* sp. nov.

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

Coloniae epiphyllae, densae, velutinae, ad 1 mm diam., confluentes. Hyphae subrectae, flexuosae vel anfractuae, alternate vel irregulariter acuteque vel

laxe ramosae, laxae vel arcte reticulatae, cellulae 17-21 × 4-7 µm. Appressoria alternata, antrorsa, 17-26 µm longa ; cellulae basillares cylindratae vel cuneatae, 4-10 µm longae ; cellulae apicales ovatae, oblongae, clavatae, saepe ad apicem altenuatae, integrae, 12-16 × 9-11 µm. Phialides in hyphis separatis oriundae, alternatae vel oppositae, ampulliformes, 14-23 × 6-8 µm. Setae myceliales plerumque circa perithecia aggregatae, simplices, rectae, flexuosae vel curvulae, ad 2% uncinatae, ad apicem obtusae, ad 300 µm longae. Perithecia dispersa, globosa, ad 160 µm diam. ; ascospores oblongae, cylindratae, 4-septatae, constrictae, 32-36 × 12-15 µm.

Colonies epiphyllous, dense, velvety, up to 1 mm in diameter, confluent. Hyphae substraight, flexuous to crooked, branching alternate to irregular at acute to wide angles, loosely to closely reticulate, cells 17-21 × 4-7 µm. Appressoria alternate, antrorse, 17-26 µm long ; stalk cells cylindrical to cuneate, 4-10 µm long ; head cells ovate, oblong, clavate, often attenuated at the apex, entire, 12-16 × 9-11 µm. Phialides borne on a separate mycelial branch, alternate to opposite, ampulliform, 14-23 × 6-8 µm. Mycelial setae mostly grouped around perithecia, simple, straight, flexuous to curved, up to 2% uncinata, obtuse at the tip, up to 300 µm long. Perithecia scattered, globose, up to 160 µm in diameter ; ascospores oblong, cylindrical, 4-septate, constricted at the septa, 32-36 × 12-15 µm.

Material examined : On leaves of *Cyclea peltata* Cooke (Menispermaceae), Nov. 15, 2003, V. B. Hosagoudar HCIO 45782 (type), TBGT 1531 (isotype).

Flexuous to uncinata mycelial setae distinguishes this species from *Meliola cissampelicola* Hansf. & Thirum. and *M. cycleae* Hosag. known on the members of the family Menispermaceae from the Western Ghats of Peninsular India (Hansford, 1961 ; Hosagoudar, 1996).

Phyllachora pongamiae (Berk. & Br.) Petch, Ann. Royal Bot. Gard. Paradeniya 5 : 291, 1912 ; Hosag., Indian Phytopathol. 38 : 450, 1985 ; Hosag, J. Econ. Taxon. Bot. 13 : 123, 1989.

Material examined : On leaves of *Pongamia pinnata* (L.) Pierre (Fabaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45682, TBGT 1429.

Questieriella strychni Hosag., J. Econ. Taxon. Bot. 28 : 196, 2004.

Material examined : On leaves of *Strychnos nuxvomica* L. (Loganiaceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45748, TBGT 1497.

Rehmidothis osbeckiae (Berk. & Br.) Theiss., Ann. Mycol. 12 : 192, 1914; Mueller & Arx, Dei Gattungen der didymosporen Pyrenomyceten, p.657, 1962.

Material examined : On leaves of *Osbeckia* sp. (Melastomataceae), Nov. 15, 2003, V. B. Hosagoudar & al. HCIO 45681, TBGT 1428.

Sarcinella theae V. B. Hosagoudar, sp. nov. (Fig. 3)

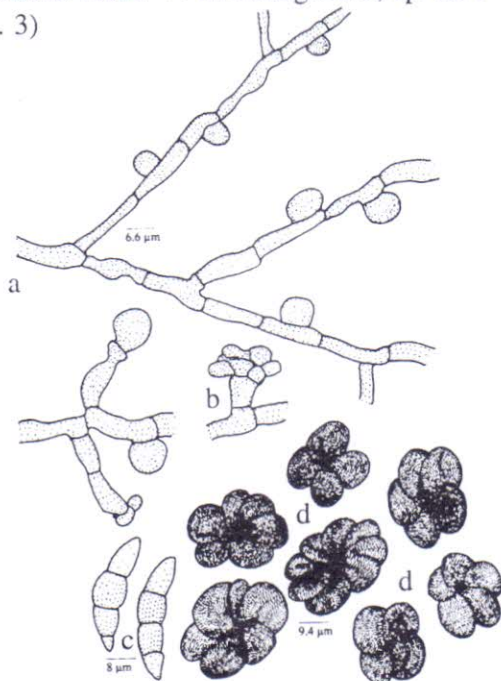


Fig. 3 : *Sarcinella theae* sp. nov. a—Appressariate mycelium, b—Developing conidiophores and conidia of *Sarcinella*, c—Conidia of *Questieriella*, d—Conidia of *Sarcinella*

Coloniae amphigeneae, densae, ad 2 mm diam., confluentes. Hyphae subrectae, vel flexuosae, irregulariter acuteque vel laxe ramosae, laxe vel arcte reticulatae, cellulae 10-16 × 4-5 µm. Appressoria alternata, vel unilateralis, globosa, integra, 9-12 µm diam. Conidiophora micronemata, mononemata, simplices, recta, brunnea, 0-2-septata, 17-21 × 5-7 µm. Cellulae conidiogenae monoblasticae, integratae, plerumque terminalis, cylindratae, determinatae. Conidia sarciniiformes solitaria, sicca, acrogena, glabra, sarcinatim septata, leniter constricta, brunnea vel fusca, 11-32 µm diam. Conidia *Questieriella* pauca, curvula, fusiformis, 3-septata, leniter constricta ad septata, cellulae centralis brunneae, cellulae terminalis pallidae vel utrinque attenuatae et late rotundata, 30-34 × 9-11 µm.

Colonies amphigenous, dense, up to 2 mm in diameter, confluent. Hyphae substraight to flexuous, branching irregular at acute to wide angles, loosely to closely reticulate, cells 12-16 × 4-5 µm. Appressoria alternate, to unilateral, globose, entire, 9-12 µm in diameter. Conidiophores micronematous, mononematous, simple, straight, brown, 0-2 septate, 17-21 × 5-7 µm. Conidiogenous cells monoblastic, integrated, mostly terminal, cylindrical, determinate. Sarciniform conidia solitary, dry, acrogenous, smooth, sarcinately septate, slightly constricted the septa, brown to dark brown, 11-32 µm in diameter. Few *Questieriella* conidia were observed, curved, fusiform, 3-septate, slightly constrict at the septa, central cells brown, terminal cells pale and attenuated to broadly rounded at the tips, 30-34 × 9-11 µm.

Material examined : On leaves of *Camellia sinensis* (L.) Kuntze (*Thea sinensis* L.) (Theaceae), Nov. 15, 2003, V. B. Hosagoudar HCIO 45784 (type), TBGT 1533 (isotype).

Schiffnerula camelliae (Sydow, Sydow & Bulter) Hughes is known on this host from North-East India, Kerala and Java (Hughes, 1987; Hosagoudar et al. 1999). However, this species is known only with the *Questieriella* anamorph and *Schiffnerula* teleomorph but *Sarcinella* state is not known

(Sivanesan, 1983). In contrast to it, the present collection reveals abundant *Scrcinella* conidia and few *Questieriella* conidia. The morphology of the *Questieriella* conidia in the present collection is different from the earlier known ones. Further, outer surface of the mycelia is undulate in *Schiffnerula camelliae* and is smooth and straight in the present collection. Hence, it is proposed here as a new species.

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REFERENCES

- Anonymous 2003. *A descriptive guide of Sri Subramanya Kehetra* Administrative Council, Kukke Sri Subramanya Temple, Subramanya, DK, pp. 92.
- Hansford, C. G. 1961. The Meliolaceae. A Monograph. *Sydowia*. Beih **2** : 1-806.
- Hosagoudar, V. B. 1996. *Meliolales of India*. Botanical Survey of India, Calcutta, pp. 363.
- Hosagoudar, V. B., Abraham, T. K. and Biju, C. K. 1999. Notes on some follicolous fungi from Kerala, India. *J. Mycorpathol. Res.* **37** : 25-28.
- Hughes, S. J. 1987. Pleomorphy in some hyphopodiate fungi. In : Sugiyama (ed.) *Pleomorphic fungi. The diversity and its taxonomic implications*. Kodansha & Elsevier, Tokyo pp. 103-139.
- Sivanesan, A. 1983. *The Bitunicate Ascomycetes*. International Books and Periodical Supply Service, New Delhi, pp. 701.
- Song, B. and Hosagoudar, V. B. 2003. A list of *Lembosia* species based on the literature. *Guizhou Sci.* **21** : 93-1001.
- Stevens, F. L. and Ryan, M. H. 1939. The Microthyriaceae. *Illinois Biol. Monographs* **17** : 1-138.
- Sydow, H. and Petrak, F. 1931. Micromycetes Philippensis — ser. II. *Ann. Mycol.* **29** : 145-279.
- Sydow, H. and Sydow, P. 1914. Fungi from Northern Palawan. *Philippine J. Sci.* **9** : 157-189.

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