
Meliolaceae of Nagaland (India) - II

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Five new Meliolaceous fungi viz. *Asteridiella eugeniae-fruticosae* sp. nov., *A. colebrookiae* sp. nov., *A. mangiferae* sp. nov., *Irenopsis hypophyllae* sp. nov. and *Appendiculella wendlandiae* sp. nov. have been collected and illustrated from Dimapur and Junheboto district of Nagaland (India).

Key words : Meliolaceae, *Asteridiella*, *Irenopsis*, *Appendiculella*, Fungal taxonomy, new species, Nagaland

INTRODUCTION

Leaf inhabiting fungi cover wide range of fungi whose occurrence is wide spread. A large number of workers have done their work on this fascinating group of fungi viz. Hansford (1961), Kar and Maity (1970), Bilgrami *et al.* (1991), Hosagoudar (1996), Sarhoy *et al.* 1996, Hu and Lu (1989), Mibey and Hawksworth (1997), Patil and Mahamulkar (1999), Sanchez and Carrion (1992), Goos and Uecker (1992), Crane and Jones (2001). A review of literature reveals that this group of fungi have not been worked out by any worker in Nagaland hitherto and as such there is ample scope to work on this group of fungi particularly of Nagaland.

MATERIALS AND METHODS

The specimens were collected from different localities (both from plains and foot hills) of Nagaland throughout the year from 2000 to 2004. They were worked out from fresh and preserved materials and preparations were stained in lactophenol-cotton blue.

Holotypes have been deposited in Indian Agricultural Research Institute (IARI), New Delhi, India and isotypes are preserved in the Department of Botany, Presidency College, Kolkata as Presidency College Collection (PCC).

RESULTS AND DISCUSSION

Asteridiella eugeniae-fruticosae T. K. Jana, S. N. Ghosh et A. K. Das sp. nov.

Coloniae epiphyllae, nigrae, dispersae, globosae, tenuis, ad 4 mm diam., confluentes. Hyphae rectae vel undulatae, plerumque oppositae, acuteque ramosae, dense reticulatae, atrobrunneae, cellulae plerumque 13-19 × 4-6 µm. Appressoria alternata vel unilaterialia, recta vel leniter curvuls, bicellularia, brunnea, subantrorsa vel patentia, 12-17 µm longa; cellula basali cylindracea vel cuneata, 3-5 µm longa; cellula apicali globosa, ovata vel clavata, integra, angularia, rotundata ad apicem vel truncata, 9-14 × 7-12 µm. Phialides appressoriis intermixta, opposita vel alternata, unicellularia, brunneae, ampullacea, 15-20 × 5-7 µm. Perithecia dispersa vel laxe aggregata, atrobrunnea, ad 165 µm diam; cellulae peritheciales conoideae, rectae vel curvulae, acutae ad apicem, ad 16 µm longae. Asci ovaes vel elliptici, sessiles, 2 spori. Ascosporae cylindraceae vel ellipsoideae, utrinque rotundatae, rectae, septis constrictae, brunneae, 27-35 × 10-16 µm.

Colonies epiphyllous, black, spreading, round, superficial, thin, upto 4 mm in diameter or sometimes confluent. Hyphae straight to undulate,

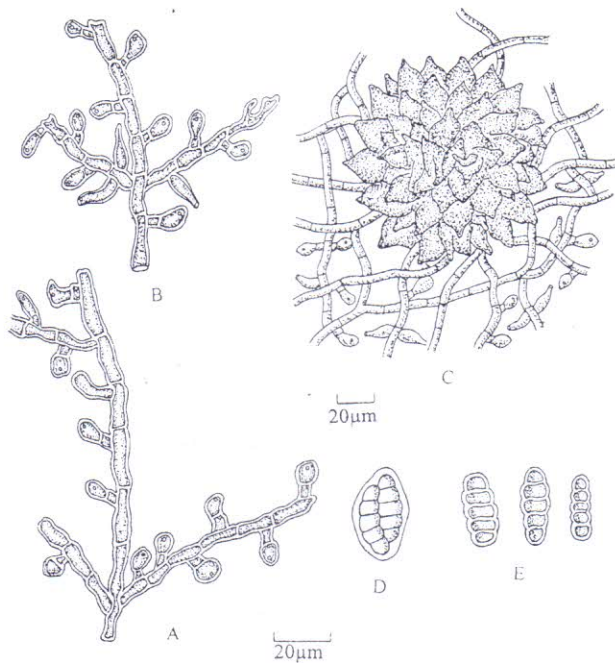


Fig. 1 : *Asteridiella eugeniae-fruticosae*

- A. Hyphae with appressoria
- B. Hyphae with phialides
- C. Perithecium associated with mycelium
- D. Ascus bearing ascospores
- E. Ascospores

branching mostly opposite at acute angles, closely reticulate, dark brown, cells mostly $13-19 \times 4-6 \mu\text{m}$. Appressoria alternate to unilateral, straight or slightly bent, 2-celled, brown, subantrorse to spreading, $12-17 \mu\text{m}$ long; stalk cells cylindrical to cuneate, $3-5 \mu\text{m}$ long; head cells globose, ovate to clavate, entire, angular, rounded at apex to truncate, $9-14 \times 7-12 \mu\text{m}$. Phialides mixed with appressoria, opposite to alternate, unicellular, brown, ampulliform, $15-20 \times 5-7 \mu\text{m}$. Perithecia scattered to

loosely grouped, dark brown, up to $165 \mu\text{m}$ in diam.; perithical surface cells conoid, straight to curved, acute at the apex, upto $16 \mu\text{m}$ long. Asci few, oval to elliptical, sessile, 2-spored. Ascospores cylindrical to ellipsoidal, rounded at ends, usually straight, constricted at the septa, brown, $27-35 \times 10-16 \mu\text{m}$.

Specimen studied

On leaves of *Eugenia fruticosa* Roxb. (Family-Myrtaceae), Medziphema, Dimapur, Nagaland, India, T. K. Jana, March 10, 2001, ITCC 4944.01 (Type), PCC 5201.

Etymology

From the name of the host.

According to Beeli formula 3101.3220, the present species *Asteridiella eugeniae fruticosae* is close to *A. mammillata* Hansf. but differs from it in having thin colonies, smaller hyphal cells and appressoria with angular to truncate head cells, smaller perithecia and ascospores. It also differs from *A. atricha* (Speg.) Hansf. in having large epiphyllous colonies, straight to undulate hyphae, smaller appressoria and perithecia with acutely conoid surface cells and smaller ascospores.

A review of literature (Hansford 1961; Bilgrami *et al* 1991; Sarbhoy *et al.* 1996; Hosagoudar 1996; Hu and Lu 1989; Goos and Uecker 1992) shows that no species of *Asteridiella* has yet been reported on the present host *Eugenia fruticosa* Roxb.

Table 1 : Comparative account of *Asteridiella eugeniae-fruticosae* sp. nov. with other species

Name of species	Colonies	Hyphae	Appressoria	Perithecia	Ascospores
<i>A. mammillata</i>	Epiphyllous, dense upto 3 mm diam.	Substraight to sinuous; cells mostly $15-25 \times 6-7 \mu\text{m}$	Alternate, $17-23 \mu\text{m}$ long; head cells ovate, pyriform, entire, $12-16 \times 8-10 \mu\text{m}$	Scattered, $180 \mu\text{m}$ diam; diam; surface cells obtusely conoid to mammillate, upto $25 \mu\text{m}$ long	$34-39 \times 14-16 \mu\text{m}$
<i>A. atricha</i>	Amphigenous, thin, upto 2 mm diam.	Substraight, cells mostly $20-30 \times 7-8 \mu\text{m}$	Alternate, $15-22 \mu\text{m}$ long; head cells ovate to cylindrical, entire, $12-16 \times 8-10 \mu\text{m}$	Loosely scattered, verrucose, upto $180 \mu\text{m}$ diam.; surface cells obtusely conoid; upto $15 \mu\text{m}$ long	$35-39 \times 15-17 \mu\text{m}$
<i>A. eugeniae-fruticosae</i>	Epiphyllous, thin, upto 4 mm diam.	Straight to undulate, cells mostly $13-19 \times 4-6 \mu\text{m}$	Alternate to unilateral, $12-17 \mu\text{m}$ long; head cells globose, ovate to clavate, entire, angular, rounded at apex to truncate, $9-14 \times 7-12 \mu\text{m}$	Scattered to lossely grouped, rough, upto $162 \mu\text{m}$ diam; surface cells conoid, straight to curved, acute at the apex, upto $16 \mu\text{m}$ long.	$34-39 \times 14-16 \mu\text{m}$

Therefore it is suggested as a new species (Table 1).

Asteridiella colebrookiae T. K. Jana, S. N. Ghosh et A. K. Das sp. nov.

Coloniae epiphyllae, nigrae, dispersae, orbiculares, tenuis vel subdensae, ad 5 mm diam., confluentes. Hyphae flexuosae vel anfractuae, brunneae, alternatae vel irregulariter acuteque ramosae, laxe reticulatae, cellulae plerumque $15-24 \times 6-9 \mu\text{m}$. Appressoria alternata, recta vel curvula, bicellularia, brunnea, antrorsa vel patentia, $20-40 \mu\text{m}$ longa; cellula basali cylindracea vel cuneata, recta vel vario curvula $5-25 \mu\text{m}$ longa; cellula apicali ovata, globosa vel cylindracea, integra, angularia vel leniter lobata, rotundata vel truncata ad apicem, $10-16 \times 6-12 \mu\text{m}$. Phialides producentes in ramus separatam myceliales alternata vel unilateralia, raro opposita, unicellularia, conoidea vel ampullacea, brunnea, $10-18 \times 5-9 \mu\text{m}$. Perithecia dispersa, nigra, globosa, verrucosa, ad $245 \mu\text{m}$ diam.; cellulae peritheciales conoideae, obtusae ad apicem, ad $8 \mu\text{m}$ longae. Asci ovals, sessiles, 2 spori; ascosporae cylindraceae vel leniter ellipsoideae, 4 septatae, atrobrunneae, septis constrictae, utrinque rotundatae, rectae vel leniter curvulae, $27-37 \times 10-15 \mu\text{m}$.

Colonies epiphyllous, black, scattered, orbicular, superficial, thin to subdense, upto 5 mm in diameter or confluent. Hyphae flexuous, crooked, brown, branching alternate to irregular at acute angles, loosely reticulate, cells mostly $15-24 \times 6-9 \mu\text{m}$. Appressoria alternate, straight to variously curved, 2-celled, brown, antrorse to spreading, $20-40 \mu\text{m}$ long; stalk cells cylindrical to cuneate, $5-25 \mu\text{m}$ long; head cells ovate, globose to cylindrical,

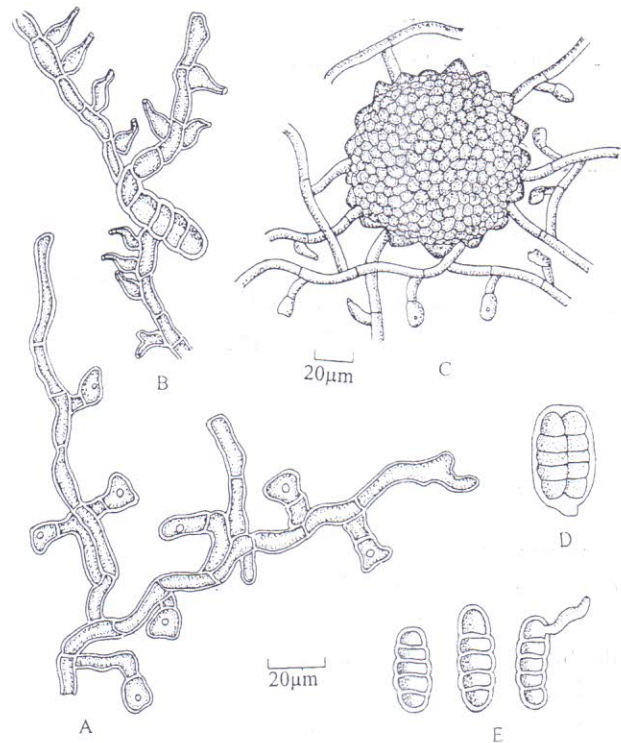


Fig. 2 : *Asteridiella colebrookiae*
 A. Hyphae with appressoria
 B. Hyphae with phialides
 C. Perithecium associated with mycelium
 D. Ascus bearing ascospores
 E. Ascospores

entire, angular to slightly lobate, rounded to truncate at the apex, $10-16 \times 6-12 \mu\text{m}$ with a small circular hyaline spot at the centre. Phialides borne on a separate mycelial branch, alternate to unilateral, rarely opposite, unicellular, ampulliform, brown, $10-18 \times 5-9 \mu\text{m}$. Perithecia scattered, black, round, verrucose, upto $245 \mu\text{m}$ in diam.; perithecial cells conoid, obtuse at apex, upto $8 \mu\text{m}$ long. Asci oval, sessile, 2-spored. Ascospores cylindrical to slightly

Table 2 : Comparative account of *Asteridiella anastomosans* (Wint.) Hansf. and *A. colebrookiae* sp. nov.

Name of species	Hyphae	Appressoria	Phialides	Perithecia	Ascospores
<i>A. anastomosans</i>	Undulate to tortuous; cells mostly $10-20 \times 7-8 \mu\text{m}$	Alternate, usually straight, $15-25 \mu\text{m}$ long; stalk cells cylindrical to cuneate, $3-10 \mu\text{m}$ long; head cells globose to wide ovate, entire, $12-16 \times 10-13 \mu\text{m}$.	Mixed with appressoria	In central groups, upto $150 \mu\text{m}$ diam., surface cells rounded convex, upto $120 \mu\text{m}$ long.	Oblong, 4 septate, $28-25 \times 12-14 \mu\text{m}$
<i>A. colebrookiae</i>	Crooked; cell mostly $15-24 \times 9 \mu\text{m}$.	Alternate, straight to curved, $20-40 \mu\text{m}$ long; stalk cells cylindrical to cuneate, straight to variously curved, $5-25 \mu\text{m}$ long; head cells ovate, globose, cylindrical, entire, angular to slightly lobate, round to truncate at the apex, $6-12 \mu\text{m}$.	Borne on a separate mycelial branch	Scattered, upto $245 \mu\text{m}$ in diam.; perithecial cells obtusely conoid, upto $8 \mu\text{m}$ long.	Cylindrical to slightly ellipsoidal, 4 septate, $27-37 \times 10-15 \mu\text{m}$.

ellipsoidal, 4 septate, dark brown, constricted at the septa, rounded at ends, straight to slightly curved, $27-37 \times 10-15 \mu\text{m}$.

Specimen studied

On leaves of *Colebrookia oppositifolia* Sm. (Family-Labiatae), Rottomi village, Zunheboto, Nagaland, India, October 12, 2000, T. K. Jana, ITCC 4443.01 (Type), PCC 4152.

Etymology

From the name of the host.

According to Beeli formula 3101.3230, *Asteridiella colebrookiae* is close to *A. anastomosans* (Wint.) Hansf. (Hansford 1961) but differs from it in having crooked hyphae, longer appressoria, with cylindrical head cells, larger perithecia with smaller surface cells, phialides borne on a separate mycelial branch, cylindrical to slightly ellipsoidal ascospores.

Review of literature (Hansford 1961 ; Hosagoudar 1996 ; Sarbhoy *et al.* 1996 ; Bilgrami *et al.* 1991 ; Mibey and Hawksworth 1997) shows that no species of *Asteridiella* was reported on *Colebrookia oppositifolia* Sm. Therefore, it is proposed as a new species. (Table 2)

Asteridiella mangiferae T. K. Jana, S. N. Ghosh et A. K. Das sp. nov.

Coloniae epiphyllae, subdensae, velutinae, nigrae, dispersae, globosae, ad 6 mm diam. Hyphae subrectae vel leniter anfractuae, atrobrunneae, oppositae vel irregulariter acuteque vel laxae ramosae, dense reticulatae, cellulae plerumque $20-30 \times 7-10 \mu\text{m}$. Appressoria alternata vel unilateralia, bicellularia, atrobrunnea, antrorsa vel subantrorsa, recta vel leniter curvula, $15-25 \mu\text{m}$ longa ; cellula basali cylindracea, cuneata, $4-8 \mu\text{m}$ longa ; cellula apicali ovata, clavata vel cylindracea, integra vel angularia, $10-16 \times 8-12 \mu\text{m}$. Phialides appressoriis intermixtae, oppositae vel alternatae, unicellularia, brunnea, ampullacea, $15-25 \times 6-10 \mu\text{m}$. Perithecia pleuri. dispersa, nigra, globosa, ad $125 \mu\text{m}$ diam ; cellulae peritheciales conoideae, rectae, ad $10 \mu\text{m}$ longae. Ascospores

cylindracea vel subellipsoideae, rectae vel curvulae, 4 septatae, atrobrunneae, septis constrictae, utrinque rotundatae, medio cellula leniter major, $42-45 \times 14-20 \mu\text{m}$.

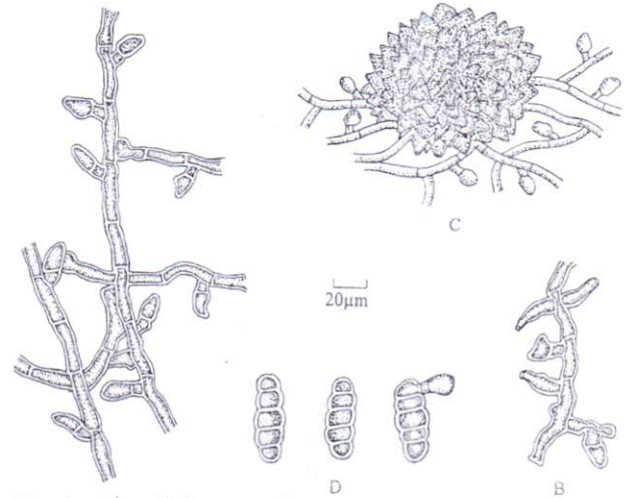


Fig. 3 : *Asteridiella mangiferae*
A. Hyphae with appressoria
B. Hyphae with phialides
C. Perithecium associated with mycelium
D. Ascospores

Colonies epiphyllous, subdense, velvety, black, scattered, round, superficial, upto 6mm in diameter. Hyphae substraight to slightly crooked, dark brown, devoid of setae branching opposite to irregular at acute to wide angle, closely reticulate, cells mostly $20-30 \times 7-10 \mu\text{m}$. Appressoria alternate to unilateral, 2 celled, dark brown, antrorse to subantrorse, straight or slightly bent, $15-25 \mu\text{m}$ long ; stalk cells cylindric to cuneate, $4-8 \mu\text{m}$ long ; head cells ovate, clavate to cylindrical, entire to angular, $10-16 \times 8-12 \mu\text{m}$. Phialides mixed with appressoria, opposite to alternate, unicellular, brown ampulliform, $15-25 \times 6-10 \mu\text{m}$. Perithecia many, scattered, black, round upto $125 \mu\text{m}$ in diam ; perithecial cells conoid, straight, upto $10 \mu\text{m}$ long. Ascospores cylindrical to subellipsoidal, straight to curved, 4 septate, dark brown, constricted at the septa, rounded at ends, middle cell slightly larger than the adjacent cells, $42-45 \times 14-20 \mu\text{m}$.

Specimen studied

On leaves on *Mangifera* sp (family-Anacardiaceae), Ao-kashiram, Dimapur, Nagaland, India, November

5, 2000, T. K. Jana, ITCC 4437.01 (Type), PCC 5146.

Etymology

A review of literature (Hosagoudar 1996; Hansford 1961; Bilgrami *et al.* 1991; Sarbhoy *et al.* 1996; Jiang 1995; Patil and Mahamulkar 1999) shows that there is no report of occurrence of *Asteridiella* on host genus *Mangifera* except that of *Meliola mangiferae* Earle. Therefore, it is suggested as a new species.

Irenopsis hypophyllae T. K. Jana, S. N. Ghosh et A. K. Das sp. nov.

Coloniae hypophyllae, nigrae, dispersae, orbiculares, tenuis, ad 5 mm diam. Hyphae subrectae, flexuosae vel linitè anfractuae, atrobrunneae, plerumque alternatae, raro opposite acuteque ramosae, laxè reticulatae, cellulae plerumque $30-60 \times 5-8 \mu\text{m}$. Appressoria alternata ad 10% opposita, recta vel curvula, antrorsa vel patentia, atrobrunneae, $13-28 \mu\text{m}$ longa; cellula basali cylindracea, vel cuneata, $6-13 \mu\text{m}$ longa; cellula apicali globosa, ovata, integra vel sublobata $10-15 \times 10-17 \mu\text{m}$. Phialides producentes in ramis separatam myceliales, opposita vel unilateralia, unicellularia, brunnea, ampullacea, $18-27 \times 6-10 \mu\text{m}$. Perithecia dispersa, atrobrunneae vel nigra, globosa, verrucosa, ad $150 \mu\text{m}$ diam.; setae peritheciales $6-10$, erectae, simplices, septatae, brunneae, rectae infra, hamatae vel irregulariter curvulae supra, obtusae ad apicem, ad $145 \mu\text{m}$ longae. Asci, elliptici, sessiles, $2-4$ spori. Ascospores cylindracea, rectae, $3-4$ septatae, utrinque rotundatae, parietibus levibus, septis constrictae, atrobrunneae, $35-50 \times 10-21 \mu\text{m}$.

Colonies hypophyllous, black, scattered, orbicular, superficial, thin, upto 5 mm in diameter. Hyphae substraight flexuous to slightly crooked, dark brown, branching mostly alternate, rarely opposite at acute angle, loosely reticulate, cells mostly $30-60 \times 5-8 \mu\text{m}$. Appressoria alternate, about 10% opposite, straight to curved, antrorse to spreading, dark brown, $13-28 \mu\text{m}$ long; stalk cells cylindric to cuneate, $6-13 \mu\text{m}$ long; head cells globose, ovate, entire to sublobate with a small circular, hyaline

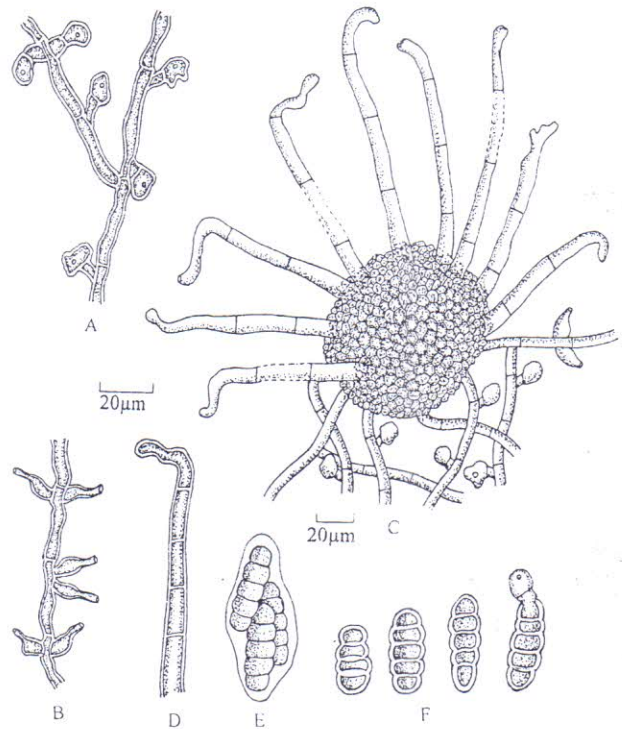


Fig. 4 : *Irenopsis hypophyllae*

- A. Hyphae with appressoria
- B. Hyphae with phialides
- C. Perithecium associated with mycelium and perithecial setae
- D. Perithecial setae
- E. Ascus bearing ascospores
- F. Ascospores

spot at the centre, $10-15 \times 10-17 \mu\text{m}$. Phialides borne on a separate mycelial branch, opposite to unilateral, unicellular, brown ampulliform, $18-27 \times 6-10 \mu\text{m}$. Perithecia scattered, dark brown to black, globose, verrucose, upto $150 \mu\text{m}$ in diam; perithecial setae $6-10$, erect, simple, septate, brown, straight below, hamate to irregularly bent above, obtuse at the apex, upto $145 \mu\text{m}$ long. Asci many, elliptical, sessile, $2-4$ spored. Ascospores cylindric, to subcylindric, broad, straight, $3-4$ septate, rounded at the ends, smooth walled, constricted at the septa, dark brown, $35-50 \times 10-20 \mu\text{m}$.

Specimen studied

On leaves of *Mallotus roxburghianus* Muell. (Family-Euphorbiaceae), Diphu Road, Dimapur, Nagaland, India, T. K. Jana, March 20, 2000, ITCC 4642.01 (Type), PCC 5155.

Table 3 : Comparative account of *Irenopsis paulensis* Hansf. and *I. hypophyllae* sp. nov.

Name of species	Colonies	Appressoria	Phialides	Perithecia	Perithecial setae	Ascospores
<i>I. paulensis</i>	Epiphyllous	Alternate, straight, antrorse to subantrorse, 12-18.5 μm long; head cells globose entire, 9-12.5 \times 12-15.5 μm	Mixed with appressoria	Upto 110 μm in diameter	4-6, straight, obtuse at the apex, upto 80 μm long	Oblong, 4 septate, 27-43.5 \times 12-22 μm
<i>I. hypophyllae</i>	Hypophyllous	Alternate, about 10% opposite, straight to curved, subantrorse to spreading, 13-28 μm long; head cells globose, ovate, entire to sublobate, 10-15 \times 10-17 μm	Borne on a separate mycelial branch	Upto 245 μm in diameter	5-10, erect, simple, septate, straight below, hamate to irregularly bent above, obtuse, upto 145 μm long	Cylindrical, to subcylindric, straight, 3-4 septate, 35-52 \times 10-21 μm

Etymology

From the nature of mycelial colonies on leaves.

Based on Beeli formula 3401.4320, the present species *Irenopsis hypophyllae* is comparable with *I. paulensis* Hansf. described on *Croton* sp. from India (Hosagaudar 1996). However, the new species differs from it in having hypophyllous colonies, 10% opposite appressoria, phialides borne on a separate mycelial branch, large perithecia and longer perithecial setae with hamate to irregularly bent above and longer cylindrical to subcylindric ascospores.

A review of literature (Hosagaudar 1996; Hansford 1961; Bilgrami *et al.* 1991; Sarbhoy *et al.* 1996; Crane and Jones 2001; Sanchez and Carrion 1992) shows that no species of *Irenopsis* has yet been reported on host *Mallotus roxburghianus* Muell. Therefore, it is suggested as a new species (Table 3).

Appendiculella wendlandiae T. K. Jana, S. N. Ghosh et A. K. Das sp. nov.

Coloniae amphigenae, nigrae, dispersae, orbiculares, tenuis, ad 3 mm diam., raro confluentes. Hyphae subrectae vel undulatae, alternatae vel opposite acuteque vel laxe ramosae, cellulae plerumque 20-35 \times 5-8 μm . Appressoria alternata recta vel leniter curvula, brunnea, antrorsa vel subantrorsa, 16-26 μm longa; cellula basali cylindracea vel cuneata, 4-8 μm longa; cellula apicali globosa, ovata, vel clavata, integra angularia vel sublobata, 12-18 \times 10-16 μm . Phialides pauca, producentes in ramus separatam myceliales, opposita, alternata vel unilateralia, brunnea,

ampullacea, unicellularia, 13-20 \times 6-10 μm . Perithecia laxe dispersa, atrobrunnea vel nigra, applanata vel globosa, ad 150 μm diam.; Appendiculoe peritheciales multi, cylindraceae, brunneae, obtusae vel hamatae ad apicem, ad 100 μm longae. Asci pauca, ovaes vel elliptici, sessiles, 2 spori. Ascosporae cylindraceae vel subellipsoideae, rectae brunneae, 4 septatae, parietibus levibus, utrinque rotundatae, septis constrictae, 30-39 \times 10-15 μm .

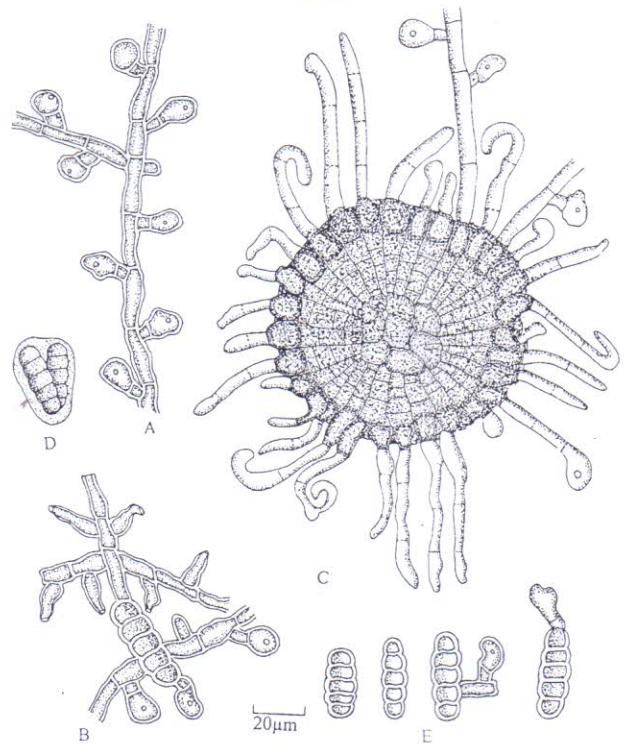


Fig. 5 : *Appendiculella wendlandiae*

- A. Hyphae with appressoria
- B. Hyphae with phialides
- C. Perithecium associated with mycelium and appendages
- D. Perithecial setae
- E. Ascus bearing ascospores
- F. Ascospores

Colonies amphigenous, black, scattered, orbicular, superficial, thin, upto 3 mm in diameter, rarely confluent. Hyphae substraight to undulate, branching alternate to opposite at acute to wide angles, dark brown, loosely to closely reticulate, cells mostly 20-35 × 5-8 µm. Appressoria alternate, straight to slightly curved, brown, antrorse to subantrorse, 16-26 µm long; stalk cells cylindrical to cuneate, 4-8 µm long; head cells globose, ovate to clavate entire, angular to sublobate, 12-18 × 10-16 µm. Phialides few, borne on a separate mycelial branch, opposite, alternate to unilateral, brown, ampulliform, unicellular, 13-20 × 6-10 µm.

branch, longer perithecial appendages with hamate at the apex, larger ascospores. It also differs from *A. tonkinensis* (K&R.) Toro, var. *cecropiae* (Stev.) Hansf. in having small colonies, longer appressoria, phialides borne on a separate mycelial branch, longer perithecial appendages, larger ascospores.

Review of literature (Hansford 1961; Hosagoudar 1996; Bilgrami *et al.* 1991; Sarbhoy *et al.* 1996; Patil and Mahamulkar 1999) shows that *Appendiculella* has not yet been described on host *Wendlandia scabra* Kurtz. Therefore, it is proposed as a new species (Table 4).

Table 4 : Comparative account of *Appendiculella wendlandiae* sp. nov. with other species.

Name of species	Colonies	Appressoria	Phialides	Perithecia	Ascospores
<i>A. vernoniae</i>	Epiphyllous, thin, upto 1 mm diam.	12-18 µm long; head cells globose, entire, 10-12 µm diam.	Mixed with appressoria	0-4, erect-spreading, straight or uncinat, pale clear brownish, obtuse and slightly swollen at apex, upto 120 µm long	Cylindric to subellipsoid, 4 septate, slightly constricted, 31-36 × 13-15 × 10-12 µm
<i>A. tonkinensis</i> var. <i>cecropiae</i>	Epiphyllous, thin, upto 10 mm diam.	13-20 µm long; head cells globose, entire, 10-14 × 10-13 µm	Mixed with appressoria	None to numerous, clear pale brown, obtuse, bent at the dark tip, upto 40 µm long	Cylindric to subellipsoid, 4 septate, constricted, 32-36 × 14-15 µm
<i>A. wendlandiae</i>	Amphigenous, thin, orbicular, superficial, upto 3 mm diam.	16-26 µm long; head cells globose, ovate, entire, angular to sublobate, 12-18 × 10-16 µm	Borne on a separate mycelial branch	Many, cylindrical, brown, obtuse to, hamate at the apex, upto 100 µm long	Cylindric to subcylindric, straight, 4 septate, constricted at the septa, 30-39 × 10-15 µm

Perithecia loosely scattered, dark brown to black, flattened initially and round at maturity, upto 150 µm in diam; perithecial appendages many, cylindrical, brown, obtuse to hamate at the tip, upto 100 µm long. Asci few, oval to elliptical, sessile, 2 spored. Ascospores cylindric to subcylindric, straight, brown, 4 septate, thickwalled, rounded at ends, constricted at the septa, 30-39 × 10-15 µm.

Specimen studied

On leaves on *Wendlandia scabra* Kurz. (Family-Rubiaceae), Patkai, Dimapur, Nagaland, India, November 15, 2000, T. K. Jana, ITCC 4433.01 (Type), PCC 5141.

According to Beeli formula 3201.3220, *Appendiculella wendlandiae* is close to *A. vernoniae* (Stev.) Hansf., but differs from it in having large amphigenous colonies, longer appressoria, phialides borne on a separate mycelial

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REFERENCES

- Bilgrami, K. S.; Jamaluddin, S. and Rizwi, M. A. 1991. *Fungi of India*. List and References. Today and Tomorrow's Printers and Publishers, New Delhi.
- Crane, J. L. and Jones, A. G. 2001. Nomenclature and taxonomic revisions in the Meliolaceae, *Mycotaxon*, **77** : 145-151.
- Goose, R. D. and Uecker, F. A. 1992. New species and Additional records of fungi from Hawaii. *Mycologia*, **84** : 3, 322-328.
- Hansford, C. G. 1961. *The Meliolineae*. A monograph. *Sydowia Beih*, **2** : 1-806.
- Hosagoudar, V. B. 1996. The Meliolales of India, Botanical survey of India, 1-363 PP.

- Hu, Y. X. and Lu, D. J. 1989. The Meliolaceae of Hainan province. *Acta Mycologica Sinica* **8** : 3. 182-190.
- Jiang, G. Z. 1989. The Meliolaceae of China-iv. *Acta Mycologica Sinica*, **14** : 1, 1-9.
- Kar, A. K. and Maity, M. K. 1970. New Meliolineae from West Bengal (India). *Sydowia*, **24** : 59-68.
- Mibey, R. K. and Hawksworth, D. L. 1997. Meliolaceae and Asterinaceae of the Shimba Hills, Kenya. *Mycological Papers*, No 174, vii + 108 PP.
- Patil, M. S. and Mahamulkar, S. H. 1999. Studies on Meliolaceae of India-IV. *Indian Phytopathology*, **52** : 3. 242-253.
- Sanchez, M. and Carrion, G. 1992. New records of black mildews (Meliolaceae) in Mexico. *Rivista Mexicana de Micologia*, **8** : 27-41.
- Sarbhoj, A. K.; Varshney, J. L. and Agarwal, D. K. 1996. Fungi of India (1982-92). CBS Publishers and Distributors, New Delhi.

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