

New Meliolineae from West Bengal (India)¹

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(With 5 Text-figures)

Five new Meliolineae have been collected and described from West Bengal (India). They are: *Asteridiella meliosmae* sp. nov., *A. pentapterygii* sp. nov., *A. ohiana* (Stev.) Hansf. var. *major* var. nov., *Appendiculella hoveniae* sp. nov. and *Irenopsis tenuissima* (Stev.) Stev. var. *major* var. nov. growing parasitically on the leaves of: *Meliosma simplicifolia* Bl., *Pentapterygium serpens* Klotzsch., *Syzygium claviflora* Roxb., *Hovenia dulcis* Thbg., and *Gouania leptostachya* DC. respectively.

In course of survey of fungi of West Bengal (India), the authors collected two new species of *Asteridiella* McAlpine, one new variety of *A. ohiana* (Stev.) Hansf., one new species of *Appendiculella* von Hoehnel and one new variety of *Irenopsis tenuissima* (Stev.) Stev. growing parasitically on the leaves of: *Meliosma simplicifolia* Bl., *Pentapterygium serpens* Klotzsch., *Syzygium claviflora* Roxb., *Hovenia dulcis* Thbg. and *Gouania leptostachya* DC. respectively.

These fungi were collected from different localities of West Bengal (both from plains and hills) during May, October and November of 1967. They were worked out from fresh and preserved materials and preparations were stained in lactophenol cotton blue.

Theissen and Sydow erected the genus *Irene* typified by *I. inermis* (Kalchbr. & Cooke) Theiss. & Syd. which was previously treated as a species of the genus *Meliola*. But von Hoehnel (1919) subdivided the genus *Irene* by segregating species with "larviform" or "vermiform" appendages on the perithecium into the new genus *Appendiculella* with type *A. calostroma* (Desm.) Hoehnel. Whereas Stevens (1927) separated from *Irene* those species possessing true perithecial setae, constituting the new genus *Irenopsis* having type *I. tortuosa* (Wint.) Stev. Again Stevens (1927) introduced confusion by describing the South African species, *Irene inermis* possessing "larviform" appendages. E. M. Doidge and C. G. Hansford (1955, 1961) examined a wide range of specimens of this South African species. They stated that this fungus possesses merely conoid projections of the surface cells of

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the perithecial wall, but no such appendages are present as described by Stevens. As such, Steven's reduction of *Appendiculella* Hoehnel to synonymy with *Irene* Theiss. & Syd. is incorrect. Hence these two genera stand as originally defined. But long before the genus *Irene* was erected McAlpine (1897) in Australia established the genus *Asteridiella* with type *A. solani* McAlpine, which is nothing but *Irene* in the sense of Theissen & Sydow. Since *Asteridiella* antedates *Irene* the former gets priority over the latter.

1. *Asteridiella meliosmae* Kar & Maity sp. nov. (Text-fig. 1).

Plagulae epiphyllae, irregulariter dispersae, orbiculares usque ad 4 mm diam.; mycelii hyphae laxae oppositae et subdense reticulato-ramosae, remote septatae, atro-brunneae, 6.6—8.2 μ latae rectae vel leniter undulatae; hyphopodia capitata alternata, antrorsa, recta, cellula basali cylindracea vel obconica, 9.9—14.8 \times 6.6—9.9 μ , cellula apicali globosa, ovoidea vel irregulari, antice late rotundata vel subtruncata, integra vel 1—3- raro 4-lobulata, 16.5—23 μ diam.; hyphopodia mucronata, pauca, plerumque opposita, e basi cylindracea paulatim vel abruptiuscule attenuata, antrorsa vel antice plus minusve recurvata, 19.8—29.5 \times 6.4—8.9 μ ; perithecia in plagularum centro sparsa vel aggregata, globosa, 181.5—247.5 μ diam.; pariete pseudoparenchymatico, cellulis superficialibus conoideis, acuminatis, usque ad 43 μ prominulis praedito; asci ovoidei vel ellipsoidei, sessiles, bispori, 59.4—69.3 \times 23—33 μ ; sporae oblongae vel cylindraceae, utrinque late rotundatae, vix vel parum attenuatae, rectae, 4-septatae, ad septa plus minusve constrictae, atro-brunneae, 56—61 \times 17—24.5 μ .

The fungus is parasitic, strictly on the upper surface of the leaf. It forms black, scattered, orbicular, superficial patches, upto 4 mm in diam. (Fig. 1 A). The mycelium is superficial, radiating, wavy and devoid of setae. It is composed of darkbrown, septate, much branched hyphae, 6.6—8.2 μ wide, giving rise to opposite branches (rarely alternate) and hyphopodia at an acute angle just behind the septa. The branches of hyphae and hyphopodia form a net-like mass. The hyphopodia are of two types — capitata and mucronate (Fig. 1 B). The capitata hyphopodia are many, alternately arranged, 2-celled, darkbrown in colour and straight or antrorse. The lower cell of the hyphopodium is small, cuneate to cylindrical, 9.9—14.8 \times 6.6—9.9 μ and the upper cell of the hyphopodium is globose to oval or irregular, entire or 2—4 lobed, 16.5—23 μ in diam., with a small, circular, hyaline spot at the centre. The mucronate hyphopodia are few, opposite or solitary, unicellular, ampulliform, 19.8—29.5 \times 6.4—8.9 μ . The perithecia are many, scattered or in groups, black, round, seated in the centre of the mycelial colony like pin heads, 181.5—247.5 μ in diam., wall rough due to black conoid projections 23—43 μ long, which arise from the wall of the ascocarps and gradually narrow towards the tips (Fig. 1 C). The asci are many,

oval to elliptical, sessile, 2-spored, $59.4\text{--}69.3 \times 23\text{--}33 \mu$ (Fig. 1 D), evanescent at maturity. The ascospores are cylindrical to subcylindric, straight, broad, 4-septate, rounded at ends, constricted at each septum, thick-walled, hyaline when young, brown at maturity, $56\text{--}61 \times 17\text{--}$

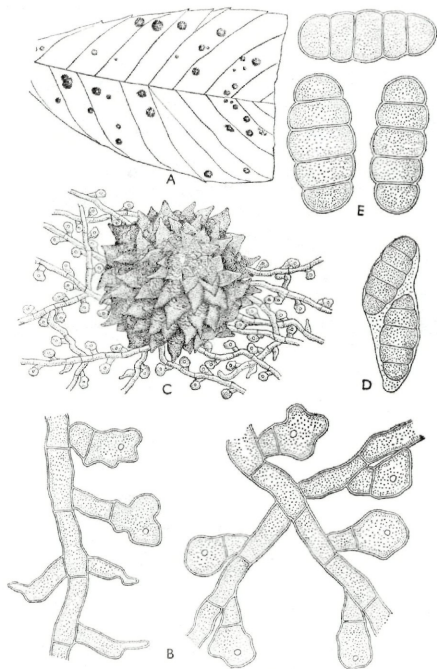


Fig. 1 A—E. *Asteridiella meliosmae*. A portion of a leaf showing patches of infection, $\times \frac{1}{2}$. B. Hyphae with hyphopodia, $\times 550$. C. Perithecium associated with mycelium, $\times 125$. D. Ascus, $\times 550$. E. Ascospores, $\times 550$.

24.5μ ; the middle cell is larger than the other cells (Fig. 1 E). The germ tube comes out from one end cell.

Host: On the living leaves of *Meliosma simplicifolia* Bl. Type locality: Dhuppuri forest, Jalpaiguri, West Bengal, India; November 7, 1967. — Type specimen has been deposited in the Herbarium, IMI No. 133538.

No species of *Asteridiella* has yet been reported on Sabiaceae. So it is proposed a new species.

2. *Asteridiella pentaptergii* Kar. & Maity sp. nov. (Text-fig. 2).

Plagulae epiphyllae, irregulariter dispersae, nigrae, orbiculares, densae, usque ad 3 mm diam.; mycelii hyphae rectiusculae, leniter undulatae, subremote septatae, atro-brunneae, laxe opposite ramulosae, 9.9—13.2 μ latae; hyphopodia capitata alternata, antrorsa, cellula basali cylindracea vel obconica, 4.9—6.6 \times 8.2—11.5 μ , cellula apicali ovoidea

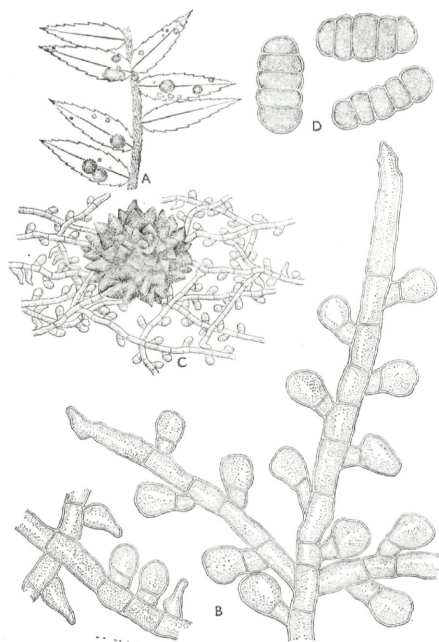


Fig. 2 A—D. *Asteridiella pentaptergii* A. Leaves showing patches of infection, \times 1.5. B. Hyphae with hyphopodia, \times 550. C. Perithecium associated with mycelium, \times 125. D. Ascospores, \times 550.

vel subglobosa, antice late rotundata, raro subtruncata, integra, 13.2—16.5 μ diam.; hyphopodia mucronata pauca, opposita vel in hypharum uno latere evoluta, ampullacea, e basi inflata paulatim vel abruptiuscule attenuata, recta, antrorsa, 19.8—26.4 \times 6.6—9.9 μ ; perithecia in plagularum centro dispersa, globosa, 115.5—151.8 μ diam.; pariete pseudo-parenchymatico, cellulis superficialibus conoideis, abruptiuscule acuminatis, usque ad 36.3 μ prominulis; sporae ellipsoideae vel cylindraceae,

atro-brunneae, rectae, utrinque late rotundatae, vix attenuatae, 4-septatae, ad septa plus minusve constrictae, $39.6-42.9 \times 13.2-19.8 \mu$.

The fungus is parasitic, borne on the upper surface of the leaves and forms black, scattered, orbicular, superficial, dense patches, upto 2 mm in diam. (Fig. 2 A). The mycelium is superficial, radiating, straight and devoid of setae. It is composed of darkbrown, septate, much branched hyphae, $9.9-13.2 \mu$ wide, giving rise to opposite branches and hyphopodia at an acute angle. The hyphal branches and hyphopodia form a net like mass. The hyphopodia are of two types — capitate and mucronate (Fig. 2 B). The capitate hyphopodia are alternately arranged, 2-celled, darkbrown in colour, straight or bent. The lower cell of the hyphopodium is small, cuneate to cylindrical, $4.9-6.6 \times 8.2-11.5 \mu$ and the upper cell of the hyphopodium is capitate, globose to oval, entire to subentire, $13.2-16.5 \mu$ in diam. The mucronate hyphopodia are oppositely arranged or one-sided or solitary, unicellular, ampulliform, brown in colour, $19.8-26.4 \times 6.6-9.9 \mu$. The perithecia are scattered, black, orbicular, seated in the centre of the mycelial colony, $115.5-151.8 \mu$ in diam., surface wall rough due to dark coloured conoid projections, $26.4-36.3 \mu$ long, broad at the base and gradually narrowed towards the apex (Fig. 2 C); intact ascus bearing ascospores not found. The ascospores are cylindrical, 4-septate, constricted at each septum, rounded at ends, straight, darkbrown in colour, $39.6-42.9 \times 13.2-19.8 \mu$ (Fig. 2 D).

Host: On the living leaves of *Pentapterygium serpens* Klotzsch. Type locality: Tung (7,500 ft.), Darjeeling, West Bengal, India; May 12, 1967. — Type specimen has been deposited in the Herbarium, IMI No. 133534.

This fungus is quite distinct from *Asteridiella exilis* (Syd) Hansf. and *A. vaccinicola* Hansf. recorded on Vacciniaceae. So it is proposed a new species.

3. *Asteridiella ohiana* (Stev.) Hansf. var. **major** Kar & Maity, var. nov. (Text-fig. 3).

A typo differt hyphopodiis mucronatis oppositis et parietis cellulis exterioribus usque ad 43μ prominulis.

The fungus is parasitic, borne on both surfaces of the leaves, usually on the upper surface and forms black, scattered, orbicular, superficial, dense patches, upto 5 mm in diam. (Fig. 3 A). The mycelium is superficial, radiating, substraight, devoid of setae and composed of darkbrown, septate, much branched hyphae, $4.9-6.6 \mu$ wide, giving rise to opposite branches and hyphopodia at an acute angle just behind the septa. The hyphopodia are of two types — capitate and mucronate (Fig. 3 B). The capitate hyphopodia are usually alternately arranged, rarely one-sided or solitary, 2-celled, brown in colour, straight or bent. The lower cell of the hyphopodium is small, cylindrical, $3.3-4.9 \times 6.6 \mu$

and the upper cell of the hyphopodium is capitate, oval, rounded at upper end, entire, $11.5-13.2 \times 8.2 \mu$. The mucronate hyphopodia are oppositely arranged or solitary, unicellular, ampulliform, brown in colour, $19.8-26.4 \times 4.9-6.6 \mu$. The perithecia are 2-6, scattered, orbicular, black, seated in the centre of the mycelial colony like pin heads, $194.7-273.9 \mu$ in diam. The surface of the perithecia are rough due to dark coloured conoid projections, upto 43μ long. The tips of the projections are pointed

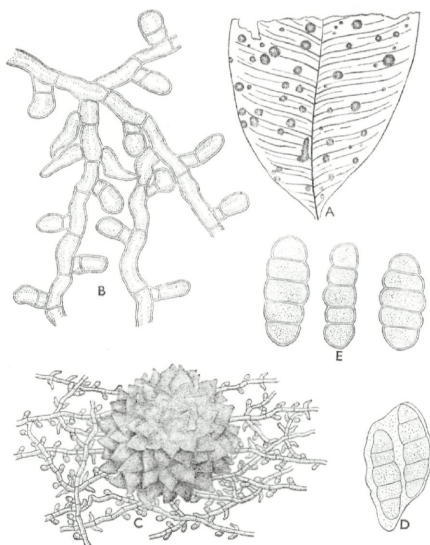


Fig. 3 A—E. *Asteridiella ohiana* var. *major*. A. Portion of a leaf showing patches of infection, $\times 1$. B. Hyphae with hyphopodia, $\times 550$. C. Perithecium associated with mycelium, $\times 125$. D. Ascus, $\times 550$. E. Ascospores, $\times 550$.

or rounded (Fig. 3 C). The asci are many, elliptical, 2-spored, sessile, $46.2-52.8 \times 16.5-23 \mu$ (Fig. 3 D). The ascospores are cylindrical to elliptic-cylindrical, straight, 4-septate, constricted at each septum, rounded at ends, thick-walled, hyaline when young, brown at maturity, $45.8-49.5 \times 15.8-19 \mu$ (Fig. 3 E).

Host: On the living leaves of *Syzygium claviflora* Roxb. Type locality: Dhupguri, Jalpaiguri, West Bengal, India; November 7, 1967. — Type specimen has been deposited in the Herbarium, IMI No. 133537.

This fungus differs from *Asteridiella ohiana* (Stev.) Hansf. in

having oppositely arranged mucronate hyphopodia and much longer conoid projections of the perithecia. As such a new variety of *A. ohiana* is suggested.

4. *Appendiculella hoveniae* Kar & Maity sp. nov. (Text-fig. 4).

Plagulae epiphyllae, laxe irregulariterque dispersae, nigrae, usque ad 3 mm diam.; mycelii hyphae fuscae, septatae, oppositae, raro alternatim

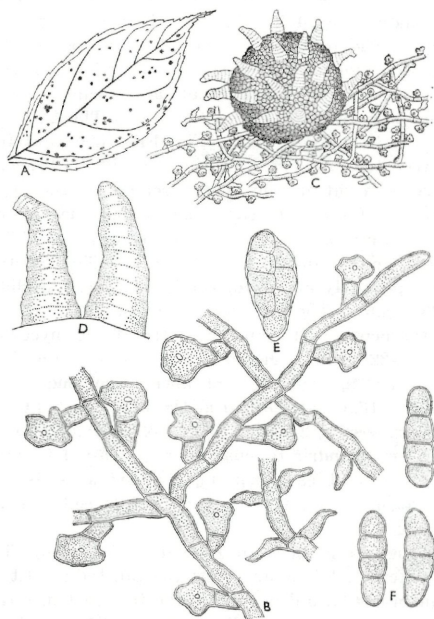


Fig. 4 A—F. *Appendiculella hoveniae*. A. Leaf showing patches of infection, $\times \frac{1}{2}$. B. Hyphae with hyphopodia, $\times 550$. C. Perithecium associated with mycelium, $\times 125$. D. "Larviform" appendages, $\times 550$. E. Ascus, $\times 550$. F. Ascospores, $\times 550$.

ramulosae, rectae vel leniter undulatae; hyphopodia capitata alternata, raro in hypharum uno latere evoluta, antrorsa, cellula inferiore cylindracea vel ovoidea, $9-13.2 \times 6.6 \mu$, cellula apicali subglobosa, irregulariter 2-4-lobulata, lobulis late rotundatis vel subtruncatis, $16.5-19.8 \mu$ diam.; hyphopodia mucronata rara, opposita, raro solitaria, ampullacea, paulatim attenuata, saepe plus minusve recurvata, $16.5-23 \times 6.6 \mu$;

perithecia in centro plagarum dispersa vel aggregata, globosa, verrucosa, 171.5—224 μ diam., ubique processibus larviformibus, brunneolis, paulatim attenuatis, rectis, ad apicem plerumque leniter curvulis, 36—60 μ longis, 16.5—20 μ crassis oblecta; asci crasse clavati, bispori, 36.3—49.5 \times 9.9—16.5 μ ; sporae cylindratae, utrinque late rotundatae, vix attenuatae, rectae vel leniter curvulae, 3-septatae, ad septa constrictae, brunneae, 41—46 \times 13.2—14.8 μ .

The fungus is parasitic and borne strictly on the upper surface of the leaf. It forms black, scattered, orbicular, superficial, thin patches, upto 3 mm in diam. (Fig. 4 A). The mycelium is superficial, radiating, straight or wavy and devoid of setae. It is composed of darbbrown, septate, branched hyphae, 6.6—8.25 μ wide, giving rise to opposite branches at a wide angle (rarely alternate at an acute angle) and hyphopodia at an acute angle just behind the septa. The hyphopodia are of two types — capitate and mucronate (Fig. 4 B). The capitate hyphopodia are many, alternately arranged, rarely one-sided, 2-celled, brown in colour, antrorse, straight or bent. The lower cell of the hyphopodium is small, cylindric to cuneate, 9—13.2 \times 6.6 μ and the upper cell of the hyphopodium is capitate, usually 2 to 4-lobed, 16.5—19.8 μ in diam., with small, circular, hyaline spot at the centre. The mucronate hyphopodia are few, oppositely arranged, rarely solitary, unicellular, ampulliform, 16.5—23 \times 6.6 μ . The perithecia are few, scattered or in groups, black, round, verrucosa, seated in the centre of the mycelial colony like pin heads, 171.5—224 μ in diam. The outer wall of the perithecia is with lightbrown, larviform, conical, unbranched appendages which are 36—60 μ long and 16.5—20 μ broad at the base (Fig. 4 C, D). The asci are many, clavate, sessile, 2-spored, 36.3—49.5 \times 9.9—16.5 μ (Fig. 4 E). The ascospores are cylindric to subcylindric, straight to slightly curved, 3-septate, constricted at each septum, rounded at ends, hyaline when young, brown at maturity, thick-walled, middle cells larger, 41—46 \times 13.2—14.8 μ (Fig. 4 F).

Host: On the living leaves of *Hovenia dulcis* Thbg. Type locality: Rajabhatkhawa forest, Jalpaiguri, West Bengal, India; October 28, 1967. — Type specimen has been deposited in the Herbarium, IMI No. 133540.

Only one species *Appendiculella splendens* (Stev.) Hansf. recorded on *Alphitonia* of Rhamnaceae. This species is quite distinct from *A. splendens* in all respects. So it is proposed a new species.

5. *Irenopsis tenuissima* (Stev.) Stev. var. **major** Kar & Maity var. nov. (Text-fig. 5).

Differt a typo setis perithecorum longioribus, nempe 72.5—142 \times 6—9 μ .

The fungus is parasitic only on the upper surface of the leaf (Fig. 5 A). It forms brownish-black to black, scattered, orbicular, superficial, thin patches, upto 5.5 mm in diam. Sometimes patches coalesce

each other and take irregular shape. The mycelium is superficial, radiating, straight or wavy and devoid of setae. It is composed of brown, septate, branched hyphae, 6.6μ wide, giving rise to opposite branches and hyphopodia at an acute angle just behind the septa. The hyphopodia are of two types — capitata and mucronate (Fig. 5 B). The

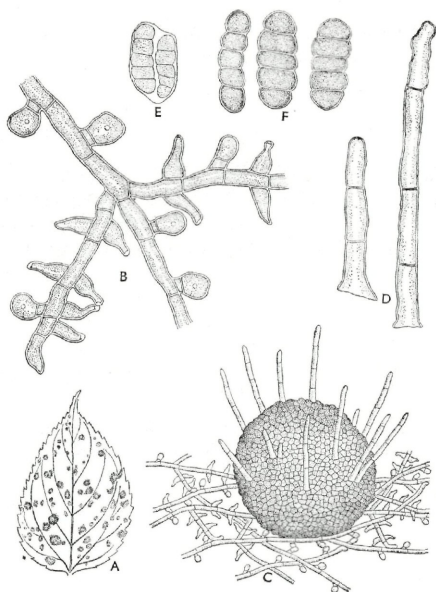


Fig. 5 A—F. *Irenopsis tenuissima* var. *major*. A. Leaf showing patches of infection, $\times \frac{1}{2}$. B. Hyphae with hyphopodia, $\times 550$. C. Perithecium associated with mycelium, $\times 125$. D. Perithecial setae, $\times 550$. E. Ascus, $\times 550$. F. Ascospores, $\times 550$.

capitate hyphopodia are alternately arranged, rarely one-sided, 2-celled, brown in colour and straight or bent. The lower cell of the hyphopodium is small, square or rectangular, $3.3-5 \times 6.6 \mu$ and the upper cell of the hyphopodium is capitate, round to oval, $13.2-16.5 \times 9.9-11.5 \mu$, with a small, hyaline, circular spot at the centre. The mucronate hyphopodia are oppositely arranged, unicellular, ampulliform, brown in colour, $16.5-20 \times 6.6-8 \mu$. The perithecia are few, scattered or in groups, black, shiny, seated on the mycelium like pin heads, round, verrucose, $247-300 \mu$ in diam. The surface of the perithecia is with many setae

(Fig. 5 C). The setae are stiff, straight, bluntly pointed, unbranched, septate, brown in colour, $72.5\text{--}142 \times 8\text{--}9 \mu$ (Fig. 5 D). The asci are many, oval to elliptical, sessile, 2-spored (Fig. 5 E). The ascospores are cylindrical, usually broad, rarely narrow, rounded at ends, 4-septate, constricted at each septum, thick-walled, hyaline when young, but brown at maturity, $41.2\text{--}46 \times 11.5\text{--}16.5 \mu$ (Fig. 5 F).

Host: On the living leaves of *Gouania leptostachya* DC. Type locality: Rajabhatkhawa, Jalpaiguri, West Bengal, India; November 1, 1967. — Type specimen has been deposited in the Herbarium, IMI No. 133539.

This fungus is very similar to *Irenopsis tenuissima* (Stev.) Stev. except in possessing longer perithecial setae. As such new variety is suggested.

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