

## THE HELOTIALES OF INDIA-XVI<sup>1</sup>

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### ABSTRACT

Seven species of Helotiales collected from Darjeeling Hills are dealt with and are described as new records for India. The fruit bodies have been described from fresh material supplemented with Study of dried and preserved material. On the basis of present studies, for new combinations for the species of *Ascocoryne* and *Hymenoscyphus* have been proposed.

This paper deals with 7 species of Helotiales collected from Darjeeling Hills in 1964. All these species are new records for India. Four new combinations for the species of *Ascocoryne* and *Hymenoscyphus* have been proposed. The first 15 contri-

butions (1-15) on the series give an account of 63 known and 17 new species. The fruit bodies have been described from the fresh material, supplemented with dried and preserved (alcohol-formalin) material. For anatomical studies both free hand and microtome sections were prepared. The number of speices are the serial numbers of the helotioid flora studied by the senior author in this laboratory.

The collections have been deposited in the Herbarium of Panjab University Botany Department, Chandigarh, India (PUI) and Royal Botanic Gardens, Kew, England (K).

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81. ***Hymenoscyphus subserotinus*** (P. Henn. & Nym.) Dennis, *Persoonia* 3: 74. 1964.

(Figs. 1 A-B, 4B)

*Apothecia* up to 5.5. mm across, up to 8 mm in total height, gregarious to some-

times scattered, solitary, soft, fleshy, shallow cupulate, regular, stipitate; external surface orange, smooth, margin entire; hymenium concolorous, concave; stipe up to 600  $\mu$   $\times$  450  $\mu$ , cylindrical, lighter concolorous above almost black at the

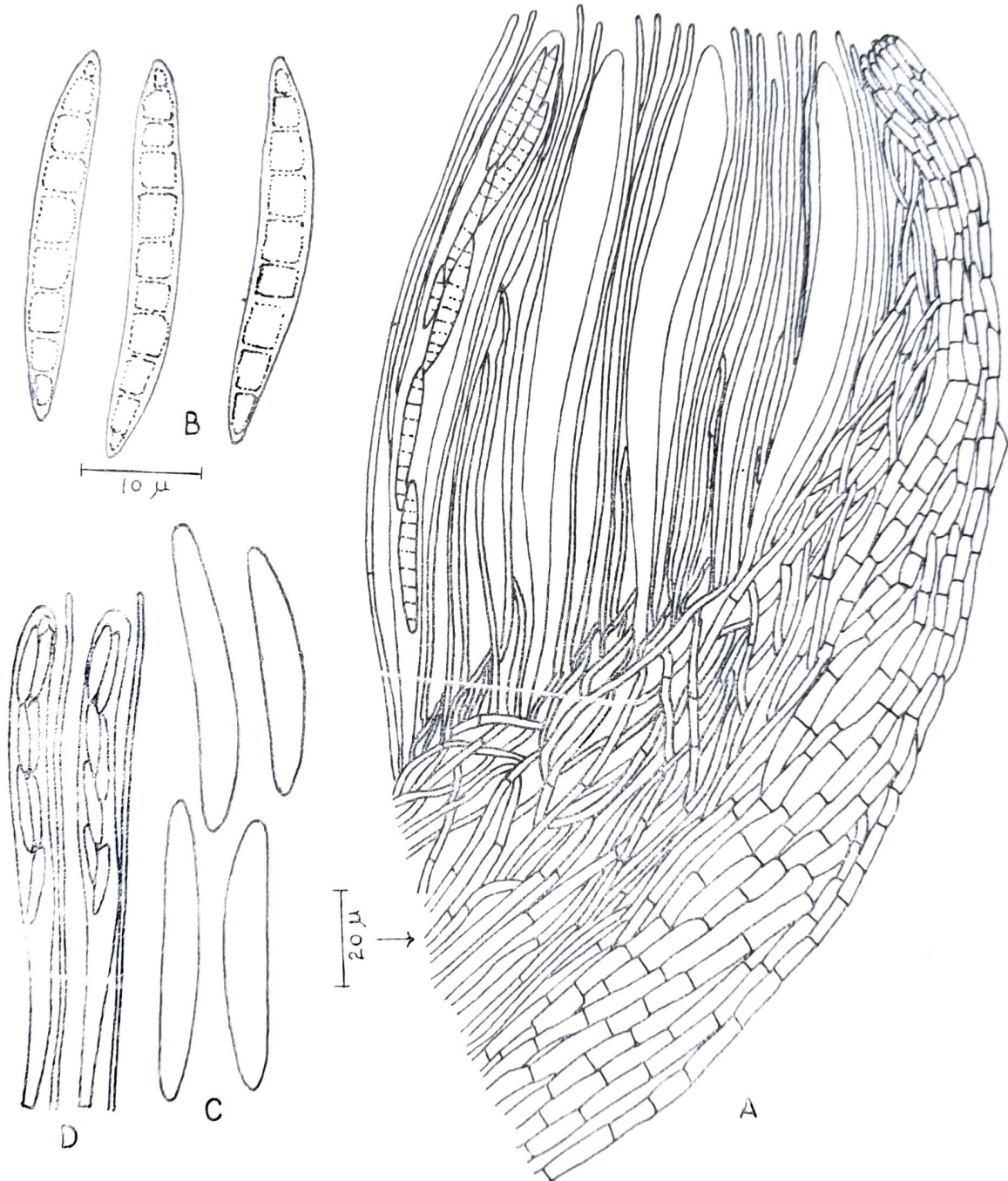


FIG. 1 A-D. A-B. *Hymenoscyphus subserotinus* A. V. s. ascigerous region. B. Ascospores. C-D. *Hymenoscyphus crocatus* C. Ascospores. D. Asci and paraphyses.

point of attachment, almost smooth to minutely roughened. *Asci* 140-170 × 9-12 μ, 8-spored, clavato-cylindrical, tapering below into long stem-like base, J+, apices narrow but obtuse. *Ascospores* 28-34 × 3.8-4.5 μ, irregularly biseriate above, uniseriate below, straight to slightly bent, fusoid, hyaline, thin-walled, non-septate, multiguttulate. *Paraphyses* up to 1.6 μ wide, filiform, light yellow above and almost hyaline lower down in mass, hyaline individually, thin-walled, nonseptate, unbranched, slightly projecting beyond asci tips.

*Anatomy*.—Ascigerous Region.—Ectal excipulum up to 60 μ thick, *textura porrecta*, outer ectal layer covered with brown amorphous matter, hyphae compact, radially arranged, up to 7 μ wide; medullary excipulum *textura intricata*, up to 200 μ thick in the middle, decreasing towards the margin, hyphae oose, up to 4 μ wide; hypothecium indistinct. *Stipe* is differentiated into cortex and medulla; cortex up to 62 μ thick, *textura porrecta*, hyphae compact, up to 7 μ wide, outer few layers contain brown amorphous matter; medulla up to 180 μ thick, *textura subporrecta*, hyphae loose, up to 3.8 μ wide.

*Substratum*.—On dead twigs of *Quercus* sp.

*Collection examined*.—3791, Takdah, Darjeeling, W. Bengal, July 19, 1964 (PUI & K).

The only Indian collection is quite typical of this species. However, Le Gal (1953) has recorded much longer and broader (32-50 × 5-8 μ) ascospores and branched paraphyses for the species.

82. *Hymenoscyphus crocatus* (Mont.) Thind & Singh Comb. Nov. Basionym *Peziza crocata* Montagne, *Seconde centurie De Plantes cellulaires Exotiques Nouvelles* (Ann. Sc. Nat., XIII, 2 and

Ser p. 207, 1840)

(Figs. 1 C-D, 4E)

*Apothecia* up to 1.5 mm across, up to 2.8 mm in total height, mostly gregarious, sometimes scattered, solitary, soft fleshy, shallow cupulate to almost plane, regular, stipitate; external surface bright yellow, smooth, margin entire; hymenium darker concolorous above, almost black at the point of attachment. Scattered on outer surface are thick-walled, subhyaline, unbranched, nonseptate, caulocystidia-like hairs up to 25 × 4 μ. *Asci* 100-120 × 7-8.5 μ, 8-spored, clavate, tapering below into short stem-like base, J+, apices obtuse. *Ascospores* 20-25 × 3-4.5 μ, biseriate, fusoid, straight to slightly bent, hyaline, thin-walled, guttate up to 10 gutta per spore, gutta disappearing at maturity. *Paraphyses* up to 1.6 μ wide, filiform, yellow above, almost hyaline lower down in mass, hyaline individually, thin-walled, nonseptate, branched at lower levels, slightly projecting beyond tips of asci.

*Anatomy*.—Ascigerous Region.—Ectal excipulum up to 54 μ thick, *textura porrecta*, hyphal cells compact and radially arranged, thick-walled, up to 40 × 8 μ; medullary excipulum up to 225 μ thick, subporrecta, hyphae loose, up to 2 μ wide, hypothecium indistinct. *Stipe* differentiated into cortex and medulla; cortex up to 70 μ thick, *textura porrecta*, hyphae compact, thick-walled, up to 42 × 9 μ; medulla up to 200 μ thick, *textura subporrecta*, hyphae loose and narrow, up to 2 μ wide.

*Substratum*.—On dead leaves (mostly petioles, sometimes midribs) of *Quercus lamellosa* Sm.

*Collections examined*.—3786, 3787, Birch Hill, Darjeeling, W. Bengal (PUI & K), July 15, 1967; 3788, Lupchu, Darjeeling, W. Bengal, October 3, 1964 (PUI).

This species is characterised by bright yellow to orange, slightly tomentose apothecia and fusoid ascospores. It differs from *Helotium rubroflavum*\* Thind and Saini, in having much smaller ascospores and different host substratum. All the Indian collections are quite typical of *H. crocatus*.

83. *Hymenoscyphus javanicus* (P. Henn.) Dennis, *Persoonia* 3: 77. 1964 (Figs. 2 A-B, 4C)

*Apothecia* up to 2.5 mm across and up to 2 mm in total height, mostly gregarious, sometimes scattered, solitary, soft, fleshy, cupulate, regular, stipitate; external surface yellow, smooth, margin entire; hymenium concolorous, concave; stipe upto 1.8 mm  $\times$  250  $\mu$ , cylindrical, lighter concolorous above, almost black at the point of attachment, almost smooth. *Asci* 85-120  $\times$  5.2-6.4  $\mu$ , 8-spored, clavate, tapering below into long stem like base,

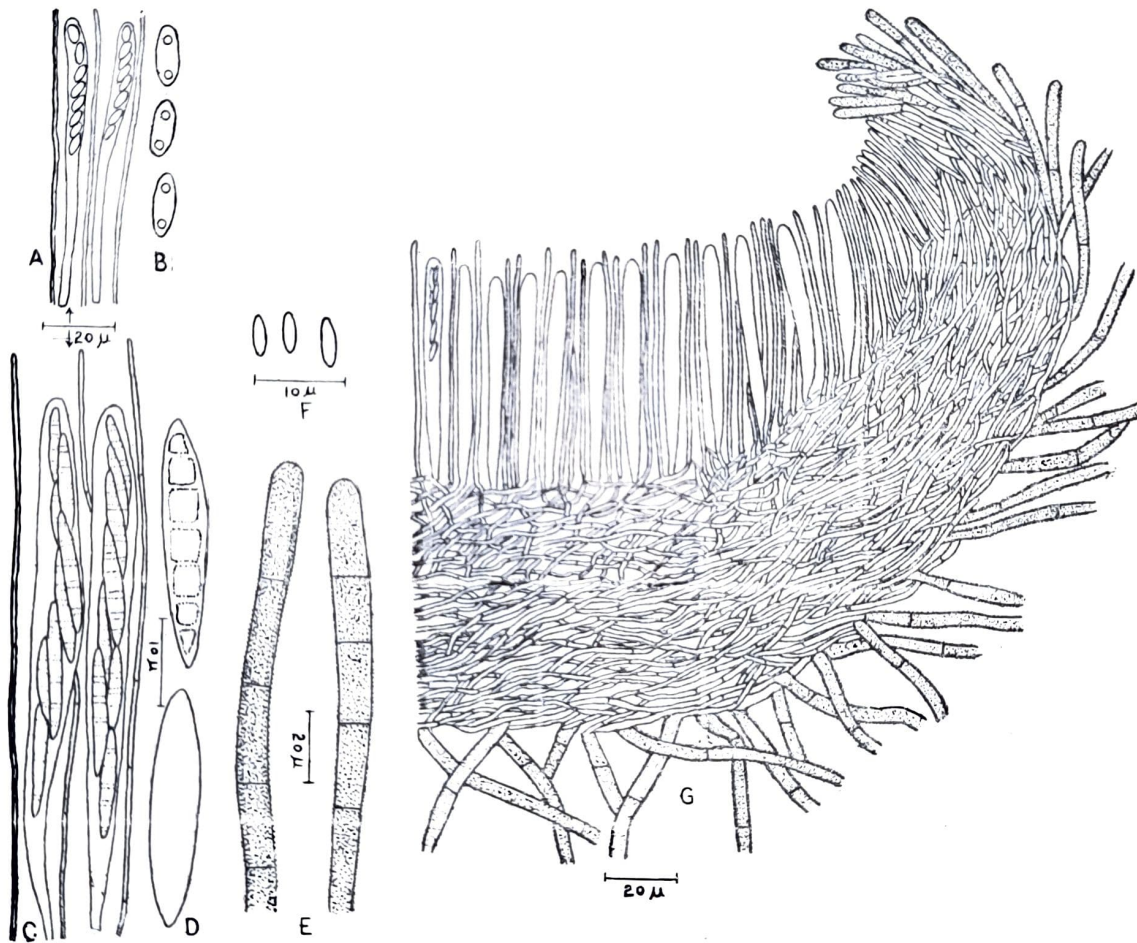


FIG. 2. A-G. A-B. *Hymenoscyphus javanicus* A. Asci and paraphyses. B. Ascospores. C-D. *Hymenoscyphus miniatus* C. Asci and paraphyses. D. Ascospores. E-G *Dasyscyphus papyraceus* E. A part of hairs. F. Ascospores. G. V. s. ascigerous region.

\* This species was described by Thind and Saini in 1967. It is transferred here to *Hymenoscyphus*. *Hymenoscyphus rubroflavum* (Thind and Saini) Thind and Singh comb. nov. Basionym *Helotium rubroflavum* Thind and Saini, *Mycologia* 59. P. 467. 1967.

J+, apices obtuse. *Ascospores* 5-7  $\times$  2.2-2.8  $\mu$ , uniseriate, ellipsoid, hyaline, thin-walled, nonseptate, biguttulate, *Paraphyses* up to 2  $\mu$  wide, filiform, hyaline, thin-walled, nonseptate, slightly projecting beyond tips of asci.

*Anatomy*.—Ascigerous Region.—Ectal excipulum up to 40  $\mu$  thick, textura porrecta, hyphae compact and radially arranged, up to 7  $\mu$  wide; medullary excipulum up to 200  $\mu$  thick, textura intricata, hyphae loose, up to 4  $\mu$  wide; hypothecium indistinct. *Stipe* is differentiated into cortex and medulla; cortex up to 150  $\mu$  thick, textura porrecta, hyphae compact, up to 6.8  $\mu$  wide; medulla up to 140  $\mu$  thick, textura subporrecta, hyphae loose, up to 4.5  $\mu$  wide.

*Substratum*.—On dead angiospermic wood.

*Collection examined*.—3789, Lupchu, Darjeeling, W. Bengal, September 8, 1964 (PUI & K).

This collection is quite typical of the species and resembles it in all respects. It can be easily diagnosed by yellow, stipitate apothecia, clavate, J+ asci and ellipsoid, nonseptate, biguttulate ascospores. From *H. immarginatus* (Karst.) Dennis, it differs in having larger apothecia and much longer asci.

84. *Hymenoscyphus miniatus* (Pat. apud. Duss) Dennis, *Persoonia* 3: 74. 1964.

(Figs. 2 C-D)

*Apothecia* up to 3 mm across, scattered, solitary, soft, fleshy, cupulate, regular, short stipitate to sessile; external surface orange, smooth, margin entire; hymenium concolorous, concave; stipe small, almost negligible, concolorous above, almost black at the point of attachment. *Asci* 130-160  $\times$  10-12.5  $\mu$ ., 8-spored, clavato-cylindrical, tapering below into stem-like base, J-, apices obtuse. *Ascospores* 27-35  $\times$  4-5.5  $\mu$ ., irregularly biseriate above and uniseriate below, fusoid, hyaline, thin-walled, nonseptate, multiguttulate, guttules sometimes disappearing at maturity. *Paraphyses* up to 1.4  $\mu$  wide, filiform, light yellow above, subhyaline lower down in mass, subhya-

line individually, septate, thin-walled, projecting up to 25  $\mu$  beyond asci tips.

*Anatomy*.—Ascigerous Region.—Ectal excipulum up to 70  $\mu$  thick, textura porrecta, hyphae radially arranged, up to 12  $\mu$  wide; medullary excipulum to 240  $\mu$  thick, textura intricata, hyphae loose, up to 7  $\mu$  wide, hypothecium indistinct.

*Substratum*.—On dead bark of some angiospermic Plant.

*Collection examined*.—3790, Rangaroon, Darjeeling, W. Bengal, July 17, 1964 (PUI & K).

This species differs from *H. subserotinus* in having smaller apothecia, smaller and narrower asci and slightly broader fusoid ascospores. The only Indian collection resembles this species closely.

85. *Dasyscyphus papyraceus* (Karst.) Sacc., *Syll. Fung.* 8: 434, 1884.

(Figs. 2 E-G., 4 D.)

*Apothecia* up to 1.5 mm across, and up to 1 mm in total height, mostly gregarious, sometimes scattered, solitary, soft fleshy, shallow cupulate to cupulate, stipitate, hairy; external surface cream coloured, clothed with thin-walled, roughened throughout externally, remotely septate, hyaline cylindrical hairs up to 77  $\times$  5  $\mu$ ; margin hairy, hairs akin to those on the external surface. *Asci* 36-45  $\times$  3.2-4.6  $\mu$ ., 8-spored, cylindrical, tapering gradually below into stem-like base, J+, apices narrow but obtuse. *Ascospores* 4.5-6.2  $\times$  1.5-2.2  $\mu$ ., irregularly uniseriate, ellipsoid, hyaline, thin-walled, nonseptate, aguttate. *Paraphyses* up to 1.4  $\mu$  wide, filiform, hyaline, nonseptate, thin-walled, unbranched, slightly projecting beyond tips of asci.

*Anatomy*.—Ascigerous Region.—Ectal excipulum up to 72  $\mu$  thick, textura subporrecta, hyphae radially arranged, thin-walled, up to 2  $\mu$  wide; covered by hairs (as described above); medullary excipulum

up to  $90\ \mu$  thick in the middle, decreasing towards the margin, *textura intricata*, hyphae loose, up to  $2\ \mu$  wide; hypothecium indistinct.

*Substratum*.—On decorticated wood.

*Collection examined*.—3782, Rangaroon, Darjeeling, W. Bengal., October 1, 1964 (PUI & K).

This collection is quite typical of the species except in having slightly longer ascospores.

86. *Mollisia subglobosa* Rodw., Pap. Proc. Roy. Soc. Tasmania 102. 1924. (Figs. 3A-B).

*Apothecia* up to 6 mm across, mostly gregarious, sometimes scattered, soft, fleshy, discoid when young, becoming shallow cupulate to almost plane at maturity, regular, sessile, attached to the sub-

stratum by means of central region only, attaching hyphae septate, deep brown, unbranched, up to  $3\ \mu$  wide; external surface smoky brown, roughened due to the presence of attaching hyphae, margin almost black, entire; hymenium concolorous with margin, concave. *Asci*  $50-65 \times 5-5.6\ \mu$ , 8-spored, clavate, tapering below into long stem-like base, J+, apices obtuse. *Ascospores*  $5-6.8 \times 2.2-3\ \mu$ , mostly irregularly biseriate above and uniseriate below, sometimes uniseriate throughout, ellipsoid, hyaline, becoming light brown with age, minutely verrucose. *Paraphyses* up to  $1.4\ \mu$  wide, filiform, subhyaline above and hyaline lower down in mass, thin-walled, nonseptate, almost in level with tips of asci.

*Anatomy*.—Ascigerous Region.—Ectal

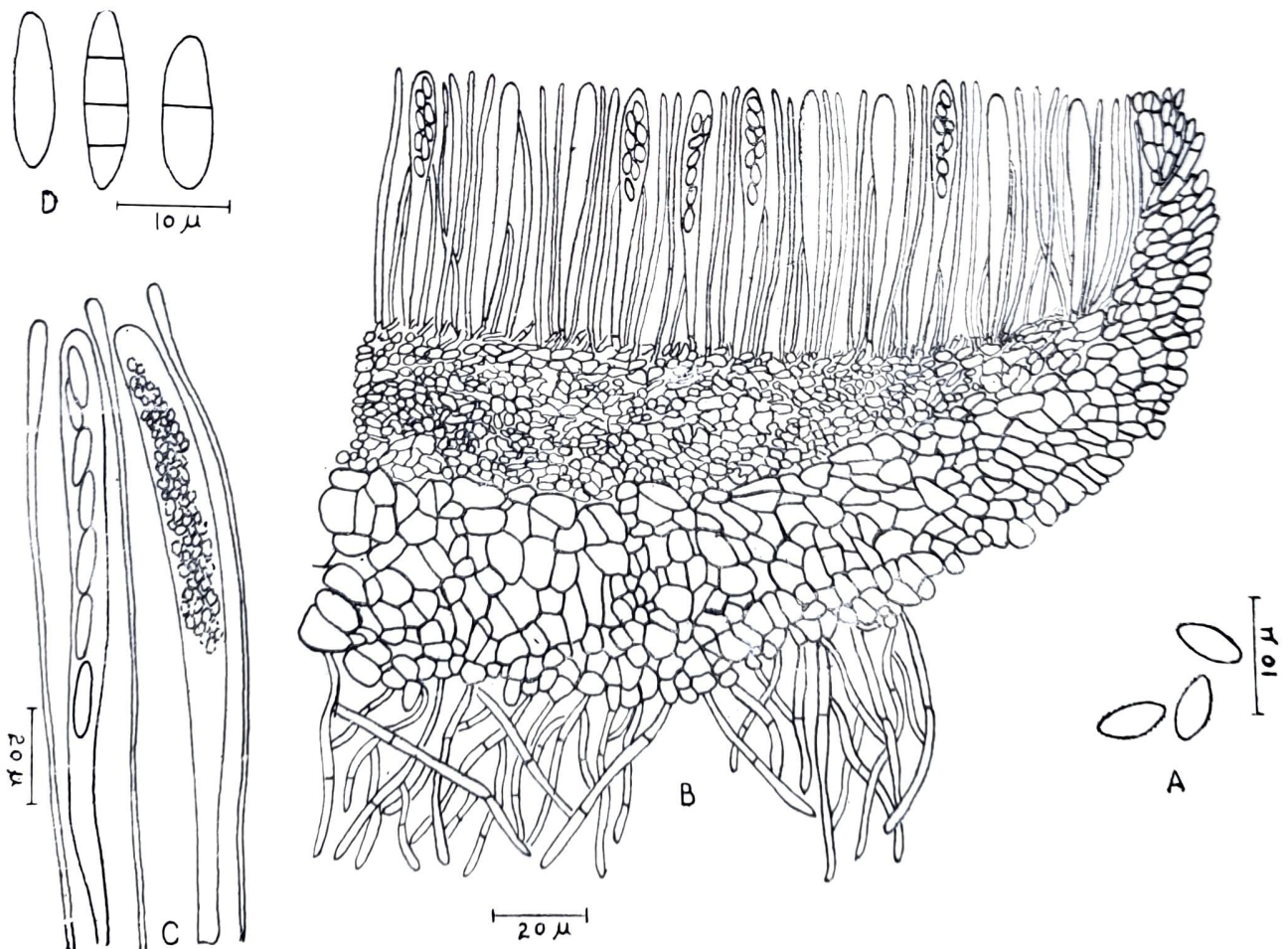


FIG. 3 A-D. A-B *Mollisia subglobosa* A. Ascospores. B. V. s. ascigerous region. C-D *Ascocoryne javanica* C. Ascus and paraphyses. D. Ascospores.

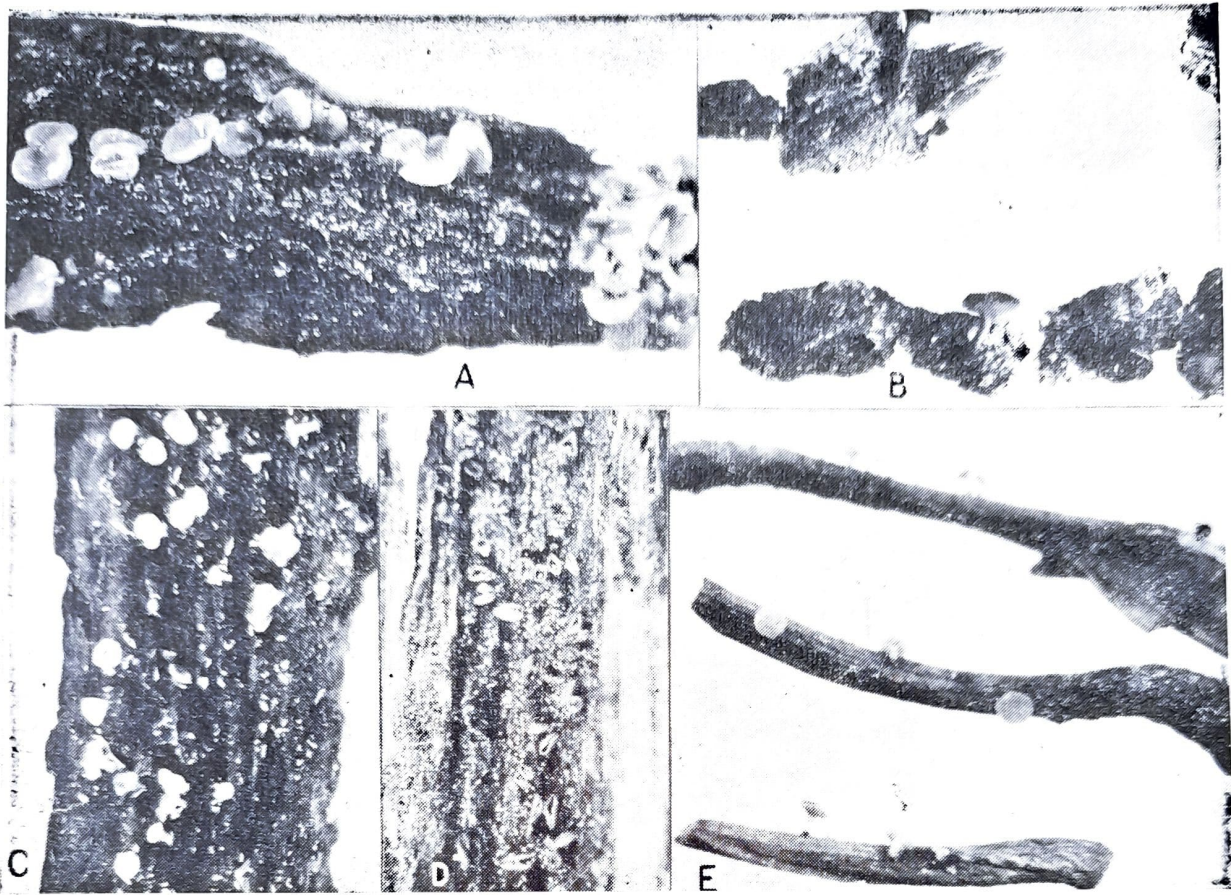


FIG. 4 A-E. A. *Ascocoryne javanica* (Penz. and Sacc.) Thind and Singh Comb. nov. B. *Hymenoscyphus subserotinus* (P. Henn. and Nym.) Dennis. C. *Hymenoscyphus javanicus* (P. Henn.). D. *Dasyscyphus papyraceus* (Karst.) Sacc. E. *Hymenoscyphus crocatus* (Mont.) Thind Singh Comb. nov.

excipulum up to 50  $\mu$  thick in the middle, decreasing towards the margin, deep brown, textura angularis, cells thick-walled, up to  $10 \times 8 \mu$ , covered on the outer surface especially in the central region by agglutinated attaching hyphae (as described above); medullary excipulum cream coloured, upto 40  $\mu$  thick, textura sub-angularis, cells thin-walled, up to  $6 \times 5 \mu$ ; hypothecium indistinct.

*Substratum*.—On dead log of wood.

*Collection examined*.—3781, Tiger Hill, Darjeeling, W. Bengal, September 5, 1964 (PUI & K).

This collection is quite typical of the species and is characterised by minutely

verrucose ascospores which become light brown with age and textura sub-angularis medullary excipulum.

87. *Ascocoryne javanica* (Penz. & Sacc.) Thind & Singh comb. Nov. Basionym *Coryne javanica* Penz. & Sacc., Malpighia 219, 1901.

(Figs. 3 C-D, 4A)

*Apothecia* up to 6 mm across, and up to 2.5 mm in total height, highly gregarious to sometimes scattered, mostly clustered together, open and repand having a depression in the centre, regular when singly, irregular when clustered, tough and leathery, gelatinous, short stipitate; external surface reddish purple, minutely

roughened, margin entire; hymenium concolorous, concave; stipe almost negligible, concolorous. *Asci* 125-160 × 8-11  $\mu$ , 8-spored, clavato-cylindrical, tapering below into stem-like base, J+, apices obtuse. *Ascospores* 12-17 × 4-5  $\mu$ , irregularly biseriate above and uniseriate below, sometimes uniseriate throughout, ellipsoid, hyaline, thin-walled, nonseptate, becoming 1-3 septate with age, ascospores bud off secondary spores while still within the ascus. *Paraphyses* up to 1.4  $\mu$  wide; filiform, enlarged abruptly at the tips into pyriform heads, up to 3  $\mu$  in diameter, purplish brown above, almost hyaline lower down in mass, hyaline individually, thin-walled, nonseptate, unbranched, slightly projecting beyond tips of asci.

*Anatomy*.—Ascigerous Region.—Ectal excipulum up to 85  $\mu$  thick, *textura globulosa*, cells mostly perpendicular to the surface; medullary excipulum up to 400  $\mu$  thick, *textura intricata*, hyphae loose, embedded in gelatinous matrix, up to 7  $\mu$  wide; hypothecium indistinct.

*Substratum*.—On dead angiospermic wood.

*Collection examined*.—3785, Rangaroon, Darjeeling, W. Bengal, September 25, 1964 (PUI & K).

This collection is quite typical of the species and resembles it in all respects.

It can be easily identified by its reddish purple, short stipitate to almost sessile, gelatinous apothecia, continuous to septate ascospores giving rise to secondary spores while still within asci. Some asci are completely filled with secondary spores and there is no trace of primary one's left in them with age. This species seems to be rare in Himalayas, since it has been collected only once from Eastern Himalayas so far.

Groves and Wilson (1967) substituted the generic name *Ascocoryne* based on perfect stage for the generic name *coryne*, which was based on conidial state alone. This has already been accepted by recent workers including present authors (Singh, 1969, Ph. D. Thesis). Accordingly, the only one previously described species of *Coryne* by the authors is here transferred to *Ascocoryne* as follows:

*Ascocoryne Cylichnium* (Tul.) Thind and Singh comb. Nov.

Basionym *Pezizacylichnium* Tul. Ann. Sci. Nat. Ser. 3: 174. 1865.

This species was published by the authors in 1969, on the basis of a number of collections made from N. W. Himalayas. For a detailed and illustrated description of the species, please refer to the "Helotiales of India—VIII" in Proc. Indian Acad. Sci. 70: 251-261. 1969.

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