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THE HELOTIALES OF INDIA–XIII

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This paper records three new species of Helotiales collected from Darjeeling Hills in the Eastern Himalayas during 1964. The first 12 contributions on the series (1-12; references to the first 9 papers on the series are included in the references given) give an account of 48 known and 14 new species. The fruit bodies have been described from the fresh material, supplemented with dried and preserved (alcohol-formalin) material. For anatomical study both free hand and microtome sections were prepared. The numbers of species are the serial numbers of the Helotioid flora being studied in this laboratory. The type collections have been deposited in the Herbarium of Punjab University, Chandigarh. A part of the type material of each of these species is also deposited in the Herbarium, Royal Botanic Gardens, Kew, England.

63. ***Belonopsis bambusae*** Thind & Singh, sp. nov. (Fig. 1)

Apothecia sparsa vel subconferta, ad 2mm lata, superficialia, sessilia, subplana, circa basin hyphis brunneis, septatis, superficialibus cincta. Excipulum ad 70μ crassum, marginem versus tenuius, textura angularis, cellulis subpolyedricis, ad 15 × 8μ, membranis atrobrunneis. Hymenium humectate aquoso-griseum. Asci clavati, 100-140 × 7.2-9μ, octospori, apice rotundati, poro lodo adjuvante coerulescenti. Ascosporae filiformes, 30-55 × 2.8-4μ, 11-septatae, hyalinae, rectae vel leniter curvulae. Paraphyses simplices, filiformes, crassite. 1.6μ, apice clavato, ad 5.6 μ crasso, infuscatae, conglutinatae.

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Ad culmos emortuos Bambusae, prope Darjeeling, 12.9.1964, Thind 3780 Typus.

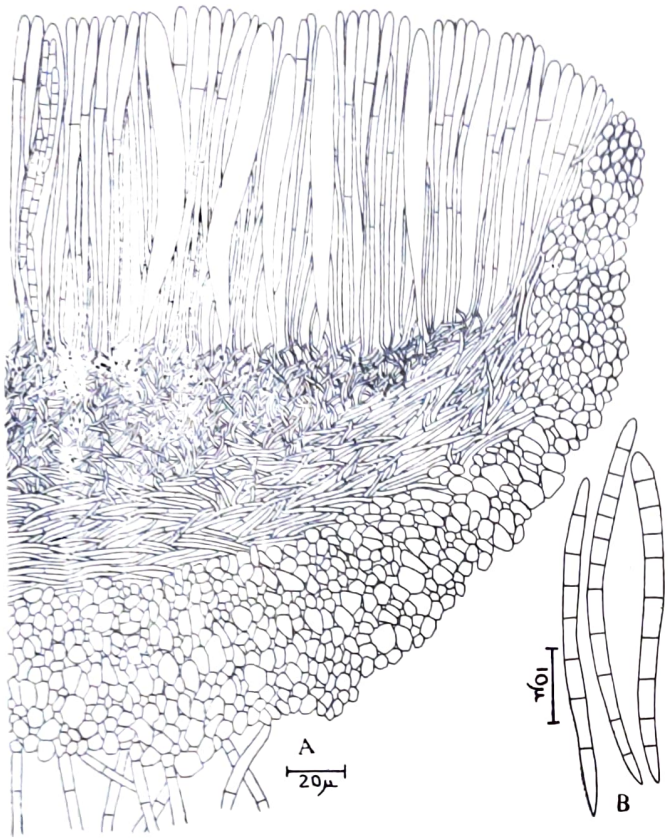

Fig. 1. *Belonopsis bambusae* Thind & Singh, sp. nov. A. V.S. of ascigerous region. B. Ascospores.

Apothecia up to 2mm across, gregarious, mostly solitary, sometimes closely appressed together, soft, fleshy, shallow cupulate to almost plane, regular when singly, somewhat irregular due to close crowding, sessile, attached to the substratum by means of thick-walled, septate, dark brown, intertwined hyphae up to 3.6μ wide; external surface roughened due to the presence of attaching hyphae, dark brown, margin light grey, entire; hymenium concolorous with the margin, concave to plane. *Asci* 100-140 × 7.2-9μ, 8-spored, clavate, J+, apices obtuse. *Ascospores* 30-55 × 2.8-4μ, irregularly multiseriate, elongated, mostly bent, sometimes straight, hyaline, up to 11-septate. *Paraphyses* up to 1.6μ wide, enlarged above up to 5.6μ, light brown above and hyaline lower down in mass, remotely septate, thin-walled, agglutinated together above, almost level with tips of asci.

Anatomy: Ascigerous region.—Ectal excipulum dark brown, up to 70μ thick, textura angularis, cells thin-walled, up to 15 × 8μ; medullary excipulum up to 100μ thick in the middle, textura intricata, divided into two regions; outer zone up to 32μ thick, hyphae mostly transversely arranged, up to 3μ wide; inner zone up to 60μ thick, hyphae loose, mostly in vertical direction, up to 2.6μ wide; hypothecium indistinct.

Substratum.—On dead twigs of bamboo.

Collection examined.—3780 Type, Tiger Hill, Darjeeling, W. Bengal, Sept.12,1964. It differs from the allied *B. filispora* (Cke.) Nannf. (see Dennis, 1968, p. 179) in having larger apothecia, longer and narrower asci, up to 11-septate ascospores and a different host substratum.

64. ***Rustroemia indica*** Thind & Singh, sp. nov. (Fig. 2)

Apothecia sparsa, stipitata, firma. Cupula patelliformis, obsolete villosula, cinerea, epithecio cinereo, latit. ad 6.5mm, concavo. Stipes aequalis, 3.5 × 0.6mm, concoloris, deorsum nigrescens, pilis confertis patulis obsessa. Excipulum ad 70μ crassum, textura angularis, cellulis 10 × 7μ. Pili cupulae laeves, inarticulati, 28 × 3·6μ. Asci clavati, octospori, 68-82 × 9-11.2μ, poro Iodo adjuvante coerulescenti. Ascosporae mono-vel distichae, oblongatea, hyaliane, continuae, eguttulatae, 8-11.5 × 4-5.5μ. Paraphyses filiformes, simplices, crassit 1.6μ. Ad petiolis et ramulis Querci, prope Darjeeling, 18.10.1964, Thind 3783 Typus.

Apothecia up to 6.5mm across and up to 4.5mm in total height, mostly gregarious, sometimes scattered, solitary, soft, fleshy, discoid to shallow cupulate, regular, stipitate; external surface ashen grey, covered by subhyaline, nonseptate, slightly thick-

walled and pointed hairs up to 28×3.6μ, margin darker concolorous, entire to slightly uneven; hymenium concolorous with the external surface, concave; stipe up to 3.5×0.6 mm, cylindrical, ashen grey above, almost black at the point of attachment, hairy, hairs akin to those of the external surface. *Asci* 68-82×9-11.2μ, 8-spored, clavate, J+, apices obtuse. *Ascospores* 8-11.5×4-5.5μ, mostly uniseriate, ellipsoid, hyaline, nonseptate, aguttate. *Paraphyses* up to 1.6μ wide, filiform, light brown above, almost hyaline lower down in mass, hyaline individually, thin-walled, septate, almost level with tips of asci.

Stipe differentiated into cortex and medulla; cortex up to 48μ thick, textura angularis, cells up to 10×7μ; medulla up to 500μ thick, textura intricata, hyphae up to 3μ wide; hypothecium indistinct.

Substratum.—On dead parts (leaves and twigs) of *Quercus* sp.

Collections examined.—3783 Type, Rangaroon, Darjeeling, W. Bengal, Oct.5, 1964; 3784, Tiger Hill, Darjeeling, W. Bengal, Oct.18,1964.

It can be easily identified by ashen grey apothecia which are be set with nonseptate, subhyaline hairs, clavate, J+asci and ellipsoid, nonseptate, aguttate ascospores. It

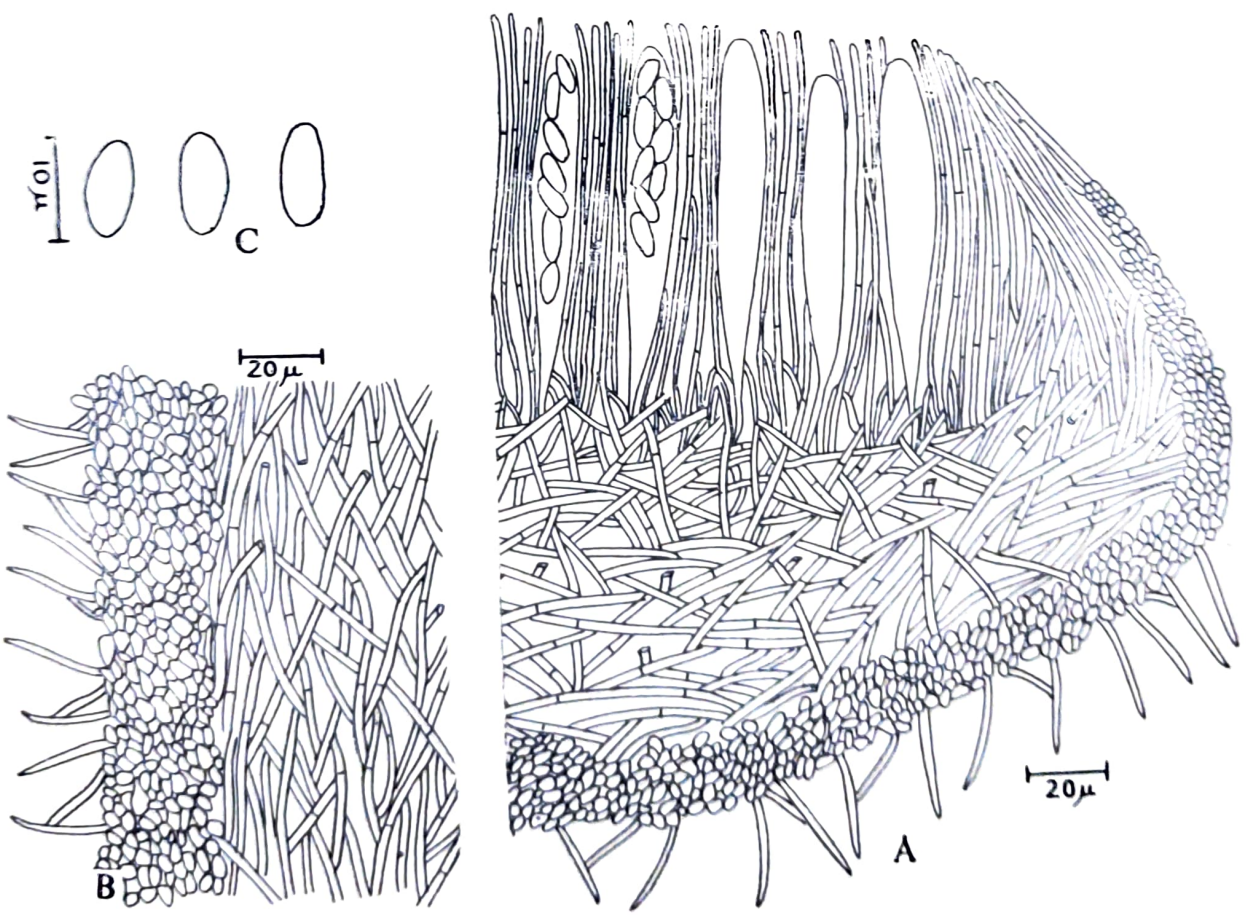

Fig. 2 A—C. *Rutstroemia indica* Thind & Singh, sp. nov. A. Vs. of ascigeruos region. B. Vs. of stipe. C. Ascospores.

Anatomy: Ascigerous region.—Ectal excipulum up to 70μ thick, textura angularis, cells up to 10×7μ; medullary excipulum up to 320μ thick, textura intricata, hyphae

is interesting to note that such distinct hairs are not recorded for any other species of the genus (as monographed by white, 1941).

65. **Hymenoscyphus subcomplicatum** Thind & Singh sp. nov. (Fig.3)

Apothecia sparsa, superficialia, stipitata, concaviuscula, testaceolutea, glabra, ad 2mm lata, margine integerrimo. Excipulum ad 65 μ crassum, filamentis conglutinatis contextum, textura intricata. Asci clavati, octospori, 68-75 $\times$ 5.6-6.2μ, apice rotundati, poro Iodo adjuvante coerulescenti. Ascosporae distichae, fusoideo-oblongatae, rectae, biguttulatae dein eguttulatae, 12-15 $\times$ 2.5-4μ. Paraphyses filiformes, crassit 1.4μ.

Ad truncis emortuis Cryptomeriae japonicae, prope Darjeeling, 6.10.1964, Thind 3792 Typus.

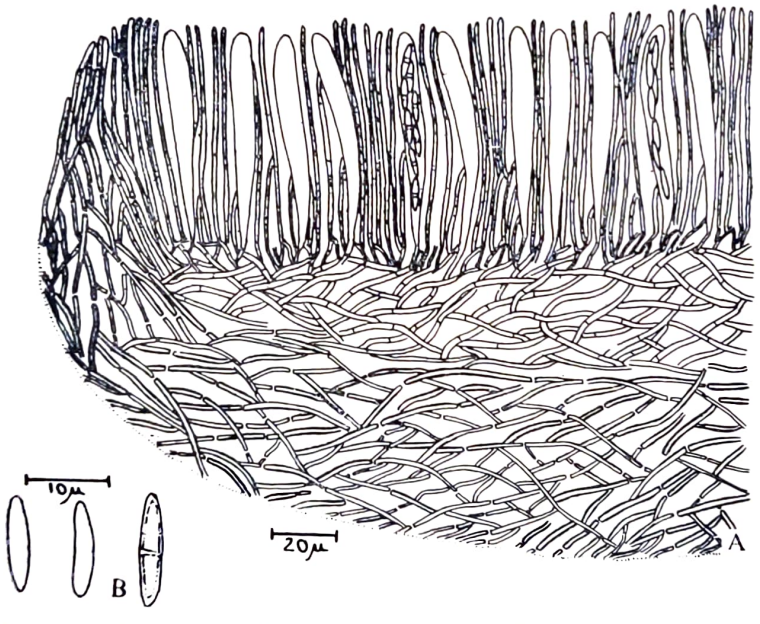

Fig. 3. *Hymenoscyphus subcomplicatum* Thind & Singh, sp. nov. A.V.S. of ascigerous region. B. Ascospores.

Apothecia up to 2mm across, up to 1.4 mm in total height, scattered, solitary, soft, fleshy, shallow cupulate, regular, stipitate; external surface light orange, almost smooth to minutely roughened, margin entire; hymenium concolorous, concave; stipe up to 1.2 mm $\times$ 300μ, cylindrical, lighter concolorous above, almost black at the point of attachment, smooth. *Asci* 68-75 $\times$ 5.6-6.2μ, 8-spored, clavate, J+, apices obtuse. *Ascospores* 12-15 $\times$ 2.5-4μ, irregularly biseriate above, uniseriate below, fusoid, hyaline, thin-walled, nonseptate, biguttate, gutta invariably disappearing at maturity. *Paraphyses* up to 1.4μ wide, filiform, light yellow above, almost hyaline lower down, hyaline individually, thin-walled, nonseptate, almost level with tips of asci.

Anatomy: Ascigerous region.—Ectal excipulum up to 65μ thick, white and glassy, shining, textura intricata, hyphae loose, thick-walled, up to 2μ wide; medullary excipulum up to 50μ thick, texturaintricata, hyphae loose, relatively thin-walled, up to 3μ wide; hypothecium indistinct. *Stipe* differentiated into cortex and medulla; cortex up to 80μ thick, textura porrecta, hyphae loose, running longitudinally, hyphal walls thick, white and glassy, up to 2μ wide; medulla up to 100μ thick, textura porrecta, hyphae loose, relatively thin-walled, up to 3μ wide.

Substratum.—On dead log of *Cryptomeria japonica* D. Don.

Collection examined.—3792 Type, So-

65. ***Hymenoscyphus subcomplicatum*** Thind & Singh sp. nov. (Fig.3)

Apothecia sparsa, superficialia, stipitata, concaviuscula, testaceolutea, glabra, ad 2mm lata, margine integerrimo. Excipulum ad 65 μ crassum, filamentis conglutinatis contextum, textura intricata. Asci clavati, octospori, 68-75 $\times$ 5.6-6.2μ, apice rotundati, poro Iodo adjuvante coerulescenti. Ascosporae distichae, fusoideo-oblongatae, rectae, biguttulatae dein eguttulatae, 12-15 $\times$ 2.5-4μ. Paraphyses filiformes, crassit 1.4μ.

Ad truncis emortuis Cryptomeriae japonicae, prope Darjeeling, 6.10.1964, Thind 3792 Typus.

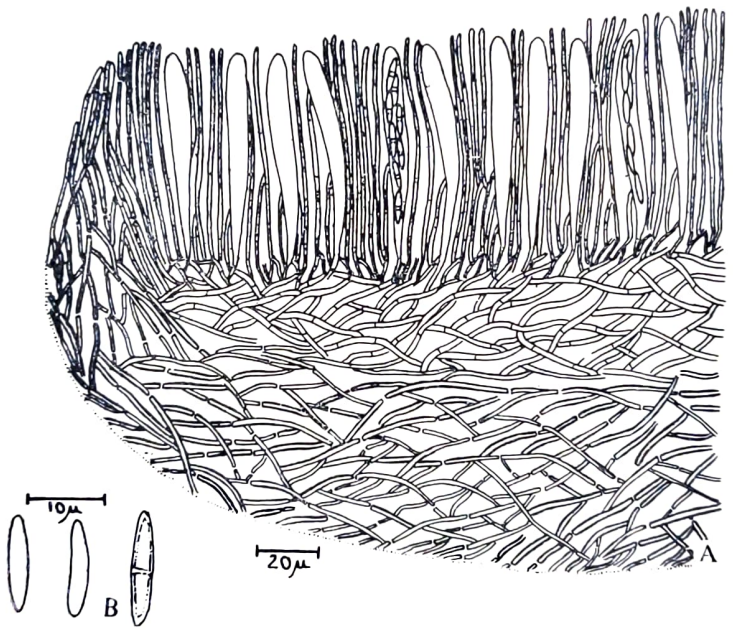

Fig. 3. *Hymenoscyphus subcomplicatum* Thind & Singh, sp. nov. A.V.S. of ascigerous region. B. Ascospores.

Apothecia up to 2mm across, up to 1.4 mm in total height, scattered, solitary, soft, fleshy, shallow cupulate, regular, stipitate; external surface light orange, almost smooth to minutely roughened, margin entire; hymenium concolorous, concave; stipe up to 1.2 mm $\times$ 300μ, cylindrical, lighter concolorous above, almost black at the point of attachment, smooth. *Asci* 68-75 $\times$ 5.6-6.2μ, 8-spored, clavate, J+, apices obtuse. *Ascospores* 12-15 $\times$ 2.5-4μ, irregularly biseriate above, uniseriate below, fusoid, hyaline, thin-walled, nonseptate, biguttate, gutta invariably disappearing at maturity. *Paraphyses* up to 1.4μ wide, filiform, light yellow above, almost hyaline lower down, hyaline individually, thin-walled, nonseptate, almost level with tips of asci.

Anatomy: Ascigerous region.—Ectal excipulum up to 65μ thick, white and glassy, shining, textura intricata, hyphae loose, thick-walled, up to 2μ wide; medullary excipulum up to 50μ thick, texturaintricata, hyphae loose, relatively thin-walled, up to 3μ wide; hypothecium indistinct. *Stipe* differentiated into cortex and medulla; cortex up to 80μ thick, textura porrecta, hyphae loose, running longitudinally, hyphal walls thick, white and glassy, up to 2μ wide; medulla up to 100μ thick, textura porrecta, hyphae loose, relatively thin-walled, up to 3μ wide.

Substratum.—On dead log of *Cryptomeria japonica* D. Don.

Collection examined.—3792 Type, So-

khia Pokhri, Darjeeling, W. Bengal, Oct. 6,1964.

This species is characterised by light orange apothecia, fusoid, nonseptate, biguttate ascospores, phialeoid excipulum and its occurrence on dead log of *Cryptomeria Japonica*. From *Helotium Lutescens* [(Hedw.) Fr.] Fr. (see Dennis, 1956, p.90) it differs in having slightly smaller and narrower asci, nonseptate, guttate, ascospores, separate host substratum and different excipular structure.

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INHERITANCE OF ANTHOCYANIN PIGMENTATION IN SEPTUM, JUNCTURA BACK, LEAFTIP AND STIGMA IN RICE (*ORYZA SATIVA* L.).[1]

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Abstract

The F_2 segregation in a cross between a purple (AC 806) and a green (AC 37) variety of rice with regard to anthocyanin pigmentation gave a trigenic complementary ratio of 27 purple: 37 green in the septum, a tetragenic complementary ratio of 81 purple: 175 green in junctura back and leaf tip, and a trigenic inhibitory ratio of 9 purple : 55 green in the stigma.

The genetics of anthocyanin pigmentation in rice has attracted keen interest among research workers in India and abroad. Investigations carried out by many workers reveal that the anthocyanin pigmentation as such is not so important except that it is extensively used as a means for classifying rice varieties. Ramiah (1935,1953) has given a critical review on the number of genes responsible for anthocyanin pigmentation in different parts of the rice plant.

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