

## STUDIES IN NORTH-WEST HIMALAYAN CORTICIACEAE (BASIDIOMYCETES) - I - SOME INTERESTING SPECIES FROM DALHOUSIE HILLS

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An account of 8 species of family Corticiaceae based on the collections from the Dalhousie hills made during the years 1988-89 has been given in this paper. Of these *Hyphoderma setigerum* var. *bicytidium* Dhingra & Nishi var. nov. is proposed as a new variety, *Trechispora microspora* (Karst.) Libert and *Fibulomyces mutabilis* (Bres.) Jilich are new records for India, while *Hyphoderma tsugae* (Burt) Erikss. & Strid and *Hyphodontia propinqua* Hjortst. are new records for North-Western Himalayas. An illustrated and detailed account has been given for the new variety and new records for India, for rest of the taxa only brief taxonomic notes are given.

Key Words : Himalayan Corticiaceae.

Keeping in view a small number (about 98, fide, Rattan, 1977) of taxa of family Corticiaceae reported from the North-western Himalayas, the authors have undertaken the exploration of this vast wealth for the study of family Corticiaceae (Aphylophorales, Basidiomycetes). In the years 1988-89, many collections of the corticioid fungi were made from the different localities of and around Dalhousie. This paper provides information about 8 species of family Corticiaceae. The material of all these species is deposited at the Herbarium, Department of Botany, Punjabi University, Patiala (PUN). The abbreviations used for herbaria follow Holmgren and Keuken (1974), while the colour standards used are according to Kornerup and Wanscher (1978).

### OBSERVATIONS

*Confertobasidium olivaceoalbum* (Bourd. & Galz.) Julich, Willd. Beih. 7 : 167, 1972 - *Corticium olivaceoalbum* Bourd. & Galz., Bull. Soc. Mycol. France 27 : 239, 1911. Fig. 1.

It is characterized by resupinate, loosely adnate, (up to 250  $\mu\text{m}$  thick), pelliculose to athelioid when young, membranous when mature fruitbodies with brownish rhizomorphs in the subiculum and periphery; clamped, 2.3-4  $\mu\text{m}$  wide, generative hyphae; clavate, 4-sterigmate basidia (9.6-17.6 x 2.8-4  $\mu\text{m}$ ); and ellipsoid, thin-walled basidiospores (4-5.1 x 2.3-3.8  $\mu\text{m}$ ).

*Collection examined* : Himachal Pradesh : Chamba, Khajjiar, on a decaying pine cone, GSD\* 1467 (PUN), September 14, 1988.

A species of rare occurrence in India. Earlier reported from North-Western Himalayas by Rattan (1977) on the basis of a single collection from Kulu (H.P.). PUN 1467 is probably the second collection of this species from India and is a new record for Dalhousie hills.

*Fibulomyces mutabilis* (Bres.) Julich, Willd. Beih. 7: 182, 1973 - *Corticium mutabile* Bres., Fungi trid. 2: 59, 1892. Figs. 2-5.

Fruitbody resupinate, effused, thin, pellicular, loosely adnate; hymenial surface smooth, yellowish white; margins indeterminate, thinning, paler concolorous. *Hyphal System* : monomitic; generative hyphae 2-4  $\mu\text{m}$  wide, branched, septate; basal hyphae thin to somewhat thick walled, less branched; subhymenial hyphae thin walled, somewhat narrower, crystalline encrustation present especially on subhymenial hyphae. *Cystidia* : None. *Basidia* : 9.6-19.3 x 2.8 - 3.4  $\mu\text{m}$ , clavate to subcylindrical, 4-sterigmate, with a basal clamp; sterigmata upto 4.5  $\mu\text{m}$  long. *Basidiospores* - 2.8-4.5 x 2-2.3  $\mu\text{m}$ , ellipsoid to subcylindrical, thin walled, smooth, nonamyloid, acyanophilous, with or without guttules.

*Collections examined* : Himachal Pradesh : Chamba, Kalatope, on the undersurface of a decaying gymnospermic log. GSD 1468 (PUN), Sept. 12, 1988; Kalatope, on the undersurface of a decaying gymnospermic log, GSD 1481 (PUN, Sept. 12, 1988).

*F. mutabilis* is characterized by thin, pellicular, loosely adnate fruitbodies; clamped generative hyphae which are almost of same width in subiculum

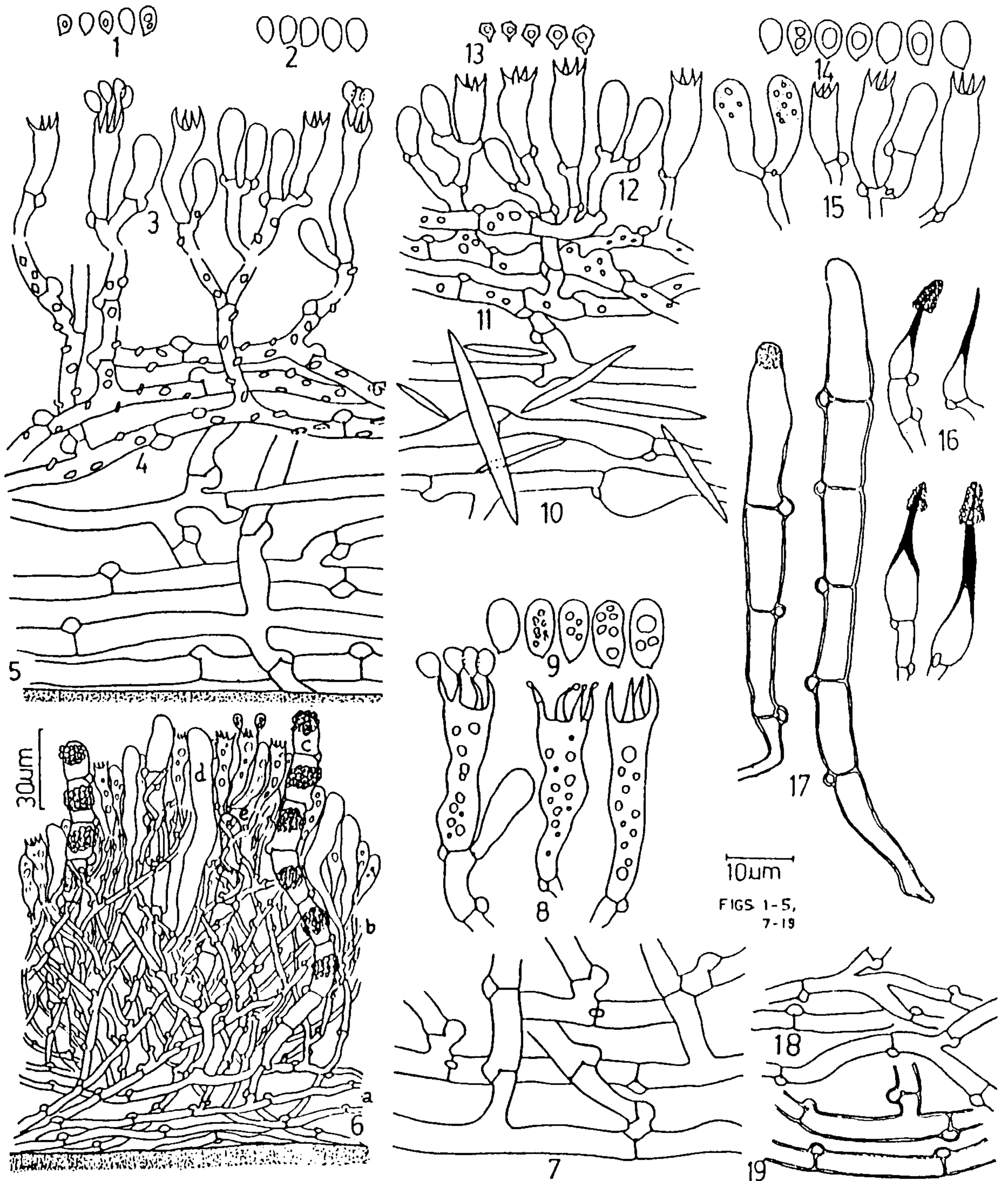


Fig. 1. *Confertobasidium olivaceoalbum* Basidiospores. Figs. 2-5. *Fibulomyces mutabilis* 2. Basidiospores, 3. Basidioles and basidia, 4. Subhymenial hyphae with crystalline encrustation, 5. Basal hyphae. Fig. 6-9. *Hyphoderma setigerum* var. *bicystidium*, 6. V.S. of the fruitbody showing, (a) basal hyphae, (b) subhymenial hyphae, (c) Septocystidia (d) Leptocystidia, (e) basidia. 7. Basal hyphae. 8. Basidia, 9. Basidiospores. Fig. 10-13. *Trechispora microspora*, 10. Basal hyphae, 11. Subhymenial hyphae, 12. Basidia and basidioles, 13. Basidiospores.

Figs. 14-19. *Hyphodontia propinqua*, 14. Basidiospores, 15. Basidia and basidioles, 16. Lagenocystidia, 17. Septocystidia, 18. Thin-Walled generative hyphae., 19. Thick-walled generative hyphae.

and subhymenium; clavate to subcylindrical basidia and ellipsoid to sub-cylindrical basidiospores, and is a new record for India. PUN collections resemble the description of the species as given by Eriksson & Ryvarde (1975) in most of the characters.

*Hyphoderma setigerum* (Fr.) Donk, Fungus 27: 15, 1957 - *Thelephora setigera* Fr., Elench. Fung. 1: 208, 1828.

*Collections examined* : Himachal Pradesh : Chamb: Banikhet, on a decaying gymnospermic stick, Nishi 1474 (PUN), Sept. 23, 1989; Surkhigala, on a decaying angiospermic stump, Nishi 1475 (PUN), Sept. 23, 1989; on the way from Surkhigala to Dalhousie, on a decaying angiospermic stick, Nishi 1476 (PUN), Sept. 23, 1989.

It is a widely distributed species in the Himalayas. First described by Thind and Rattan (1970) from N.W. Himalayas, followed by Dhingra (1989) from the Eastern Himalayas. However, from Dalhousie hills, it is being reported for the first time. PUN collections resemble closely the description of this species as given by Rattan (1977) and Eriksson & Ryvarde (1975).

*Hyphoderma setigerum* var. *bicystidium* Dhingra & Nishi Var. Nov. Figs. 6-9.

Fructificatio resupinata, effusa, adnata, ad 160  $\mu\text{m}$  crassa in sectione; hyphae nodose-septata; cystidia bitypia (i) septocystidia cylindrica ad hyphoidea, ad 230  $\mu\text{m}$  longa (ii) leptocystidia subcylindrica (51-170 x 4.5-8.5  $\mu\text{m}$ ), tenuitunicata, et fibula basali instructa; basidia clavata ad subclavata, 22-27 x 5.7 - 7.4  $\mu\text{m}$ , 4 sterigmatibus et fibula basali instructa; basidiosporae angustae ellipsoideae, 7.9-10 x 4.5-5.1  $\mu\text{m}$ .

Holotypus : Himachal Pradesh, Chamba, Banikhet, super *Xanthoxylum* sp. rameum, Nishi 1469 (PUN), September 23, 1989.

Fruitbody resupinate, effused, adnate, up to 160  $\mu\text{m}$  thick in section; hymenial surface smooth, fibrous or porous when young, becoming odontoid (with small teeth on a smooth surface) or irregularly tuberculate with age, cracking on drying (some cracks due to the cracks in the substratum), white to pale yellow; margins thinning, somewhat fibrous under lens, paler concolorous. *Hyphal system* : monomitic; generative hyphae 2.8-5.1  $\mu\text{m}$  wide, septate, clamped; basal hyphae sparsely branched, loosely interwoven,

thin to somewhat thick walled, usually parallel to substrate; sub-hymenial hyphae much branched, closely united, thin walled, at right angles to the subicular hyphae. *Cystidia* : of two types (i) *Septocystidia* up to 230  $\mu\text{m}$  long, cylindrical to hyphoid, thick walled except for the growing apical part, septate, clamped at each septum, encrusted, encrustation dissolves in 3% KOH, enclosed or projecting upto 16  $\mu\text{m}$  out of the hymenium (ii) *Leptocystidia* 51-120 x 4.5-8.5  $\mu\text{m}$ , subcylindrical, thin walled, aseptate, with a clamp at the base. *Basidia* : 22-27 x 5.7-7.4  $\mu\text{m}$ , subclavate to clavate, thin walled, 4-sterigmate, clamped at the base; sterigmata upto 6.2  $\mu\text{m}$  long. *Basidiospores* 7.9-10 x 4.5-5.1  $\mu\text{m}$ , narrowly ellipsoid, thin walled, subhyaline, smooth, minutely apiculate, nonamyloid, acyanophilous.

*Collection examined* : Himachal Pradesh : Chamba, Banikhet, on branches of *Xanthoxylum*, Nishi 1469 (PUN), September 23, 1989.

*Hyphoderma setigerum* var. *Bicystidium* is characterized by the presence of two types of cystidia i.e. (i) normal septate, clamped cystidia and (ii) numerous, thin walled, nonseptate cystidia. It has been given the status of a different taxon from *H. setigerum* on the basis of two types of cystidia. Earlier, a similar type of material has been described by Eriksson & Ryvarde (1975) but they kept it pending with the statement that either it represents abnormal development or a taxon of its own.

*Hyphoderma tsugae* (Burt) Erikss. & Strid, in Erikss. & Ryv., Cort. N. Europe 3 p. 541, 1975 - *Corticium tsugae* Burt, Ann. Miss. Bot. Gard. 13 p. 276, 1926.

Chief Features of this species are thin (up to 125  $\mu\text{m}$ ) fruitbodies; smooth, greyish-white with brownish dots hymenial surface; clamped generative hyphae (up to 4.5  $\mu\text{m}$  wide); two types of cystidia (1) fusiform cystidia with acute to subobtuse tips (42-49 x 6.8-7.4  $\mu\text{m}$ ), (ii) subcylindrical cystidia with obtuse tips and apically excreting a brown resinous amorphous matter (17-31 x 5.7-8  $\mu\text{m}$ ); and ellipsoid basidiosporous (7.4-8.5 x 4-4.5  $\mu\text{m}$ ).

*Collection examined* : Himachal Pradesh : Chamba, Khajjiar, on a decaying gymnospermic stump, GSD 1470 (PUN), Sept. 14, 1988.

*H. tsugae* is a rarely found species in the Himalayas, reported first by Dhingra (1989) from the

Eastern Himalayas. It is characterized by thin fruitbodies and ellipsoid spores. PUN 1470 resembles closely with the description of the species as given by Eriksson & Ryvarde (1975) and Dhingra (1989) and is a new record for the N.W. Himalayas.

*Hyphodontia propinqua* Hjortst., Mycotaxon 27 : 553, 1983. Fig. 14-19.

Fruitbody resupinate, effused, adnate, thin, upto 150  $\mu\text{m}$  thick in section, at first porose, with time continuous; hymenial surface smooth, pruinose to somewhat velvety under lens by the projecting cystidia, yellowish white to light yellow or ochraceous; margins thinning, not well differentiated, paler concolorous. Hyphal system: monomitic; generative hyphae 1.7-4  $\mu\text{m}$  wide, branched, septate, clamped, cyanophilous; basal hyphae somewhat thick walled, loosely interwoven; subhymenial hyphae thin walled, richly branched, densely interwoven. Cystidia - of two types (i) *Septate Cystidia* numerous, 46-105 x 6.2-7.4  $\mu\text{m}$ , subcylindrical to hyphoid, thick walled, cyanophilous, septate, clamped, slightly constricted, projecting up to 50  $\mu\text{m}$  out of the hymenium. (ii) *Lagenocystidia* 15.3-28 x 3.4-5.1  $\mu\text{m}$ , abruptly ending in needle like apices, provided with a characteristic encrustation, generally immersed. *Basidia* : 9.6-17 x 4-5.7  $\mu\text{m}$ , subclavate to subcylindrical, thin walled, 4-sterigmate, with a basal clamp; sterigmata upto 3.4  $\mu\text{m}$  long. Basidiospores - 5.1-7.4 x 3.4-4.5  $\mu\text{m}$ , broadly ellipsoid, thin walled, smooth, minutely apiculate, non-amyloid, acyanophilous, usually with one guttule.

*Collections examined* : Himachal Pradesh : Chamba, on way to Kalatope from Dalhousie, on the undersurface of a decaying angiospermic log, GSD 1471 (PUN), Sept. 12, 1988, Kalatope, on the undersurface of gymnospermic sticks, GSD 1473 (PUN), Sept. 12, 1988; Panjula, on the decayed stump, Nishi 1628 (PUN), Sept. 24, 1989.

It is a rarely found species in the Himalayas. First described from India by Hjortstam (1983) on the basis of a collection (Isotype) made by Dhingra in 1980 from the Eastern Himalayas. This is the second report of this species from India and first from the N.W. Himalayas.

*Subulicystidium longisporum* (Pat.) Parm., Consp. Syst. Cort. p. 121, 1968. - *Hypochnus longisporus* Pat., J. Bot. Paris 8 : 221, 1894.

*Collections examined* : Himachal Pradesh , Chamba, Khajjiar, on the undersurface of decaying angiospermic wood, GSD 1477 (PUN), September 14, 1988; on way to Banikhet from Dalhousie, on the undersurface of a decaying gymnospermic stump, Nishi 1478 (PUN), September 19, 1989; about 2 Km. from Dalhousie towards Banikhet, on the undersurface of decaying gymnospermic stump, Nishi 1479 (PUN), September 19, 1989; on way to Banikhet from Dalhousie, on the undersurface of gymnospermic stump, Nishi 1480 (PUN), September 19, 1989.

This species is of common occurrence in the Himalayas. Earlier, Rattan (1977) reported this species from N.W. Himalayas, followed by Thind and Dhingra (1985) from the Eastern Himalayas. However, from Dalhousie hills it is being reported for the first time.

*Trechispora microspora* (Karst.) Liberta, Taxon 15 : 319, 1966. - *Grandinia microspora* Karst., Bidr. Kenn. Finl. Nat. Folk 48 : 365, 1889. Figs. 10-13.

Fruitbody resupinate, effused, thin, loosely adnate; hymenial surface smooth, poroid under lens, white; margins thinning, indeterminate, fibrillose; cordons present in the subiculum and extending beyond the margins. *Hyphal System*: monomitic; generative hyphae upto 4  $\mu\text{m}$  wide, branched, septate, clamped, thin walled, subicular hyphae and hyphae of cordons with frequent ampulliform swellings near the septa, provided with acrose crystals; subhymenial hyphae short celled, much branched, of even width or slightly inflated. Cystidia; None. *Basidia* 8.5-14.2 x 4.5-5.1  $\mu\text{m}$ , subcylindrical to cylindrical, thin walled, 4-sterigmate, clamped at the base, sterigmata up to 2.8  $\mu\text{m}$  long. *Basidiospores* : 2.5-3.4 x 2.3-2.8  $\mu\text{m}$ , subglobose to more or less lacrimoid, prominently apiculate, thin walled, verrucose except for in the apicular region, non-amyloid, acyanophilous, usually with single guttule.

*Collection examined* : Himachal Pradesh : Chamba, Khajjiar, on the undersurface of a decaying gymnospermic log, GSD 1472 (PUN), Sept. 14, 1988.

PUN 1472 is the first report of this species from India. It resembles the description of the species as given by Liberta (1973) and Hjortstam, Eriksson & Ryvarde (1988), except for the smaller size of basidiospores i.e. 2.5-3.4 x 2.3-2.8  $\mu\text{m}$  in comparison to 4-4.5-(5) x (3) - 3.3 - 3.5 - (4)  $\mu\text{m}$ .

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#### REFERENCES

- Dhingra G S 1989 Genus *Hyphoderma* Wallr. em Donk in the Eastern Himalayas in M L Trivedi, B S Gill & S S Saini (Eds) *Plant Science Research in India Today & Tomorrow* New Delhi pp. 197-212.
- Eriksson J & L Ryvardeu 1973 *Corticiaceae of North Europe* III Oslo 287-546 pp.
- Hjortstam K 1983 Studies in the genus *Hyphodontia* *Mycotaxon* 17 550-554.
- Hjortstam K, K H Larsson & L Ryvardeu 1988 *The Corticiaceae of North Europe* VIII Oslo 1450-1631 pp.
- Holmgren P K & W Keuken 1974 *Index Herbariorum* part I. *The Herbaria of the world* 6th Ed Regnum Veg 92 397 pp.
- Kornerup A & J H Wanscher 1978 *Mathuen's Handbook of Colours*
- Liberta A E 1973 The genus *Trechispora* (Basidiomycetes Corticiaceae) *Can J Bot* 51 1871-1892.
- Rattan S S 1977 The Resupinate Aphyllophorales of the North Western Himalayas, *Bibliotheca Mycologica* 60 427 pp.
- Thind K S & S S Rattan 1970 The Thelephoraceae of India III. The genus *Tubulicrinis* and *Hyphoderma* *proc Indian Acad Sci* 71 118-131.
- Thind K S & G S Dhingra 1985 Thelephoroid fungi of the Eastern Himalayas *I Res Bull (Sc) Pan Univ.* 36 165-174.