
The Genus *Hymenochaete* Lev. in West Bengal

A. B. DE

Department of Botany, Burdwan Raj College, Burdwan 713104, West Bengal

Uptil 2005 six species of *Hymenochaete* Lev. were recorded from West Bengal. These are : *Hymenochaete cacao* (Berk.) Berk., *Hymenochaete rheicolor* (Mont.) Lev., *Hymenochaete rubiginosa* (Dicks. : Fr.) Lev., *Hymenochaete sphaericola* L. loyd, *Hymenochaete tabacina* (Sow. Fr.) Lev. and *Hymenochaete villosa* (Lev.) Bres. Of them *H. sphaericola* and *H. tabacina* were found to grow only at higher altitudes (Darjeeling and Kalimpong) but the others were collected from higher altitudes as well as from the plains. All of these species caused white rot. Morphological, anatomical and cultural characters of these species along with the results of oxidase tests were studied. All of these species were found to give positive results in oxidase tests. A key to the identification of these species occurring in West Bengal was presented.

INTRODUCTION

The genus *Hymenochaete* Lev. has been erected by Leveille in 1846 (*Ann. Sci. Nat. Bot.* III 5, 1846) which is characterised by : (i) basidiocarp effused, effuso-reflexed to pileate with non-poroid hymenial surface; (ii) basidiocarp red, brown to rusty in colour which darkens or turns almost black when aqueous solution of KOH is used (Xanthochroic reaction) ; (iii) hyphal system monomitic to dimitic with simple septate generative hyphae; (iv) hymenial setae present and (v) causes white rot of wood.

In West Bengal the genus *Hymenochaete* Lev. was first studied in 1935 by Prof. S.N. Banerjee (Banerjee, 1935) and he recorded 5 species in his paper 'Thelephoraceae of Bengal-I'. But at present *Hymenochaete* Lev. belongs to the Family-Hymenochaetaceae Donk (Donk, 1948). However, the 5 species recorded by Banerjee (1935) were (i) *Hymenochaete aspera* Berk. & Curt; (ii) *Hymenochaete cacao* Berk; (iii) *Hymenochaete nigricans* Lev. ex Bres; (iv) *Hymenochaete rubiginosa* Dicks. ex Lev; and (v) *Hymenochaete tenuissima* Berk.

But of these 5 species *Hymenochaete aspera* Berk. & Curt. has been transferred to the genus *Dichochaete* Parmasto (Parmasto, 2001) and it is now

known as *Dichochaete setosa* (Sw. : Fr.) Parmasto (Parmasto, 2001). Of the remaining four species the valid names of *Hymenochaete nigricans* Lev. ex Bres. and *Hymenochaete tenuissima* Berk. are *Hymenochaete villosa* (Lev.) Bres. and *Hymenochaete rheicolor* (Mont.) Lev. respectively.

In 1949 T. C. Roy (Roy, 1949) in his enumeration entitled, 'Fungi of Bengal' enumerated the same 5 species recorded by Banerjee 14 years ago. Dr. Mundkur in the 'Foreword' of this enumeration stated, "... and I hope that provincial Mycologists will publish lists of fungi occurring in their respective areas ... there still await several which have to be collected and named, many of them perhaps new to science, and I hope that the mycologists and botanists of Bengal will collect them and study them as time goes on."

Unfortunately no work has been done in this regard in West Bengal so far the genus *Hymenochaete* is concerned for the last almost 70 years until I have started collecting the species of *Hymenochaete* from West Bengal again in 2003. But I have been able to collect only 2 more species, namely - *Hymenochaete sphaericola* Lloyd and *Hymenochaete tabacina* (Sow. : Fr.) Lev. Therefore, altogether 6 species of *Hymenochaete* have been re-

corded so far from West Bengal (total number of species recorded from India are 9). Distribution of these 6 species in West Bengal has been shown in the Fig. 1. I have studied morphological, anatomical and cultural characters of these 6 species and the observations are presented herein along with their hosts, the type of rots they cause on woods and the results they show in oxidase tests. A key to the identification of these 6 species occurring in West Bengal is also given.

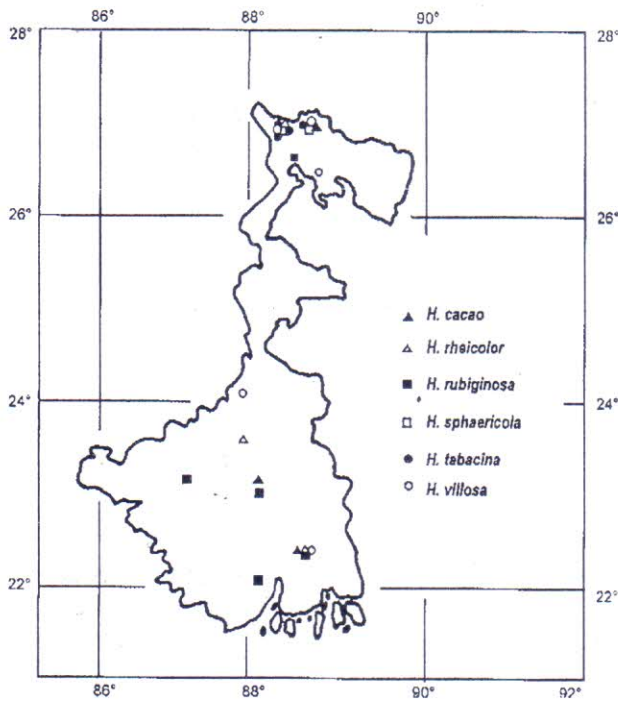


Fig. 1 : Map showing distribution of six species of *Hymenochaete* in West Bengal.

MATERIALS AND METHODS

Macroscopic and microscopic characters of the fungi were studied from fresh specimens collected by the author. For microscopic characters of basidiocarps observations were made on freehand vertical sections and their teased portions mounted in distilled water, Melzer's reagent (Boidin, 1958), cotton blue in lactic acid (Boidin, 1958) and in 2 % aqueous solution of KOH and observed under microscope. Cultures were established from basidiospores of these basidiocarps. For cultural studies the procedure of Nobles (1948, 1965) was followed. Voucher specimens and cultures were deposited in the Mycological Herbarium, Department of Botany, Burdwan Raj College (BRCMH), Burdwan, West Bengal, India.

KEY TO THE IDENTIFICATION OF THE SPECIES OCCURRING IN WEST BENGAL

Context with a dark bordering zone on the abhymenial side, hyphal system dimitic.

Basidiocarp effuso-reflexed

Setae up to 80 μ m long

Hymenial surface brown,
basidiospores allantoid,
basidiocarp soft, margin
of basidiocarp yellowish gold

— *H. tabacina*

Hymenial surface reddish brown,
basidiospores elliptical, basidiocarp hard
and rigid, margin concolourous with the
rest of the basidiocarp

— *H. rubiginosa*

Setae 30-55 μ m long

Hymenial surface date brown

— *H. villosa*

Basidiocarp resupinate

Hymenial surface red

— *H. sphaericola*

Context without a dark bordering zone on the
abhymenial side, hyphal system monomitic

Basidiocarp flexible, soft,
basidiospores 4.5-7.0 μ m long

— *H. rheicolor*

Basidiocarp coriaceous or woody hard,
not flexible, basidiospores 3-4 μ m long

— *H. cacao*

OBSERVATIONS

Hymenochaete cacao (Berk.) Berk.

J. Linn. Soc. Bot. 10 : 333 (1868) ; *Stereum cacao* Berk., *Hook. J. Bot.* 6 : 169 (1854).

Basidiocarp

Basidiocarp sessile-pileate to rarely effuso-reflexed, flabelliform, imbricate, thin, coriaceous to woody hard, not flexible, up to 2 mm thick, brittle when dry ; pileus up to 3 cm broad, 1-2 cm wide, upper surface velvety, dark brown to blackish ; margin lobed, concolourous with the pileal surface ; hymenial surface reddish brown to blackish ; context up to

600 μm thick, not bordered by a darker zone on the abhymenial side.

Microscopic characters : Hyphal system monomitic ; generative hyphae simple-septate, 2-5 μm wide, thin-walled (Fig. 6a) to thick-walled (Fig. 6b), yellowish to brownish, sparingly branched ; setal hyphae, cystidia and hyphidia absent ; setae (Fig. 6c) subulate, 20-50 \times 4-8 μm , straight with acute tip, dark brown, lumen narrow ; basidia (Fig. 6d) clavate, 10-15 \times 3-5 μm , tetrasterigmatic, sterigma 2-3 μm long ; basidiospores (Fig. 6e) hyaline, broadly ellipsoid, 3-4 \times 2-3 μm , inamyloid.

Type of rot produced : White rot.

Specimens examined : BRCMH HY2, on dead wood of *Acacia arabica*, 6.8.2003, Burdwan ; BRCMH HY5, on the stump of *Mangifera indica*, 11.10.2003, Calcutta ; BRCMH HY10, on stump of *Pinus* sp., 9.9.2004, Darjeeling ; BRCMH HY22, on log of unknown angiosperm, 27.9.2005, Kalimpong.

Culture

Growth character : Growth slow, plates covered in 6 weeks. Mat white and cottony with advanced mycelium submerged at the beginning, turning brown after the 4th week (Fig. 3a). Reverse changed to brown.

Oxidase reactions : Positive in both gallic acid (Fig. 4a) and tannic acid (Fig. 5a).

Microscopic characters : Hyphae of the advancing zone (Fig. 6f) hyaline, thin-walled, simple septate, branched, 1.5-3.5 μm wide. Aerial hyphae simple-septate, branched, 2-5 μm wide, yellow to brownish, thin-walled (Fig. 6g) to slightly thick walled (Fig. 6h). Setal hyphae and setae lacking.

Cultures examined : BRCMH HY2, BRCMH HY5, BRCMH HY10 and BRCMH HY22.

Hymenochaete rheicolor (Mont.) Lev.

Ann. Sci. Nat III, 5 : 151 (1846) : *Stereum rheicolor* Mont., *Ann. Sci. Nat.* II, 18 : 23 (1842) : *Hymenochaete tenuissima* Berk., *Linn. Soc. Bot. J.*, 10 : 333 (1868).

Basidiocarp

Basidiocarp sessile-pileate to effuso-reflexed,

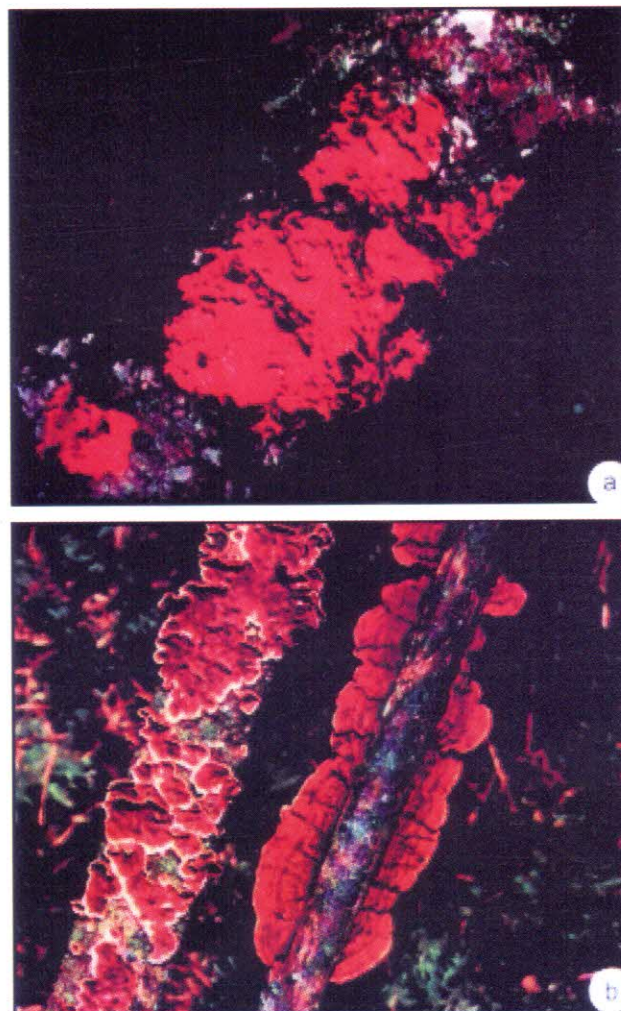


Fig. 2 : Basidiocarps of two species of *Hymenochaete* : (a) *H. sphaericola* ; (x2) ; (b) *H. tabacina* ; (x2).

flabelliform, imbricate, thin, papery, flexible when dry, may be folded without breaking ; pileus 1-3.5 cm long, up to 900 μm thick, upper surface radiately fibrillose, silky, concentrically zonate, reddish golden to light brown ; margin lobed, yellowish when young but concolourous with pileal surface when old ; hymenial surface fulvous to cinnamon brown ; context up to 400 μm thick, not bordered by a darker zone on the abhymenial side.

Microscopic characters : Hyphal system monomitic ; generative hyphae simple-septate, 2.5-5 μm wide, thin-walled (Fig. 6a) to thick-walled (Fig. 6b'), yellowish to brownish, branched usually at right angle ; setal hyphae, hyphidia and cystidia absent ; setae (Fig. 6c') subulate, to conical, 40-120 \times 8-15 μm , with almost blunt or acute tip, dark brown, lumen narrow ; basidia (Fig. 6d') hyaline, clavate, tetrasterigmatic, 15-20 \times 3-5 μm , sterigmata

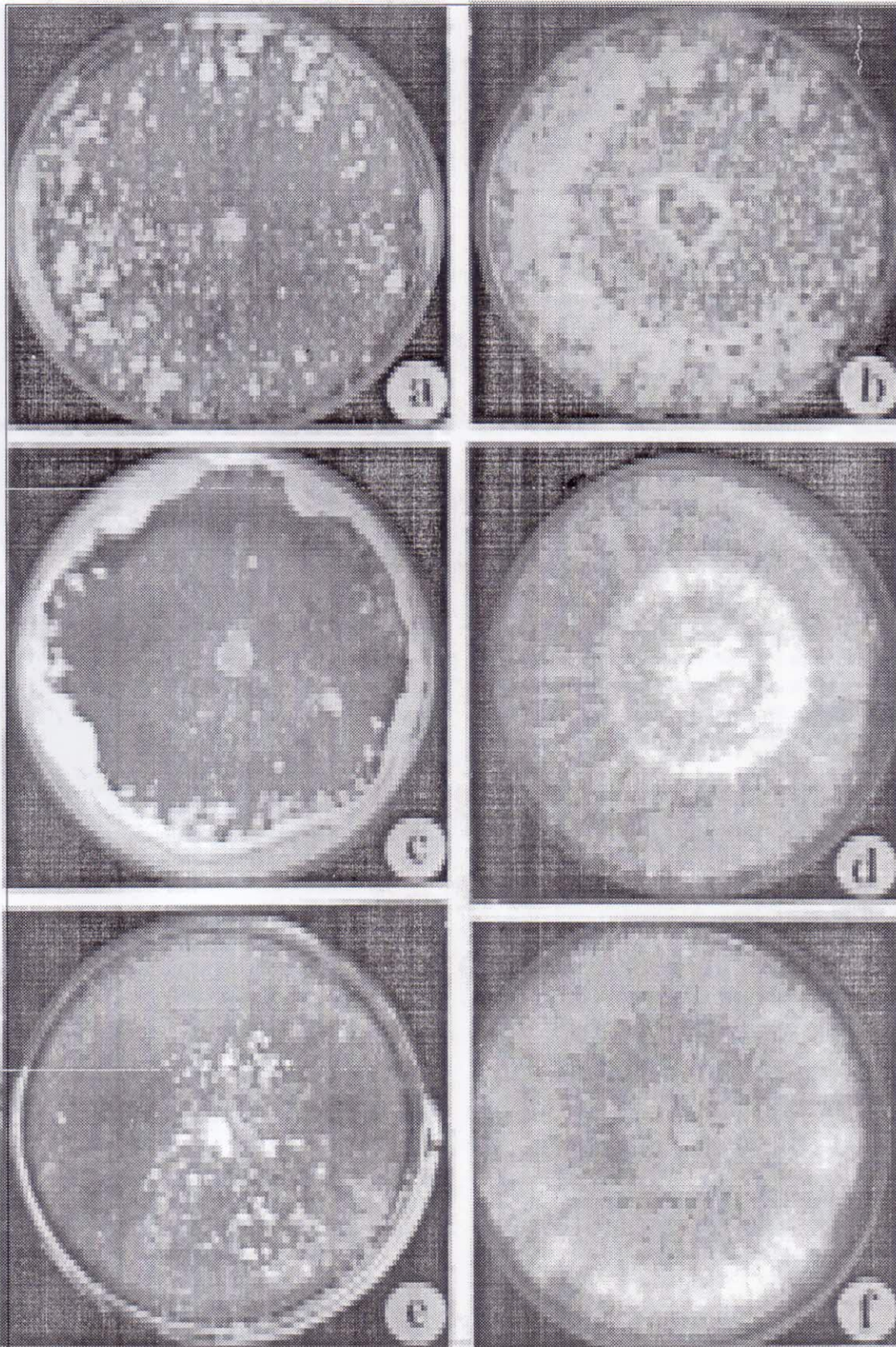


Fig. 3 : Growth characters of six species of *Hymenochaete* in 1.5% malt-agar medium : (a) *H. cacao*, (b) *H. rheicolor*, (c) *H. rubiginosa*, (d) *H. sphaericola*, (e) *H. tabacina*, (f) *H. villosa*.

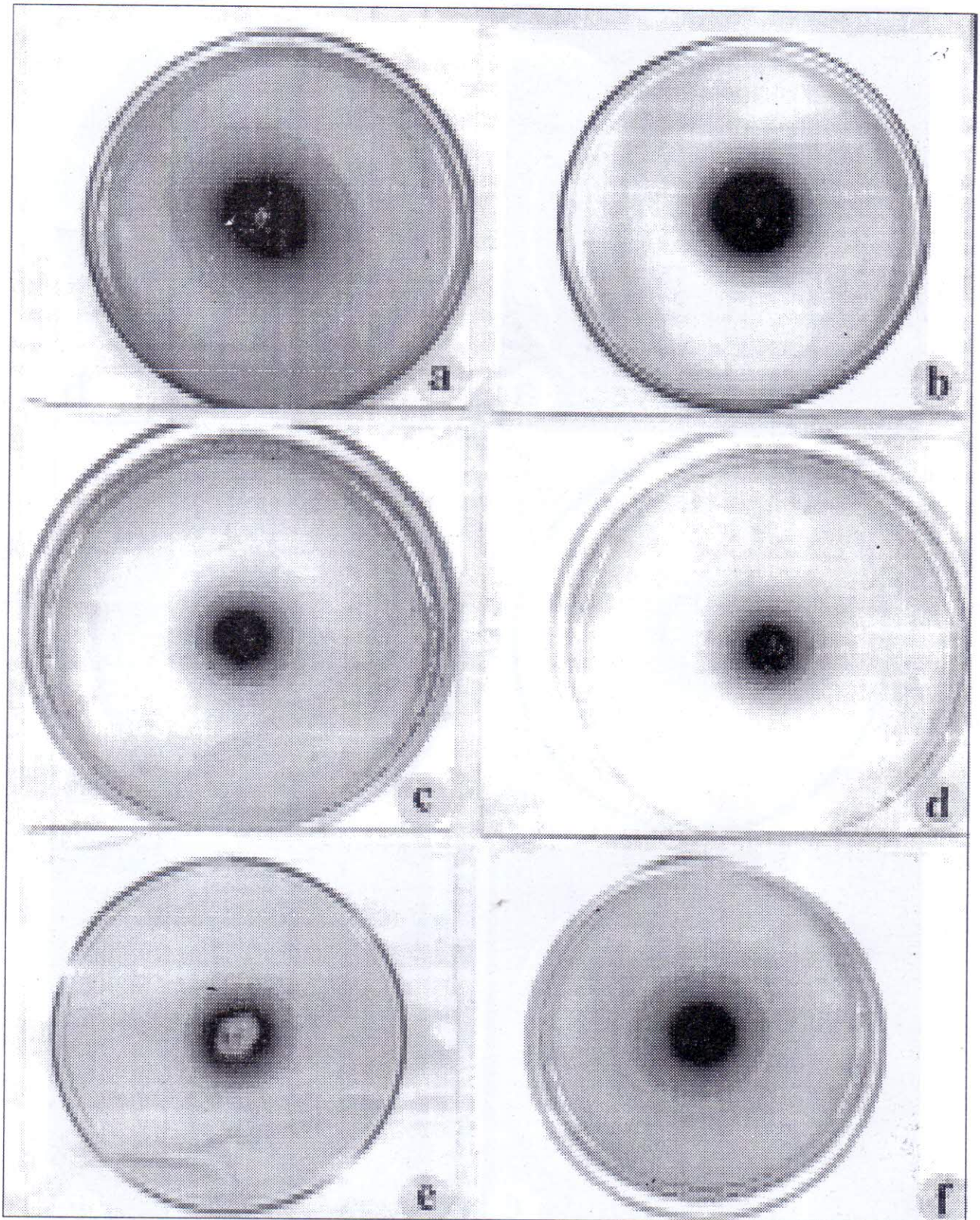


Fig. 4 : Result of oxidase test of six species of *Hymenochaete* in 1.5% malt-agar medium containing gallic acid : (a) *H. cacao*, (b) *H. rheicolor*, (c) *H. rubiginosa*, (d) *H. sphaericola*, (e) *H. tabacina*, (f) *H. villosa*.

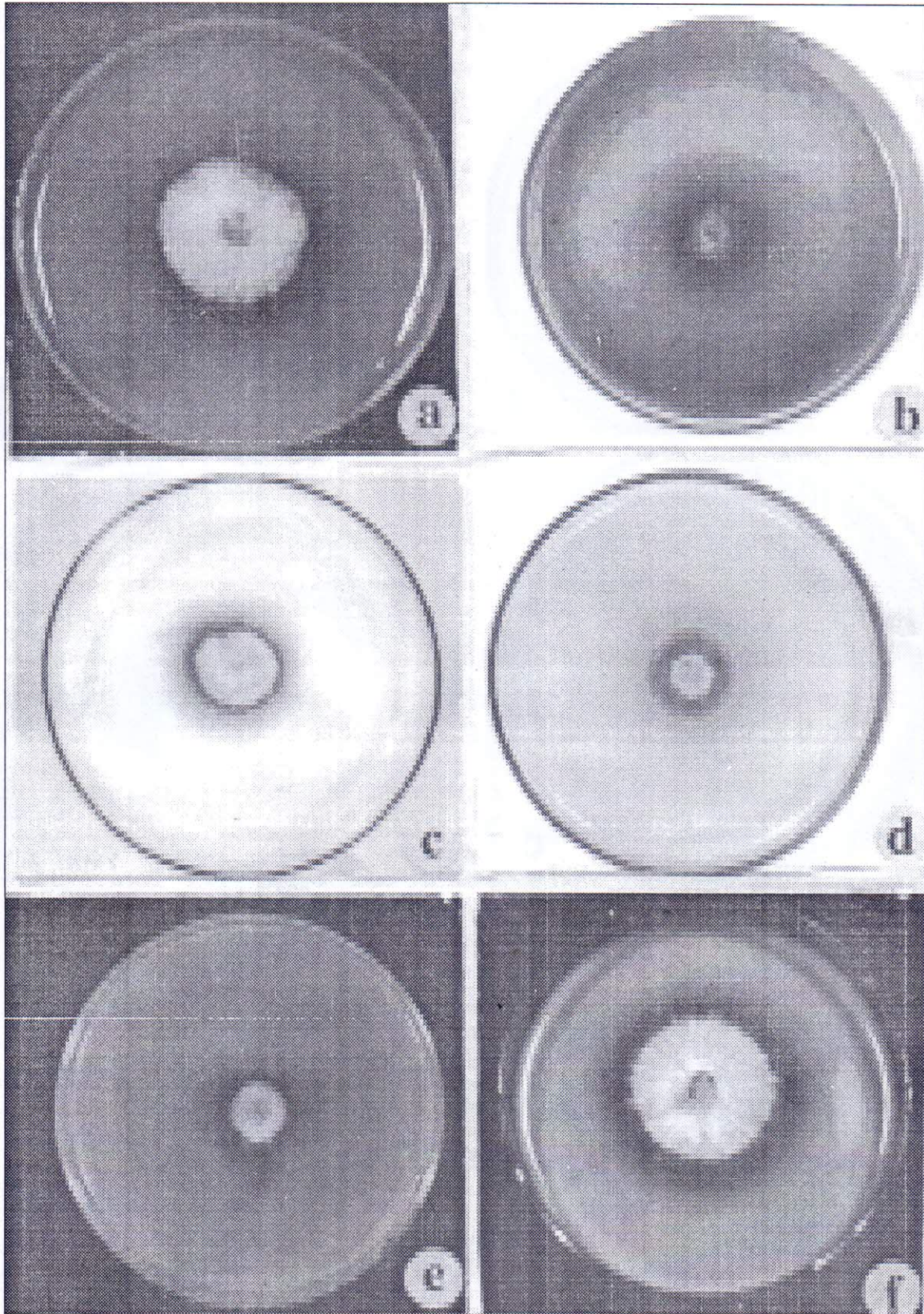
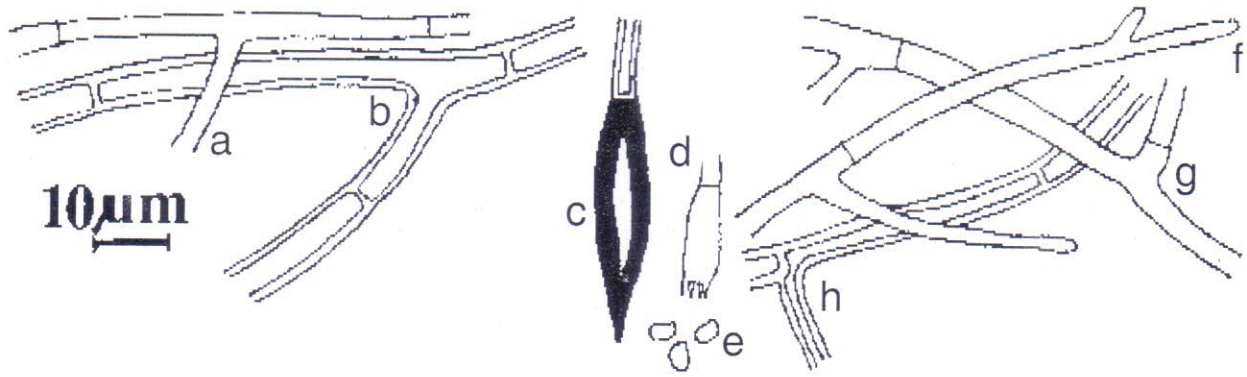
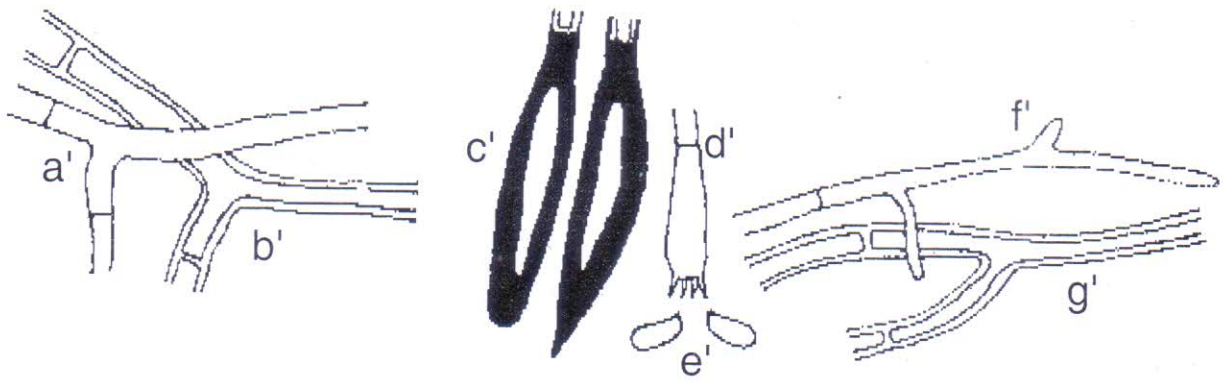


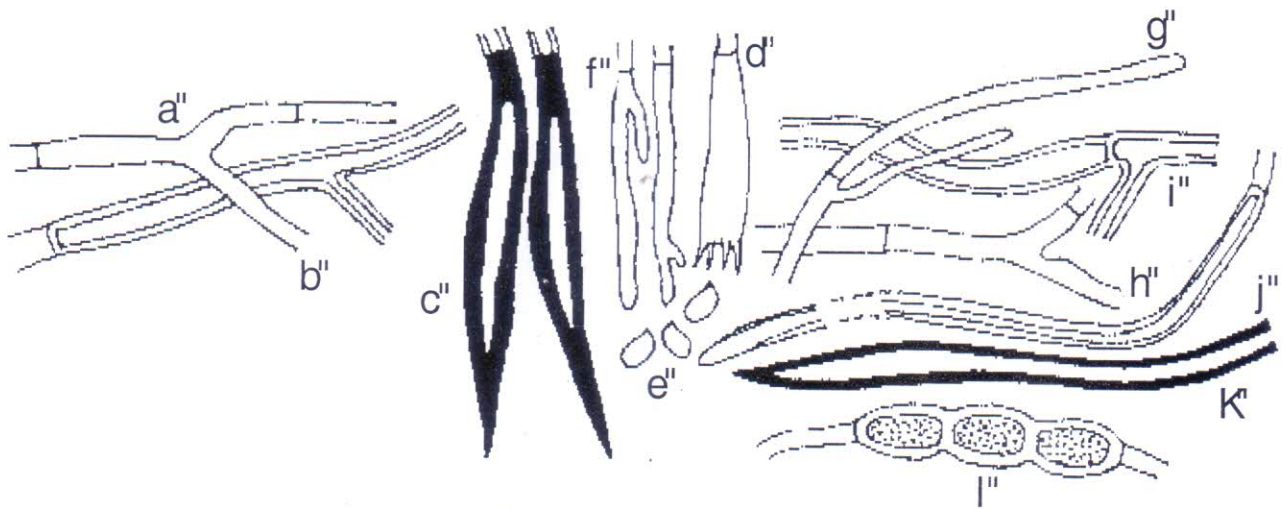
Fig. 5 : Result of oxidase test of six species of *Hymenochaete* in 1.5% malt-agar medium containing tannic acid : (a) *H. cacao*, (b) *H. rheicolor*, (c) *H. rubiginosa*, (d) *H. sphaericola*, (e) *H. tabacina*, (f) *H. villosa*.



Hymenochaete cacao

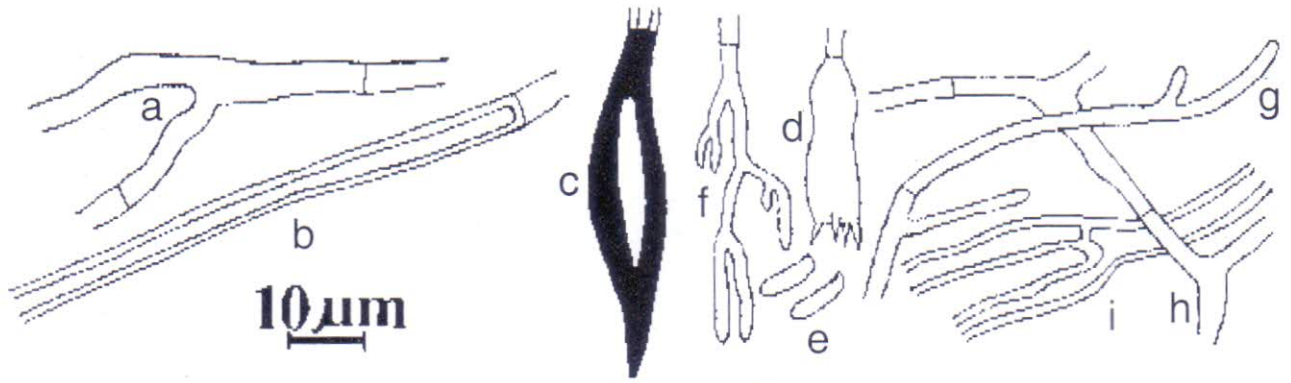


Hymenochaete rheicolor

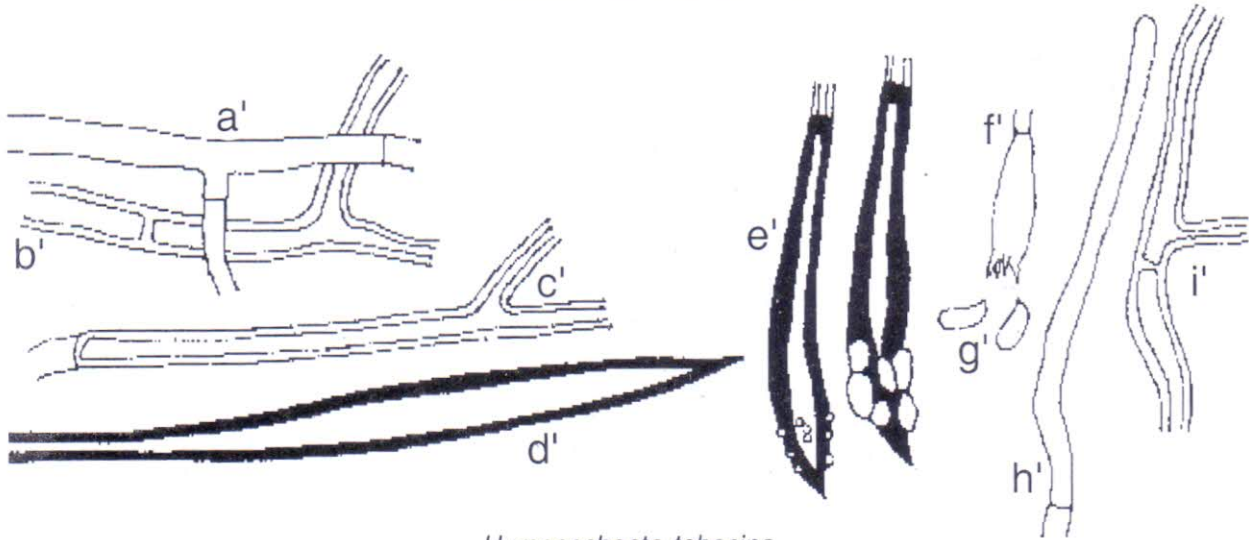


Hymenochaete rubiginosa

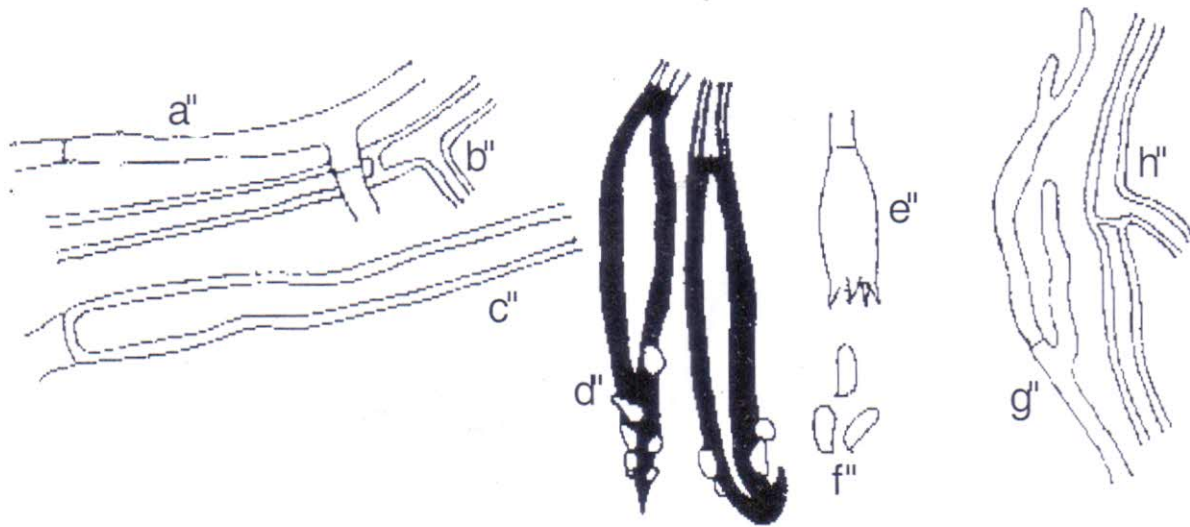
Fig. 6 : Microscopic structures of basidiocarps and cultures of different species of *Hymenochaete*.



Hymenochaete sphaericola



Hymenochaete tabacina



Hymenochaete villosa

Fig. 7 : Microscopic structures of basidiocarps and cultures of different species of *Hymenochaete*.

3-5 μm long; basidiospores (Fig. 6e') hyaline, cylindrical, 4.5-7 \times 2-2.5 μm , nonamyloid.

Type of rot produced : White rot.

Specimens examined : BRCMH HY7, on dead thin branch of *Cassia fistula*, 11.10.2003, Calcutta ; BRCMH HY8, on dead wood of *Shorea robusta*, 12.11.2003, Shantiniketan; BRCMH HY16, on dead wood of *Quercus* sp., 10.9.2004, Darjeeling.

Culture

Growth character : Growth slow, plates covered in more than 6 weeks. Advancing zone appressed. Mat at first cottony, white, becoming woolly and finally become light brown and densely woolly (Fig. 3b). Reverse unchanged or darker.

Oxidase reactions : Positive in both gallic acid (Fig. 4b) and tannic acid (Fig. 5b).

Microscopic characters : Hyphae in the advancing zone (Fig. 6f') hyaline, thin-walled, simple septate, branched, 1.5-3 μm wide. Aerial hyphae thin to slightly thick-walled (Fig. 6g'), branched, simple-septate, yellowish to brownish, 2-5 μm wide. Setal hyphae and setae lacking.

Cultures examined : BRCMH HY7, BRCMH HY8, BRCMH HY11, BRCMH HY16.

Hymenochaete rubiginosa (Dicks. : Fr.) Lev.

Ann. Sci. Nat. Bot. III, 5 : 151 (1846) : *Helvella rubiginosa* Dicks., *Pl. Crypt. Brit.*, 1 : 20 (1785)

Basidiocarp

Basidiocarp effuso-reflexed, imbricate, hard and rigid ; reflexed portion reniform, up to 3.5 cm long, 1.5 cm broad, upper surface velutinous or tomentose, reddish brown or brown to blackish, concentrically zonate ; margin thin to thick, entire or lobed, concolourous with the rest of the pileus ; hymenial surface reddish brown or brown to blackish ; context up to 700 μm thick, light brown, bordered by a darker zone on the abhymenial side.

Microscopic characters : Hyphal system dimitic ; generative hyphae simple-septate, subhyaline, 2-3.5 μm wide, thin-walled (Fig. 6a'') branched ; skeletal hyphae (Fig. 6b'') brown, 2.5-5 μm wide, thick-

walled ; cystidia absent ; setae (Fig. 6c'') reddish brown, thick walled, 40-80 \times 6-12 μm , conical to fusiform with acute tip, straight but some with slightly curved tip ; hyphidia (Fig. 6f'') hyaline or yellowish, 1.5-3 μm wide ; basidia (Fig. 6d'') clavate, hyaline to yellowish, 15-30 \times 4-6 μm , tetrasterigmatic, sterigmata 4-5 μm long ; basidiospores (Fig. 6e'') ellipsoid, 3.5-5.5 \times 2-3 μm . hyaline, thin-walled, nonamyloid.

Type of rot produced : White pocket rot.

Specimens examined : BRCMH HY3, on log of *Tectona grandis*, 10.9.2003. Bankura; BRCMH HY4, on stump of *Gmelina arborea*, 11.10.2003, Calcutta; BRCMH HY9, on dead branch of *Artocarpus integrifolia*, 16.11.2003, Tamluk; BRCMH HY12, on dead wood of *Pinus* sp., 9.9.2004, Darjeeling; BRCMH HY19, on log of *Shorea robusta*, 17.9.2004, Siliguri; BRCMH HY20, on dead wood of *Bauhinia* sp., 22.9.2004, Chinsura.

Culture

Growth character : Growth rapid, plates covered in 3 weeks. Advancing zone raised, rarely appressed. Mat at first cottony to cottony-woolly, later becoming densely woolly to felty, white at first, finally becoming buff to cinnamon (Fig. 3c). Reverse darker.

Oxidase reactions : Positive in both gallic acid (Fig. 4c) and tannic acid (Fig. 5c).

Microscopic characters : Hyphae of the advancing zone (Fig. 6g'') hyaline, thin-walled, simple septate, 2-3 μm wide. Aerial hyphae hyaline to yellowish, 1-5 μm wide, thin-walled (Fig. 6h'') to thick-walled (Fig. 6i''), branched, simple-septate. Fibre hyphae (Fig. 6j'') thick-walled, long, rarely branched, brownish, 2-3 μm wide. Chlamydospores (Fig. 6k'') globose to ovoid, often in chains, brownish, thick-walled, 8-12 \times 6-8 μm . Setal hyphae (Fig. 6l'') brownish, 5-8 μm wide.

Cultures examined : BRCMH HY3, BRCMH HY4, BRCMH HY9, BRCMH HY12, BRCMH HY19, BRCMH HY20.

Hymenochaete sphaericola Lloyd

Mycol. Notes 7(9) (no. 74) : 1338 (1925); *Hymenochaete murashkinskyi* Pilat, *Hedwigia* 71 : 322 (1934).

Basidiocarp

Basidiocarp (Fig. 2a) resupinate, up to 3 cm in diameter, 100-400 μm thick, soft, coriaceous, detachable from the substrate, usually with slightly elevated, up to 5 mm long pileus-like indistinctly zonate margin; hymenial surface red; context with a dark bordering zone on the abhymenial side.

Microscopic characters : Hyphal system dimitic; generative hyphae (Fig. 7a) hyaline, thin-walled, simple-septate, 2-5 μm wide, branched; skeletal hyphae (Fig. 7b) reddish, thick-walled, 2-5 μm wide; setal hyphae absent; setae (Fig. 7c) fusoid, 40-120 \times 7-15 μm , sometimes with granulose encrustations at the tip; dendrohyphidia (Fig. 7f) 30-40 μm long, 2-4 μm wide, thin-walled with 2-8 branches; basidia (Fig. 7d) subutriform, thin-walled, hyaline, 20-30 \times 5-8 μm , tetrasterigmatic, sterigmata 3-4 μm long; basidiospores (Fig. 7e) hyaline, thin-walled, cylindrical, slightly curved, 6-9 \times 2.5-4.2 μm .

Type of rot produced : White rot.

Specimens examined : BRCMH HY13, on dead branch of *Rhododendron* sp., 9. 9. 2004, Darjeeling; BRCMH HY17, on dead wood of *Quercus incana*, 10. 9. 2004, Darjeeling; BRCMH HY 25, on stump of unknown angiosperm, 27. 9. 2005, Kalimpong.

Culture

Growth character : Growth slow, plates covered in more than 6 weeks. Advancing zone even, appressed. Mat white at first, slightly raised, later becoming downy and reddish with woolly concentric growth around the inoculum (Fig. 3d). Reverse darker.

Oxidase reactions : Positive in both gallic acid (Fig. 4d) and tannic acid (Fig. 5d).

Microscopic characters : Hyphae in the advancing zone (Fig. 7g) hyaline, thin-walled, 1.5-2.5 μm wide, simple-septate, branched. Aerial hyphae hyaline to reddish, thin-walled (Fig. 7h) to slightly thick-walled (Fig. 7i), branched, simple-septate, 2.5-6 μm wide. Setal hyphae and setae absent.

Cultures examined : BRCMH HY13, BRCMH HY17, BRCMH HY25.

***Hymenochaete tabacina* (Sow. : Fr.) Lev.**

Ann. Sci. Nat. Bot. III 5 : 145 (1846) : *Auricularia*

tabacina Sow., *Col. Fig. Engl. Fungi* 1, pl. 25 (1797); *Thelephora tabacina* Sow. : Fr., *Syst. Mycol.* 1 : 437, 1821.

Basidiocarp

Basidiocarp (Fig. 2b) effuso-reflexed, thin, imbricate, coriaceous, brittle when dry, up to 400 μm thick; pilei dimidiate, up to 4 cm long, 2 cm wide, upper surface fibrillose, silky, glabrous when old, with concentric zones, reddish brown; margin thin, entire, yellowish gold; hymenial surface radially cracked, brown; context up to 120 μm thick, yellowish brown with a dark bordering zone on the abhymenial side.

Microscopic characters : Hyphal system dimitic; generative hyphae simple-septate, 3-5 μm wide, hyaline to yellowish, thin-walled (Fig. 7a') to slightly thick-walled (Fig. 7b'), branches usually diverging at right angle; skeletal hyphae (Fig. 7c') thick-walled with scarce septa, brown; setal hyphae (Fig. 7d') 7-13 μm wide, dark brown, thick-walled; hyphidia and cystidia absent; setae (Fig. 7e') 50-80 \times 7-15 μm , fusiform with acute tip, finely encrusted with hyaline or yellowish granules or crystals in upper part; basidia (Fig. 7f') clavate, 15-20 \times 3-5 μm , hyaline, tetrasterigmatic, sterigmata up to 4 μm long; basidiospores (Fig. 7g') cylindrical, allantoid, 4.5-7 \times 1.5-2.5 μm , hyaline, nonamyloid.

Type of rot produced : White rot.

Specimens examined : BRCMH HY14, on dead branch of *Rhododendron arboreum*, 9. 9. 2004, Darjeeling; BRCMH HY18, on dead wood of *Picea abies*, 10. 9. 2004, Darjeeling; BRCMH HY24, on dead wood of *Pinus longifolia*, 27. 9. 2005, Kalimpong.

Culture

Growth character : Growth moderately rapid, plates covered in 4 weeks. Advancing zone even, hyaline. Mat at first white, slightly raised, later becoming wood brown, downy to felty and finally becoming thin woolly (Fig. 3e). Reverse unchanged or slightly darker.

Oxidase reactions : Positive in both gallic (Fig. 4e) acid and tannic acid (Fig. 5e).

Microscopic characters : Hyphae in the advancing zone (Fig. 7h') hyaline, occasionally branched,

simple-septate, 3-6 μm wide. Aerial hyphae (Fig. 7i) brown, slightly thick-walled, branched, simple-septate, 2-5 μm wide.

Cultures examined : BRCMH HY14, BRCMH HY18, BRCMH HY24.

***Hymenochaete villosa* (Lev.) Bres.**

Atti. Accad. Sci., Lett. Arti Agiate III 3 (1897); *Stereum villosum* Lev., *Ann. Sci. Nat. Bot.* III 5 (1846).

Basidiocarp

Basidiocarp effuso-reflexed, thin, imbricate, coriaceous, up to 400 μm thick; reflexed part dimidiate, pileus surface dark brown, concentrically zonate with different shades of brown hairs; margin thin, entire, concolourous with pileus surface; hymenial surface dark brown; context 150-200 μm thick, dark amber with a dark bordering zone on the abhymenial side.

Microscopic characters : Hyphal system dimitic; generative hyphae simple-septate, hyaline to yellowish, thin-walled (Fig. 7a") to thick-walled (Fig. 7b"), branched, 2-5 μm wide; skeletal hyphae (Fig. 7c") thick-walled, brown, 5-10 μm wide; setal hyphae, hyphidia and cystidia absent; setae (Fig. 7d") 30-55 \times 7-15 μm , subulate, with acute tip, straight or some with slightly curved tip, sometimes encrusted with small crystals at tip. basidia (Fig. 7e") hyaline, thin-walled, clavate, tetrasterigmatic, 20-30 \times 6-8 μm . basidiospores (Fig. 7f") hyaline, thin-walled, cylindrical, 5-7 \times 2-3 μm .

Type of rot produced : White rot.

Specimens examined : BRCMH HY1, on dead branch of *Dalbergia sissoo*, 16.7.2003, Rampurhat; BRCMH HY6, on log of *Tamarindus indica*, 11.10.2003, Calcutta; BRCMH HY15, on dead wood of *Cedrus deodera*, 9.9.2004, Darjeeling; BRCMH HY21, on log of *Pongamia glabra*, 25.9.2005, Jalpaiguri; BRCMH HY23, on dead branch of *Pinus* sp., 27.9.2005, Kalimpong.

Culture

Growth character : Growth rapid, plates covered in 3 weeks. Advancing zone raised, rarely appressed. Mat at first cottony, white to cream, finally becoming brown and cottony-woolly to woolly or woolly-felty (Fig. 3f). Reverse slightly bleached.

Oxidase reactions : Positive in both gallic acid (Fig. 4f) and tannic acid (Fig. 5f).

Microscopic characters : Hyphae in the advancing zone (Fig. 7g") hyaline, thin-walled, branched, simple-septate, 2-4 μm wide. Aerial hyphae thick-walled (Fig. 7h"), yellowish, simple-septate, branched, 2-5 μm wide.

Cultures examined : BRCMH HY1, BRCMH HY6, BRCMH 15, BRCMH HY21, BRCMH HY23.

ACKNOWLEDGEMENTS

The author is greatly indebted to Dr. Anjali Roy and Prof. Balen Nandi for their constant encouragement and suggestions.

REFERENCES

- Banerjee, S. N. 1935. Thelephoraceae of Bengal-I. *J. Ind. Bot. Soc.* **14** (1) : 13-48.
- Boidin, J. 1958, Essai biotaxonomique sur les Hydnes resupines et les corticies. *Rev. Mycol. Mem. Hors-Ser.* **6** : 1-387.
- Donk, M. A. 1948. Notes on Malesian fungi-I, *Bull. Bot. Gdns. Buitenzorg* III, **17**(4) : 473-483.
- Nobles, M. K. 1948, Studies in forest pathology. VI. Identification of cultures of wood-rotting fungi. *Can. J. Res.* **C 26** : 281-431.
- Nobles, M. K. 1965, Identification of cultures of wood-inhabiting Hymenomycetes. *Can. J. Bot.* **43** : 1097-1139.
- Parmasto, E. 2001, New taxa and two new combinations in hymenochaetoid fungi (Hymenomycetes). *Folia Cryptog. Estonica.* **37** : 55-66.
- Roy, T. C. 1949, *Fungi of Bengal*. Bot. Soc. Bengal, Calcutta, pp. 1-44.

(Accepted for publication December 07, 2007)