

WOOD-ROTTING FUNGI (APHYLLOPHORALES) FROM SIKKIM

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A B S T R A C T

92 species of wood-rotting Aphyllophorales are reported from higher altitudes of Sikkim Himalayas. Out of these, *Pyrrhoderma sendaiense* (Yas.) Imaz. is the new generic record while *Anurodia odora* (Peck : Sacc.) Gilbn. & Ryv., *Ceriporiopsis gilvescens* (Bres.) Dom., *Incrustoporia carneola* (Bres.) Ryv., *Inonotus hamusetulus* Ryv., *I. flavidus* (Berk.) Ryv., *Oxyporus spiculifer* (Cunn.) Buch. & Ryv. and *Phellinus nigricans* (Fr.) Karst. are new species records for India and are described and illustrated in detail. Wherever possible the type of rot is also given.

INTRODUCTION

The wood-rotting mycoflora of Sikkim is poorly known except Imazeki (1966) and Berkeley (1850, 1851 & 1854). The author led a trekking to North Sikkim from 25th Sept. to 15th Oct. 1989 and collected 92 species of wood-rotting fungi belonging to the order Aphyllophorales of the subclass Homobasidiomycetidae. The localisation of the places and their altitudes are shown in Fig. 1.

Collecting was confined to the higher altitudes i.e. from 2500 m to timber line marked with *Rhododendron* and prostrate *Juniperus* forests. The major substrata were the species of *Abies*, *Betula* and *Quercus*. Unless otherwise specified, the substratum is dead standing / stump of fallen trees/logs of the species given. The fungi that cause heart-rot in living trees are identified as

such. The grouping by families follows the arrangement of Donk (1964).

These collections clearly involve three types of species :

1. The typical boreal species confined to the *Juniperus-Betula-Abies* zone e.g. *Inonotus radiatus* (Sow. : Fr.) Karst., *I. tenuicarnis* Peg. & Reid, *Phellinus nigricans* (Fr.) Karst., *P. laevigatus* (Fr. : Karst.) Bourd. & Galz., *P. igniarius* (L. : Fr.) Quel., *P. sanfordii* (Lloyd) Ryv. and *Oligoporus fragilis* (Fr.) Gilbn. & Ryv.

2. Wide spread temperate species like : *Phellinus robustus* (Karst.) Bourd. & Galz., *Fomitopsis rosea* (Alb. et Schw. : Fr.) Karst., *F. officinalis* (Vill. : Fr.) Bond. et. Sing., *F. pinicola* (Swartz : Fr.) Karst., *Inonotus cuticularis* (Bull. : Fr.) Karst., *I. dryadeus* (Pers. : Fr.) Murr., *I. glomeratus* (Pk.) Murr., *Phylloporia weberiana* (Bres. &

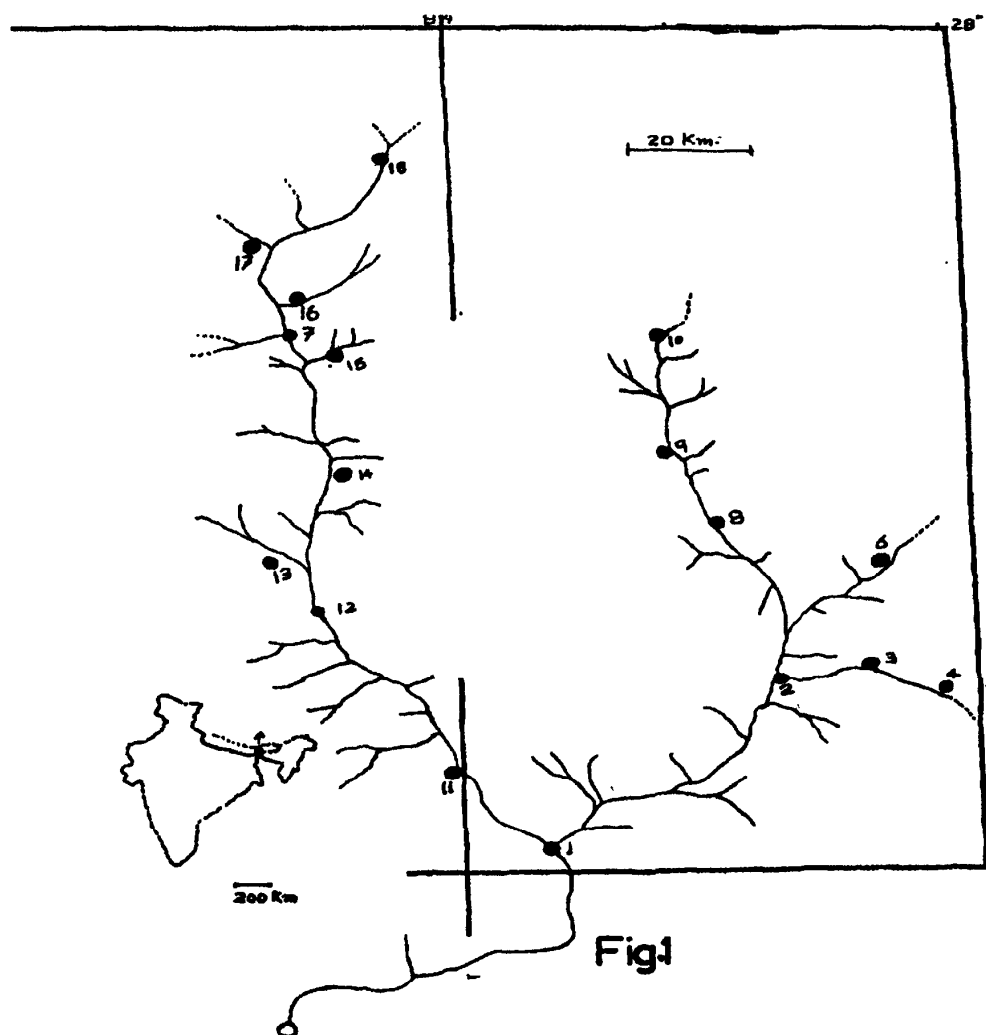


Fig. 1 Map of localities : 1. Chungthang (1800 m). 2. Lachung (2750 m). 3. Zycophiac (3970).
 4. Forest post (4100 m). 6. Dombiang (300 m). 7. Kalep (3850 m). 8. Shingba (3700 m). 9. Yumthang (3950 m).
 10. Rula (4100 m). 11. Yuigong (2000 m). 12. Lachen (2680 m). 13. Zemu (2800 m). 14. Talem (3000 m).
 15. Yathang (3350 m). 16. Thangoo (3950 m). 17. Yongdi (4050 m). 18. Gogong (4300 m).

Henn. : Sacc.) Ryv., *Daedalea incana* (Lev.) Ryv., *Phellinus xeranticus* (Berk.) Peg., *Daedaleopsis purpurea* (Cooke) Imaz. & Aoshima, *Inonotus flavidus* and *Pyrrhoderma sendaiense*. The last four showing relationship with the mycoflora of Japan and Nepal.

3. Some cosmopolitan species like *Trametes scabrosa* (Pers.) Cunn., *Lenzites acuta* Berk. and *Phellinus gilvus* (Schw.) Pat. showing tropical and subtropical affinities.

Free hand sections mounted in 3% KOH with a drop of phloxine lactophenol and Melzer's reagent were used for observation of the microscopic features. For each species usually one or two collection numbers are given after the locality (number in bracket) where the collection has been made. Type of rot is given at the end. As the period of collecting is restricted, so the date of collection has not been specifically mentioned. Collections are deposited under the author's name in Central National Herbarium (CAL); Biology Department, Oslo University (O) and Departamento de Ciencias, Buenos Aires (BAFC). All the drawings were made with the help of Camera lucida and colours are from the Kelly and Judd (1955).

CONIOPHORACEAE

***Serpula himantoides* (Fr.) Bond.**

On *Abies* (3), 60179 (CAL); brown rot.

***S. lacrimans* (Wulf.) S.F. Gray**

Wooden roof of Forest Rest House (2), 61289 (CAL); brown cuboidal rot.

***S. mollusca* (Fr.) Donk**

On *Quercus* (6), 61102 (CAL); brown rot.

CORTICIACEAE

***Asterostroma muscicolum* (Berk. &**

Curt.) Massae

On *Abies* (3,10); 60121, 61225 (CAL); white rot.

***Merulius tremellosus* (Schrad) Fr.**

On *Betula* (16), 60125 (CAL); white pocket rot.

GANODERMATACEAE

***Ganoderma lucidum* (Fr.) Karst.**

Bases of *Quercus* (6) 60102 (CAL); white root and butt rot of living trees.

HYMENOGASTRACEAE

***Coltricia montagnei* (Fr.) Murr.**

On conifers (6), 60118 (CAL); white rot.

***C. perennis* (Fr.) Murr.**

On ground (6), 60113 (CAL).

***C. vallata* (Berk.) Teng.**

On coniferous wood (7), 60123 (CAL).

Berkeley (1851) and Ryvarden (1977) reported this species from Khasia hills and Nepal respectively.

***Cyclomyces tabacinus* (Mont.) Pat.**

Common on hard woods (9), 60130 (CAL); white pocket rot

***C. turbinatus* Berk.**

On ground in coniferous forests (6), 60128 (CAL).

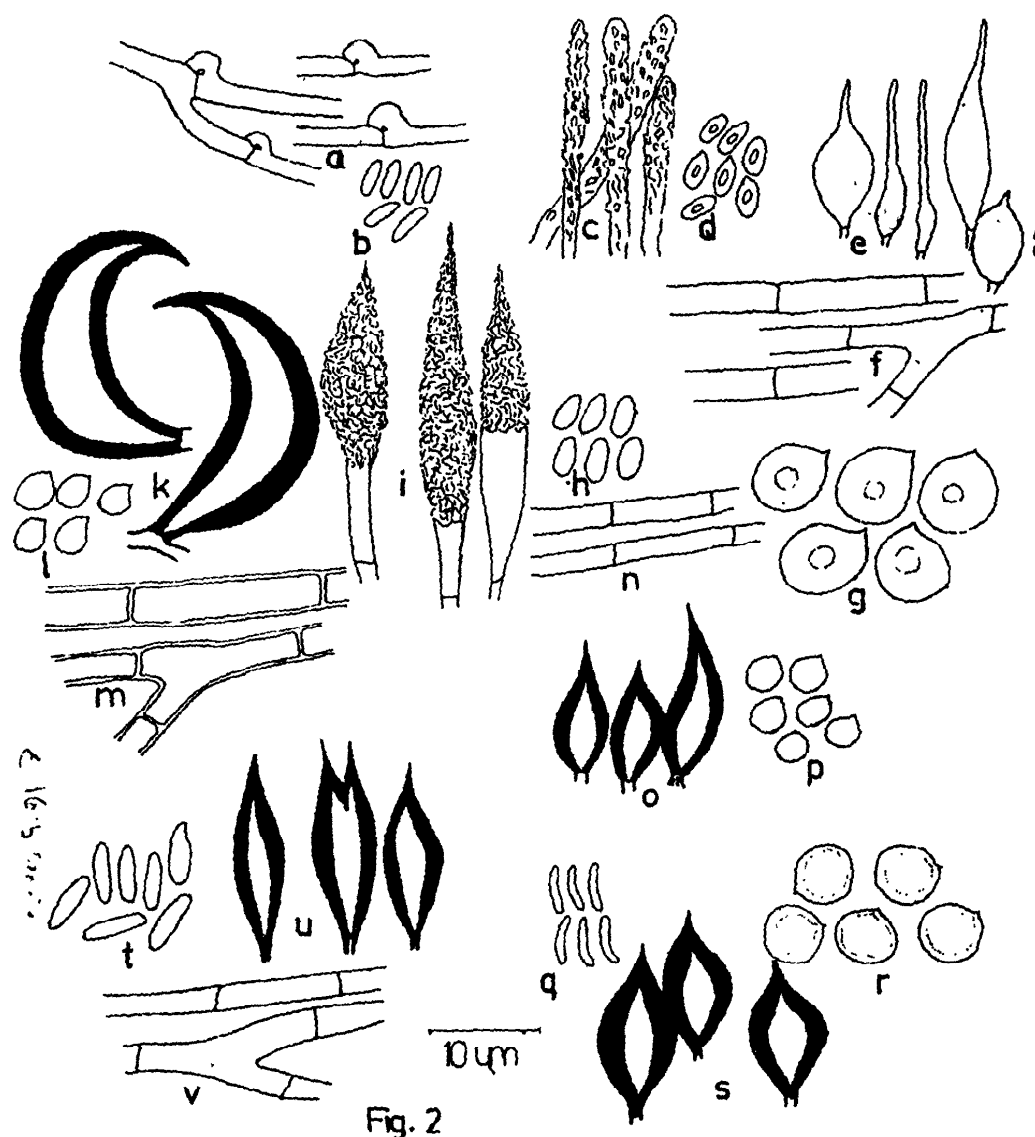


Fig. 2

Fig. 2. *Ceriporiopsis gilvescens* (J61792) a. generative hyphae. b. spores; *Incrustoporia carneola* (J60155). c. incrustated skeletal hyphae. d. spores; *Pyrrhoderma sendaiense* (J78331). e. cystidioles. f. generative hyphae. g. spores; *Oxyporus spiculifer* (J60809). h. spores. i. incrustated cystidia. n. generative hyphae; *Inonotus hamusetulus* (J60994). m. generative hyphae. k. setae. l. spores; *Phellinus laevigatus* (J61635). o. setae. p. spores. *Phellinus nigricans* (J61257). r. spores. s. setae; *Inonotus flavidus* (J78322). t. spores. u. setae. v. generative hyphae; *Antrodia odora* (J61239) q. spores.

Hymenochaete mougeotii (Fr.) Cooke

On *Larix* (6), 60160 (CAL); white rot of hardwoods and conifers.

Hymenochaete villosa (Lev.) Bres.

On *Quercus* (11) 61155 (CAL); white rot.

Inonotus circinatus (Fr.) Gilbn.

On living *Abies* (9), 61138 (CAL); and *Picea* (7), 60133 (CAL); white pocket rot of heartwood.

I. cuticularis (Bull. : Fr.) Karst.

On living *Quercus* (7), 60164 (CAL); white stringy rot with black zones in the heartwood.

I. diverticuloseta Peg.

On hardwood (14), 61169 (CAL); white rot.

Pegler (1967) described this species from among the collections of Bagchee which Bagchee *et al.*, (1954) had identified as *I. nothofagi* Cunn.

I. dryadeus (Pers. : Fr.) Murr.

On *Quercus* (7), 60141 (CAL); white rot of heartwood in butts and roots.

I. dryophilus (Berk.) Murr.

On *Quercus* (7), 61141 (CAL); white rot of heartwood.

I. flavidus (Berk.) Ryv. (Fig. 2 t.u.v)

Mycotaxon 20, 145, 1984.

Fruitbody annual, pileate, closely imbricate, light in weight on drying, applanate to convex, 10-40 mm broad, 30-100 mm long and up to 10 mm thick at the base; surface brown to fulvo-

ferruginous, soft velutinate to tomentose, soon glabrous in narrow concentric zones, subcrusty, radially wrinkled on drying, margin thin and bent down in dry condition; pore surface coffee brown; pores 4-6 mm; tubes concolorous with pore surface; context 1-3 mm thick, golden brown, brittle on drying, with a distinct black line below the upper tomentum; hyphae monomitic, generative hyphae simple septate, 2-3.5 μ m wide; setae numerous, 15-25 (30) x 4.5-5-8 μ m, dark brown, ventricose, rarely dichotomously branched at the apex; spores cylindrical, apiculate, 5-7 x 2-2.5 μ m, hyaline to pale yellow, nonamyloid.

Collections examined : On *Betula* (9), 78322 (CAL, O. SAFC); on *Quercus* (4, 10); 60162, 61162 (CAL); white pocket rot.

I. flavidus is an unusual species of *Inonotus* because of its apiculate cylindrical spores. This species was described by Imazeki (1943) as *I. sciurinus* Imaz. growing on *Acer* and Ryvarden (1977, 1984) from Nepal on *Rhododendron*. However, in India it is common on dead hardwoods at higher altitudes.

I. glomeratus (Peck) Murr.

On hardwood (6), 60115 (CAL), O; white rot.

I. hamusetulus Ryv. (Fig. 2k, l, m)

Mycotaxon 20, 145, 1984.

Fruitbody annual, pileate, up to 80 mm broad, 120 mm wide and 50-80 mm thick; pileus dimidiate to conchate, sometimes appearing substipitate; surface velutinate-tomentose when young, soon glabrous with concentric sulcate zones, radially wrinkled on drying; pore surface dark to deep brown, darkening on bruising; pores 6-8

per mm; context duplex with a black line below the upper tomentum; hyphae monomitic generative hyphae pale brown, simple septate, 2.5 to 3.5 μ m wide; setae scattered to numerous, straight to hooked, dark brown, 20-30 (4) x 8-12 μ m, ventricose; spores pale brown, nonamyloid, subglobose, 4-4.5 x 3-3.5 μ m.

Collections examined: On *Quercus* (7), 60994 (CAL, O, BAFC); on *Quercus* 4,6; 61136, 61662 (CAL); white rot of the heartwood of living trees.

The closest relative of *I. hamusatulus* is *I. radiatus* as both the species have hooked setae and pale yellowish spores. But the latter has smaller fruitbodies with bright yellow margin, larger spores (5-7 x 4-4.5 μ m) and pores (2-4 per mm). This is the first record of this species outside Nepal.

Inonotus hispidus (Bull. : Fr.) Karst.

On *Abies* (4), 611129 (CAL); white rot.

I. radiatus (Sow. : Fr.) Karst.

On *Betula* (18), 60142 (CAL, O, BAFC); white pocket rot.

I. tenuicarnis Peg. & Reid

On *Betula* (18), 61160 (CAL); *Betula* (17) 61247 (CAL, O, BAFC); white rot. This is a common species on *Betula*. Pegler (1964) reported it from India.

I. tomentosus (Fr.) Teng.

On coniferous wood (9), 61180 (CAL); white pocket rot.

Phellinus allaridii (Bres.) Ryv.

On living *Quercus* (11), 61154 (CAL); white pocket rot of heartwood.

P. contiguus (Fr.) Pat.

On living hardwood (6), 61157 (CAL); white fibrous rot.

P. extensus (Lev.) Pat.

On living *Prunus* (6), 61149 (CAL, O); *Quercus* (7), 61151 (CAL); white rot of heartwood.

P. gilvus (Schw.) Pat.

On hardwood (3), 61152 (CAL); white rot.

P. igniarius (Fr.) Quel.

On *Abies* (16), 61158 (CAL) white rot.

P. johnsonianus (Murr.) Ryv.

On hardwood (10), 61182 (CAL); white rot.

P. laevigatus (Fr. : Karst.) Bourd. & Galz. (Fig 2 O,p)

Hymen, Fr. P. 624, 1928.

Fruitbody resupinate, adnate; pore surface coffee brown, deeply cracked with age; pores 6-8 per mm; margin broad, shining black with age; context reddish brown, 1-3 mm, thick, indistinctly stratified; hyphae dimitic, generative hyphae septate, skeletal hyphae parallel in trama; setae abundant, ventricose to subulate, 15-25 (30) x 5-7 μ m; spores hyaline to pale yellow, 3.5-4.5 x 2-3 μ m.

Collections examined: On *Betula* (18), 61231 (CAL, O, BAFC); on *Betula* (17), 61535 (CAL); white laminated rot. Reported by Mitter and Tondon (1937) as *Poria lacrigata* Fr.

P. merillii (Murr.) Ryv.

On hardwoods (8), 61187 (CAL); white pocket rot.

Phellinus nigricans (Fr.) Karst. (Fig. 2 r. s)

Soc. Fauna Flora Fenn. 1 : 134, 1899.

Fruitbody perennial, pileate, triquetrous, 30-70 cm broad, 50-100 mm and 10-30 mm thick at the base; surface black, sulcate with numerous narrow concentric zones, cracking near the base; margin acute and broad; pore surface dark rusty brown, tubes indistinctly stratified up to 10 mm thick deep; context dense, up to 10 mm thick; hyphae dimitic, generative hyphae hyaline and simple septate, 2-3 μ m wide; skeletal hyphae brown intertwined in trama; setae numerous, subulate to ventricose, dark brown, 12-20 (24) $\times$ 4-7 μ m; spores globose to subglobose, thick walled (5.5-6.7 $\times$ 5-6.5 μ m).

Collections examined : On *Betula* (17), 61257 (CAL, O); On *Betula* (18) 61237 (CAL, O, BAFC); on *Betula* (10), 61253 (CAL), white rot.

P. nigricans, **P. laevigatus** and **P. igniarius** are very close and can be separated as follows :

P. nigricans P. laevigatus P. igniarius

Pileate	Resupinate	Effused -reflexed to pileate.
Pilear surface black	Same	Greyish black
Margin obtuse	Acute to obtuse	Obtuse
Skeletal hyphae in trama intertwined	Parallel	Intertwined.
Spores 6-7 $\times$ 5-6 μ m walls thick upto 1 μ m	Spores 4-5 $\times$ 3-4 μ m thin walled	Spores 5-7.5 $\times$ 4-6 μ m slightly thick walled
On <i>Betula</i>	same	<i>Abies</i> and other deciduous trees

P. pini (Fr.) Ames

Living *Picea* (6), 60157 (CAL); *Pinus* (60), 60132 (CAL); white pocket rot of standing and fallen trees.

P. portoricensis (Overh.) Fidalgo

On hardwoods (6), 61052 (CAL); white rot.

P. robustus (Karst.) Bourd. & Galz.

On *Larix* (7), 61106 (CAL); *Abies* (4), 61154 (CAL); white rot of heartwood in the butt and roots.

P. sanfordii (Lloyd) Ryv.

On *Rhododendron* (4), 61122 (CAL); on *Betula* (8), 61226 (CAL, O); white spongy rot.

P. scruposus (Fr.) Cunn.

On hardwoods (6), 61124 (CAL); while fibrous rot.

P. xeranticus (Berk.) Pegler

Common on *Quercus* (7), 60147 (CAL); white pocket rot.

Phylloporia weberiana (Bres. & Henn. : Sacc.) Ryv.

On living *Quercus* (6), 60119 (CAL); dead hardwoods (3), 60437 (CAL); yellow conks.

Pyrrhoderma sendaiense (Yas.) Imaz.

(Fig. 2e, f, g). Trans. Mycol. Soc. Japan 7:3, 1966.

Fruitbody perennial, pileate, solitary, pileus applanate to reniform with a lateral, crusty, irregular stipe, 80-100 mm long, 60-80 mm wide and up to 15 mm thick at the base, surface dull, gray to brownish

black, smooth with a thick crust, sulcate with narrow concentric zones; margin obtuse, pore surface deep brown; pores round, 5-6 per mm; context yellowish brown, 10-15 mm thick at the base, delimited on the upper side by a thick crust becoming thinner towards the margin; hyphae monomitic, generative hyphae golden brown, thick walled rarely branched, simple septate, 4-8 μm wide; cystidioles present, clavate or pyriform to ventricose-mucronate or bottle shaped with tips protruding up to 30 μm beyond the hymenium and with age these tips elongate into long hyphae filling the tubes with dense white tangle; setae absent or rare, ventricose, dark brown, 15-25 x 6-10 μm ; basidia hyaline, clavate, 4-spored; spores globose to subglobose, 6-8.5 μm in diam., darkening in KOH, nonamyloid.

Collections examined : On living *Quercus* (6), 78331 (CAL); on living *Acer* (2) 60532 (CAL, BAFC); white rot of heartwood.

The genus *Pyrrhoderma* Imaz. was proposed by Imazeki (1966) to accommodate two species of polypores i.e. *P. adamantinum* (Berk.) Imaz. (= *Polyporus adamantinus* Berk.) and *P. sendaiense*, the latter being the type species and endemic to Japan. Both these species have a palisadodermous, well differentiated, thick crust and hyaline spores. There are however, many differences between the two species. *P. adamantinum* is sessile with a thick crust which cracks both longitudinally and radially, spores are globose to drop shaped (5-6.6 μm in diam.); cystidioles absent and above all the hyphae are dimitic. These characters show that the species is better placed under the genus *Phellinus*. In contrast *P. sendaiense* with a smooth crust,

monomitic hyphae, large globose spores and cystidioles in the hymenium remains the type species of the new monotypic genus *Pyrrhoderma*.

Vararia ochroleuca (Bourd. & Galz.)
Donk

On *Betula* (6), 61245 (CAL); white rot.

V. pallescens (Schw.) Rogers

On *Quercus* (9), 60140 (CAL); white rot.

POLYPORACEAE

Antrodia albida (Fr.) Donk

On hardwoods (5), 60136 (CAL); white spongy rot.

A. lenis (Karst.) Ryv.

On *Abies* (13), 61139 (CAL, O, BAFC); white spongy rot.

A. lindbladii (Berk.) Ryv.

On *Abies* (8), 61150 (CAL, O) white stringy rot.

A. odora (Peck : Sacc.) Gilbn. & Ryv. (fig. 2q)

Mycotaxon 22 : 363, 1985.

Fruitbody annual, resupinate, 3-4 mm thick, watery with a strong garlic odour when fresh, hard and brittle on drying, tubes up to 2 mm deep; hyphae dimitic, generative hyphae with clamps. 2-3 mm μm wide; skeletal hyphae dominating; cystidioles present; spores 4-5.5(6) x 1.5 μm , allantoid.

Collections examined : On hardwood (13), 61239 (CAL); on *Rhododendron* (8), 61227 (CAL, O, BAFC); brown cuboidal rot.

The strong garlic like odour of basidiocarps and allantoid spores are diagnostic features.

Antrodiella semisupina (Berk. & Curt.)

Ryv.

On *Quercus* (7), 61176 (CAL).**Bjerkendera adusta** (Fr.) Karst.On hardwoods (7), 61153 (CAL); on *Abies* (3), 61115 (CAL); white fibrous rot.**Bondarzewia berkeleyi** (Fr.) Bond. &

Sing.

On living *Quercus* (6), 61156 (CAL); (9), 61174 (CAL).**Ceriporia xylostromatoides** (Berk.) Ryv.On *Picea* (3), 61171 (CAL, O).**Ceriporiopsis gilvescens** (Bres.) Dom
[fig 2. a,b]

Fruitbody annual, resupinate, widely effused, waxy soft when fresh brittle hard on drying, 1-3 mm thick; pore surface pinkish yellow, yellowish brown where touched; pores 5-6 per mm; context thin, whitish; hyphae monomitic, generative hyphae with clamps; cystidioles present; spores oblong-ellipsoid to cylindrical, 3.5-5 x 1.5-2 μ m.

Collections examined : On hardwood (16), 61192 (CAL, O, BAFC); on *Picea* (13), 61792 (CAL); on *Rhododendron* (8), 61382 (CAL).

Daedalea incana (Lev.) Ryv.On *Quercus* (7), 61166 (CAL, O); on *Pseudotsuga* (3), 61177 (CAL); brown cuboidal rot.**Daedaleopsis confragosa** (Bott. : Fr.)

Schroet.

On hardwood (6), 61178 (CAL); white rot.

D. purpurea (Cooke) Imaz. & AoshimaOn *Quercus* (6), 60246 (CAL, O, BAFC); white rot.**Fomes fomentarius** (L. : Fr.) Kick.On *Quercus* (6), 61162 (CAL); white spongy rot.**Fomitopsis officinalis** (Vill. : Fr.) Bond. & SingOn *Abies* (6), 61132 (CAL); brown rot.**F. pinicola** (Swartz : Fr.) Karst.On *Picea* (6), 61146 (CAL); brown cuboidal rot.**F. rosea** (Alb. et. Schw. : Fr.) Karst.On *Abies* (7), 61151 (CAL); brown cuboidal rot.**Gloeophyllum carbonarium** (Berk. & Curt.) Ryv.On *Abies* (4), 61148 (CAL) brown cuboidal rot of charred and burnt wood.**G. subferrugineum** (Berk.) Bond. & Sing.On *Abies* (9), 61140 (CAL); brown cuboidal rot.**Heterobasidion insulare** (Murr.) Ryv.On *Abies* (3), 61164 (CAL); white stringy rot.**Incrustoporia carneola** (Bres.) Ryv.

Norw. J. Bot. 19 : 232. 1972. (Fig. 2. c, d.)

Fruitbody annual, resupinate, adnate, 1-3 mm thick, resinous hard on drying; margin myceloid; pores angular to splitting with age, 2-5 per mm; tubes concolorous with pore surface; context medium brown; hyphae dimitic, generative hyphae with clamps, skeletal hyphae dominating, finely encrusted especially near the pore mouths; cystidia none; spores broadly ellipsoid, 3.5-5 x 2-2.5 μ m.

Collections examined : On hardwood (11), 60155 (CAL); on *Quercus* (12), 61114 (CAL).

The resupinate basidiocarps, pale yellowish pore surface, broadly ellipsoid spores and encrusted skeletal hyphae make this taxon distinct.

Irpex lacteus (Fr. : Fr.) Fr.

On *Quercus* (2) 61144 (CAL); white fibrous rot.

Junghunia collabens (Fr.) Ryv.

On *Abies* (9), 60145 (CAL); on *Larix* (14), 61130 (CAL); white fibrous rot.

Lenzites acuta Berk.

Common on hardwoods (1), 60170 (CAL); white stringy rot.

L. betulina (Fr.) Fr.

On *Quercus* (6), 60173 (CAL); white stringly rot.

Microporus xanthopus (Fr.) Kunt.

On *Quercus* (6), 60188 (CAL); white fibrous rot.

Oligoporus fragilis (Fr.) Gilbn. & Ryv.

On *Abies* (3), 80155 (CAL); brown cuboidal rot; most common species of *Abies*-zone.

Oxyporus cervino-gilvus (Jungh.) Ryv.

On hardwoods (6), 60177 (CAL); white stringy rot.

O. placentus (Fr.) Gilbn. & Ryv.

On *Abies* (10), 61170 (CAL); brown cuboidal rot.

O. populinus (Fr.) Donk

On *Quercus* (16), 61195 (CAL); white rot.

O. ravidus (Fr.) Bond. & Sing.

On *Abies* (3), 61184 (CAL); *Larix* (6), 61284; (CAL); white stringy rot.

O. spiculifer (Cunn.) Buch. & Ryv. (Fig. 2. h,i,n)

Mycotaxon 31 : 28, 1988.

Fruitbody annual, widely effused, hard brittle on drying, up to 8 mm thick; pore surface white to yellowish pink, medium brown on drying; pores 1-3 per mm, lacerate with dissepiments torn into tapering spines; context whitish; hyphae monomitic, generative hyphae with septa; cystidia numerous in hymenium, dissepiments and context, typically ventricose with swollen bases and tapering apices, 30-90 x 5-10 μ m at the base, encrusted in the upper part; spores broadly ellipsoid, 3.5-5 x 2.5-3 μ m.

Collections examined : On *Schima wallichii* (DC) Choisy (6), 60809. (CAL, O, BAFC); on hardwood (3), 61179 (CAL); white rot.

The spores are slightly larger for the Indian collections as compared to Cunningham (1965). Spore size and ventricose cystidia with long apices separate this species from *O. pellicula* (Jungh.) Ryv. occurring in tropical Africa and Asia. The latter has larger and more broadly ellipsoid spores (6-7 x 3-4.5 μ m).

Pachykytospora papyracea (Schw.) Ryv.

On *Quercus* (6), 61177 (CAL).

Polypores brumalis Fr.

On *Betula* (17), 61188 (CAL); white rot.

P. dictyopus Mont.

On hardwood (9), 61190 (CAL).

P. grammocephalus Berk.

On *Quercus* (2), 60186 (CAL); white stringy rot.

Pseudofavolus miquelii (Mont.) Pat.

On *Betula* (10) 60185 (CAL).

Rigidoporus microporus (Fr.) Ovarreem

On living *Quercus* (6), 60187 (CAL); white rot of heart-wood.

Rigidoporus ulmarius (Fr.) Imaz.

On *Quercus* (6), 60195 (CAL); on *Populus* (7), 60106 (CAL); brown rot of heartwood of living trees.

R. vinctus (Brek.) Ryv.

Common on hardwoods (6), 61198 (CAL); white rot.

Spongipellis delectans (Peck) Murr.

A wound parasite on *Quercus* (6), 60199 (CAL); white spongy rot of heartwood.

S. unicolor (Schw.) Murr.

A wound parasite on *Quercus* (6), 60199 (CAL); white spongy rot of heartwood.

Trametes gibbosa (Pers.) Fr.

On *Quercus* (4), 60197 (CAL); white fibrous rot of heartwood.

T. hirsutus (Wulf.) Pil.

On hardwoods (16), 61212 (CAL); white spongy rot.

T. scabrosa (Pers.) Cunn.

On hardwoods (7), 61206 (CAL) white stringy rot.

T. tephroleuca Berk.

On hardwoods (4), 61292 (CAL); white rot.

T. versicolor (Fr.) Pilat

On *Quercus* (4), 61185 (CAL); white fibrous rot.

Trichaptum abietinum (Fr.) Ryv.

On *Abies* (13), 61194; white spongy rot.

I. biformis (Fr.) Ryv.

On *Quercus* (6), 61201 (CAL); on *Abies* (8); 61216 (CAL); brown stringy rot.

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