

A List of Polypores (Basidiomycotina, Aphyllophorales) Collected in Jumla, Nepal

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Abstract Twenty-four species of polypores are reported from Jumla, Nepal. Three new species, *Pachykytospora nepalensis* T. Hatt., *Phellinus subsanfordii* T. Hatt., *Trichaptum montanum* T. Hatt. are described. *Pachykytospora nepalensis* is characterized by the long tubes (up to 10 mm deep), white and large (2–3/mm) pores, and tuberculate basidiospores measured $8.5\text{--}11.5 \times 4.5\text{--}6.5\ \mu\text{m}$. *Phellinus subsanfordii* is characterized by the duplex context with a thin crust, scattered hyphoid setae, and subglobose and almost colorless basidiospores. *T. montanum* is characterized by the duplex context with white and fibrous tomentum, tubular hymenophore with regular pores, and cylindrical basidiospores measured $5.2\text{--}6.5 \times 1.2\text{--}2.0\ \mu\text{m}$.

Key words: Nepal, new species, *Pachykytospora nepalensis*, *Phellinus subsanfordii*, polypores, *Trichaptum montanum*.

Introduction

Berkeley (1851a; 1851b; 1854a; 1854b) described a number of polypores from Himalayas based on the specimens collected by W. J. Hooker. Imazeki *et al.* (1966) reported 21 polypores and several other fungi from Sikkim and other Himalayan areas. Rattan (1977) reported 198 species of resupinate Aphyllophorales fungi from the North Western Himalayas including 16 polypores. Hjortstam & Ryvarden (1984) reported 39 polypores and other corticioid fungi from central areas of Nepal. Recently, Adhikari (2000) made a comprehensive list of macrofungi known from Nepal and listed 136 polypores. However, polypore mycobiota in Nepal and other Himalayan areas is still not well established.

This report provides 24 polypores including 3 new species and 7 species new to Nepal based on the specimens collected in temperate to subalpine

areas (alt. 2,650–3,500 m) of Jumla, a middle west area of Nepal. All specimens examined here were collected by T. Suda, M. K. Adhikari, and Y. Doi, and are deposited in the National Herbarium of Botanical Survey & Herbarium Section, Godawary, Lalitpur, Nepal (KATH), and duplicate specimens in the herbarium of the Department of Botany, National Science Museum, Tokyo (TNS).

List and descriptions

Bjerkandera adusta (Willd. : Fr.) P. Karst.,
Medd. Soc. Fauna Fl. Fenn. 5: 38 (1897).

Distribution: widely distributed in the Northern Hemisphere (Gilbertson and Ryvarden, 1986).

Specimens examined: Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999 (TNS-F-4472), near Chhakalepani, Jumla,

alt. 3,650 m, 14 May 1999 (TNS-F-4473).

Coltricia cinnamomea (Pers.) Murrill, Bull. Torr. Bot. Cl. 31: 343 (1904).

Distribution: cosmopolitan (Ryvarden & Gilbertson, 1993).

Specimen examined: Deepal Goan, Jumla, alt. 2,650 m, 10 May 1999 (TNS-F-107767).

Fomitopsis aff. **cajanderi** (P. Karst.) Kotl. & Pouzar, Česká Mykol. 11: 157 (1957).

The specimen indicated above likely to represents *F. cajanderi*, but we tentatively leave this as *F. aff. cajanderi* because it is sterile and might be *F. rosea* (Alb. & Schwein. : Fr.) P. Karst., an allied species with differently shaped basidiospores.

Specimens examined: Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999 (TNS-F-4474).

Ganoderma applanatum (Pers.) Pat., Bull. Soc. Mycol. France 5: 67 (1889).

Distribution: cosmopolitan (Gilbertson & Ryvarden, 1986).

Specimen examined: Near Chhakalepani, Jumla, alt. 3,650 m, 14 May 1999 (TNS-F-4475).

Gloeophyllum protractum (Fr.) Imazeki, Bull. Tokyo Sci. Mus. 6: 75 (1943).

Distribution: widely distributed in the boreal areas of the Northern Hemisphere (Gilbertson & Ryvarden, 1986). This is the first report of this species from Nepal.

Specimen examined: Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999 (TNS-F-107797).

Gloeophyllum sepiarium (Fr.) P. Karst., Finl. Hattsv. 2: 80 (1879).

Distribution: widely distributed in the boreal areas of the Northern Hemisphere (Gilbertson & Ryvarden, 1986).

Specimens examined: Ditachaur, Tyanki Khoncha, Jumla, alt. 2,650 m, 9 May 1999 (TNS-F-107761; 107762; 4476).

Heterobasidion insulare (Murrill) Ryvarden, Norw. J. Bot. 19: 237 (1972).

Distribution: From Nepal to Far East Russia, China, and Japan (Núñez & Ryvarden, 2001).

Specimen examined: between Bhorgaon Khola & Tharpu Dhunga, Jumla, alt. 2,800–3,200 m, 17

May, 1999 (TNS-F-4477).

Inonotus obliquus (Pers.: Fr.) Pilát, Atl. Champ. Eur. III: 572 (1942).

Distribution: widely distributed in the boreal areas of the Northern Hemisphere (Gilbertson & Ryvarden, 1986).

Specimen examined: Near Chhakalepani, Jumla, alt. 3,650 m, 14 May 1999 (TNS-F-4486).

Inonotus triqueter (Fr.) P. Karst., Rysslands och Finlands. Basidsv. 2: 73 (1881).

Distribution: temperate areas of the Northern Hemisphere (Núñez & Ryvarden, 2000). This is the first report of this species from Nepal. In Central Asia, also known from Pakistan (Hattori & Murakami, 1993).

Specimen examined: Deepal Goan, Jumla, alt. 2,650 m, 10 May 1999 (TNS-F-4478).

Ischnoderma benzoinum (Wahlenb. : Fr.) P. Karst., Acta Soc. Fauna Fl. Fenn. 2: 32 (1881).

Distribution: widely distributed in the boreal areas of the Northern Hemisphere (Ryvarden & Gilbertson, 1993).

Specimen examined: Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999 (TNS-F-4479).

Lenzites cf. **acutus** Berk., London J. Bot. 1: 146 (1842).

Remarks: This resembles *L. acutus*, a tropical Asian species and *L. warnieri* Durieu & Mont., a southern European species. It is unclear if this is a distinct species or only a subalpine form of *L. acutus* or *L. warnieri* both with southern distributions. For the time being, we prefer to leave this as *L. cf. acutus*.

Specimen examined: Thamikanda-Chhakale Pani, Jumla, alt. 3,000–3,600 m, 12 May 1999 (TNS-F-4480).

Oligoporus cf. **caesius** (Schrad. : Fr.) Gilb. & Ryvarden, Mycotaxon 22: 365 (1985). Fig. 1

Basidiocarps sessile. Pilei dimidiate, fused then elongated, applanate to convex; pileus surface glabrous, powdery, azonate to subzonate, pale orange to grayish, partly darker; pileus margin thin and acute, inrolled, almost entire. Context fibrous-chalky, brittle, white, up to 1.5 mm thick. Tubes chalky, grayish, up to 3 mm deep.

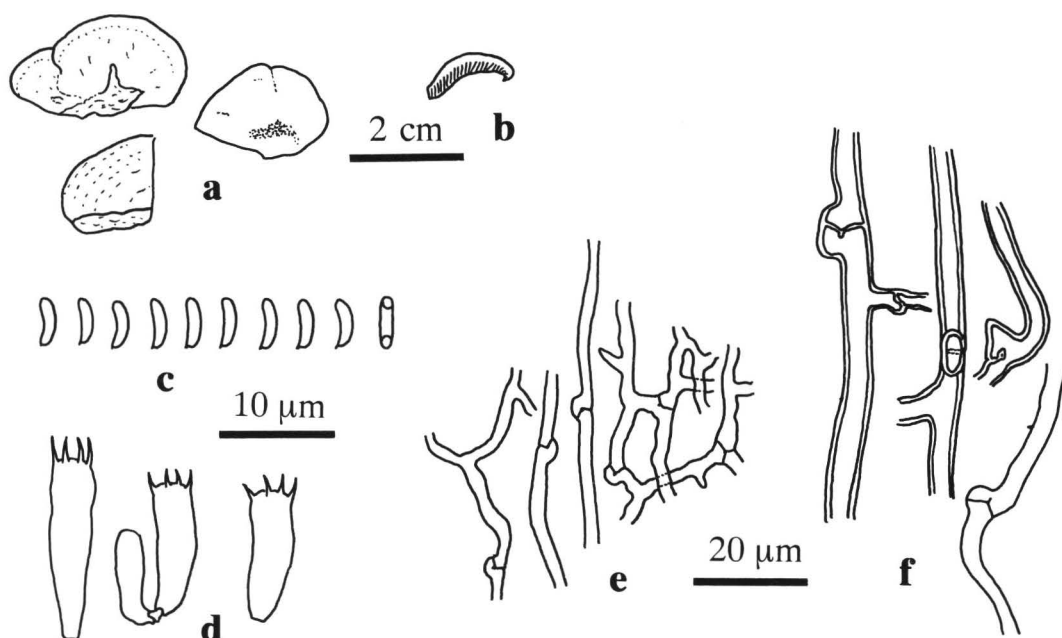


Fig. 1. *Oligoporus* cf. *caesius* (Schröd. : Fr.) Gilb. & Ryvarden (TNS-F-4481) a. Upper view of basidiocarps. b. Section view of basidiocarp. c. Basidiospores. d. Basidia. e. Generative hyphae from trama. f. Generative hyphae from context.

Pore surface grayish, pores angular to round, 6–8/mm, dissepiments thin and entire. Taste mild.

Trama hyphal system monomitric: generative hyphae hyaline, IKI-, with clamp-connections, some conspicuously branched, 1.5–2.5 µm wide, swelled in KOH solution. Context hyphae monomitric: generative hyphae with large loop-like clamp-connections, often branched with right angles, 2–5 µm wide. Basidia clavate, 4-sterigmate, 12–15 × 3.5–4 µm. Basidiospores allantoid, bent, hyaline, IKI-, 4–4.5 × 1–1.2 µm, Q (length/width ratio)=3.6–4.1.

Type of rot unknown.

Remarks: This specimen is similar to *O. caesius* in the grayish tubes and allantoid basidiospores, but distinct by the fibrous-chalky context, smaller pores (3–6/mm in typical form of *O. caesius*) and smaller basidiospores (4.5–6 × 1.5–2 µm in *O. caesius*). *Oligoporus caesius* is a variable species, and for the time being we prefer to leave this as *O. cf. caesius* because it is difficult to judge if it is a distinct species only by a single specimen.

Specimen examined: Thamikanda-Chhakale Pani, Jumla, alt. 3,000–3,600 m, 12 May 1999 (TNS-F-4481).

***Pachykytospora nepalensis* T. Hatt., sp. nov.**

Fig. 2

Basidiocarpia resupinata. Caro suberosa, alba. Tubi suberosi. Pori albi vel cremei, 2–3/mm. Systema hypharum dimiticum; hyphae generativae fibulatae; hyphae skeletales haud dextrinoideae. Sporae ellipsoideae, tuberculares, hyalinae, haud dextrinoideae, 8.5–11.5 × 4.5–6.5 µm.

Etymology: Latin, *nepalensis*=Nepalese, occurring in Nepal.

Holotype: NEPAL, Jumla, near Chhakalepani, alt. 3,650 m, 14 May 1999 (KATH; isotype in TNS-F-4482).

Basidiocarps fully resupinate. Context corky, white, up to 1 mm thick. Tubes corky, pale orange, up to 10 mm deep. Pore surface whitish to cream; pores angular to round, partly elongated, 2–3/mm, dissepiments entire.

Trama hyphal system dimitic: generative hyphae hyaline, IKI-, thin-walled, occasionally

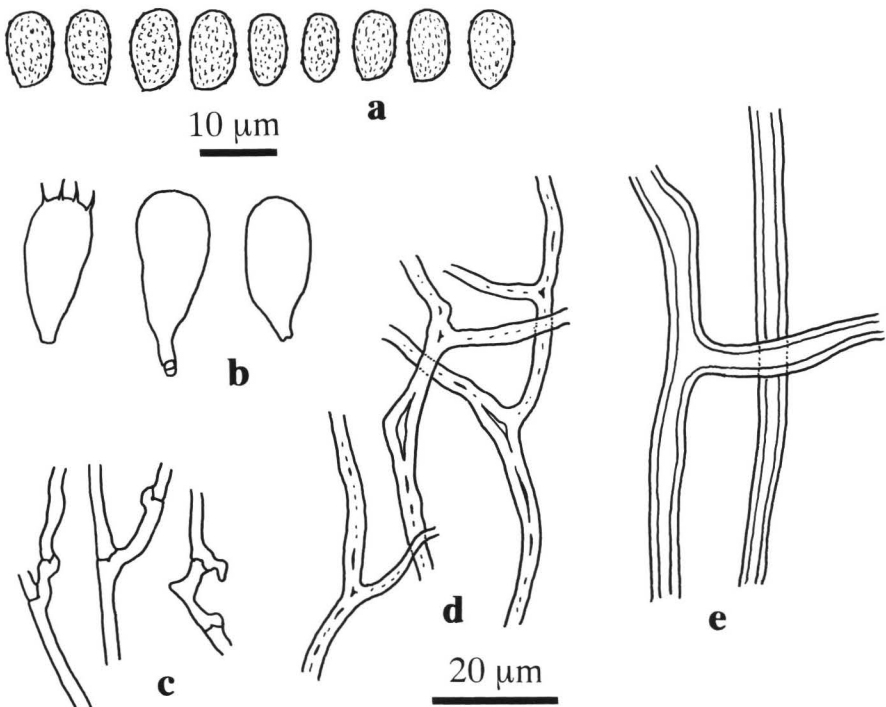


Fig. 2. *Pachykytospora nepalensis* T. Hatt., sp. nov. (TNS-F-4482, isotype) a. Basidiospores. b. Basidia. c. Generative hyphae from trama. d. Skeletal hyphae from trama. e. Skeletal hyphae from context.

branched, with clamp connections, 1.5–3 µm wide; skeletal hyphae hyaline, IKI-, unbranched to arboriform, thick-walled (up to 2 µm thick), 2–6 µm wide; context hyphae dimitic: generative hyphae 2.5–4 µm wide; skeletal hyphae up to 7 µm wide, otherwise similar to context hyphae. Cystidia not seen. Basidia ellipsoid to short cylindrical, 4-sterigmate, 18–25×6–10 µm. Basidiospores ellipsoid to short cylindrical, hyaline, IKI-, ornamented with fine warts, 8.5–11.5×4.5–6.5 µm, Q (length/width ratio)=1.6–1.9.

Attached with a white rot.

Distribution: Known only from the type material.

Remarks: This species is characterized by the combination of thick basidiocarps, white and large (2–3/mm) pores, skeletal hyphae with non-amyloid and non-dextrinoid reaction, and relatively small basidiospores (8.5–11.5 µm long) within the genus. *Pachykytospora tuberculosa* (Fr.) Kotl. & Pouzar also has thick basidiocarps, but distinct from *P. nepalensis* by the dextrinoid

skeletal hyphae, longer basidiospores, and usually darker pore surface (Kotlaba & Pouzar, 1979; Ryvarden & Gilbertson, 1994). *Pachykytospora subtrametea* (Pilát) Kotl. & Pouzar is also similar, but has smaller pores and partly amyloid skeletal hyphae (Kotlaba & Pouzar, 1979).

Six species of *Pachykytospora* have been already reported from Asia (Kotlaba & Pouzar, 1979; Natarajan & Kolandavelu, 1993; Núñez & Ryvarden, 2001; Zheng & Bi, 1989). A key to the Asian species of *Pachykytospora* is shown below.

A key to the Asian species of *Pachykytospora*

- 1. Pores 3–6 per mm 2
- 1. Pores 1–3(–4) per mm or larger 4
- 2. Basidiospores 12–17×6–7.5 µm, with longitudinal to reticulate ridges, IKI-; basidiocarps annual, pores round, 4–5/mm, pore surface light yellow to brownish orange; skeletal hyphae IKI-; known from India. . .

- *P. thindii* Natarajan & Koland.
2. Basidiospores up to 12 μm long, ornamented with fine echinulae or warts 3
3. Basidiocarps perennial; pores angular to round, 3–5/mm, pore surface white to ochraceous; skeletal hyphae non-dextrinoid, partly amyloid; basidiospores ornamented with fine warts, weakly dextrinoid, 9–11.5 $\times$ 5.5–6 μm ; known from Russia (Siberia).
- *P. subtrametea* (Pilát) Kotl. & Pouzar
3. Basidiocarps annual; pores angular to round, 4–6/mm, pore surface ochraceous buff; skeletal hyphae IKI-; basidiospores echinulate tending to be in longitudinal rows, IKI-, 9.5–12.5 $\times$ 4–5.5 μm ; known from tropical to warm temperate areas of Asia and N. America.
- *P. alabamae* (Berk. & Cooke) Ryvar den
4. Basidiospores 8.5–11.5 $\times$ 4.5–6.5 μm , ornamented with fine warts, IKI-; pores angular to round, partly elongated, (1–)2–3/mm, pore surface white to cream; skeletal hyphae IKI-; known only from the type locality (Nepal).
- *P. nepalensis* T. Hatt.
4. Basidiospores 17–21 $\times$ 6–7 μm , at first verrucose then becoming smooth occasionally, IKI-; basidiocarps annual; pores angular to hexagonal, 1–1.5 mm in diam., pore surface white to yellowish; skeletal hyphae IKI-; known only from China (Guangdong Prov.).
- *P. major* G. Y. Zheng & Z. S. Bi
4. Basidiospores 13–18 μm long, pores 2–3 (–4)/mm. 5
5. Basidiocarps annual, thin; pores angular, 2–3 (–4)/mm, pore surface cream to cinnamon buff; context less than 1 mm thick; skeletal hyphae IKI- to weakly dextrinoid; basidiospores echinulate tending to be in longitudinal rows, IKI-, 14–17 $\times$ 6–8 μm ; known from East North America and East Asia
- *P. papyracea* (Schwein.) Ryvar den
5. Basidiocarps annual to perennial, up to 10 mm thick; pores angular to round, 2–3/mm, pore surface cream to brownish; context up to 5 mm thick; context hyphae dextrinoid; basidiospores rough with fine tubercles, IKI-,

13–18 $\times$ 6–8.5 μm ; known from Europe, China and N. America.

..... *P. tuberculosa* (Fr.) Kotl. & Pouzar

Phellinus ferreus (Pers.) Bourd. & Galz., Bull. Soc. Mycol. France 41: 247 (1925).

Distribution: cosmopolitan species (Gilbertson & Ryvar den, 1987). This is the first report of this species from Nepal.

Specimen examined: Near Chhakalepani, Jumla, alt. 3,650 m, 14 May 1999 (TNS-F-107864).

Phellinus himalayensis Y. C. Dai, Acta Bot. Fenn. 166: 97 (1999).

Distribution: Known from China (Lijiang, Yunnan Prov.; Dai, 1999) and Nepal. This is the first report of this species from Nepal, and outside of China.

Remarks: According to Dai (1999), this species is restricted on *Picea likiangensis* in the type locality. The present specimen was on *Abies* sp.

Specimen examined: Near Chhakalepani, Jumla, alt. 3,650 m, on *Abies* sp., 14 May 1999 (TNS-F-4483).

Phellinus subsanfordii T. Hatt., sp. nov. Fig. 3

Basidiocarpia effusoreflexa, perennia. Pilei velutini, sulcati, brunnei. Caro duplex, crustosa, brunnea. Tubi stratosi, suberosi. Pori brunnei, 5–6/mm. Systema hypharum dimiticum. Setae hyphoideae, aculeatae, sparsae, usque ad 10 μm latae. Sporae subglobose, hyalinae, haud dextrinoideae, 5.5–6.5 $\times$ 4.5–5.5 μm .

Etymology: Latin, *subsanfordii*=similar to *P. sanfordii* (Lloyd) Ryvar den, refers to the macroscopic characters of the basidiocarps with sulcate pileus surface and duplex context with a thin crust.

Holotype: NEPAL, Jumla, Bhotel Pipal, Chausandra Khola, alt. 2,700–2,900 m, 11 May 1999 (KATH; isotype in TNS-F-4486).

Basidiospores effused-reflexed (holotype probably developed underside of the substratum), perennial. Pilei semicircular to irregular, pileus surface velutinous, subsilky, sulcate, brown, pileus margin thin and acute, mostly entire. Context duplex with upper tomentum and lower

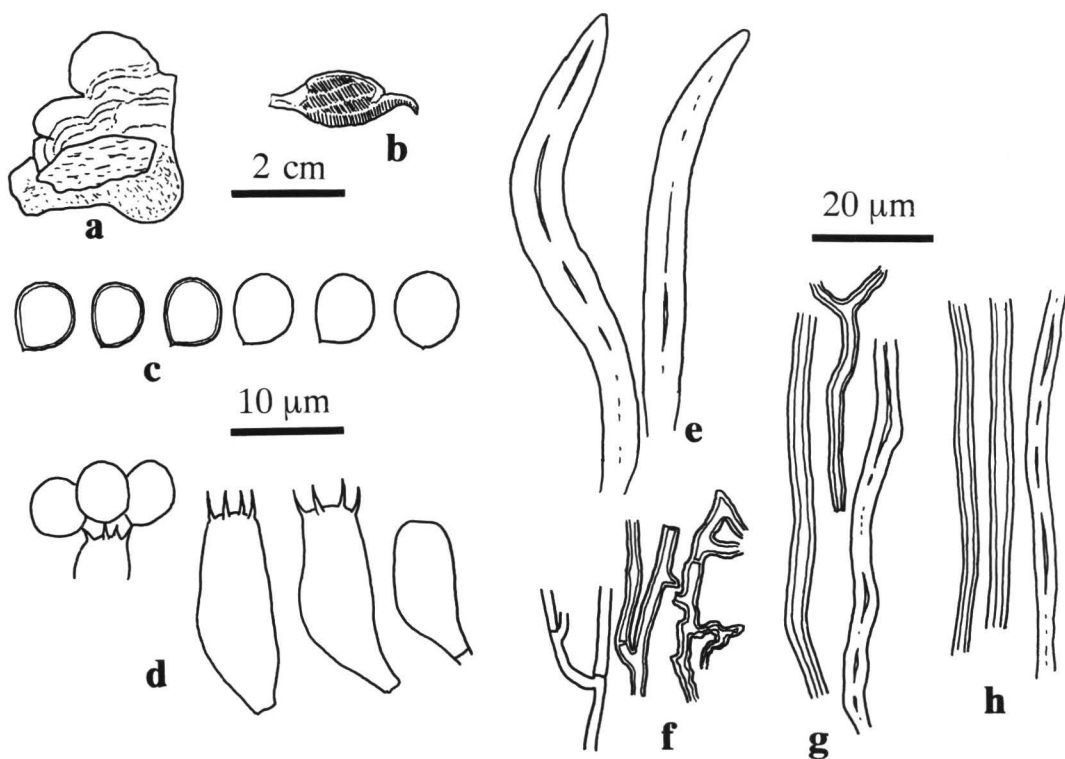


Fig. 3. *Phellinus subsanfordii* T. Hatt., sp. nov. (TNS-F-4486, isotype) a. Upper view of basidiocarp. b. Section view of basidiocarp. c. Basidiospores. d. Basidia. e. Setae. f. Generative hyphae from trama. g. Skeletal hyphae from trama. h. Skeletal hyphae from context.

zone: tomentum soft-fibrous, brown, up to 0.5 mm thick; lower zone leathery, brown, up to 2/3 mm thick, with a thin and black crust under the tomentum (but partly obscure). Tubes stratified, corky, up to 3 mm deep in each layer. Pore surface brown, slightly shining, pores angular to round, 5–6/mm, dissepiments entire.

Trama hyphal system dimitic: generative hyphae without clamp-connections, thin-walled, hyaline to yellow, 1.5–2.5 µm wide; skeletal hyphae unbranched to branched, thick-walled (up to 2 µm thick), brown, 2.5–4.5 µm wide; non-agglutinated but not easily squashed in KOH solution. Context skeletal hyphae unbranched and almost straight, otherwise context hyphae almost similar to trama hyphae. Setae sparse, hyphoid, pointed, arising from trama and project into hymenium, up to 10 µm wide and 100 µm long, not seen in context. Basidia clavate, 4-sterigmate, 13–18 × 5.5–6.5 µm. Basidiospores subglobose,

slightly thick-walled (up to 0.5 µm thick), hyaline to slightly yellowish, occasionally brownish in old tubes, IKI-, weakly cyanophilous, 5.5–6.5 × 4.5–5.5 µm, Q (length/width ratio)=1.1–1.2.

Attached with a white rot.

Distribution: Known only from the holotype.

Remarks: This species is peculiar with the combination of thin crust under the tomentum, pointed hyphoid setae arising from trama, and subglobose and hyaline basidiospores without dextrinoid reaction. This is somewhat similar to the members of subgen. *Phellinidium* Kotl. by occurrence of hyphoid setae and almost hyaline basidiospores. However, the members of *Phellinidium* have monomitic hyphal system and more prominent hyphoid setae both in trama and context (Dai, 1999). This species is more similar to the members of subgen. *Porodaedalea* Y. C. Dai (= *P. pini* comp.) by presence of duplex con-

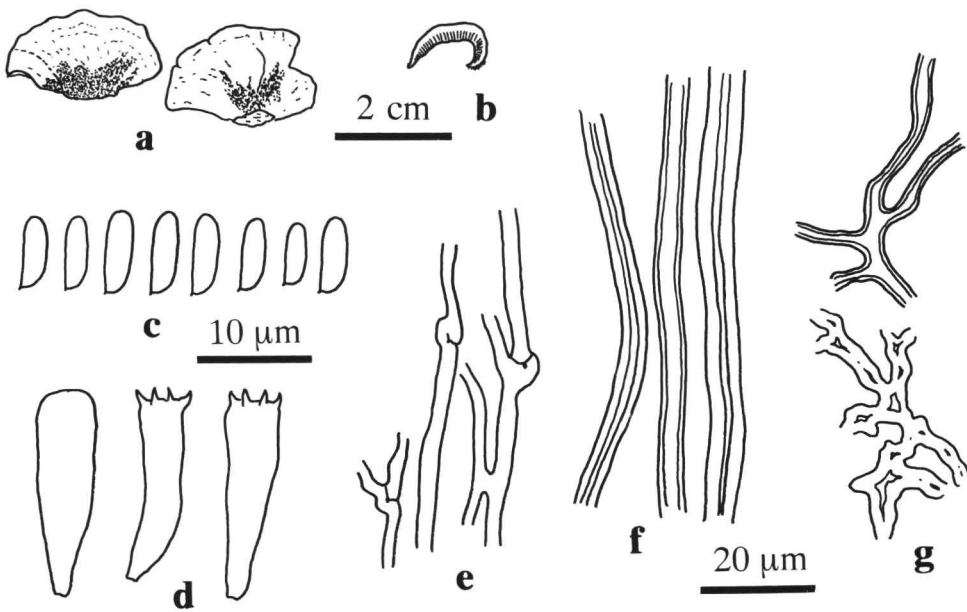


Fig. 4. *Trametes* cf. *pubescens* (Schum. : Fr.) Pilát (TNS-F-107868) a. Upper view of basidiocarps. b. Section view of basidiocarp. c. Basidiospores. d. Basidia. e. Generative hyphae from context. f. Skeletal hyphae from context. g. Binding hyphae from context.

text with a thin crust, long setae arising from trama, and hyaline to pale colored subglobose basidiospores. However, *P. subsanfordii* is distinct by the longer and more hyphoid setae seen in the trama and larger basidiospores that are usually less than $5.5\ \mu\text{m}$ long in *P. pini* comp. (Dai, 1999).

Phellinus tremulae (Bondartsev) Bondartsev & Borissov in Bond., Polyporaceae Eur. USSR and Caucasia, p. 358 (1953).

Distribution: widely distributed in the Northern Hemisphere (Gilbertson & Ryvarden, 1987; Ryvarden & Gilbertson, 1994). This is the first report of this species from Nepal.

Specimen examined: Near Chhakalepani, Jumla, alt. 3,650 m, 14 May 1999, Y. Doi (TNS-F-107859).

Trametes ochracea (Pers.) Gilb. & Ryvarden, North American Polypores vol. 2: 752 (1987).

Distribution: Boreal and temperate areas of the N. Hemisphere (Ryvarden & Gilbertson, 1994). This is the first report of this species from Nepal.

Specimen examined: Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999

(TNS-F-107783).

Trametes* cf. *pubescens (Schum : Fr.) Pilát, Atl. Champ. Europ. 3: 268 (1939). Fig. 4

Basidiocarps sessile. Pilei dimidiate to flabelliform, applanate, up to 35 mm long and 20 mm wide, pileus surface pubescent near the base and margin, otherwise almost glabrous, subzonate, pale orange to light brown, partly with blackish stain, margin eroded, inrolled. Context fibrous-corky, whitish, up to 1.5 mm thick, crust lacking. Tubes whitish near the context, light brown near the pore surface, up to 3 mm deep. Pore surface light brown, pores 3–5/mm, angular, dissepiments thin, eroded.

Trama hyphae trimitic: generative hyphae hyaline, thin-walled, with clamp connections, $1.5\text{--}2\ \mu\text{m}$ wide; skeletal hyphae unbranched, almost straight, hyaline, IKI-, thick-walled to almost solid, $2\text{--}4\ \mu\text{m}$ wide; binding hyphae conspicuously branched, up to $4\ \mu\text{m}$ wide. Context hyphae trimitic: generative hyphae $2\text{--}3.5\ \mu\text{m}$ wide; skeletal hyphae $3\text{--}6\ \mu\text{m}$ wide; otherwise similar to trama hyphae. Basidia clavate, 4-sterigmate, $15\text{--}22 \times 5\text{--}6\ \mu\text{m}$. Basidiospores cylin-

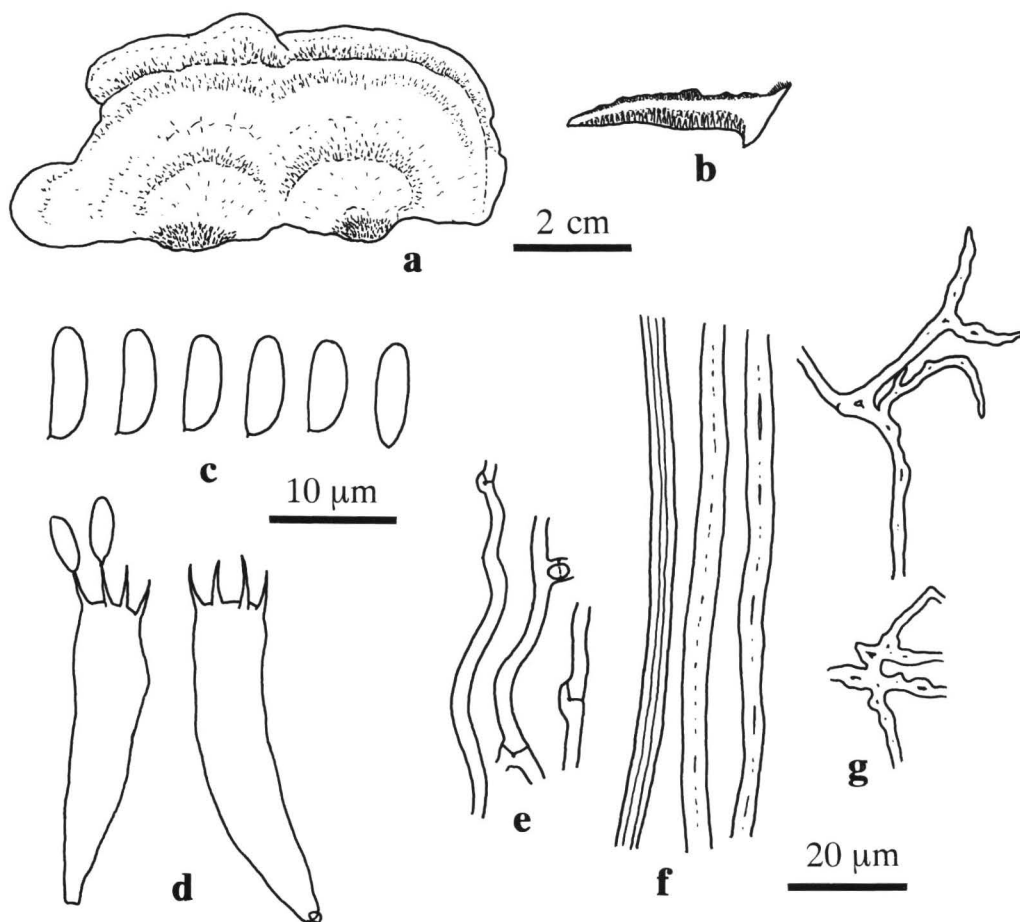


Fig. 5. *Trametes tephroleuca* Berk. (TNS-F-107759) a. Upper view of basidiocarp. b. Section view of basidiocarp. c. Basidiospores. d. Basidia. e. Generative hyphae from trama. f. Skeletal hyphae from context. g. Binding hyphae from context.

drical, slightly fusiform, hyaline, IKI-, $5.5\text{--}7 \times 2\text{--}2.7 \mu\text{m}$, Q (length/width ratio) = $2.5\text{--}3.0$.

Remarks: This is similar to *T. pubescens* that is common in cool temperate to boreal areas of the Northern Hemisphere. However, this is distinct from the typical form by the broader and slightly fusiform basidiospores, more persistent tomentum, and partly dark colored pileus. For the time being, we prefer to leave this as *T. cf. pubescens* because it is difficult to judge if this is a distinct species or a form of *T. pubescens* only by a single specimen.

Specimen examined: Near Chhakalepani, Jumla, alt. 3,650 m, 14 May 1999 (TNS-F-107868).

Trametes tephroleuca Berk., Hook. *Jor. Bot.* 6: 165 (1854).

Fig. 5

Basidiocarps sessile. Pilei dimidiate, applanate, pileus surface fibrous-tomentose, sulcate with thick tomentose zones, grayish white to pale yellowish gray, margin thin and acute, entire. Context duplex with upper tomentum and lower corky zone; upper tomentum fibrous, pale grayish yellow, up to 2 mm thick; lower context corky, yellowish white, up to 3 mm thick, with a thin and white crust below the tomentum. Tubes corky, yellowish white. Pore surface grayish orange, pores angular, 1–2/mm, dissepiments thin, entire.

Trama hyphae trimitic; generative hyphae hya-

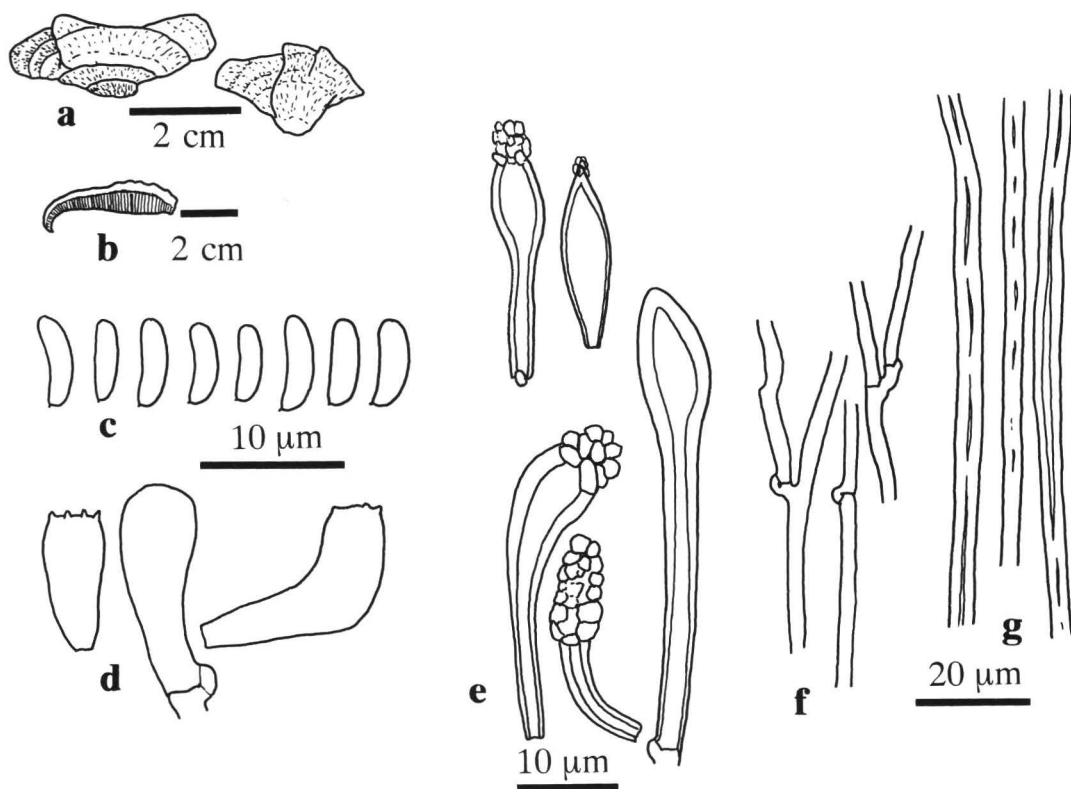


Fig. 6. *Trichaptum montanum* T. Hatt., sp. nov. (TNS-F-107775, isotype) a. Upper view of basidiocarps. b. Section view of basidiocarp. c. Basidiospores. d. Basidia. e. Cystidia. f. Generative hyphae from trama. g. Skeletal hyphae from context.

line, thin-walled, with clamp connections, 1.5–2.5 μm wide; skeletal hyphae unbranched, almost straight, hyaline, IKI-, thick-walled (up to 2 μm thick), 2–4.5 μm wide; binding hyphae up to 3 μm wide. Context hyphae similar, generative hyphae sparse. Cystidia not seen. Basidia clavate, 4-sterigmate, 18–25 × 4.5–5.5 μm. Basidiospores cylindrical, hyaline, IKI-, 7–8.5 × 2.5–3 μm, Q (length/width ratio)=2.6–3.2.

Attached with a white rot.

Distribution: Nepal, Kazakhstan, Kyrgyzstan, and Uzbekistan (Bondartsev, 1953).

Remarks: As described by Berkeley (1854b), this species is similar to *T. hirsuta* (Wulf. : Fr.) Pilát, but has larger and grayish pores. Besides, upper tomentum is soft and not hirsute as in the latter species.

Specimen examined: Ditachaur, Tyanki Khoncha, Jumla, alt. 2,650 m, 9 May 1999 (TNS-F-

107759).

Trametes versicolor (L.: Fr.) Lloyd, Mycol. Writ. 6: 1045 (1921).

Distribution: cosmopolitan (Gilbertson & Ryvarden, 1987).

Specimens examined: Ditachaur, Tyanki Khoncha, Jumla, alt. 2,650 m, 9 May 1999 (TNS-F-107763); Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999 (TNS-F-4484).

Trametes villosa (Fr.) Kreisel, Ciencias Biol. Ser. 4, no 16: 84 (1971).

Distribution: Temperate areas of Asia and North America (Gilbertson & Ryvarden, 1987). This is the first report of this species from Nepal.

Specimen examined: Deepal Goan, Jumla, alt. 2,650 m, 10 May 1999 (TNS-F-4485).

Trichaptum montanum T. Hatt., sp. nov. Fig. 6

Basidiocarpi sessilia vel effusoreflexa. Pilei velutini, sulcati, albi vel lutei-cineracei. Caro du-

plex, haud crustosa. Tubi brunneoli. Pori brunneoli, angulares vel elongati, 3–4/mm. Systema hypharum dimiticum; hyphae generativae fibulatae; hyphae skeletales haud dextrinoideae. Cystidia abunda, ventricosa vel clavata, incrassata, apicibus incrustatis. Sporae cylindricae, hyalinae, haud dextrinoideae, $5.2\text{--}6.5 \times 1.5\text{--}2.0\ \mu\text{m}$.

Etymology: Latin, *montanus* = mountainous, refers to the characteristics collected in a mountainous area.

Holotype: NEPAL, Jumla, Deepal Goan, alt. 2,650 m, 10 May 1999 (KATH; isotype in TNS-F-107775).

Basidiocarps sessile to effused-reflexed. Pilei dimidiate to flabelliform or elongated, applanate, pileus surface velutinous to fibrous-tomentose, rough in old specimens, sulcate, white to yellowish gray, pileus margin thin and acute, inrolled when dried. Context duplex: upper layer loose, fibrous-spongy, white, up to 1 mm thick; lower layer as a thin line, light brown, up to 0.3 mm thick. Tubes leathery, light brown, up to 2 mm deep. Pore surface light brown, pores 3–4/mm, angular, partly elongated but not irpicoid, dissepiments entire to eroded.

Trama hyphal system dimitic: generative hyphae hyaline, IKI-, with clamp-connections; skeletal hyphae hyaline, IKI-, almost straight, thick-walled to almost solid, $2.5\text{--}4\ \mu\text{m}$ wide. Context hyphae dimitic: generative hyphae sparse; skeletal hyphae sinuous; otherwise similar to trama hyphae. Cystidia abundant, some hymenial, others arising from trama, ventricose to clavate, hyaline, thick-walled (up to $2\ \mu\text{m}$ thick), apically encrusted with rough crystals, $20\text{--}45 \times 4\text{--}7\ \mu\text{m}$. Basidia clavate, 4-sterigmate, $8.5\text{--}13.5 \times 4.5\text{--}6\ \mu\text{m}$. Basidiospores cylindrical, slightly bent, hyaline, IKI-, $5.2\text{--}6.5 \times 1.5\text{--}2.0\ \mu\text{m}$, Q (length/width ratio) = 3.3–4.0.

Attached with a white pocket rot.

Distribution: known only from Nepal.

Remarks: This species is characterized by the tubular hymenophore with mostly regular pores, soft-fibrous tomentum (upper layer of the context) within the genus *Trichaptum* Murrill. *Trichaptum subchartaceum* (Murrill) Ryvar-

den is known from boreal areas of N. America also has tubular hymenophore with mostly regular pores and pale colored context. However, this species is distinct from *T. montanum* by the thicker context (up to 1 cm thick) and longer basidiospores ($7.5\text{--}11\ \mu\text{m}$ long) according to Gilbertson & Ryvar-

den (1987).
Specimens examined: Deepal Goan, Jumla, alt. 2,650 m, 10 May 1999 (Holotype in Nat. Herb. Godawary, Nepal; isotype in TNS-F-107775; the same data, TNS-F-107773); Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999 (TNS-F-107791).

Tyromyces aff. **gratus** (Berk.) Ryvar-

den, Nor. J. Bot. 24: 221 (1977).

Fig. 7

Basidiocarps sessile. Pilei dimidiate, narrowly-attached, applanate to conchate; pileus surface rough with radial ridges and projections, subzonate, whitish, partly grayish, pileus margin thin and acute, almost entire. Context corky-chalky when dried, white, up to 2 mm thick. Tubes chalky, white, up to 3 mm deep. Pore surface white, pores angular, 5–6/mm, dissepiments thin and entire. Taste mild.

Trama hyphal system monomitic: generative hyphae mostly unbranched, thin-walled, hyaline, IKI-, with clamp-connections, dissolved in KOH solution. Context hyphae subdimitic: generative hyphae thin- to thick-walled, some hyphae conspicuously branched; some hyphae thick-walled with few septa and may be taken for skeletal hyphae. Cystidia not seen. Basidia not seen. Basidiospores allantoid, slightly bent, hyaline, IKI-, $4.0\text{--}5.2 \times 1.0\text{--}1.3\ \mu\text{m}$, Q (length/width ratio) = 4.0–4.5.

Type of rot unknown.

Remarks: *Tyromyces gratus* is a little known species hitherto known only from Nepal. The present specimen is mostly similar to the description of the holotype of *T. gratus* in Ryvar-

den (1977) which is the only one made by a modern mycologist. Later, Hjortstam and Ryvar-

den (1984) reported this species from Gandaki Prov., a central area of Nepal.

Specimen examined: Bhotel Pipal, Chausandra Khola, Jumla, alt. 2,700–2,900 m, 11 May 1999

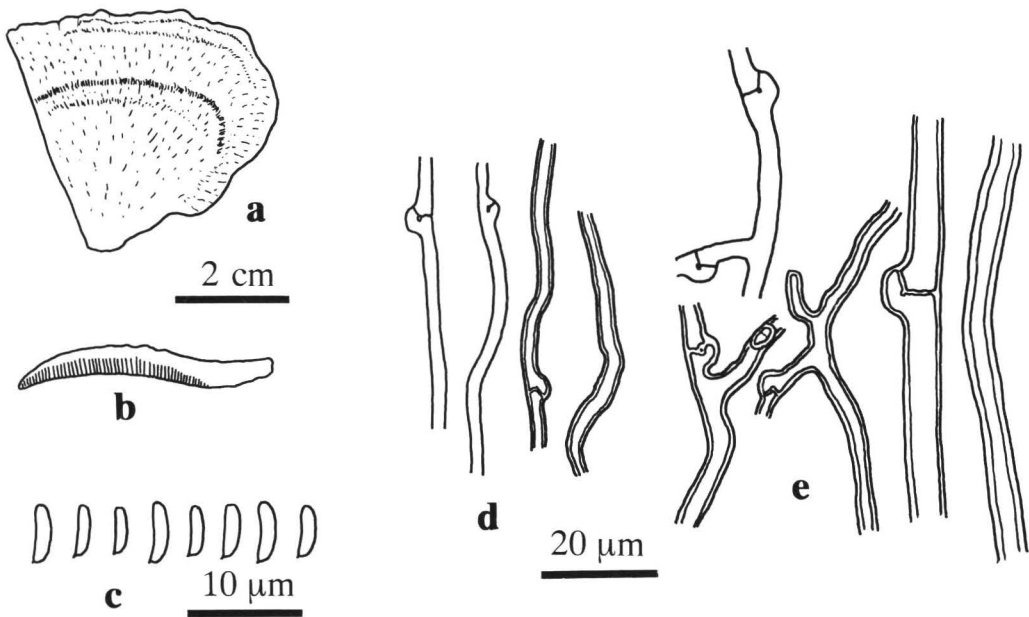


Fig. 7. *Tyromyces* aff. *gratus* (Berk.) Ryvarden (TNS-F-108898) a. Upper view of basidiocarp. b. Section view of basidiocarp. c. Basidiospores. d. Generative hyphae from trama. e. Generative hyphae from context.

(TNS-F-107798).

Discussion

Twenty-four species of polypores are reported from temperate to subalpine sites of a middle-west area of Nepal in the present paper. In temperate belt (between alt. 2,000 and 3,000 m) of Nepal, *Pinus wallichiana*, *Cedrus deodara*, *Cupressus torulosa*, *Abies pindrow*, and *Picea smithiana* are important tree species (Adhikari, 2000). In subalpine belt (between alt. 3,000 and 4,000 m), *Abies spectabilis* and *Tsuga dumosa* are important (Adhikari, 2000).

Collected species can be divided into the following 5 groups according to the distribution pattern: cosmopolitan or widespread in the Northern Hemisphere; the Northern Hemisphere boreal; Asia-North American temperate; East Asian; and endemic in Himalayan areas and mountainous areas of Asia.

Cosmopolitan or widespread species in the Northern Hemisphere: *Bjerkandera adusta*; *Coltricia cinnamomea*; *Ganoderma applanatum*; *In-*

onotus triqueter; *Phellinus ferreus*; *Trametes ochracea*; *T. versicolor*. Many of these species are widely distributed from boreal to subtropical areas, but occurrence of *I. triqueter* and *T. ochracea* in the East Asia seems to be restricted in boreal areas.

The boreal species: *Fomitopsis* aff. *cajanderi*; *Gloeophyllum protractum*; *G. sepiarium*; *Inonotus obliquus*; *Ischnoderma benzoinum*; *Phellinus tremulae*. Occurrence of *I. obliquus* and *P. tremulae* are mostly restricted to *Betula* spp. and *Populus* spp., respectively. Other species are usually on boreal conifers.

Asia-North American species: *T. villosa*. In the East Asia, this species is common in warm temperate and subtropical areas, and probably a southern element.

East Asian species: *Heterobasidion insulare*. This species is widely distributed from boreal to subtropical areas of the East Asia, and common on *Abies* spp., *Picea* spp., *Pinus* spp. etc.

Endemic to the Himalayan areas and mountainous areas of Asia: *Pachykytospora nepalensis*; *Phellinus himalayensis*; *P. subsan-*

fordii; *Trametes tephroleuca*; *Trichaptum montanum*. Distribution patterns of many Asian polypores are unclear, but these species are hitherto known only from Himalayan areas and mountainous areas of the East and Central Asia. Possibly they are boreal to cool temperate species and restricted in mountainous areas.

Pachykytospora Kotl. & Pouzar is a small genus hitherto with only 8 constituents including the newly described species, here. *Pachykytospora nanospora* A. David & Rajch. described from tropical Africa is the only species unknown from Asia. On the other hand, 4 species out of 8 are known only from the Asian Continent. This suggests that the center of distribution of the genus *Pachykytospora* exists in Asia, and this genus may originate in this area.

In this report, several species are listed without final determination. Except for *F. aff. cajanderi* and *T. aff. gratus*, these species possibly represent distinct species though we hesitate to describe them here because of the limited information. The number of specimens examined here is less than 40, but some undescribed species are included among them. This suggests that polypore microbiota in the Himalayan areas is far from completed, and a number of undescribed species are expected from this area.

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