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FULL PAPER

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Type studies of the polypores described by E.J.H. Corner from Asia and West Pacific Areas. V. Species described in *Tyromyces* (2)

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Abstract Identification of 33 species of polypores described by Corner in 1989 and 1992 were made by type examinations. The following new combinations are proposed: *Antrodia multipapillata*, *Antrodiella negligenda*, *Elmerina substuppea*, *Fomitopsis ostreiformis*, *F. scorteus*, *F. singularis*, *Hyphodontia ovispora*, *Oligoporus subfragilis*, *Oxyporus rufipusillus*, *Perenniporia permacilenta*, *Polyporus oncospermatis*, *Rigidoporus malayanus*, and *Trichaptum perpusillum*. The following names are accepted in the original genus: *Tyromyces levis*, *T. mediocris*, *T. mollicaseus*, *T. nemorosus*, and *T. stenomitis*. The following species are synonyms: *Tyromyces miser*, a synonym of *Dichomitus eucalypti*; *T. montanus*, a synonym of *T. mollicaseus*; *T. perskeletalis*, a synonym of *Fomitopsis ostreiformis*; *T. polycystes*, a synonym of *Hyphodontia arguta*; *T. roseipileus*, a synonym of *T. incarnatus*; and *T. subfibrillosus*, a synonym of *T. mollicaseus*. Final determination was not made for *T. rubrifuscescens*, which may be conspecific or allied with *Elmerina substuppea*. *Tyromyces sinapicolor* belongs to Corticiaceae *sensu lato* with a nonporoid hymenophore. *Tyromyces ochraceicarneus* may be also a member of Corticiaceae *sensu lato*, but final determination was not made. The following species are dubious because of the poor or sterile conditions of their type specimens: *Tyromyces ochraceivinosus*, *T. pinguidus*, *T. pusillicaesius*, *T. rhodomelon*, *T. rubricarneus*, and *T. descendens*. No authentic specimens were traced for *T. pulviniformis* and *T. rufipileatus*. Descriptions and line drawings are given for little-known species.

Key words E.J.H. Corner · Polypores · Southeast Asia · Type specimens · *Tyromyces*

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Introduction

This is the fifth part of the type studies of polypores described by Corner (1989, 1992). In this study, I examined type materials of 33 species described in the genus *Tyromyces* P. Karst. by Corner (1989, 1992). Their identities are shown, and descriptions and line drawings are given for little-known species.

Materials and methods

Type specimens of the species described by Corner (1989, 1992) were examined macroscopically and microscopically. The colors of basidiocarps are given according to Kornerup and Wanscher (1981). Information from living and dried specimens collected in Pasoh Forest Reserve, a lowland rainforest of West Malaysia, and Japan is also incorporated for some species. Descriptions on fresh specimens given by Corner (1989, 1992) are also occasionally referred. Herbaria where specimens are deposited are abbreviated according to Holmgren et al. (1990).

Identification and descriptions

Tyromyces levis Corner, Beih. Nova Hedwig. 96:175, 1989. Fig. 1

Holotype: Solomon I., Ysabel, Huali, Oct. 1, 1965, leg. E.J.H. Corner (E).

Accepted as *T. levis.*

Basidiocarps effused-reflexed to sessile, single or imbricated on resupinate foot, pileus applanate to convex, semicircular to elongated. Pileus surface soft tomentose to velutinous, azonate, whitish (4A1–2). Pileus margin thin and acute, inrolled. Pore surface pale orange (5A3–4), pores angular to partly sinuous, 2–3(–4)/mm, dissepiments thin and eroded. Context loose spongy near the surface,

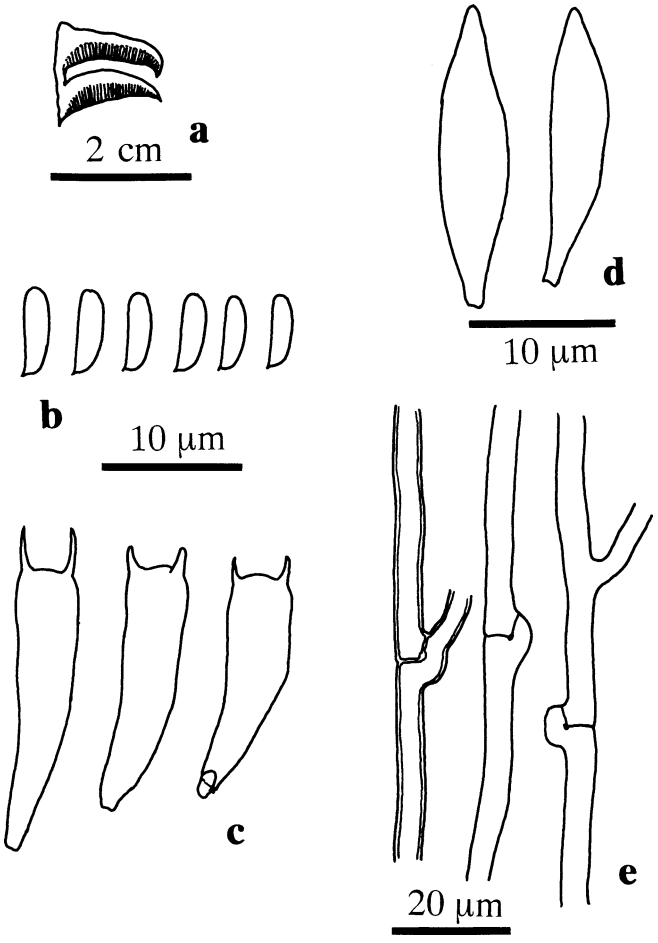

Fig. 1. Structures of *Tyromyces levis* from basidiocarps (holotype). **a** Vertical section view of basidiocarp. **b** Basidiospores. **c** Basidia. **d** Hymenial cystidioles. **e** Generative hyphae from context

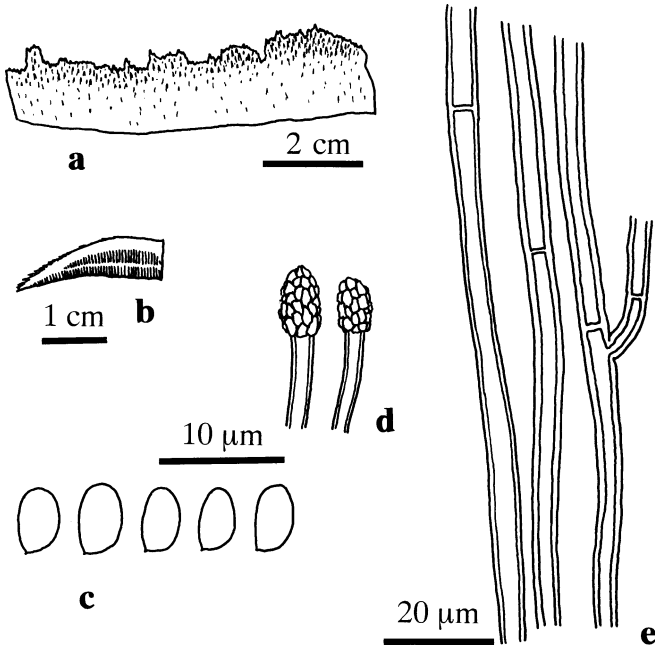

Fig. 2. Structures of *Rigidoporus malayanus* from basidiocarps (holotype). **a** Upper view of basidiocarp. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Encrusted hyphal tips from trama. **e** Generative hyphae from context

fibrous-corky near the tubes, whitish, up to 1 mm thick, without a crust. Tubes fibrous-corky, whitish, up to 3 mm.

Hyphal system monomitic. Tramal hyphae hyaline, IKI−, with clamp connections, occasionally branched, 2–3.5 μm wide. Contextual hyphae with clamp connections, 3–6 μm wide. Cystidioles scattered in the hymenium, fusoid, smooth, 15–25 × 4–5 μm. Basidia 2-sterigmate, 12–20 × 4.5–5.5 μm. Basidiospores cylindrical, colorless, IKI−, 5.5–7 × 1.8–2.5 μm.

Remarks: Type of rot is unknown for this species, but I retain this in *Tyromyces*. This species is peculiar with small and imbricated basidiocarps, 2-sterigmate basidia, and cylindrical basidiospores up to 7 μm long.

Tyromyces malayanus Corner, Beih. Nova Hedwig. 96:175, 1989. Fig. 2

Holotype: Malaysia, Pahang, Cameron Highland, July 31, 1934, leg. E.J.H. Corner (E).

Accepted as ***Rigidoporus malayanus*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile, pileus applanate to triquetrous, elongated. Pileus surface strigose-hispid near the margin, tomentose-villose near the base, azonate, light orange (5B3–4; pallid cream white when fresh according to the original description). Pileus margin thin and acute, deeply split. Pore surface whitish, pores angular near the margin, irpicoid near the base, 1–3/mm, dissepiments thin and eroded. Context fibrous-spongy, white, up to 2 mm thick, without a crust. Tubes corky, white, stratified (2-layered), up to 3 mm deep in each layer.

Hyphal system monomitic. Tramal hyphae colorless, IKI−, without clamp connections, 2–5 μm wide, some hyphal tips encrusted with coarse crystals, occasionally project into the hymenium, coarse granular crystals abundant in the trama. Contextual hyphae without clamp connections, thick-walled (up to 1 μm thick). Cystidia not seen. Basidia not seen. Basidiospores short ellipsoid, colorless, IKI−, 5–6.2 × 3–4 μm.

Remarks: I place this species in *Rigidoporus* because of the monomitic hyphal system without clamp connections, short ellipsoid basidiospores, and lack of hymenial cystidia. This species is peculiar with large and irregular pores and strigose pileus surface within the genus *Rigidoporus*.

Tyromyces mediocris Corner, Beih. Nova Hedwig. 96:177, 1989. Fig. 3

Holotype: New Guinea, Morobe district, Oomsis, Sept. 28, 1960, leg. E.J.H. Corner (E).

Accepted as *T. mediocris*.

Basidiocarps sessile, pileus convex, semicircular. Pileus surface velutinous, azonate, smooth, pale orange (5A3–4; white when fresh according to the original description). Pileus margin acute, entire. Pore surface whitish, pores angular, 5–6/mm, dissepiments thin and entire, partly eroded. Context soft, fibrous-spongy, fissile near the surface, white,

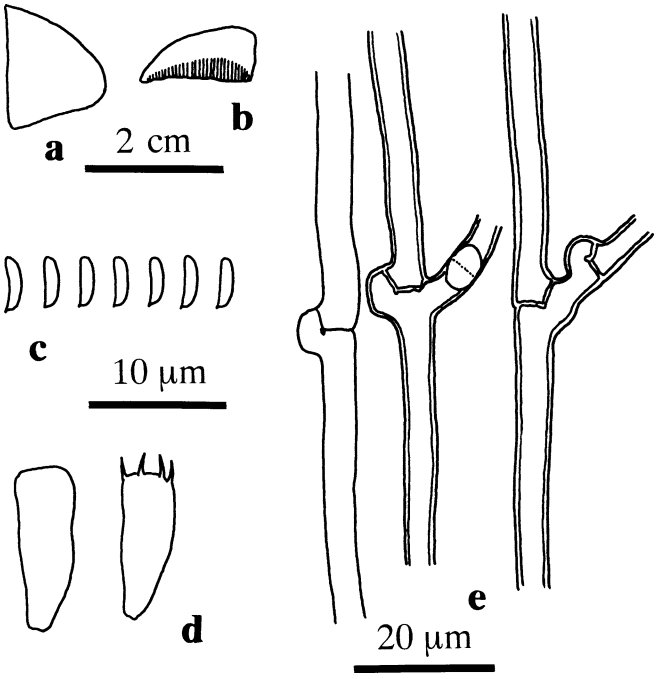

Fig. 3. Structures of *Tyromyces mediocris* from basidiocarps (holotype). **a** Upper view of basidiocarp. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Basidia. **e** Generative hyphae from context

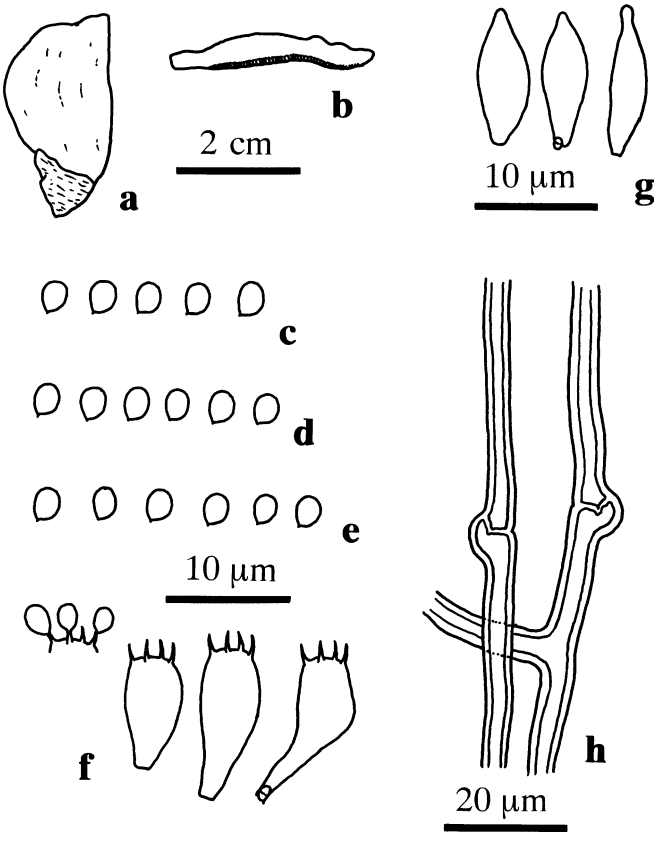

Fig. 4. Structures of *Tyromyces mollicaseus* from basidiocarps **a**, **b**, **c**, **h** holotype of *T. mollicaseus*; **d** holotype of *T. montanus*; **e**, **f**, **g** holotype of *T. subfibrillosus*). **a** Upper view of basidiocarp. **b** Vertical section view of basidiocarp. **c–e** Basidiospores. **f** Basidia, tip of basidium bearing basidiospores (*left*). **g** Hymenial cystidioles. **h** Generative hyphae from context

up to 8 mm thick, without a crust. Tubes brittle, whitish, up to 3 mm deep. Taste mild.

Hyphal system monomitic. Tramal hyphae colorless, IKI−, with clamp connections, 2–4 μm wide. Contextual hyphae with clamp connections, thin- to slightly thick-walled (up to 0.5 μm thick), 2.5–6 μm wide. Cystidia not seen. Basidia 4-sterigmate, 12–15 × 4–5 μm. Basidiospores short cylindrical, colorless, IKI−, 3–4 × 1.2–1.5 μm.

Remarks: Type of rot is unknown for this species, but I retain this in *Tyromyces*. There are some other species of *Tyromyces* and *Oligoporus* Bref., with glabrous to velutinous and whitish pileus surface, soft-fibrous (not becoming dense after dried) context, without cystidia and gloeoplerous hyphae, and with short cylindrical basidiospores, but they are discriminated from *T. mediocris* as follows. *Oligoporus leucospongia* (Cooke & Harkn.) Gilb. & Ryvarden and *O. perdelicatus* (Murrill) Gilb. & Ryvarden are on conifers. Also, the former has longer basidiospores (4.5–6 × 1–1.7 μm) and the latter has a thinner pileus (up to 3 mm), according to Gilbertson and Ryvarden (1987). *Oligoporus substipticus* (Pers. : Fr.) Gilb. and Ryvarden tastes very bitter and has wider basidiospores (3.5–5 × 1.5–2 μm; Gilbertson and Ryvarden 1987). *Tyromyces gratus* (Berk.) Ryvarden has longer basidiospores (4.5–5 × 1–1.2 μm; Ryvarden 1977).

Tyromyces miser Corner, Beih. Nova Hedwig. 96:178, 1989.

Holotype: Solomon I., Kolombangara, Aug. 24, 1965, leg. E.J.H. Corner (E).

The holotype represents a large-pored form of *Dichomitus eucalypti* Ryvarden. A condensed description of the holotype is as follows: basidiocarps almost resupinate, slightly reflexed; pores whitish, angular, 1–1.5/mm; hyphal pegs abundant in the hymenium; hyphal system dimitic, hyphae IKI−; basidiospores cylindrical, IKI−, 7.5–9 × 2.5–3.5 μm. For a description of the typical form of *D. eucalypti*, see Ryvarden (1985).

Tyromyces mollicaseus Corner, Beih. Nova Hedwig. 96:178, 1989. Fig. 4

Holotype: Malaysia, Borneo, Mt. Kinabalu, Bembangan River, altitude 1700 m, Feb. 27, 1964, leg. E.J.H. Corner (E).

Accepted as *T. mollicaseus*.

Basidiocarps sessile, pileus applanate, semicircular to flabelliform. Pileus surface matt to almost glabrous, azonate, pale orange (5A3) to brownish (white to pale cream according to the original description). Pileus margin entire. Pore surface whitish, pores angular to round, 10–12/mm (6–8/mm in the holotype of *T. subfibrillosus*; 8–10/mm in the holotype of *T. montanus*, both synonyms of this species). Context fibrous-corky and pale orange (5A3), corky-horny and darker in the holotype of *T. montanus*, up to 5 mm thick, without a crust. Tubes corky, concolorous with context, 4 mm deep in the holotype of *T. montanus*.

Hyphal system monomitic. Tramal hyphae colorless, IKI−, occasionally branched, thin- to thick-walled (up to 1 mm thick), with clamp connections, 2–3 μm wide, more or less agglutinated. Contextual hyphae with clamp connections, thick-walled (up to 2 μm thick), 4–6 μm wide. Hymenial cystidia not seen, but fusoid cystidioles abundant in the holotype of *T. subfibrillosus*, 8–12 × 3–4 μm. Basidia seen in the holotype of *T. subfibrillosus*, 4-sterigmate, 10–15 × 4–4.5 μm. Basidiospores subglobose, colorless, IKI−, 2.2–3 × 1.8–2.5 μm.

Remarks: Type of rot is unknown, but I retain this in *Tyromyces*. This species is peculiar with small and subglobose basidiospores within the genus. *Tyromyces corticola* Corner also has similar basidiospores, but is distinct by the thin and fibrous context, the habitat on barks of living trees, and encrusted hyphae in the trama (Hattori 2002).

Tyromyces montanus Corner, Beih. Nova Hedwig. 96:179, 1989.

Holotype: Malaysia, Borneo, Mt. Kinabalu, altitude 1300 m, Aug. 3, 1961, leg. E.J.H. Corner (E).

The holotype represents an agglutinated specimen of *T. mollicaseus* because of the sessile basidiocarps, monomitic hyphal system with thick-walled generative hyphae, and small and subglobose basidiospores.

Tyromyces multipapillatus Corner, Beih. Nova Hedwig. 96:180, 1989. Fig. 5

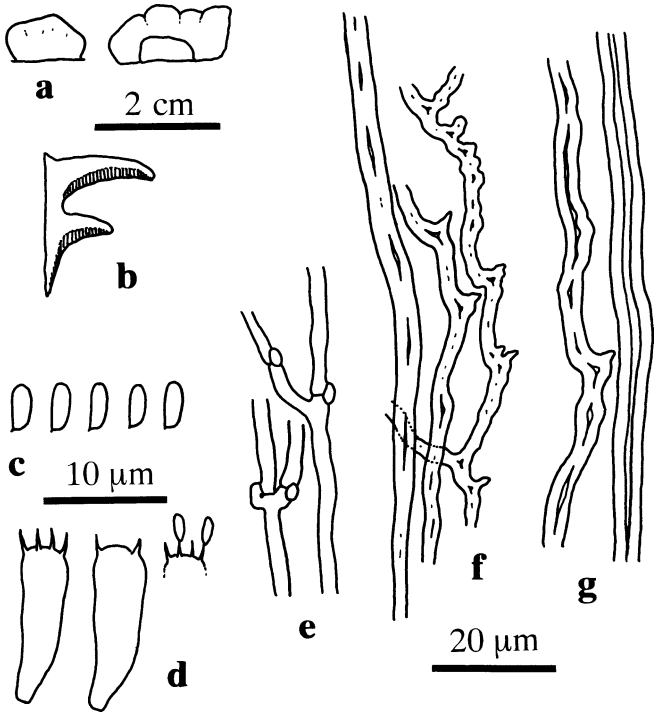

Fig. 5. Structures of *Antrodia multipapillata* from basidiocarps (holotype). **a** Upper view of basidiocarps. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Basidia, tip of basidium bearing basidiospores (*right*). **e** Generative hyphae from trama. **f** Skeletal hyphae from trama. **g** Skeletal hyphae from context

Holotype: Solomon I., Ysabel, San Jorge, 25 Sept. 1965, leg. E.J.H. Corner (E).

Accepted as ***Antrodia multipapillata*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile to effused-reflexed, pileus thin and applanate to conchate, imbricated, semicircular to elongated. Pileus surface almost glabrous, grayish-orange (6B3; at first pinkish-vinaceous or mauve-drab, becoming fuscous-drab or grayish according to the original description), azonate. Pileus margin obtuse and entire. Pore surface grayish-red (7B3–4), pores round to angular, 8–9/mm, dissepiments entire. Context fibrous-corky, white, without a crust. Tubes pinkish (7A2), up to 2 mm deep.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, 1.5–2.5 μm wide; tramal skeletal hyphae colorless, IKI−, straight to sinuous, occasionally branched, thick-walled (up to 2 μm thick), 2.5–5 μm. Contextual generative hyphae 2–5 μm wide; contextual skeletal hyphae similar to those in trama. Cystidia not seen. Basidia 2- to 4-sterigmate, 10–15 × 4–5 μm. Basidiospores long ellipsoid, colorless, IKI−, 3–3.8 × 1.5–2 μm.

Remarks: This species is fairly common in warm temperate areas of Japan, and causes a brown rot. *Antrodia* is the best genus to accommodate this species because of the dimitic hyphal system and a brown rot. This species is characterized by pinkish and often imbricated basidiocarps and short cylindrical basidiospores within the genus.

Tyromyces negligendus Corner, Beih. Nova Hedwig. 96:180, 1989. Fig. 6

Holotype: Malaysia, Borneo, Mt. Kinabalu, altitude 1500 m, June 15, 1961, leg. E.J.H. Corner (E).

Accepted as ***Antrodiella negligenda*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile, pileus applanate, semicircular to irregular. Pileus surface tomentose, zonate with thick tomentose zones, light orange (5A4; cream white according to the original description). Pileus margin obtuse, entire. Pore surface whitish, pores angular to sinuous, (1–)3–5/mm, dissepiments thin and eroded. Context duplex with loose spongy upper layer (up to 1 mm thick) and leathery lower layer (up to 0.4 mm thick), whitish, without a crust. Tubes fibrous, white, up to 2 mm deep.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, 1.5–3 μm wide; skeletal hyphae colorless, IKI−, unbranched to occasionally branched, thick-walled (up to 2 μm thick), some hyphae apically encrusted with fine crystals. Contextual generative hyphae 2–4 μm wide; skeletal hyphae 3–7.5 μm wide. Cystidia not seen. Basidia not seen (4-sterigmate according to the original description). Basidiospores subglobose, colorless, IKI−, 3.5–4.5 × 2.5–3.5 μm.

Remarks: This species might be placed in *Skeletocutis* Kotl. & Pouzar because of the encrusted tramal hyphae and dimitic hyphal system. However, I put this species in *Antrodiella* Ryvarden & I. Johans. because hyphal encrustation in this species is not so conspicuous as in *Skeletocutis* spp.; also, most of the *Skeletocutis* spp. produce allantoid basidiospores. *Antrodiella gypsea* (Yasuda) T. Hatt. &

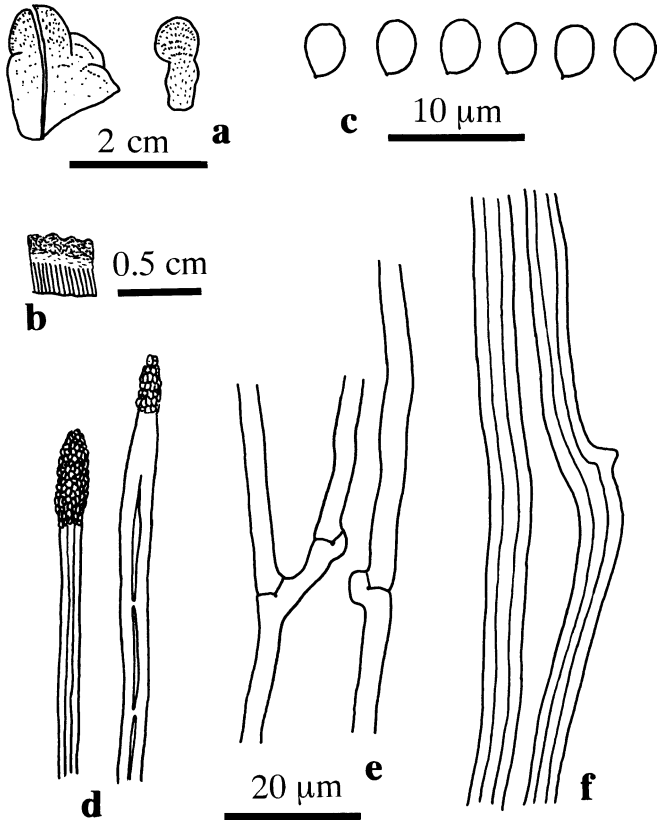

Fig. 6. Structures of *Antrodiella negligenda* from basidiocarps (holotype). **a** Upper view of basidiocarps. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Encrusted hyphal tips of trama skeletal hyphae. **e** Generative hyphae from context. **f** Skeletal hyphae from context

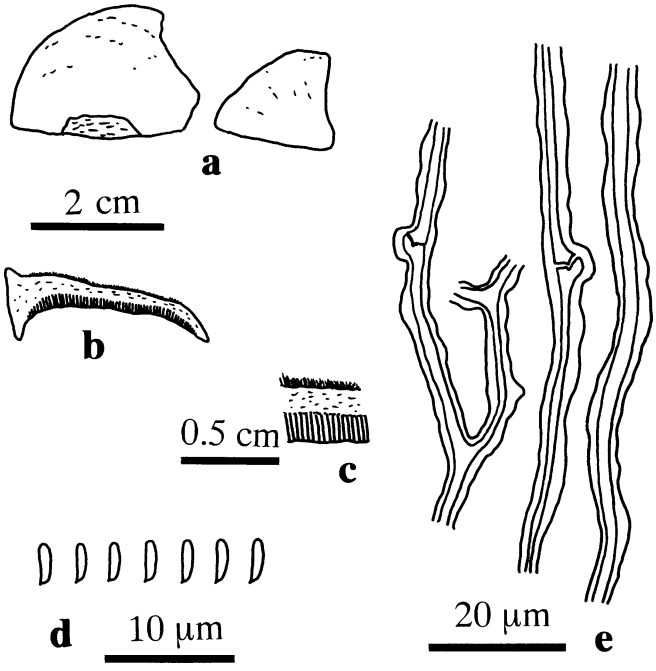

Fig. 7. Structures of *Tyromyces nemorosus* from basidiocarps (holotype). **a** Upper view of basidiocarps. **b**, **c** Vertical section view of basidiocarps. **d** Basidiospores. **e** Generative hyphae from context

Ryvarden (holotype, TNS!) and *A. diffluens* (Corner) T. Hatt. (holotype, E!) also has similar white and fibrous-spongy basidiocarps. The former has hymenial cystidia, and the latter produces short cylindrical basidiospores (Hattori and Ryvarden 1994; Hattori 2002).

Tyromyces nemorosus Corner, Beih. Nova Hedwig. 96:181, 1989. Fig. 7

Holotype: Malaysia, Pahang, Sungai Cheka, Nov. 13, 1930, leg. E.J.H. Corner (E).

Accepted as *T. nemorosus*.

Basidiocarps sessile, pileus applanate, semicircular, imbricated according to the original description. Pileus surface soft tomentose, azonate to slightly sulcate, grayish-orange (5–6C4; pure white then pale wood brown from the base outward according to the original description). Pileus margin thin and entire. Pore surface whitish, pores round to angular, 8–9/mm, dissepiments entire. Context cheesy to chalky-fibrous, white, with a thin crust below the tomentum. Tubes cheesy-fibrous, whitish, up to 1.5 mm deep.

Hyphal system monomitic. Tramal hyphae colorless, IKI−, with clamp connections, sinuous and occasionally branched, irregularly thickened (up to 2 μm thick), 2–5 μm wide, dissolved in KOH solution. Contextual hyphae 2–6 μm wide, otherwise similar to tramal hyphae. Cystidia not seen. Basidia not seen (4-sterigmate according to the original description). Basidiospores cylindrical, colorless, IKI−, 2.5–3 × 0.8–1 μm.

Remarks: Type of rot is unknown, but I retained this in *Tyromyces*, here. This species is similar to *T. mediocris* with fibrous context, but distinct by having thin crust, irregularly thickened generative hyphae, and small and cylindrical basidiospores.

Tyromyces ochraceicarneus Corner, Nova Hedwig. 55:145, 1992. Fig. 8

Holotype: Malaysia, Johore, Pontian Kechil, Dec. 1940, leg. E.J.H. Corner (E).

This is probably a member of Corticiaceae *s.l.* I do not know its proper position, but a detailed description is provided for further studies.

Basidiocarps resupinate. Pore surface grayish-orange (5B4; pallid ochraceous then pinkish-ochraceous, appearing waxy according to the original description), pores angular to sinuous, partly irregular, (1–)3–4/mm, dissepiments eroded. Context almost lacking, without a basal crust. Tubes brittle, grayish-orange, up to 4 mm deep.

Hyphal system monomitic to subdimitic. Tramal generative hyphae colorless, IKI− to slightly dextrinoid in mass, with or without clamp connections, 2–3.5 μm wide, some hyphae have few septa and may be taken for skeletal hyphae. Hymenial cystidia scattered, cylindrical to fusoid, without crystals, 15–25 × 4–6 μm. Coralloid elements scattered in the hymenium. Basidia not seen. Basidiospores short ellipsoid, colorless, IKI−, 2.5–3 × 1.5–2 μm.

Remarks: This species is characterized by resupinate basidiocarps, poroid hymenophore, waxy pore surface, monomitic (to subdimitic) hyphal system, cylindrical

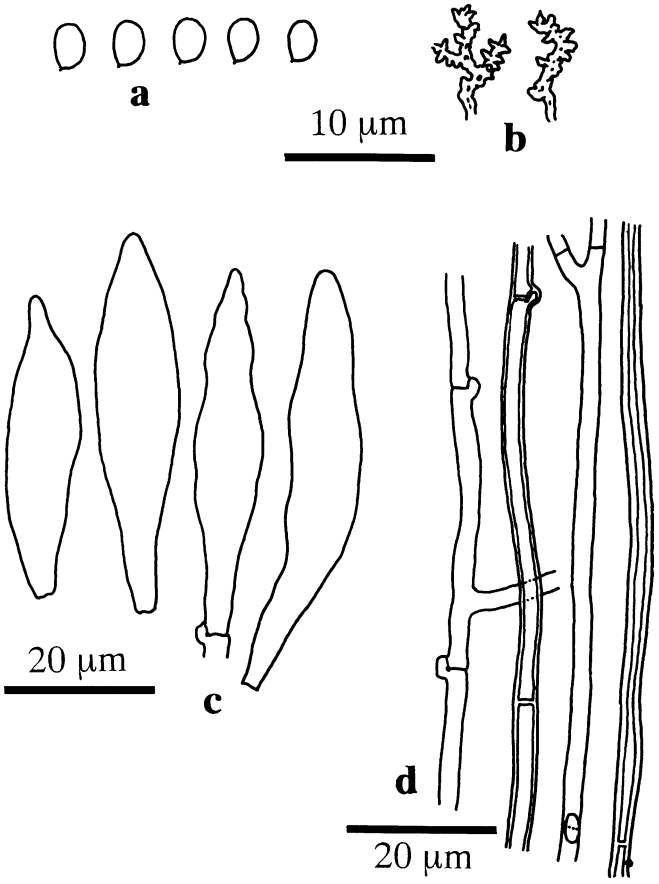

Fig. 8. Structures of *Tyromyces ochraceicarnea* from basidiocarps (holotype). **a** Basidiospores. **b** Coralloid elements. **c** Hymenial cystidia. **d** Generative hyphae from trama

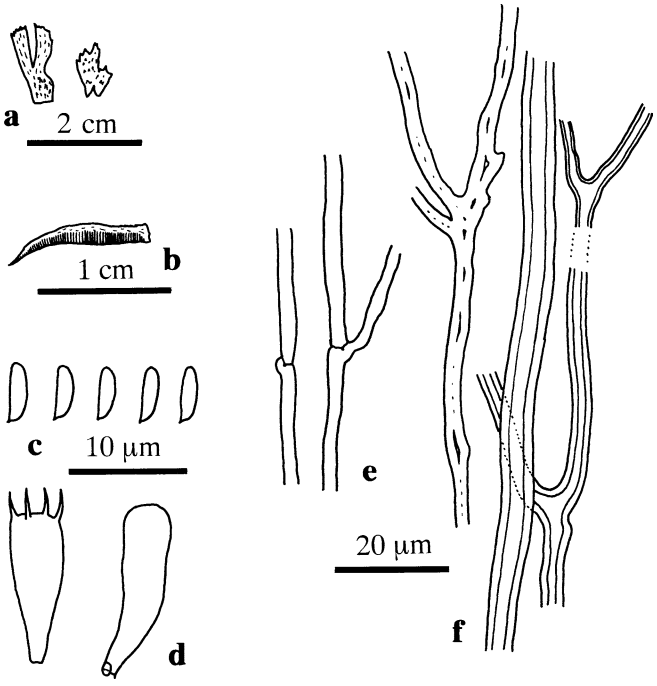

Fig. 9. Structures of *Polyporus oncospermatis* from basidiocarps (holotype). **a** Upper view of basidiocarps. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Basidia. **e** Generative hyphae from context. **f** Arboriform skeletal hyphae from context

to fusiform cystidia, coralloid elements, and small basidiospores.

Tyromyces ochraceivinosus Corner, Beih. Nova Hedwig. 96:182, 1989.

Holotype: Singapore, Thomson Road, May 23, 1943, leg. E.J.H. Corner (E).

Basidiospores are not seen from the holotype. This is probably an old specimen of *Fomitopsis palustris* (Berk. & M.A. Curtis) Gilb. & Ryvarden comp. with distinctly pileate basidiocarps, pale-colored context becoming corky after being dried, dimitic to ditrimitic hyphal system, and cylindrical basidiospores in the original description.

Tyromyces oncospermatis Corner, Beih. Nova Hedwig. 96:182, 1989. Fig. 9

Holotype: Malaysia, Pahang, Tembeling, Nov. 16, 1930, leg. E.J.H. Corner (E).

Accepted as ***Polyporus oncospermatis*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile, pileus applanate, semicircular to flabelliform. Pileus surface rough with minute scales near the base and radial fibrils near the margin, subzonate, dark brown (6F5). Pileus margin thin and acute, eroded. Pore surface light brown (6D6; pallid white when fresh), pores radially elongated, 6–8/mm (radially 3–5/mm), dissepiments eroded. Context horny-leathery (cheesy-fibrous when fresh), light brown (6D7), up to 1 mm thick, without a crust. Tubes horny, light brown, up to 1 mm deep.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, 2–3.5 μm wide; arboriform skeletal hyphae dominating, colorless to pale brown, IKI−, occasionally branched, 2–6 μm wide. Contextual generative hyphae sparse, 2–4.5 μm wide; arboriform skeletal hyphae colorless to pale brown, IKI−, thick-walled to almost solid (walls up to 2 μm thick), 2–8 μm wide. Cystidia not seen. Basidia 4-sterigmate, 12–16 × 4.5–5 μm. Basidiospores short cylindrical, colorless, IKI−, 5–6 × 2–2.5 μm.

Remarks: *Polyporus* Fr. is the proper genus for this species because of the dimitic hyphal system with arboriform skeletal hyphae and short cylindrical basidiospores, although it lacks a distinct stipe. *Dichomitus* Reid is another genus with similar microscopic characteristics, but this is better placed in *Polyporus* because of the thin and horny-leathery context when dried. This species is peculiar by lack of stipe, brownish context, and radially elongated pores within *Polyporus*. *Polyporus tenuiculus* (P. Beauv.) Fr. also has radially elongated pores and may lack a distinct stipe, but is distinct by the larger pores (radially 1–2/mm) and larger basidiospores (7–9 × 2–3 μm or larger), according to my observations.

Tyromyces ovisporus Corner, Nova Hedwig. 55:146, 1992.

Holotype: Singapore, Botanic Garden, Nov. 30, 1943, leg. E.J.H. Corner (E).

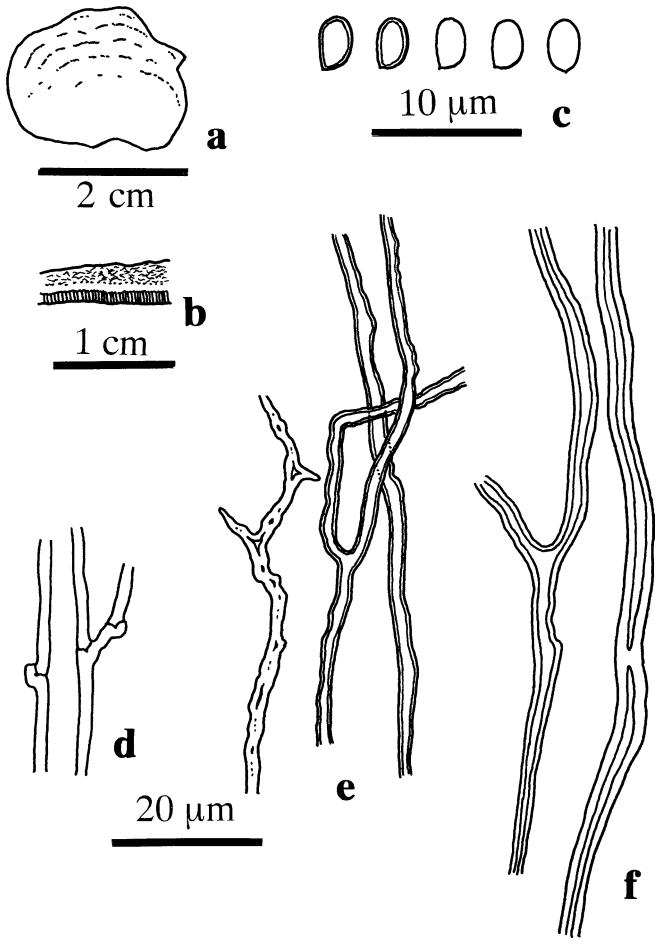

Fig. 10. Structures of *Perenniporia permacilenta* from basidiocarps (holotype). **a** Upper view of basidiocarp. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Generative hyphae from trama. **e** Skeletal hyphae from trama. **f** Skeletal hyphae from context

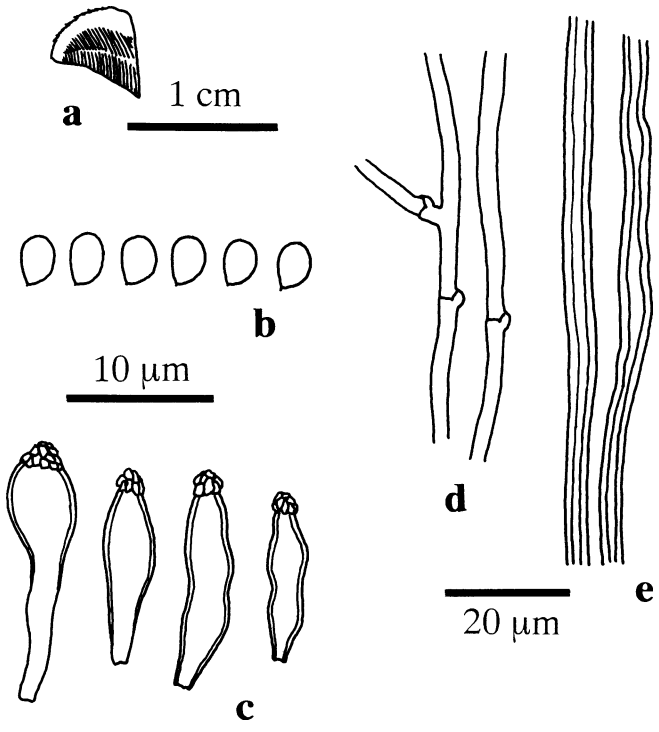

Fig. 11. Structures of *Trichaptum perpusillum* from basidiocarps (holotype). **a** Vertical section view of basidiocarp. **b** Basidiospores. **c** Hymenial cystidia. **d** Generative hyphae from context. **e** Skeletal hyphae from context

Accepted as ***Hyphodontia ovispora*** (Corner) T. Hatt., comb. nov. (basionym indicated above). This is a prior name for *H. tropica* Sheng H. Wu (not validly published; holotype not indicated in the original description). This species is common both in Malaysia and subtropical areas of Japan. It resembles *H. flavipora* (Cooke) Sheng H. Wu but is discriminated by the shorter basidiospores (2.8–4.0 × 2.0–2.8 μm in the holotype of *T. ovisporus*) and less lacerated dissepiments. For a description, see Wu (2000).

Tyromyces permacilentus Corner, Beih. Nova Hedwig. 96:186, 1989. Fig. 10

Holotype: Solomon I., Guadalcanal, Gallego, July 3, 1965, leg. E.J.H. Corner (E).

Accepted as ***Perenniporia permacilenta*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile to effused-reflexed, pileus applanate, semicircular. Pileus surface matt, sulcate, light brown (5D5–6) near the base, paler near the margin. Pileus margin entire, partly wavy. Pore surface whitish, pores round to angular, 8–9/mm, dissepiments entire. Context duplex, upper layer soft, fibrous-spongy, light brown, up to 2 mm thick; lower layer leathery, yellowish-white (4A2), up to 0.5 mm thick, without a crust. Tubes fibrous-leathery, yellowish-white, up to 1.5 mm deep.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, 1–2 μm wide; skeletal hyphae sinuous, occasionally branched, colorless, strongly dextrinoid. Contextual generative hyphae 1.5–2.5 μm wide; skeletal hyphae occasionally branched, thick-walled (up to 1 μm thick), colorless to yellow, dextrinoid, 2–3.5 μm wide. Cystidia not seen. Basidia not seen. Basidiospores short ellipsoid, slightly thick-walled (up to 0.3 μm thick), colorless, weakly dextrinoid to IKI−, 3–4 × 2.2–3 μm.

Remarks: This is a member of *Perenniporia* for reasons of the strongly dextrinoid hyphae and ellipsoid basidiospores. This species is characterized by duplex context with brownish and fibrous upper layer and whitish lower layer.

Tyromyces perpusillus Corner, Beih. Nova Hedwig. 96:187, 1989. Fig. 11

Holotype: Malaysia, Sarawak, Kuching, Jan. 24, 1959, leg. E.J.H. Corner (E).

Accepted as ***Trichaptum perpusillum*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile to effused-reflexed, pileus convex to ungulate, semicircular to irregular. Pileus surface rough with mycelial tufts and stiff hairs, azonate, grayish-orange (5C4; pale ochraceous white according to the original description). Pileus margin obtuse, entire. Pore surface pale orange (5A3), pores round to angular, 6–7/mm, dissepiments entire. Context fibrous-leathery, pale orange (5A3), up to 2 mm

thick, without a crust. Tubes 1- or 2-layered, fibrous-leathery, pale orange, up to 2 mm deep in each layer.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, 1.5–3 μm wide; skeletal hyphae almost straight, unbranched, thick-walled (up to 2 μm thick), colorless, IKI−, 3–5 μm wide. Contextual hyphae similar to tramal hyphae. Hymenial cystidia scattered, slightly thick-walled (up to 0.5 μm wide), apically encrusted. Basidia not seen (4-sterigmate according to the original description). Basidiospores subglobose, colorless, IKI−, 2.8–3.8 × 2.2–3 μm.

Remarks: This species is a member of *Trichaptum* Murrill with dimitic hyphal system and encrusted hymenial cystidia. This species is peculiar in its regular and nonlacerated pores, whitish context, and subglobose basidiospores within the genus.

Tyromyces perskeletalis Corner, Beih. Nova Hedwig. 96:187, 1989.

Holotype: Singapore, Jurong, Dec. 25, 1932, leg. E.J.H. Corner (E).

Basidiospores were not seen from the holotype. This taxon represents ***Fomitopsis ostreiformis*** (Berk.) T. Hatt., comb. nov. (basionym: *Polyporus ostreiformis* Berk., J. Linn. Soc. Bot. 16:46, 1878, as *P. ostreaeformis*) with white and fibrous-corky context when dried, grayish pileus surface, ditrimitic hyphal system, and short cylindrical basidiospores seen in the original description. This species is a member of *F. palustris* comp. with white and fibrous-corky context, distinctly pileate basidiocarps, dimitic to ditrimitic hyphal system, and brown rot. For a description, see De (1981) as *Daedalea ostreiformis* (Berk.) De.

Tyromyces pinguidus Corner, Nova Hedwig. 55:147, 1992.

Holotype: Malaysia, Johore, Mawai, Mar. 30, 1941, leg. E.J.H. Corner (E).

The holotype is moldy and basidiospores were not detected. Probably the holotype represents a *Ceriporia* sp. with resupinate basidiocarps, monomitic hyphal system without clamp connections, and lack of hymenial cystidia.

Tyromyces polycystes Corner, Nova Hedwig. 55:147, 1992.

Holotype: Malaysia, Mt. Kinabalu, altitude 1300 m, Aug. 29, 1961, leg. E.J.H. Corner (E).

I take it as a form of *Hyphodontia arguta* (Fr. : Fr.) J. Erikss. with resupinate basidiocarp, irpicoid hymenophore, and abundant lagenocystidia. A condensed description of the holotype is as follows: basidiocarps resupinate; hymenophore irpicoid; hyphal system monomitic, generative hyphae with clamp connections; lagenocystidia thin- to slightly thick-walled (up to 0.5 μm thick), usually with a tapered apex, apically encrusted or not; leptocystidia capitate, sparse; basidia 4-sterigmate; basidiospores IKI−, 3.8–5 × 2.5–3.5 μm. For drawings on microscopic structures of the holotype of *T. polycystes*, see Corner (1992). For a detailed description and synonyms of *H. arguta*, see Langer (1994).

Tyromyces pulviniformis Corner, Beih. Nova Hedwig. 96:189, 1989.

Holotype or another authentic specimen was not traced in E.

Tyromyces pusillicaesius Corner, Beih. Nova Hedwig. 96:189, 1989.

Holotype: Malaysia, Borneo, Mt. Kinabalu, Mesilau, altitude 1700 m, Aug. 22, 1961, leg. E.J.H. Corner (E).

The holotype represents a sterile specimen of *Antrodiella* sp. with horny context when dried and dimitic hyphal system with clamp connections.

Tyromyces rhodomelon Corner, Beih. Nova Hedwig. 96:190, 1989.

Holotype: Malaysia, Pahang, June 7, 1931, leg. E.J.H. Corner (E).

The holotype is sterile. It is probably a specimen of *Antrodiella* sp. or *Antrodia* sp. with effused-reflexed basidiocarps, white and corky context, ditrimitic hyphal system, and generative hyphae with clamp connections.

Tyromyces roseipileus Corner, Beih. Nova Hedwig. 96:191, 1989.

Holotype: Malaysia, Borneo, Mt. Kinabalu, altitude 1600 m, Mar. 10, 1964, leg. E.J.H. Corner (E).

Basidiospores are smaller (3.8–5 × 1.5–2 μm) than those (4.7–6 × 2.3–3 μm) of the original description. This specimen is identical with *Tyromyces incarnatus* Imazeki known from Japan with sessile basidiocarps, red pileus surface, monomitic hyphal system, and short cylindrical basidiospores. For a description, see Hattori and Ryvarden (1994).

Tyromyces rubricarneus Corner, Nova Hedwig. 55:149, 1992.

Holotype: Singapore, Reservoir Jungle, April 1929, leg. E.J.H. Corner (E).

The holotype is badly contaminated. It probably represents a *Gloeoporus* sp. with brownish tubes and monomitic hyphal system.

Tyromyces rubrifuscescens Corner, Beih. Nova Hedwig. 96:191, 1989. Fig. 12

Holotype: Solomon I., Ysabel, Oct. 1, 1965, leg. E.J.H. Corner (E).

I leave this species as *Elmerina* cf. *substuppea.*

Elmerina substuppea (Berk. & Cooke) T. Hatt. comb. nov. (basionym: *Polyporus substuppeus* Berk. & Cooke, J. Linn. Soc. Bot. 15:380, 1876, K!).

Polyporus substuppeus was already combined with *Aporpium* Bondartsev & Singer (= *Protomerulius* A. Moller) by Rajchenberg (1987) because of the longitudinally septate basidia. However, basidia seen in the holotype of *T. rubrifuscescens* remain clavate and aseptate, then separate apically, which is a character for the basidia of *Protodaedalea* Imazeki (Bandoni et al. 1982). *Protodaedalea* is now considered to be a synonym of *Elmerina* Bres. (Núñez 1997).

Holotype of *P. substuppeus* (type locality: Brazil) has sessile basidiocarps, angular pores (2–3/mm), and basid-

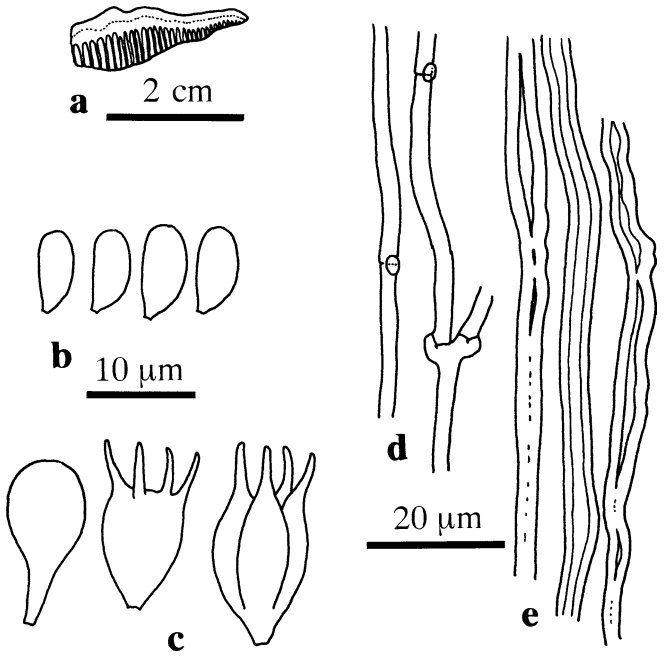

Fig. 12. Structures of *Elmerina* cf. *substuppea* from basidiocarp (holotype of *T. rubrifuscescens*). **a** Vertical section view of basidiocarp. **b** Basidiospores. **c** Basidia. **d** Generative hyphae from context. **e** Skeletal hyphae from context

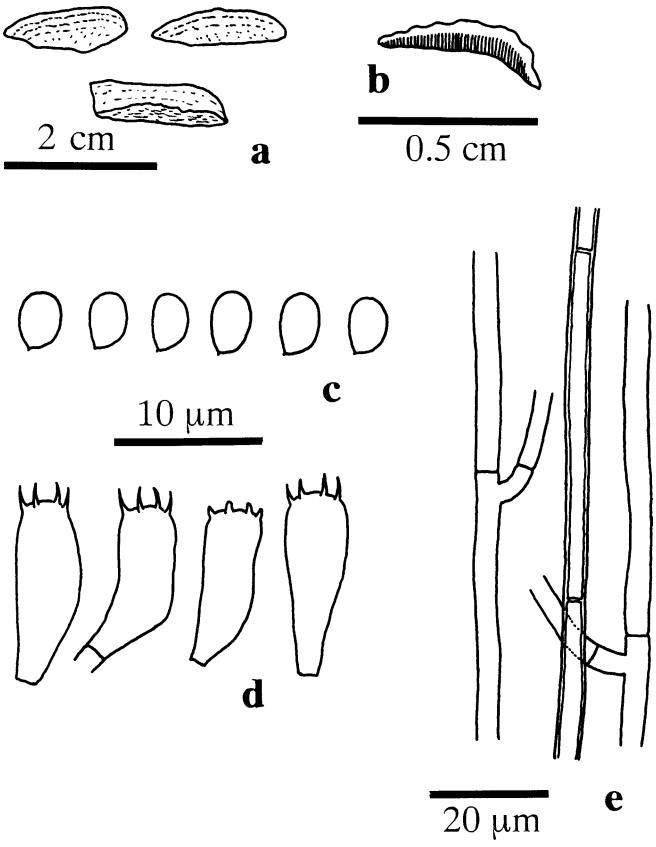

Fig. 13. Structures of *Oxyporus rufipusillus* from basidiocarps (**a**, **b** holotype; **c**–**e** F-19469, TFM). **a** Upper view of basidiocarps. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Basidia. **e** Generative hyphae from context

iospores 4.5–6 × 2.5–3.5 μm. Holotype of *Polyporus hiascens* Lloyd (US0304350, BPI!; type locality: Brazil) and that of *Polystictus subreflexus* Lloyd (US0306707, BPI!; type locality: Philippines) have effused-reflexed basidiocarps, angular to elongated pores (1–2/mm), and basidiospores 5.5–7 × 3–4 μm and 5–6.5 × 2.5–3 μm, respectively. Holotype of *Polyporus gregarius* Rick (type locality: Brazil) has sessile basidiocarps, angular pores (1–2/mm), and basidiospores 6–8 × 4–4.5 μm (Rajchenberg 1987). Holotype of *T. rubrifuscescens* has sessile basidiocarps, angular to sinuous pores ((0.5–) 1–2/mm), and basidiospores 7–8.5 × 3.5–4.5 μm. However, they all share such similar characteristics as brown and fibrous-cottony context, large and often irregular pores, and dimitic hyphal system with clamp connections. Further studies are needed to reveal if *E. substuppea* is a species with variable basidiocarp shape, pore size, and basidiospore size, or whether some related species exist among this complex.

Tyromyces rufipendens Corner, Beih. Nova Hedwig. 96:192, 1989.

Holotype: Malaysia, Borneo, Mt. Kinabalu, altitude 1100 m, leg. E.J.H. Corner (E).

The holotype is a young and sterile specimen, and it is difficult to know the proper name.

Tyromyces rufipileatus Corner, Beih. Nova Hedwig. 96:193, 1989.

Holotype or other authentic specimen was not traced in E.

Tyromyces rufipusillus Corner, Beih. Nova Hedwig. 96:193, 1989. Fig. 13

Holotype: Brunei, Kuala Belait, Feb. 23, 1959, leg. E.J.H. Corner (E).

Accepted as ***Oxyporus rufipusillus*** (Corner) T. Hatt., comb. nov. (basionym indicated above). Because the holotype and the other specimen cited in the original description are sterile, microscopical descriptions are based on the following specimen: Pasoh, N. Sembilan, Malaysia, Dec. 25, 1999, leg. T. Hattori (F-19469, TFM).

Basidiocarps effused-reflexed to sessile, pileus applanate, semicircular to elongated. Pileus surface matt, sulcate, pale orange (5A3) to grayish (pale white according to the original description). Pileus margin acute, eroded or not. Pore surface pale orange, pores angular to round, 4–5/mm, dissepiments entire. Context fibrous-spongy, whitish, without a crust. Tubes fibrous, up to 1 mm deep.

Hyphal system monomitic. Tramal hyphae colorless, IKI−, without clamp connections, 1.5–3.5 μm wide. Contextual hyphae almost similar, 2–5 μm wide. Hymenial cystidia not seen. Basidia clavate, 4-sterigmate, 9–15 × 3.5–4.5 μm. Basidiospores subglobose to short ellipsoid, colorless, IKI−, 3.5–4.5 × 2.5–3.5 μm.

Remarks: This is not a typical member of *Oxyporus* Donk without distinct hymenial cystidia. At this moment, I

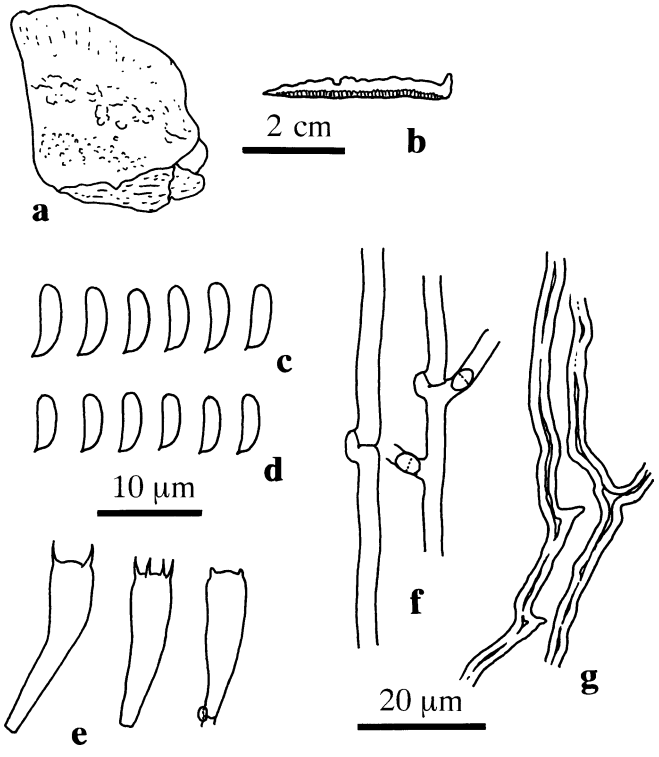

Fig. 14. Structures of *Fomitopsis scorteus* from basidiocarps (**a**, **b**, **d**, **e**, **f**, **g** holotype of *F. scorteus*; **c** holotype of *T. subroseiporus*). **a** Upper view of basidiocarp. **b** Vertical section view of basidiocarp. **c**, **d** Basidiospores. **e** Basidia. **f** Generative hyphae from trama. **g** Skeletal hyphae from trama

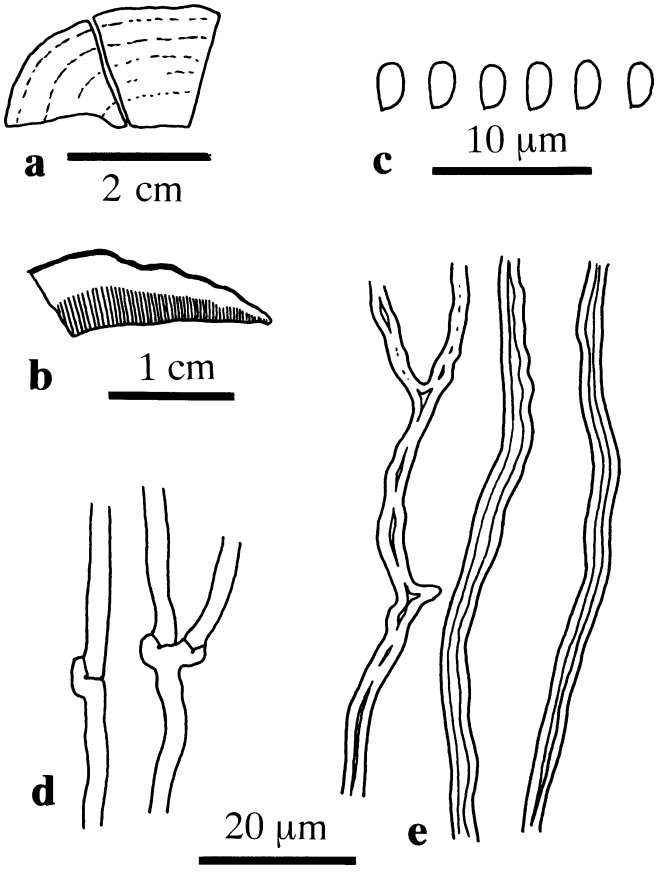

Fig. 15. Structures of *Fomitopsis singularis* from basidiocarp (holotype). **a** Upper view of basidiocarp. **b** Vertical section view of basidiocarp. **c** Basidiospores. **d** Generative hyphae from context. **e** Skeletal hyphae from context

prefer to place this in *Oxyporus* because of the small, white, and spongy basidiocarps, monomitic hyphal system without clamp connections, and subglobose basidiospores that are similar to some of *Oxyporus* spp. Other species with similar basidiocarps are discriminated as follows: *O. cuneatus* (Murrill) Aoshima has larger pores (2–4/mm) and is restricted to conifers (Gilbertson and Ryvarden 1987); *O. lilacinus* Corner has more or less irregular and lilaceous pores and a dimitic hyphal system (Hattori 2001).

Tyromyces scorteus Corner, Beih. Nova Hedwig. 96:194, 1989. Fig. 14

Holotype: Solomon I., Guadalcanal, Tsuva, Nov. 8, 1965, leg. E.J.H. Corner (E).

Accepted as ***Fomitopsis scorteus*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile to effused-reflexed, pileus thin and applanate, semicircular. Pileus surface matt, azonate, rough with irregular warts, radial ridges, and mycelial tufts, pale orange (5A3). Pileus margin thin and acute, almost entire (inrolled in the holotype of *T. subroseiporus*, a synonym of *F. scorteus*). Pore surface whitish, pores angular near the margin, otherwise daedaleoid to irpicoid (angular to sinuous in *T. subroseiporus*), 2–3/mm, dissepiments eroded. Context tough fibrous-spongy, white, up to 2 mm thick, without a crust. Tubes brittle, white, up to 2 mm deep.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, 2–3.5 μm wide; skeletal hyphae colorless, IKI−, occasionally branched, thick-walled (up to 2 μm wide), 2–4.5 μm wide. Contextual generative hyphae 2–4.5 μm wide; skeletal hyphae similar to trama, dominating. Cystidia not seen. Basidia 2- to 4-sterigmate, 15–22 × 4–5 μm. Basidiospores cylindrical, slightly bent, hyaline, IKI−, 4.5–6 × 2–3 μm (5.5–7.5 × 2–3 μm in *T. subroseiporus*).

Remarks: Type of rot is unknown, but I place this in *Fomitopsis* because it is suggested to be a member of *F. palustris* comp. with distinctly pileate basidiocarps, white and fibrous-spongy context, dimitic hyphal system with occasionally branched skeletal hyphae, and cylindrical basidiospores. This species is characteristic with thin and applanate basidiocarps, rough pileus surface, large and occasionally irregular pores, and cylindrical basidiocarps among *F. palustris* comp.

Tyromyces sinapicolor Corner, Nova Hedwig. 55:150, 1992.

Holotype: Malaysia, Borneo, Mt. Kinabalu, altitude 1800 m, Aug. 18, 1961, leg. E.J.H. Corner (E).

This is a member of Corticiaceae *sensu lato* with resupinate basidiocarps and irpicoid hymenophore.

Tyromyces singularis Corner, Beih. Nova Hedwig. 96:195, 1989. Fig. 15

Holotype: Solomon I., Guadalcanal, Mt. Gallego, July 3, 1965, leg. E.J.H. Corner (E).

Accepted as ***Fomitopsis singularis*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile, pileus applanate to triquetrous, semicircular. Pileus surface glabrous, sulcate, grayish-orange (7C3–4), whitish near the margin. Pileus margin acute and entire. Pore surface light brown (6E4; white according to the original description), pores angular, 8–10/mm, dissepiments entire. Context chalky, white, up to 3 mm thick, with an agglutinated crust, up to 200 μm thick. Tubes chalky, white, light brown near the pore mouth, up to 6 mm deep.

Hyphal system dimitic. Tramal generative hyphae dominating, colorless, IKI−, with clamp connections, 1.5–2 μm wide; skeletal hyphae scattered, colorless, IKI−, thick-walled (up to 1 μm thick), sinuous and occasionally branched, 1.5–3 μm wide. Contextual generative hyphae 1.5–3 μm wide; skeletal hyphae more abundant than in trama, 2–4 μm wide. Hymenial cystidia not seen. Basidia not seen. Basidiospores ellipsoid, colorless, IKI−, 2.5–3.2 × 1.8–2.2 μm.

Remarks: Type of rot is unknown, but I consider it as a member of *Fomitopsis* because of its affinity to *F. pseudopetchii* (Lloyd) Ryvarden by the white and chalky to corky context, agglutinated crust, dimitic hyphal system with narrow skeletal hyphae, small and ellipsoid basidiospores.

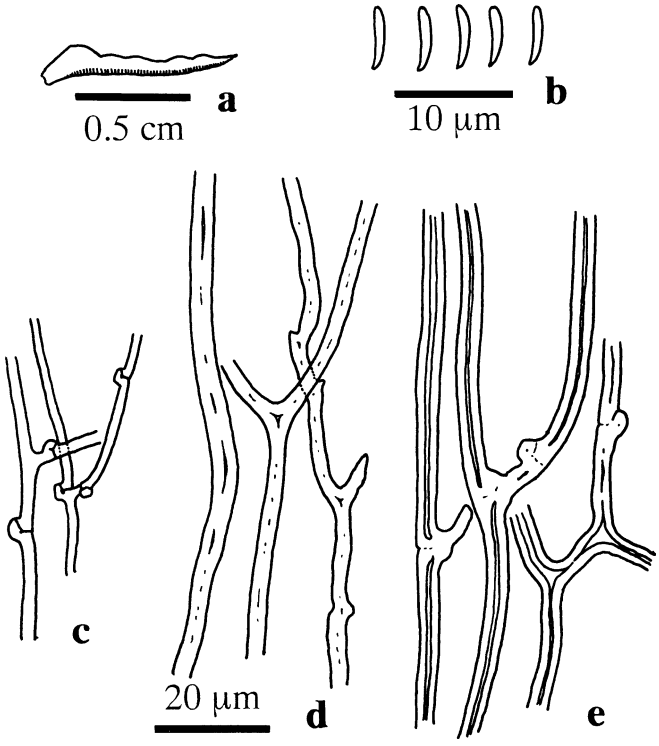

Fig. 16. Structures of *Tyromyces stenomitis* from basidiocarps (holotype). **a** Vertical section view of basidiocarp. **b** Basidiospores. **c** Generative hyphae from trama. **d** Skeletal hyphae from trama. **e** Generative hyphae from context

Tyromyces stenomitis Corner, Beih. Nova Hedwig. 96:196, 1989. Fig. 16

Holotype: Malaysia, Borneo, Mt. Kinabalu, altitude 1700 m, Mar. 1, 1964, leg. E.J.H. Corner (E).

Accepted as *T. stenomitis*.

Basidiocarps sessile to effused-reflexed, pileus semicircular to elongated, applanate. Pileus surface matted to almost glabrous, sulcate to nonsulcate, azonate, whitish. Pileus margin thin and acute, entire. Pore surface whitish, pores angular, 6–7/mm, dissepiments thin and entire. Context leathery, whitish, up to 1 mm thick, without a crust. Tubes whitish, up to 0.3 mm deep.

Hyphal system dimitic. Tramal generative hyphae colorless, IKI−, with clamp connections, occasionally branched, 1–2.5 μm wide; skeletal hyphae colorless, IKI−, thick-walled to almost solid, occasionally branched. Contextual generative hyphae colorless, IKI−, thick-walled (up to 2 μm thick), 2–5 μm wide. Hymenial cystidia not seen. Basidia not seen. Basidiospores allantoid, colorless, IKI−, 4.5–5.5 × 0.8–1 μm.

Remarks: Type of rot is unknown, but I retain this in *Tyromyces*. This species is characterized by thin and leathery basidiocarps and allantoid basidiospores.

Tyromyces subfibrillosus Corner, Beih. Nova Hedwig. 96:198, 1989.

Holotype: Malaysia, Borneo, Mt. Kinabalu, Liwagu River, altitude 1300 m, Aug. 28, 1961, leg. E.J.H. Corner (E).

This taxon represents *T. mollicaseus* with sessile basidiocarps, fibrous-corky context, and small and subglobose basidiospores.

Tyromyces subfragilis Corner, Beih. Nova Hedwig. 96:198, 1989. Fig. 17

Holotype: Solomon I., San Cristobal, Huni River, Aug. 8, 1965, leg. E.J.H. Corner (E).

Accepted as ***Oligoporus subfragilis*** (Corner) T. Hatt., comb. nov. (basionym indicated above).

Basidiocarps sessile, pileus slightly descending. Pileus surface rough with mycelial tufts (cottony-subvillose in the original description), light brown (7D7–8; white according to the original description). Pileus margin obtuse. Pore surface grayish-brown (cream-white when fresh according to the original description), tubes agglutinated, and pore size difficult to measure (pores 300 μm wide according to the original description). Context corky-horny (fibrous-cheesy when fresh according to the original description), whitish, without a crust. Tubes subhorny when dried, up to 10 mm deep.

Hyphal system monomitic. Tramal hyphae colorless, IKI−, with clamp connections, occasionally branched, 2–4.5 μm wide. Contextual hyphae colorless, IKI−, 3–7.5 μm wide. Hymenial cystidia abundant, colorless, IKI−, apically encrusted, thick-walled (up to 2 μm thick), 20–30 × 6–12 μm. Basidia not seen. Basidiospores short cylindrical, colorless, IKI−, 3.5–4.5 × 1–1.5 μm.

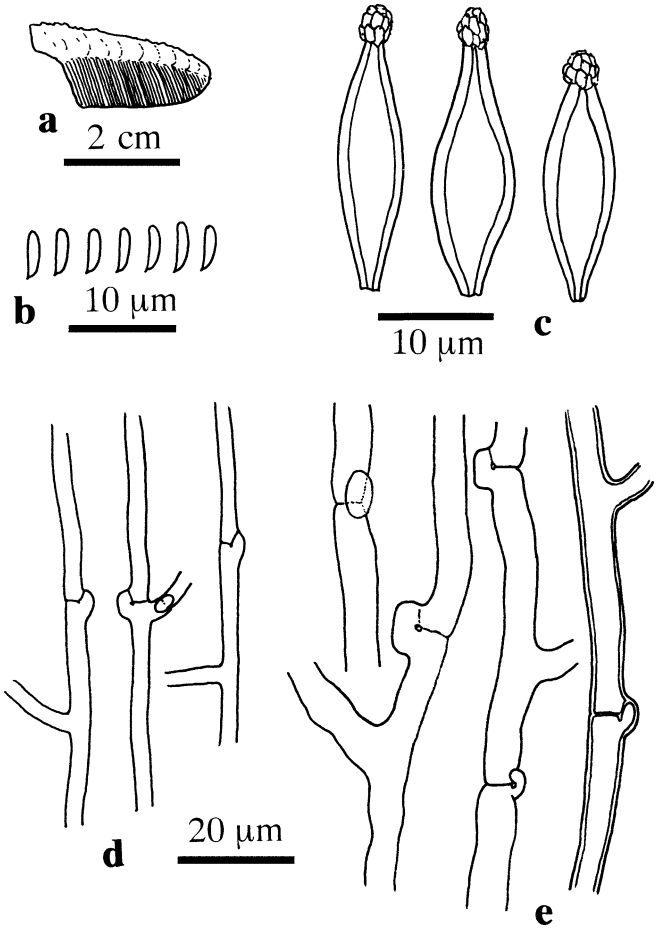

Fig. 17. Structures of *Oligoporus subfragilis* from basidiocarp (holotype). **a** Vertical section view of basidiocarp. **b** Basidiospores. **c** Hymenial cystidia. **d** Generative hyphae from trama. **e** Generative hyphae from context

Remarks: Type of rot is unknown for the holotype. I put this in *Oligoporus* because of the thick-walled hymenial cystidia, which is unknown in *Tyromyces*. *Auriporia* Ryvarden is another possible genus to accommodate this species, but it lacks the yellow coloration that is an important characteristic to define the genus *Auriporia*. This species may be placed in *Auriporia* if the taxonomic importance of thick-walled cystidia is proved.

This species is distinct from other *Oligoporus* spp. with similarly encrusted hymenial cystidia, as follows. *Oligoporus hibernicus* (Berk. & Broome) Gilb. & Ryvarden has resuspinate basidiocarps, hyphoid cystidia, and longer basidiospores (4–6 × 1–1.5 μm; Gilbertson and Ryvarden 1987). *Oligoporus inocybe* (David & Malencon) Ryvarden & Gilb. has resupinate basidiocarps, distinctly swollen cystidia, and longer basidiospores (5–6 × 1.5–1.7 μm; Ryvarden and Gilbertson 1994). *Oligoporus sericeomollis* (Romell) Pouzar has resupinate basidiocarps, wider basidiospores (4–5 × 2–2.5 μm), and occurs on conifers (Gilbertson and Ryvarden 1987). *Auriporia pileata* Parmasto has similar cystidia and basidiospores, but is discriminated by the smaller and thin basidiocarps, glabrous and yellowish pileus, and lack of brown discoloration after being dried (Parmasto 1980).

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