

FULL PAPER

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Corticoid fungi (Basidiomycota) in mangrove forests of the islands of Iriomote and Okinawa, Japan

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Abstract Sixteen species of corticoid fungi (Basidiomycota) were collected from mangrove forests in the islands of Iriomote and Okinawa, Japan. All the species are new records for the Japanese mangrove forests. Of these species, 6 species are newly reported from Japan: *Cerocorticium molle*, *Gloeocystidiellum moniliforme*, *G. wakullum*, *Hyphoderma ayresii*, *Phanerochaete tropica*, and *Phlebia acanthocystis*. Their morphological descriptions, illustrations, and remarks based on the Japanese specimens are provided.

Key words Biodiversity · Corticiaceae · Japanese species · Mangrove ecosystem · Taxonomy

Introduction

Mangrove forests are distributed in coastal and riverine intertidal zones of the subtropics and tropics in many parts of the world, and more than 30 basidiomycetous fungi (Basidiomycota) including 6 corticoid species (Corticiaceae sensu lato) have been reported from the forests (Sotão et al. 1991, 2002; Filho et al. 1993; Inderbitzin and Desjardin 1999; Schmit and Shearer 2003). In Japan, mangrove trees thrive mainly in intertidal zones of the mouths of rivers located in the southwestern subtropical region of the Japanese Archipelago. Although 98 species of the

corticoid fungi have been collected from the subtropical inland forests and described (Maekawa 1993, 1994, 1997, 1998, 1999, 2000; Maekawa and Hasebe 2002), no corticoid species has been known from the Japanese mangrove forests.

During an ongoing project studying the biodiversity of the basidiomycetous fungi that inhabit members of the mangrove trees, we collected 68 specimens of corticoid fungi from the mangrove forests of the islands of Okinawa and Iriomote, located in the Ryukyu Islands, in July 2001 and November 2002. In this article, the following 16 corticoid species, including 6 species newly recorded from Japan, are identified. All the species are new records for the Japanese mangrove forests.

Materials and methods

Collection sites of the specimens examined are indicated below the descriptions of each species. Each species newly recorded from Japan is marked with an asterisk at the head of the specific name, and its macro- and micromorphological characteristics are provided based on the Japanese specimens. Color names in double quotation marks are based on Rayner (1970). Microscopic observations were made using the methods described by Maekawa (1993). All the specimens examined in this study were deposited in the herbarium of the Tottori Mycological Institute (TMI).

Taxonomy

**Cerocorticium molle* (Berk. & M.A. Curtis) Jülich, Persoonia 8:219, 1975. Fig. 1

≡ *Corticium molle* Berk. & M.A. Curtis, J. Linn. Soc., Bot. 10:336, 1868.

Basidiomata resupinate, adnate, at first orbicular and then becoming confluent, ceraceous, 150–250 μm thick; hymenial surface “Primrose”, dull yellow, “Luteous” to

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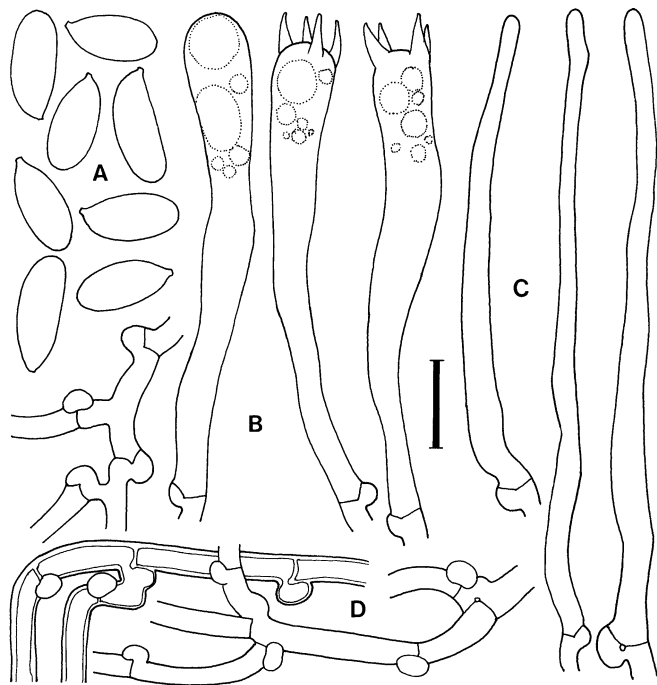


Fig. 1. *Cerocorticium molle* (TMI25189). **A** Basidiospores. **B** Basidia and an immature basidium. **C** Hyphidia. **D** Subicular hyphae. Bar 10 μ m

yellowish-orange, smooth, sometimes slightly cracked when dried; margin white, "Primrose", dull yellow to "Luteous", thinning out indeterminately, sometimes fibrillose under the lens ($\times 20$). Context in vertical section subhyaline, membranous with a basal layer. Hyphal system monomitic; hyphae 2.5–4.5 μ m in diameter, smooth, thin- to thick-walled (up to 1 μ m), nodose-septate; hyphidia not branched, 35–70 \times 2–3 μ m, produced in the hymenium; basidia narrowly clavate to tubular, sometimes sinuous, 50–60 \times 7–8 μ m, with a basal clamp, producing four sterigmata, thin-walled, sometimes with oily materials; basidiospores narrowly ellipsoid to cylindrical, 10–14 \times 4.5–5.5 μ m, smooth, thin-walled, nonamyloid.

Specimens examined: TMI25188 on decaying trunk of *Bruguiera gymnorrhiza* (L.) Lam., Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa; TMI25189 on decaying and decorticated trunk of *Kandelia candel* (L.) Druce, Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa.

Notes: This species is characterized by having nodose-septate hyphae, hyphidia in the hymenium, large basidia, and narrowly ellipsoid to subcylindrical basidiospores, and by lacking cystidia. Basidiospores of the Japanese specimens TMI25188 and TMI25189 are smaller than those described as 15–18 \times 5.9–7 μ m by Jülich (1975) and 10–16 \times 5–6.2 μ m by Wu and Chen (1990), but all the other morphological characteristics are identical to those of the descriptions. The species is mainly distributed from subtropical to tropical regions (Hjortstam and Larsson 1995).

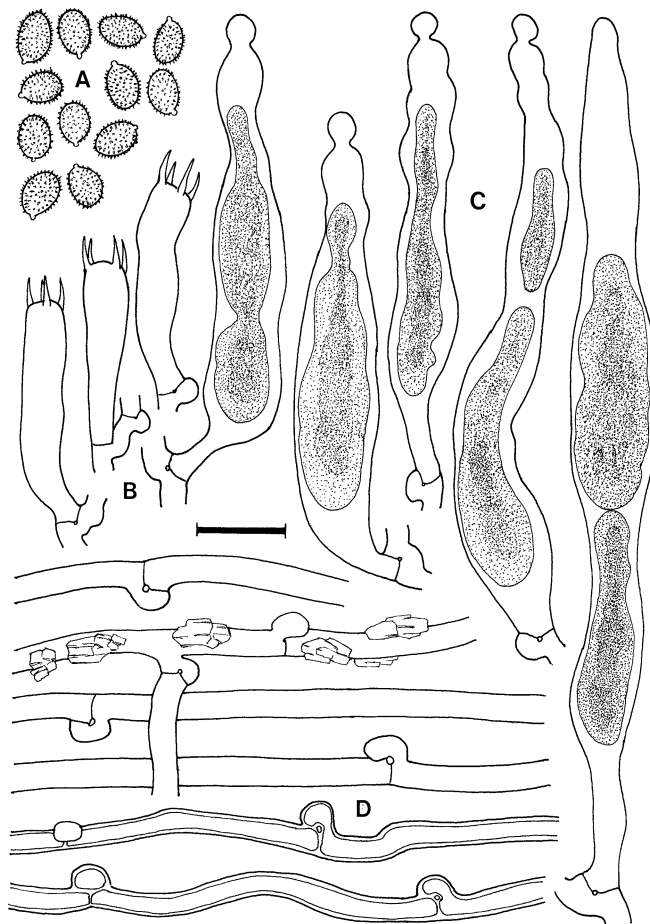


Fig. 2. *Gloeocystidiellum moniliforme* (TMI25236). **A** Basidiospores. **B** Basidia. **C** Cystidia (gloeocystidia). **D** Subicular hyphae. Bar 10 μ m

**Gloeocystidiellum moniliforme* Sheng H. Wu, Mycotaxon 58:40, 1996. Fig. 2

Basidiomata resupinate, adnate, orbicular, 150–300 μ m thick; hymenial surface white, pale cream to "Buff", smooth; margin concolorous with the hymenial surface, thinning out determinately, sometimes fibrillose under the lens ($\times 20$). Context in vertical section subhyaline, subpellicular to membranous, sometimes containing crystals. Hyphal system monomitic; hyphae 1.5–3.5 μ m in diameter, smooth, thin- to thick-walled (up to 1 μ m), nodose-septate, sometimes encrusted with crystalloid materials; cystidia (gloeocystidia) cylindrical to obclavate with a stalklike base, sometimes moniloid toward the apex, 48–110 \times 8.5–11.5 μ m, with a basal clamp, thin-walled, with pale yellowish-colored oily contents, embedded or projecting up to 15 μ m beyond the hymenial surface; basidia clavate to subcylindrical, sometimes sinuous, 20–24 \times 4.5–5 μ m, thin-walled, with a basal clamp, producing four sterigmata; basidiospores ellipsoid, 4.5–5.5 \times 3–4 μ m, minutely warted, thin-walled, amyloid.

Specimen examined: TMI25236 on decaying trunk of *Rhizophora mucronata* Lam., Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa.

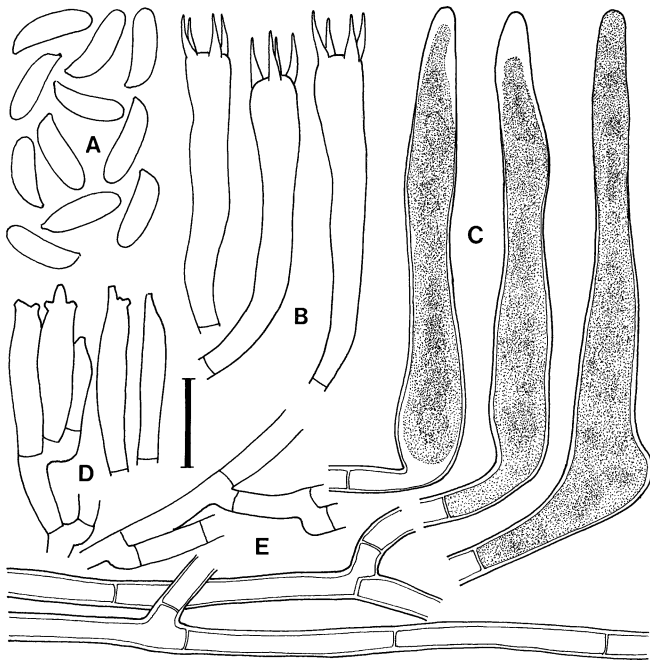


Fig. 3. *Gloeocystidiellum wakullum* (TMI25677). **A** Basidiospores. **B** Basidia. **C** Cystidia (gloeocystidia). **D** Hyphidia (acanthohyphidia). **E** Subicular hyphae. Bar 10 μ m

Notes: This species is characterized by its loosely intertwined subicular hyphae with clamp connections, cylindrical to obclavate gloeocystidia with a stalklike base, and minutely warted ellipsoid and amyloid basidiospores measuring $4.5\text{--}5.5 \times 3\text{--}4\ \mu\text{m}$. It has previously been reported only from Réunion Island in the Indian Ocean (Boidin et al. 1997) and Taiwan (Wu 1996).

**Gloeocystidiellum wakullum* Burds., Nakasone & G.W. Freeman, Syst. Bot. 6:431, 1981. Fig. 3

Basidiomata resupinate, closely adnate, at first orbicular and then becoming confluent, $60\text{--}180\ \mu\text{m}$ thick; hymenial surface pale cream, "Buff" to pale ochreous, smooth, sometimes slightly cracked when dried; margin concolorous with the hymenial surface, thinning out indeterminately, sometimes pruinose under the lens ($\times 20$). Context in vertical section subhyaline, membranous with a basal layer ($20\text{--}50\ \mu\text{m}$ thick), sometimes containing masses of crystals. Hyphal system monomitic; hyphae $3\text{--}6.5\ \mu\text{m}$ in diameter, smooth, thin- to thick-walled (up to $1.5\ \mu\text{m}$), clampless-septate; cystidia (gloeocystidia) cylindrical to obclavate, sometimes tapering toward the apex, $60\text{--}125 \times 8\text{--}12\ \mu\text{m}$, without a basal clamp, thin- to thick-walled (up to $1.5\ \mu\text{m}$), with pale yellowish oily contents; hyphidia (acanthohyphidia) cylindrical, usually with one to four papillae at the apex, $17\text{--}30 \times 2.5\text{--}4\ \mu\text{m}$, thin-walled, without a basal clamp, produced in the hymenium; basidia narrowly clavate to cylindrical, $30\text{--}40 \times 5\text{--}5.5\ \mu\text{m}$, thin-walled, without a basal clamp, producing four sterigmata; basidiospores cylindrical to subballantoid, sometimes banana-shaped, $8.5\text{--}9.5 \times 2.5\text{--}3\ \mu\text{m}$, smooth, thin-walled, amyloid.

Specimen examined: TMI25677 on decaying branch of *R. mucronata*, Komi (the mouth of Aira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2002, collected by N. Maekawa.

Notes: The major diagnostic characteristics of *G. wakullum* are the clampless hyphae, acanthohyphidia produced in the hymenium, gloeocystidia, and amyloid and cylindrical to subballantoid basidiospores measuring $8.5\text{--}9.5 \times 2.5\text{--}3\ \mu\text{m}$. This species has been reported from Guadeloupe Island in the Caribbean Sea (Boidin et al. 1997), Tanzania (Hjortstam and Larsson 1995), and Florida and Mississippi in the United States (Ginns and Freeman 1994). There are different opinions on the disposition of this species. Boidin et al. (1985) treated the species as *Vesiculomyces wakullus* (Burdsall, Nakasone & Freeman) Boidin, Lanquetin & Gilles. Subsequently, Wu (1996) moved *G. wakullum* to the genus *Stereum* Pers. because of the presence of acanthohyphidia, clampless hyphae, and smooth, amyloid basidiospores. Recently, Larsson (2002) suggested that this species should be transferred to *Megalocystidium* Jülich based on the phylogenetic analyses using sequence data of the nuclear 5.8S, internal transcribed spacer region 2 (ITS2), and large subunit rDNA genes, although acanthohyphidia have not been described as one of the generic characteristics of *Megalocystidium* in Jülich's original description (1978) and subsequent descriptions by Ginns and Freeman (1994), Wu (1996), and Boidin et al. (1997).

**Hyphoderma ayresii* (Berk. in Cooke) Boidin & Gilles, Cryptog. Mycol. 12:103, 1991. Fig. 4

\equiv *Peniophora Ayresii* Berk. in Cooke, Grevillea 8:22, 1880.

Basidiomata resupinate, adnate, at first orbicular and then becoming confluent, $70\text{--}250\ \mu\text{m}$ thick; hymenial surface dull cream to "Buff", smooth, pilose under the lens ($\times 20$); margin white to "Buff", thinning out indeterminately, sometimes pruinose to fibrillose under the lens ($\times 20$). Context in vertical section subhyaline, membranous. Hyphal system monomitic; hyphae $2\text{--}3\ \mu\text{m}$ in diameter, smooth, thin- to slightly thick-walled (up to $0.5\ \mu\text{m}$), nodose-septate; cystidia (lamprocystidia) conical to fusiiform, $70\text{--}130 \times 13\text{--}20\ \mu\text{m}$, with a basal clamp, sometimes projecting up to $130\ \mu\text{m}$ beyond the hymenial surface; hyphidia 0–3 branched, with a basal clamp, produced in the hymenium; basidia narrowly clavate, sometimes slightly constricted, $45\text{--}75 \times 9\text{--}12\ \mu\text{m}$, with a basal clamp, producing four sterigmata, slightly thick-walled (up to $0.5\ \mu\text{m}$) excluding apical part; basidiospores broadly ellipsoid, $9.5\text{--}12.5 \times 6\text{--}8\text{--}(8.5)\ \mu\text{m}$, smooth, thin-walled, nonamyloid.

Specimens examined: TMI25221 on decaying and decorticated trunk of *Heritiera littoralis* Dryand., Komi (the mouth of Maira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25671 on decaying twig of *B. gymnorrhiza*, Funaura (Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 8, 2002, collected by N. Maekawa.

Notes: This species is characterized by having lamprocystidia and broadly ellipsoid basidiospores measur-

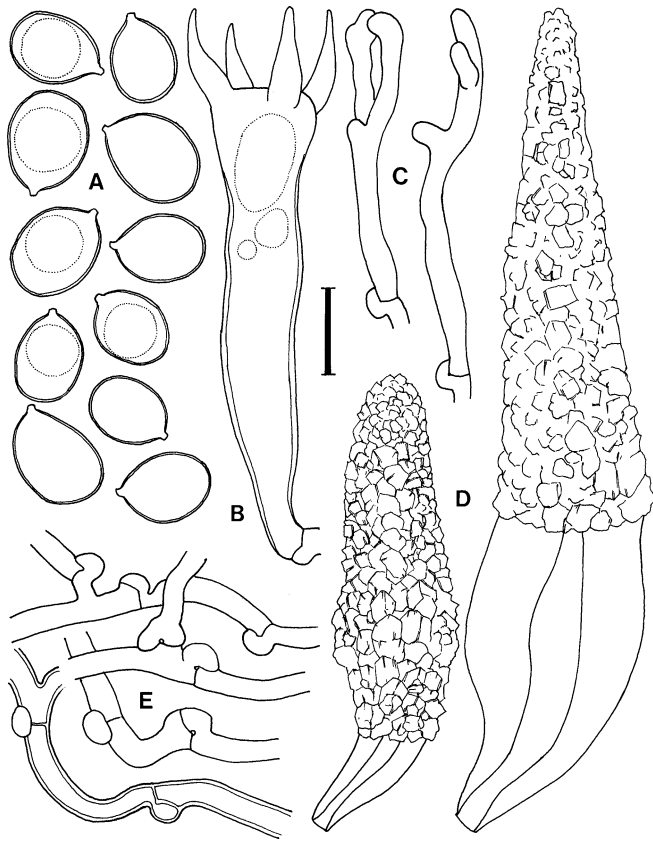


Fig. 4. *Hyphoderma ayresii* (TMI25221). **A** Basidiospores. **B** Basidium. **C** Hyphidia. **D** Cystidia (lamprocystidia). **E** Subicular hyphae. Bar 10 μ m

ing 9.5–12.5 \times 6–8(–8.5) μ m. It has been known from Central Africa, Gabon, and Réunion Island (Boidin and Gilles 1991) and Taiwan (as *Hyphoderma macrosporum* Sheng H. Wu; Wu 1990).

Hyphoderma nudicephalum Gilb. & M. Blackwell, Mycotaxon 33:378, 1988.

Specimen examined: TMI25190 on decaying trunk of *R. mucronata*, Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa.

Notes: This species is known from subtropical to tropical regions. In Japan, it has previously been collected from inland forests in the islands of Iriomote, Ishigaki (the Yaeyama Islands) (Maekawa 1998) and Hahajima (the Ogasawara Islands) (unpublished data).

Hyphoderma rude (Bres.) Hjortstam & Ryvar den, Mycotaxon 10:275, 1980.

Specimens examined: TMI25204 and TMI25205 on decaying branch of *R. mucronata*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25226 on decaying branch of *Sonneratia alba* Sm., Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25240 on decaying trunk of

K. candel, Kin-cho (the mouth of Okkubi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa; TMI25195 on decaying aerial root of *R. mucronata*, Kin-cho (the mouth of Okkubi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa; TMI25182 on decaying branch of *R. mucronata*, Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa; TMI25187 on decaying trunk of *B. gymnorrhiza*, Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa.

Notes: In Japan, *H. rude* is mainly distributed in the subtropical regions (Maekawa 1994; described as *H. odontiaeforme* Boidin & Berthet). It seems to be common in mangrove forests of the islands of Okinawa and Iriomote.

Hyphoderma crustosa (Pers.: Fr.) J. Erikss., Symb. Bot. Upsal. 16:104, 1958.

Specimen examined: TMI25200 on decaying branch of *Thespesia populnea* (L.) Soland. ex Correa, Kin-cho (the mouth of Okkubi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa.

Notes: This species is one of the common corticioid fungi in Japan (Maekawa 1994).

Hyphoderma gossypina (Parmasto) Hjortstam, Mycotaxon 39:416, 1990.

Specimen examined: TMI25229 on decaying branch of *Pouteria obovata* (R. Br.) Baehni, Komi (the mouth of Maira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa.

Notes: According to Langer (1994) and Hjortstam and Larsson (1995), *H. gossypina* has been collected from temperate to tropical regions. In Japan, it seems to be one of the common species in subtropical forests of the islands of Hahajima (Maekawa 1999), Chichijima (the Ogasawara Islands), Ishigaki, and Iriomote (unpublished data).

Phanerochaete sordida (P. Karst.) J. Erikss. & Ryvar den, Cort. N. Europe, vol. 5, 1023, 1978.

Specimens examined: TMI25208, TMI25209, and TMI25210 on decaying branch of *S. alba*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25673 on decaying branch of *B. gymnorrhiza*, Funaura (Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 8, 2002, collected by N. Maekawa.

Notes: This species is one of the most widely distributed corticioid fungi in the world and is widespread also in Japan (Maekawa 1993).

****Phanerochaete tropica*** (Sheng H. Wu) Hjortstam, Mycotaxon 54:189, 1995.

Fig. 5
= *Efibula tropica* Sheng H. Wu, Acta Bot. Fenn. 142:25, 1990.

Basidiomata resupinate, adnate, at first orbicular and then becoming confluent, 50–200 μ m thick; hymenial surface white, whitish buff to “Amber”, thinning out indeter-

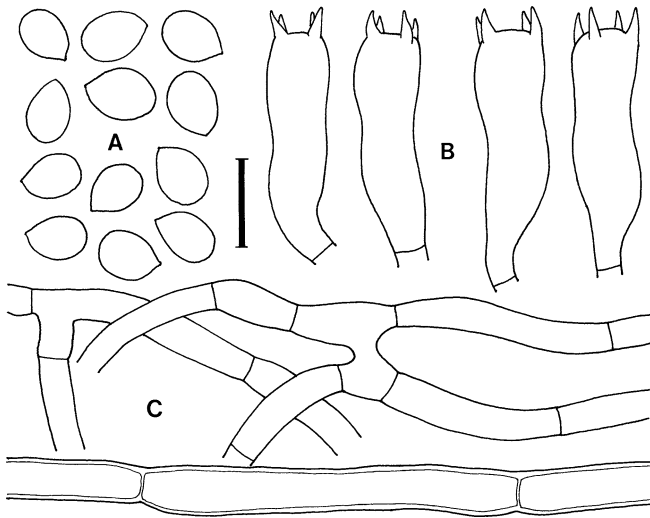


Fig. 5. *Phanerochaete tropica* (TMI25215). **A** Basidiospores. **B** Basidia. **C** Subicular hyphae. Bar 10 μ m

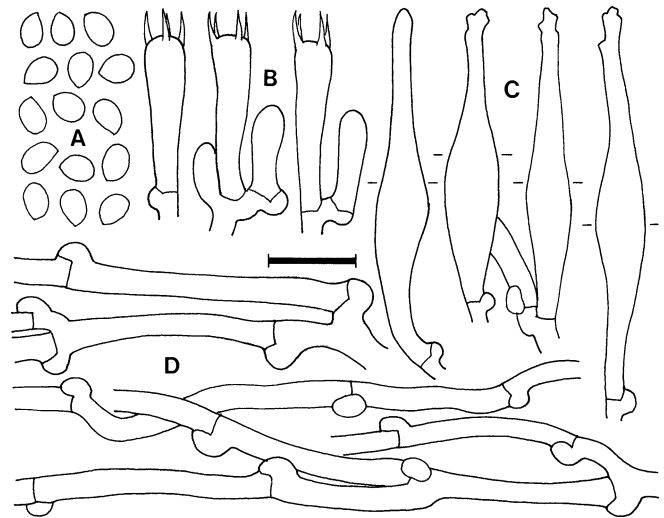


Fig. 6. *Phlebia acanthocystis* (TMI25672). **A** Basidiospores. **B** Basidia. **C** Cystidia (leptocystidia). Short horizontal lines indicate the level of the hymenial surface. **D** Subicular hyphae. Bar 10 μ m

minately, sometimes pruinose under the lens ($\times 20$). Context in vertical section, subhyaline, membranous. Hyphal system monomitic; hyphae 2.5–5 μ m in diameter, smooth, thin- to slightly thick-walled (up to 0.5 μ m), clampless-septate; cystidia lacking; cystidioles fusiform, rarely present in the hymenium; basidia cylindrical to clavate with a stalklike base, sometimes slightly constricted, 24–35 \times 6.5–8.5 μ m, without a basal clamp, producing four sterigmata; basidiospores broadly ellipsoid, 6.5–7.5(–8.25) \times 4.5–5(–5.5) μ m, smooth, thin-walled, nonamyloid.

Specimen examined: TMI25215 on decaying branch of an unidentified mangrove tree, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa.

Notes: *Phanerochaete tropica* is easily recognized by having clampless hyphae, broadly ellipsoid basidiospores measuring 6.5–7.5(–8.25) \times 4.5–5(–5.5) μ m, and by lacking cystidia. According to Wu (1990), this species has fusiform cystidioles, which are variably abundant and difficult to find in some specimens. In the Japanese specimen, they were rarely observed. It has been reported only from Taiwan (Wu 1990), and therefore this specimen represents the first record of *P. tropica* outside Taiwan.

**Phlebia acanthocystis* Gilb. & Nakasone, Folia Cryptog. Estonica 33:85, 1998. Fig. 6

Basidiomata resupinate, adnate, at first orbicular and then becoming confluent, 70–250 μ m thick; hymenial surface odontoid to hydroid, aculei 5–20/mm², up to 1.5mm in length, conical to cylindrical, cream to “Umber”, smooth; hymenium between aculei white, cream to pale brown, smooth; margin white to cream, thinning out indeterminately, sometimes pruinose to fibrillose under the lens ($\times 20$). Context in vertical section subhyaline, membranous to subceraceous. Hyphal system monomitic; hyphae 2–5.5 μ m in diameter, smooth, thin- to slightly thick-walled (up to 0.5 μ m), nodose-septate, anastomoses sometimes occurring between adjacent hyphae in the trama of aculei and

the subicula; cystidia (leptocystidia) obclavate, fusiform to ventricose, tapering gradually toward the apex, sometimes with several small knobs at the apical part, 30–55 \times 4–7.5 μ m, with a basal clamp, thin-walled, projecting up to 25 μ m beyond the hymenial surface; basidia narrowly clavate, 16–24 \times 4–5 μ m, with a basal clamp, producing four sterigmata; basidiospores broadly ellipsoid, 3.5–4.5(–5) \times 2–2.5 μ m, smooth, thin-walled, nonamyloid.

Specimens examined: TMI25213 on decaying branch of *R. mucronata*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25695 on decaying and decorticated branch of *B. gymnorrhiza*, Komi (the mouth of Aira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25685 on decaying branch of *B. gymnorrhiza*, Funaura (Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 8, 2002, collected by N. Maekawa; TMI25672 on decaying twig of *B. gymnorrhiza*, Funaura (Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 8, 2002, collected by N. Maekawa; TMI25693 and TMI25704 on decaying branch of *B. gymnorrhiza*, Ohara (the mouth of Nakama River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 9, 2002, collected by N. Maekawa.

Notes: This species is characterized by hydroid basidioma, obclavate, fusiform to ventricose leptocystidia, sometimes with small knobs at the apical part, and small ellipsoid basidiospores measuring 3.5–4.5(–5) \times 2–2.5 μ m. It was known only from the Hawaiian Islands in the United States (Nakasone and Gilbertson 1998), and therefore the Japanese specimens represent the first record of this species outside the type locality. In mangrove forests of Iriomote Island, *P. acanthocystis* appears to be common on dead branches or twigs of living mangrove trees, especially of *B. gymnorrhiza*. The polysporous isolates from the Japanese specimens usually produce basidiomata in culture.

Radulomyces confluens (Fr.: Fr.) M.P. Christ., Dansk Bot. Ark. 19:230, 1960.

Specimens examined: TMI25227 on decaying branch of *S. alba*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by K. Kinjo; TMI25686 on decaying branch of *B. gymnorrhiza*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 7, 2002, collected by N. Maekawa.

Notes: Basidiospores ($7\text{--}8.5 \times 5.5\text{--}6.5\mu\text{m}$) of this specimen are slightly smaller than those of the other Japanese specimens ($7\text{--}12 \times 6\text{--}8.5\mu\text{m}$) (Maekawa 1994), but all the other morphological features are identical to those given by him.

Subulicystidium longisporum (Pat.) Parmasto, Consp. Syst. Cort., 121, 1968.

Specimens examined: TMI25219 and TMI25220 on decaying and decorticated trunk of *Heritiera littoralis* Dryand., Komi (the mouth of Maira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25675 on decaying branch of *B. gymnorrhiza*, Funaura (Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 8, 2002, collected by N. Maekawa.

Notes: This species is one of the most common corticioid species in Japan, especially in the inland forests of the subtropical regions.

Trechispora farinacea (Pers.: Fr.) Libert, Taxon 15:318, 1966.

Specimens examined: TMI25206 on decaying branch of *R. mucronata*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa; TMI25216 on decaying branch of *S. alba*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2001, collected by N. Maekawa.

Notes: *Trechispora farinacea* is cosmopolitan and widely distributed also in Japan (Maekawa 1993).

Trechispora nivea (Pers.) K.H. Larss., Symb. Bot. Upsal. 30:110, 1995.

Specimens examined: TMI25676 on decaying branch of *B. gymnorrhiza*, Komi (the mouth of Shiira River, Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., July 7, 2002, collected by N. Maekawa; TMI25183 on decaying branch of *B. gymnorrhiza*, Higashi-son (the mouth of Gesashi River, Okinawa Island), Kunigami-gun, Okinawa Pref., July 8, 2001, collected by N. Maekawa.

Notes: According to Larsson (1995), this species is cosmopolitan, but in Japan it has been collected only from subtropical regions, the islands of Hahajima (Maekawa 1999), and Iriomote.

Tubulicium raphidosporum (Boidin & Gilles) Kisimova-Horovitz, Oberw. & L.D. Gómez, Rev. Biol. Trop. 45:1313, 1998.

Specimen examined: TMI25674 on decaying branch of *B. gymnorrhiza*, Funaura (Iriomote Island), Taketomi-cho, Yaeyama-gun, Okinawa Pref., Nov. 8, 2002, collected by N. Maekawa.

Notes: This species is probably distributed from subtropical to tropical regions. From Japan, Maekawa (1998) reported this species as *T. vermiferum* (Bourdot) Oberw. subsp. *raphidosporum* Boidin & Gilles based on a specimen collected from the inland forest in Iriomote Island.

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References

- Boidin J, Gilles G (1991) Basidiomycètes Aphyllophorales de l'île de la Réunion. XVI. Les genres *Hyphoderma*, *Hyphodermopsis*, *Chrysoderma* nov. gen. et *Crustoderma*. Cryptogam Mycol 12:97–132
- Boidin J, Lanquetin P, Gilles G, Candoussau F, Huguency R (1985) Contribution à la connaissance des Aleurodiscoideae à spores amyloides (Basidiomycotina, Corticiaceae). Bull Soc Mycol Fr 101:333–367
- Boidin J, Lanquetin P, Gilles G (1997) Le genre *Gloeocystidiellum* sensu lato (Basidiomycotina). Bull Soc Mycol Fr 113:1–80
- Filho OMA, Bueno R, Bononi VLR (1993) Algas basidiomicetos dos manguezais do estado de Sao Paulo. Hoehnea 20:87–92
- Ginns H, Freeman GW (1994) The Gloeocystidiellaceae (Basidiomycota, Hericiales) of North America. Bibl Mycol 157:1–118
- Hjortstam K, Larsson KH (1995) Annotated check-list to genera and species of corticioid fungi (Aphyllophorales, Basidiomycotina) with special regards to tropical and subtropical areas. Windahlia 21:1–75
- Inderbitzin P, Desjardin DE (1999) A new halotolerant species of *Physalacria* from Hong Kong. Mycologia 91:666–668
- Jülich W (1975) On *Cerocorticium* P. Henn., a genus described from Java. Persoonia 8:217–220
- Jülich W (1978) Studies in resupinate Basidiomycetes. V. Some new genera and species. Persoonia 10:137–140
- Langer E (1994) Die Gattung *Hyphodontia* John Eriksson. Bibl Mycol 154:1–298
- Larsson E (2002) Phylogeny of corticioid fungi with russuloid characteristics. PhD thesis, Botanical Institute, Göteborg University, Göteborg, Sweden
- Larsson KH (1995) Taxonomy of *Trechispora farinacea* and proposed synonyms. I. Species with a grandinoid or hydroid hymenophore. Symb Bot Ups 30:101–118
- Maekawa N (1993) Taxonomic study of Japanese Corticiaceae (Aphyllophorales) I. Rep Tottori Mycol Inst 31:1–149
- Maekawa N (1994) Taxonomic study of Japanese Corticiaceae (Aphyllophorales) II. Rep Tottori Mycol Inst 32:1–125
- Maekawa N (1997) Taxonomic study of Japanese Corticiaceae (Aphyllophorales) III. Rep Tottori Mycol Inst 35:29–38
- Maekawa N (1998) Taxonomic study of Japanese Corticiaceae (Aphyllophorales) IV. Rep Tottori Mycol Inst 36:1–12
- Maekawa N (1999) Taxonomic study of Japanese Corticiaceae (Aphyllophorales) V. Rep Tottori Mycol Inst 37:7–20
- Maekawa N (2000) Taxonomic study of Japanese Corticiaceae (Aphyllophorales) VI. Rep Tottori Mycol Inst 38:14–22
- Maekawa N, Hasebe K (2002) *Pseudolagarobasidium calcareum*: Japanese records and cultural characteristics. Mycoscience 43:271–275
- Nakasone KK, Gilbertson RL (1998) Three resupinate hydneous basidiomycetes from Hawai'i. Folia Cryptogam Estonica 33:85–92
- Rayner RW (1970) A mycological colour chart. Commonwealth Mycological Institute, Kew, Surrey, and British Mycological Society

- Schmit JP, Shearer CA (2003) A checklist of mangrove-associated fungi, their geographical distribution and known host plants. *Mycotaxon* 85:423–477
- Sotão HMP, Bononi VLR, Figueiredo TS (1991) Basidiomycetes of mangroves from the island of Maraca, Amapá, Brazil. *Bol Mus Paraense Emilio Goeldi N S Bot* 7:109–114
- Sotão HMP, Campos ELC, Perpétuo S, Costa SE, Melo OA, Azevedo JC (2002) Basidiomycetes macroscópicos de manguezais de Bragança, Pará, Brasil. *Hoehnea* 29 (in press)
- Wu SH (1990) The Corticiaceae (Basidiomycetes) subfamilies Phlebioideae, Phanerochaetoideae and Hyphodermoideae in Taiwan. *Acta Bot Fenn* 142:1–123
- Wu SH (1996) Studies on *Gloeocystidiellum* sensu lato (Basidiomycotina) in Taiwan. *Mycotaxon* 58:1–68
- Wu SH, Chen ZC (1990) New record of Corticiaceae (Basidiomycetes) collected from the National Taiwan University campus. *Taiwania* 35:64–68