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Enumeration of Remarkable Japanese Discomycetes (2): Two Inoperculate Discomycetes Rarely Known in Japan

Tsuyoshi Hosoya

Department of Botany, National Science Museum,
Amakubo 4–1–1, Tsukuba, 305–0005 Japan
E-mail: hosoya@kahaku.go.jp

Abstract Two remarkable inoperculate discomycetes rarely known in Japan are described and illustrated., i.e. *Phialina lachnobrachya* and *Dactylospora stygia* var. *stygia*. *Phialina lachnobrachya* is documented since 1963 while *D. stygia* var. *stygia* is documented since 1957 in Japan.
Key words : discomycetes, Japan, mycobiota.

Introduction

This is the second part of the series on remarkable Japanese discomycetes. Two inoperculate discomycetes with minute apothecia, very rarely reported and scarcely known from Japan are described and illustrated.

Materials and Methods

Collection and observation procedure followed Hosoya and Otani (1997) and Hosoya (2004). Color codes followed CMYK system referring to a publication (Anonymous, 2002).

Descriptions

1. *Phialina lachnobrachya*

Figs. 1–2

Peziza lachnobrachya Desm. Ann. Sci. Nat. **16**: 322. 1851.

Trichopeziza lachnobrachya (Desm.) Sacc., Syll. Fung. **8**: 418. 1889.

Pezizella lachnobrachya (Desm.) Höhnel, Sitzungsber. Akad. Wiss. Wien, Math. Nat. Cl. **115**: 1285. 1906.

Urceolella lachnobrachya (Desm.) Boud., Hist., classific. discom. Europe p. 130. 1907.

Hyaloscypha lachnobrachya (Desm.) Nannf., Nova Acta Soc. Sci. Upsal. Ser. 4., **8**: 273. 1932.

Phialina lachnobrachya (Desm.) Raitv., Scripta Mycol. **1**: 27. 1970.

Phialoscypha lachnobrachya (Desm.) Raitv., Fol. Crypt. Est. **8**: 2. 1977.

Calycellina lachnobrachya (Desm.) Baral, Beih. Z. Mykol. **6**: 52. 1985.

Setoscypha lachnobrachya (Desm.) Svr., Česká Mykol. **41**: 196. 1987.

Peziza araneocincta Phill., Gard. Chron. **14**: 308., Fig. 57. 1880.

Lachnella araneocincta (Phill.) Phill., Man. Brit. Discomyc. p. 271. 1887.

Trichopeziza araneocincta (Phill.) Sacc., Syll. Fung. **8**: 417. 1889.

Dasyscypha araneocincta (Phill.) Massee, Brit. fung.-fl. p. 337. 1895.

Hyaloscypha lachnobrachya (Desm.) Nannf. var. *araneocincta* (Phill.) Dennis, Mycol. Pap. **32**: 73. 1949.

Pezizella punctiformis (Grev.) Rehm f. *minor* Rhem ex Starb., Bih. Svensk Vet.-Akad. Handl. **21**: 31. pl. 1.20. 1985.

Pezizella minor Starb. Bih. Svensk Vet.-Akad. Handl. **21**: 31. 1895.

Hyaloscypha minor (Starb.) Boud., Hist. classfic. dicom. Europe p. 127. 1907.

Eupezizella minor (Starb.) Höhnel, Mitt. Bot. Inst. Techn. Hochsch. Wien **3**: 79. 1926.

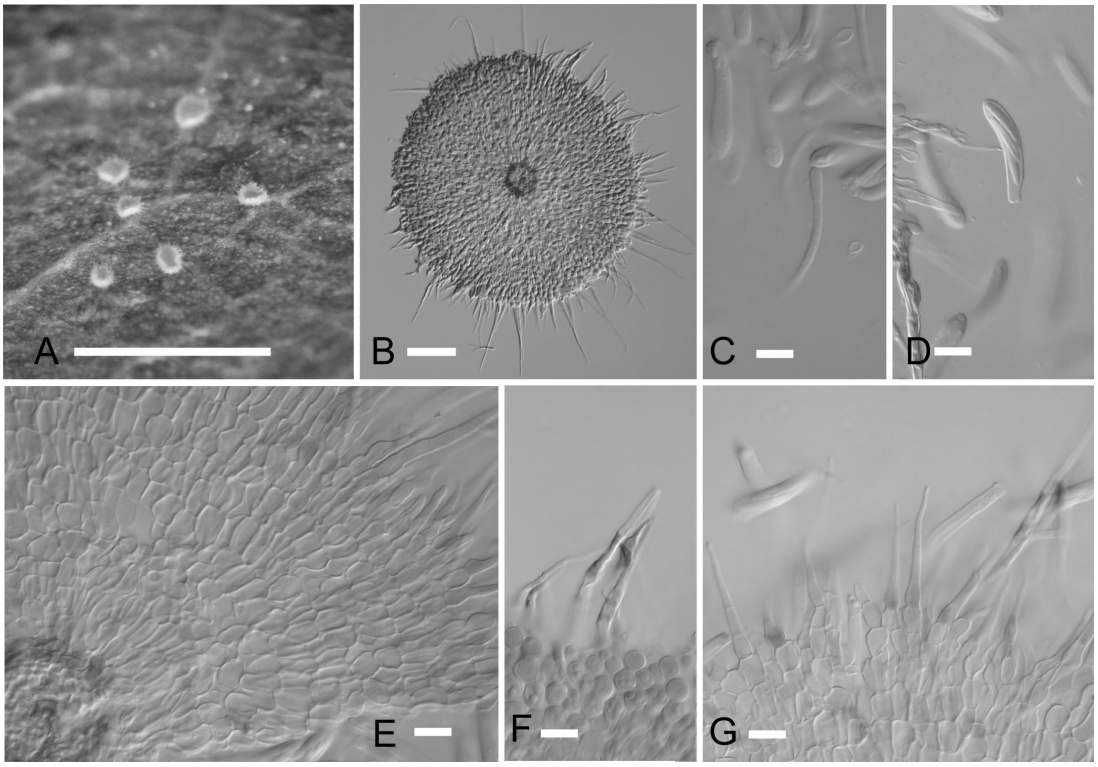

Fig. 1. *Phialina lachnobrachya* (TNS-F-11201). B–G: mounted in CB/LA. A. Dried apothecia. B. Apothecium. Note hairs radiating from the excipulum externals. C. Paraphyses. D. Asci with four ascospores. E. Close up of the ectal excipular cells in the crushed mount. F. Close up of the hairs. Note resinous matter deeply stained in CB/LA in the cells. G. Close up of the outermost of the excipular cells. Note short protrusion from the outermost layer and short hairs. Scales. A, 1 mm; B, 50 μm; C–G, 10 μm.

Pezizella punctiformis var. *minor* Rehm, Bih. Svensk Vet.-Akad. Handl. **21**: 31. 1895.

Pezizella tetraspora Feltg., Rec. Mem. Trav. Soc. Bot. Luxemb. **16**: 54. 1903.

Lachnella tetraspora (Feltg.) Höhnel, Sitzungsber. Akad. Wiss. Wien, Math. Nat. Cl. **115**: 1284. 1906.

Mollisiella tetraspora (Feltg.) Boud., Hist. classfic. dicom. Europe p. 142. 1907.

Dasypezis tetraspora (Feltg.) Höhnel, Mitt. Bot. Inst. Techn. Hochsch. Wien **3**: 79. 1926.

Pezizella jaapii Rehm, Verh. Bot. Ver. Prov. Brandenb. **49**: 9. 1907.

Setoscypha clavispora Velen., Monogr. Discom. Bohem. p. 271. 1934.

Hyaloscypha betularum Svr., Česká Mykol. **36**: 146. 1982.

Apothecia scattered, superficial; flat to slightly convex, yellowish (C0M0Y100K0) when fresh; becoming patellate, yellowish (C0M0Y80K0) with white margin when dry; arising from a short stipe. **Ectal excipulum** textura prismatica, composed of cells, 6–12×2–5 μm. **Hairs** arising from the outermost layer of the ectal excipulum, narrowly conical, gradually tapered to the pointed apex, straight, multi-septate, hyaline, smooth in surface, often containing resinous material deeply stained in cotton blue in lactic acid (CB/LA), sometimes curved irregularly, 40–70(–130) long, 4–5 μm wide at the base. **Medullary excipulum** textura intricata, inconspicuous. **Asci** 29.5–35×4.5–6 μm (31.1±1.7×5.3±0.44 μm on average±SD, n=13), short cylindrical clavate, 4-spored, arising from croziers; apex conical to rounded, pore reactive

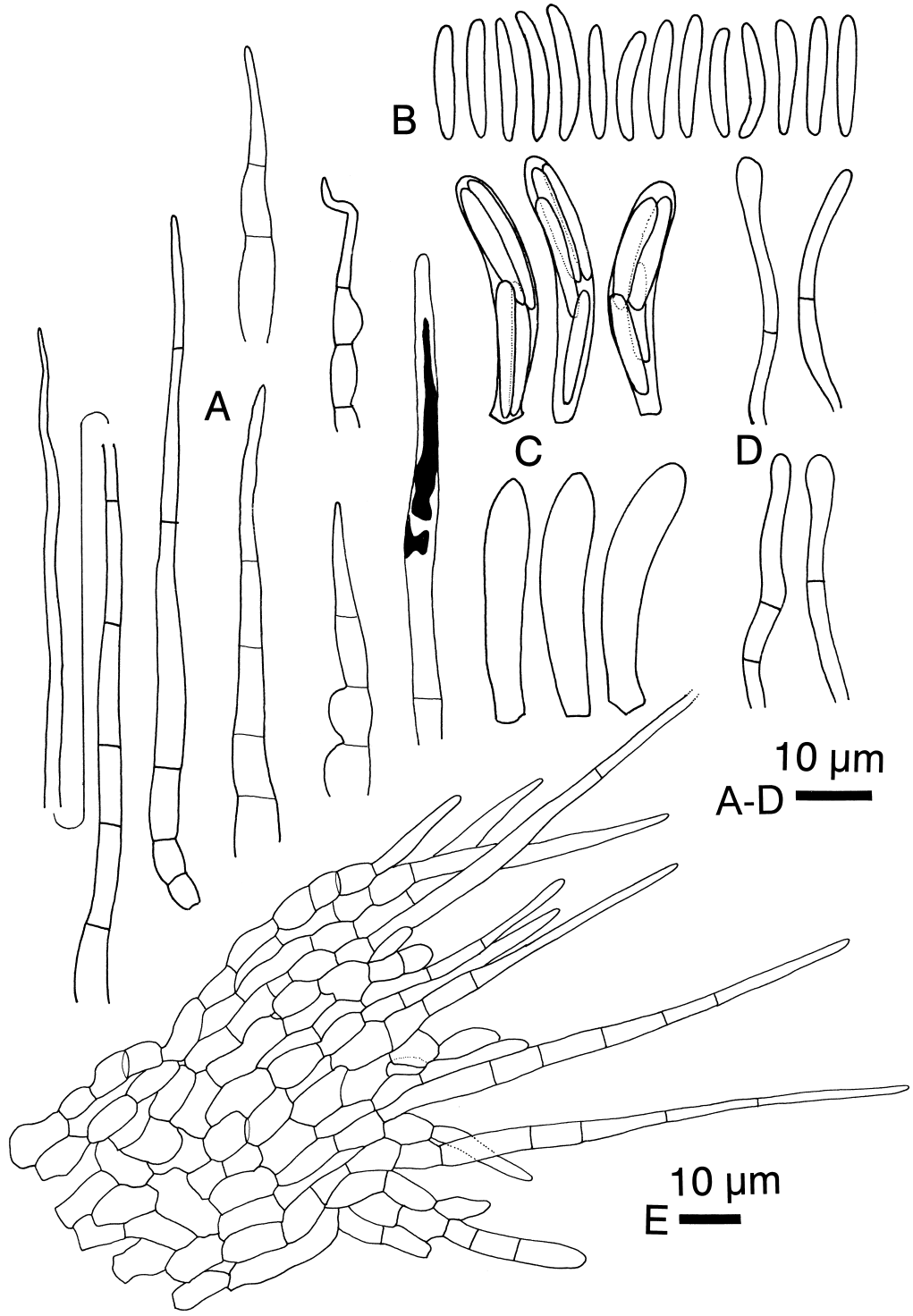

Fig. 2. *Phialina lachnobrachya* (TNS-F-11201). A–E in CB/LA. A. Hairs. One at the right shows the resinous matter stained in CB/LA. One at the right shows the irregular curving at the apex. B. Ascospores. C. Asci. D. Paraphyses. Note enlarged apex. E. Ectal excipular structure in crush mount.

in Melzer's reagent (MLZ+) with or without KOH pretreatment. **Ascospores** 14–17×2–2.5 μm (15.1±0.87×2.1±0.22 on average±SD, n=16) μm, ellipsoidal, straight or slightly curved, aseptate, hyaline. **Paraphyses** cylindrical with clavate apex, straight to flexuous, simple, 1–1.5 μm thick at the middle, becoming widended up to 4 μm at the apex.

Specimens examined. TNS-F-11201, Tomakomai-shi, Hokkaido [N42°42′ E141°30′], on *Alnus* leaf, 23–IX–2004. col. T. Hosoya.

Known distribution. Europe, North America, Asia.

Notes. Huhtinen (1987) listed detailed synonyms with type designation for each name. The four-spored asci of *Phialina lachnobrachya* is a remarkable feature that help distinguishing it from the rest of the genus *Phialina*. Huhtinen (1987) gave an excellent monograph of *Phialina* based on a number of specimens. For *Phialina lachnobrachya*, he cited three specimens from Japan, collected in Gunma in 1957, Tochigi and Hokkaido in 1963. All of these are kept in CUP (Cornell University Herbarium), and the current report seems to be the second report of its occurrence from Japan. This fungus has been variously interpreted by previous taxonomists, but the taxonomy was revised by Huhtinen (1987). He listed *Betula*, *Acer*, *Alnus*, *Quercus*, *Salix*, *Rhododendron* and *Corylus* as hosts, in the order of frequency. Apparently the present species occurs in a wide area on various hosts, but is easily overlooked due to its small size. A culture of this fungus is deposited in JCM (Japan collection of miocroorganisms, Riken Bioresource Center).

2. *Dactylospora stygia* var. *stygia*

Figs. 3–4

Patellaria stygia Berk. & Curt., Grevillea **4**: 2. 1875.

Patellea stygia (Berk. & Curt.) Sacc., Syll. Fung. **8**: 783. 1889.

Karschia stygia (Berk. & Curt.) Massee, J. Linn. Soc. **35**: 107. 1901.

Buellia stygia (Berk. & Curt.) E. Müller, Kryptogamenfl. Schweiz **11**: 257. 1962. — Hawksworth & Sivanesan, Trans. Br. Mycol. Soc. **67**: 39. 1976.

Dactylospora stygia (Berk. & Curt.) Hafellner var. *stygia* Beih. Nova Hedwigia **62**: 137. 1979.

Patellaria nigerrima Sacc., Atti Soc. Ven.-Trent. Sci. Nat. Padova **4**: 129. 1875.

Karschia nigerrima (Sacc.) Sacc. Syll. Fung. **8**: 780. 1889.

Buellia nigerrima (Sacc.) Ahmad, Biologia, Lahore, Monogr. **5**: 5. 1969.

Patellaria fusispora Cooke & Peck, Annu. Rep. N. Y. State Mus. Nat. Hist. **28**: 67. 1879.

Karschia fusispora (Cooke & Peck) Sacc., Syll. Fung. **8**: 781. 1889.

Buellia stipitate Riddle, Mycologia **4**: 139. 1912.

Karschia taveliana Rehm, Krypt.-Fl. Deutschl., 2. Aufl., **1**: 1223. 1896.

Karschia elaespora Fairman, Proc. Rochester Acad. Sci. **6**: 105. 1921.

Pseudokarschia triseptata Velen., Monogr. Discom. Bohem. **1**: 86. 1934.

Apothecia scattered, superficial, flat to patellate when fresh, 1–1.5 mm in diameter, carbonaceous, with slightly raised margin, widely attached to the substrate, seated on intricate hyphae; external morphology little changed when dried. **Epithecium** 3–5 μm thick, composed of hyaline to brown amorphous matter, dusty to resinous. **Ectal excipulum** textura prismatica to textura angularis, composed of rectangular cells 10–20×5–8 μm with brown walls 1–1.5 μm thick; radiating toward the surface in dichotomous manner, cells arranged almost perpendicular to the external surface, ending up to cells with a rounded apex. **Medullary excipulum** textura intricata, running almost horizontally, embedded in gelatinous matrix, composed of intricate, brown hyphae of 1–2 μm thick. **Ascospores** (15–)17–20×4.5–5 (18.4±1.6×5.0±0.4 μm on average±SD, n=20), ellipsoid to narrowly ellipsoid, straight to slightly curved, one-septate at the middle, usually not constricted, sometimes constricted at the septum; hyaline when young, becoming brown when mature; inconspicuously striate, biseriate to irregularly seriate in the asci,

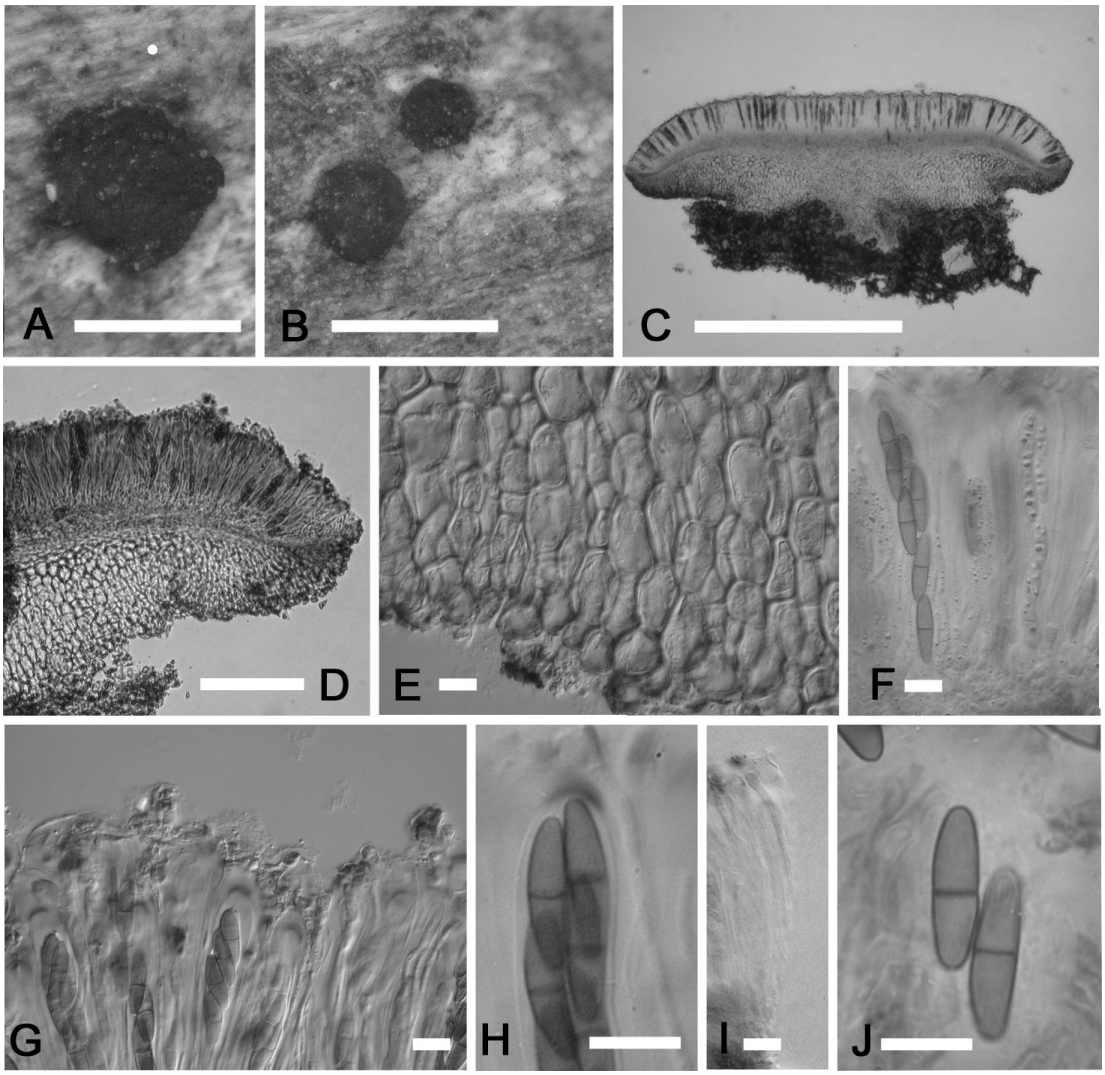

Fig. 3. *Dactylospora stygia* var. *stygia* (TNS-F-11261). C, D, G and H in MLZ. E, F, and I in CB-LA. A, B. Dried apothecia. C. Vertical section of the apothecium. Note the apothecium widely attached to the substrate. D. Vertical section of the dried apothecium kept in the herbarium for one year, mounted in MLZ. Note the profound MLZ reaction in the hymenium. E. Close up of the ectal excipulum in vertical section. F. Asci with mature and immature ascospores. Note that the ascospores lose conspicuous gutules through maturation. G. Close up of the apical portion of the hymenium in MLZ. Note MLZ reaction. H. Close up of the ascal apex in MLZ mount, showing the strong blueing reaction. I. Close up of the apraphyses apex. J. Ascospores. Scales. A, B, 1 mm; C, 500 μm; D, 100 μm; E–J, 10 μm.

two to multi-guttulate. **Asci** 75–80×12–15 μm, clavate, thick walled, thinner walled at the side, becoming thicker at the apex, not easily disrupted; apex MLZ+, with or without KOH pretreatment, stained in thick band, deeply stained around the top, reaction becoming weaker away from the apex. MLZ reaction in the asci abundant, whole the ascal wall showing strong blueing when fresh or after one year after collection in dried materials, becoming weaker and diffused. **Paraphyses** filiform, 1.5–2.0 μm thick, multi-septate toward the enlarged apex to 4 μm,

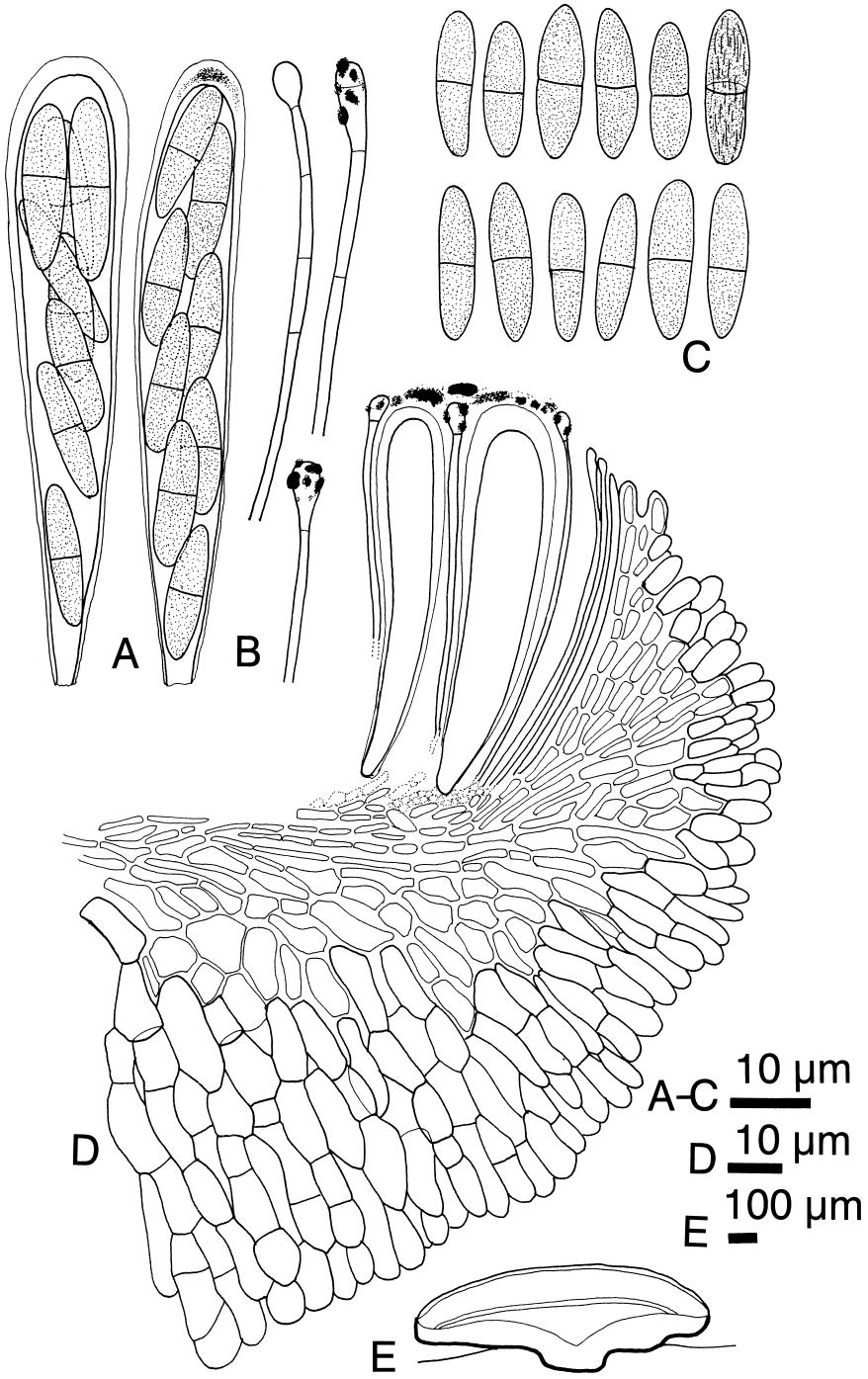

Fig. 4. *Dactylospora stygia* var. *stygia* (TNS-F-11261). A–E in MLZ. A. Asci. One at the right shows the blueing reaction in MLZ mount expressed in the density of dots in proportion to the strength of blueing. B. Paraphyses. Note the scurfy to resinous amorphous matter attached to the apex. C. Ascospores. Striation shown in one at the upper right. D. Vertical section of apothecium showing ectal excipulum, part of hymenium with epithecium. Note cells extending in radiating dichotomous manner, arranged almost perpendicular to the surface. E. Diagrammatic drawing of the apothecial section showing the outline of the structure.

nearly as long as the asci, sometimes extending beyond the asci to form epithecium, hyaline; amorphous brown matter appearing scurfy to resinous attached to the apex, embedded in a gelatinous matrix with asci.

Specimens examined. HONSHU: TNS-F-11261, Japan Mushroom Park, Hirai, Kiryu, Gunma Pref., on decaying wood, 23–III–2002. col. T. Hosoya (THX-16).

Known distribution. Europe, Asia, Africa, North and South America (for countries, see Hafellner, 1979).

Notes. The present fungus is classifed to Dactylosporaceae, Lecanorales that include both lichenized and non-lichenized fungi. *Dactylospora stygia* var. *stygia* is an non-lichenized fungus. Although the striation in the ascospore surface was not profound in the present species, Hafellner (1979) described a variety, *Dactylospora stygia* (Berk. & Curt.) Hafellner var. *striata* (Hafellner, 1979), for specimens with profound ascospore striation. The difference between var. *striata* and the type variety should be examined carefully.

The MLZ reaction of this fungus is remarkable. In the fresh specimens, the whole hymenium shows the blueing reaction, and seemingly keeps its reactive nature for at least one year in dried material. However, the reaction became weaker and not as conspicuous as the materials just after collection when examined three years later.

Dactylospora sytgia var. *stygia* is widespread (Hafellner, 1979). However, only 2 specimens collected in Fukuoka and Tochigi in 1957 and 1940, respectively, both preserved in CUP were known from Japan previously. I have collected other specimens of *Dactylospora*, apparently different from *D. stygia* var. *stygia*, but further examination is required for their identification.

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