

Hyaloscyphaceae in Japan (5)*: Some *Lachnum*-like members

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Five members of the family Hyaloscyphaceae with multiseptate hairs and lanceolate paraphyses (*Lachnum*-like members in broad sense) are described: *Albotricha fagicola* and *Dasyscyphella longistipitata* spp. nov.; *Trichopeziza discolor*, *T. sulphurea*, and *Trichopezizella barbata*, new to Japan.

Key Words—discomycetes; Hyaloscyphaceae; Japan; new species; *Lachnum*-like genera

In our survey of the family Hyaloscyphaceae, several less-known or undescribed members with relatively large apothecia, lanceolate paraphyses and multi-septate hairs were collected. These fungi were here interpreted as *Lachnum*-like in the broadest sense. They belonged to the tribes Trichopezizelleae and Lachneae, respectively, in the system by Korf (1973), or to the subfamilies Trichopezizelloideae and Lachnoideae, respectively, in the system by Raitviir (1987), and treated under the genus *Lachnum* Retz. in Nannfeldt (1932). In the present paper, descriptions of these members are presented.

Materials and Methods

Collection, isolation, and observation procedures followed Hosoya and Otani (1997). Terminology for hair morphology followed Hosoya and Harada (1999). Color names and codes followed Kornerup and Wanscher (1978). The specimens examined in the present study were collected by the junior author unless otherwise stated.

Descriptions

1. *Albotricha fagicola* Yas. Ono & Hosoya, sp. nov.

Figs. 1, 2

Apothecia brevistipitata, ad 400 μm alta, plana vel concava, usque 500 μm diam cum margine incurvatis; receptaculum album; stipes cylindraceus, angustus. Excipulum ectale "textura prismatica", ex cellulis cuboideis vel prismaticis, leviter crassitunicatis 5–10 \times 5–7 μm compositum; cellulae receptaculi medii magniores, 10–15 \times 5–10 μm . Pili primo cylindracei, gradatim angustati,

ad apicem obtusi, multiseptati, in totum crasse granulati, deinde prolifici, apice acuti mox, cum resinis amorphis obtegentes. Asci 34–43 \times 4–4.5 μm , cylindraneo-clavati, ex hamulis surgentes, apice conici, poro iodo excluso KOH coerulescenti. Ascospores 4.5–7.5 \times 1.5–2 μm , cuneiformes vel angustato ellipsoideae, aseptatae. Paraphyses lanceolatae, 4–5 μm latae, ascos 20 μm superantes.

Holotypus. HONSHU: TNS-F-7098, Ishigami-gawa, Aomori Pref., on leaves of *Fagus crenata*, mixed with *Lachnum fuscescens* (Pers.: Fr.) P. Karst. and a mollisoid fungus, 10-VI-95, TRL-1277 (culture SANK 10597).

Etymology. Latin, "*Fagus*" + "-cola", refers to its host.

Apothecia scattered on the host, short but distinctly stipitate, up to 400 μm high; disc flat to concave, up to 500 μm in diam, Light Orange (5A5), with incurving margin when dry; receptacle off white; stipe cylindrical, stout. Ectal excipulum "textura prismatica", composed of cuboid to prismatic cells with rather thick wall, 5–10 \times 5–7 μm at the margin, becoming larger at the middle receptacle, 10–15 \times 5–10 μm , walls up to 1 μm thick. Hairs of two kinds. Primary hairs cylindrical, gradually narrowed to the obtuse apex, multi-septate, 3–3.5 μm wide, bearing coarse granules all over. Secondary hairs arising by the proliferation at the tip of primary hairs, up to 110 μm long, 3–3.5 μm wide at the base, gradually narrowed to the apex; apex sharply pointed, smooth, 13–25 μm long for smooth region, bearing amorphous refractive resinous material not dissolved in MLZ. Asci 34–43 \times 4–4.5 μm , cylindrical clavate, arising from croziers; apex conical with flattened top, pore MLZ+ without KOH pretreatment. Ascospores 4.5–7.5 \times 1.5–2 μm , cuneiform to narrowly elliptic, aseptate. Paraphyses lanceolate, 4–5 μm wide at the widest point, exceeding the asci for 20 μm .

Colony of SANK 10597 low and dense, 21 mm in diam (3 wk, 23°C), plane, funiculous, Yellowish White

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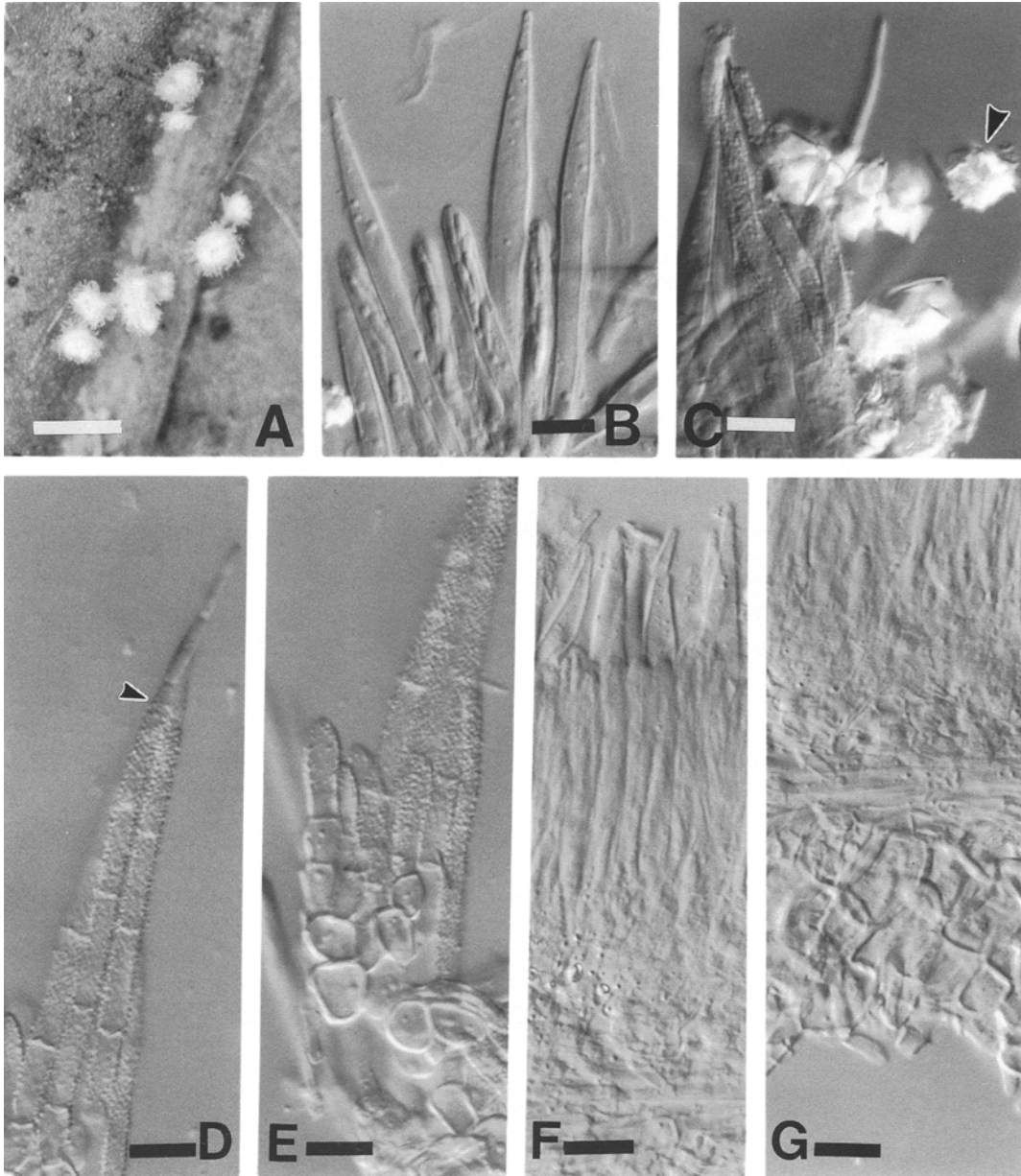


Fig. 1. *Albotricha fagicola* (TNS-F-7098).

A. Dry apothecia. B. Paraphyses and asci with ascospores. C. Hairs and crystals (arrowhead) detached from the hair apex. D. Secondary hair initials showing apical protrusion (arrowhead). E. Primary hairs distributed around the margin of the apothecium. F. Part of the hymenium showing the paraphyses long exceeding the asci. Medullary excipulum composed of interwoven hyphae shown at the bottom. G. Vertical section through medullary and ectal excipulum. Note ectal excipulum composed of large prismatic cells. Scale bars: A=1 mm; B-G=10 μ m.

(4A2); reverse Brown (7F7), but paler toward the margin. Context tough and glutinous. Aerial mycelium weakly developed, forming fascicles. Sectors and zontaitons absent. Margin distinct, entire, membranaceous.

Notes. *Albotricha fagicola* is characterized by small asci, ascospores, cuboid ectal cells, and its habitat. Excluding hair characteristics, *A. fagicola* resembles some foliicolous members of *Lachnum*, e. g. *L. ciliare* (Schrad: Fr.) Rehm, *L. rhytismatis* (W. Phillips) Nannf. and *Dasyscyphus sopittii* Masee. No foliicolous species of

Albotricha Raitv. has been reported (Raitviir, 1970, 1973, 1985).

2. *Dasyscyphella longistipitata* Hosoya, sp. nov.

Figs. 3, 4

Apothecia gregaria, longistipitata, plana vel tenuia, alba vel pallide aurantiaca, fere 1.2 mm in diametro; stipes longus, tenuis, usque 3 mm longus, 0.1 mm latus. Excipulum ectale "textura prismatica", ex cellulis 8-15 \times 4-7 μ m compositum. Pili primo cylindranei, apice obtusi,

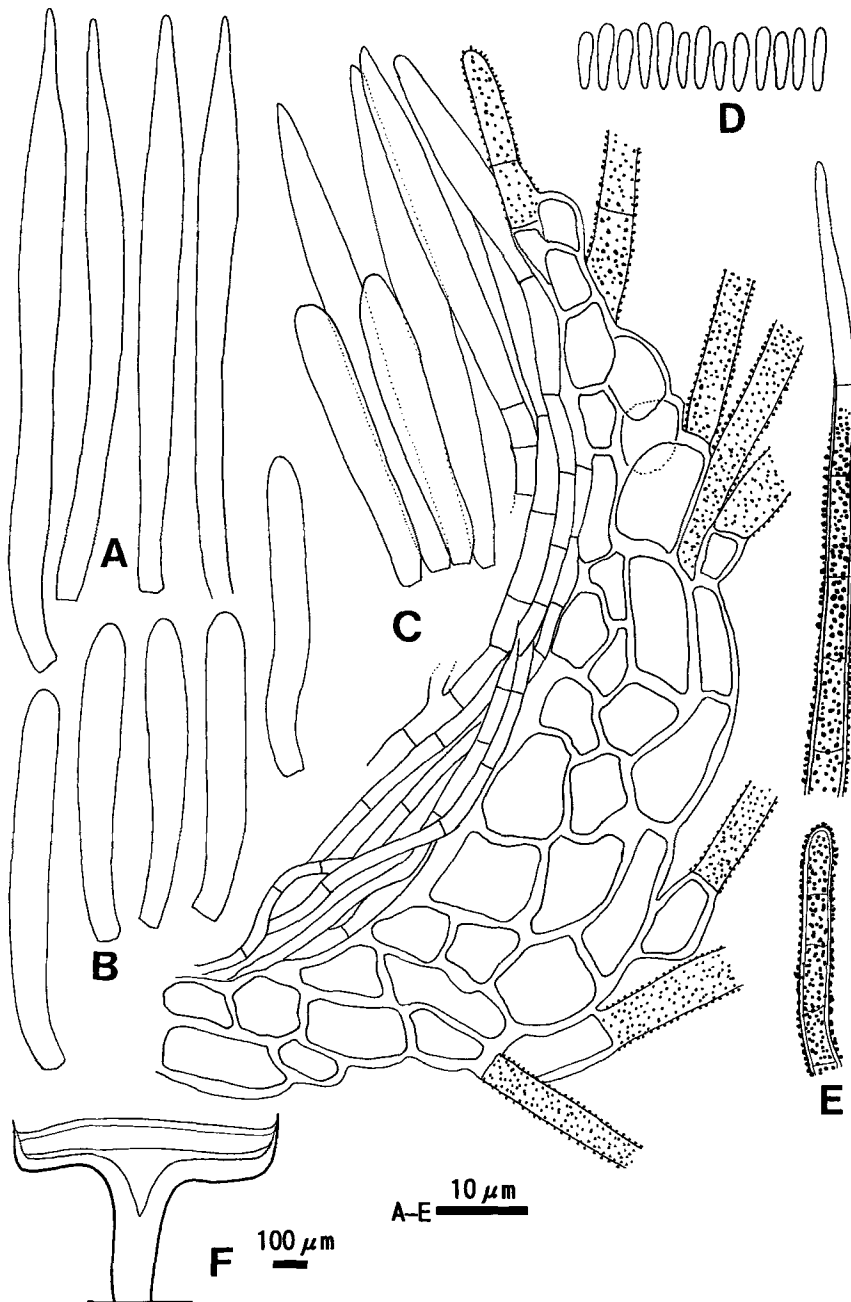


Fig. 2. *Albotricha fagicola* (TNS-F-7098).

A. Paraphyses. B. Asci. C. Vertical section showing ectal and medullary excipulum. D. Ascospores. E. Hairs. The lower shows the primary hair, and the upper shows the secondary hair initial. F. Schematic drawing of the apothecial section showing outline of the structure. Hairs only drawn at the upper margin.

in totum granulati, deinde apice protrudentes et laeves, sursum attenuati vel ad apicem inflati. Asci $42-48 \times 4-5 \mu\text{m}$, cylindraceo-clavati, ex hamulis surgentes; poro iodo excluso KOH non coerulescenti. Ascosporae $6-9 \times 2-3 \mu\text{m}$, ellipsoideae vel limoniformes aliquando unilaterale complanatae. Paraphyses fere cylindricae cum apice acuminato vel anguste lanceolato, aseptatae vel septatae.

Holotypus. TNS-F-7100, Mt. Tsukuba, Tsukubashi, Ibaraki Pref., on cupules of *Fagus crenata*, 18-IV-95,

TRL-1132 (culture SANK 15197).

Etymology. Latin, "*longus*" + "*stipitatus*", refers to its long stipe.

Apothecia gregarious, long-stipitate; disc flat to shallow, white to pale yellow when fresh, deep to irregularly shrunk, obscured by the incurving margin, Yellow Orange (4A8) to Orange (5A6), mostly 1.2 mm in diam when dry; receptacle floccose, white, covered by white hairs; stipe slender, up to 3 mm long, 0.1 mm wide, concolorous with the receptacle, white to pale yellow at the base

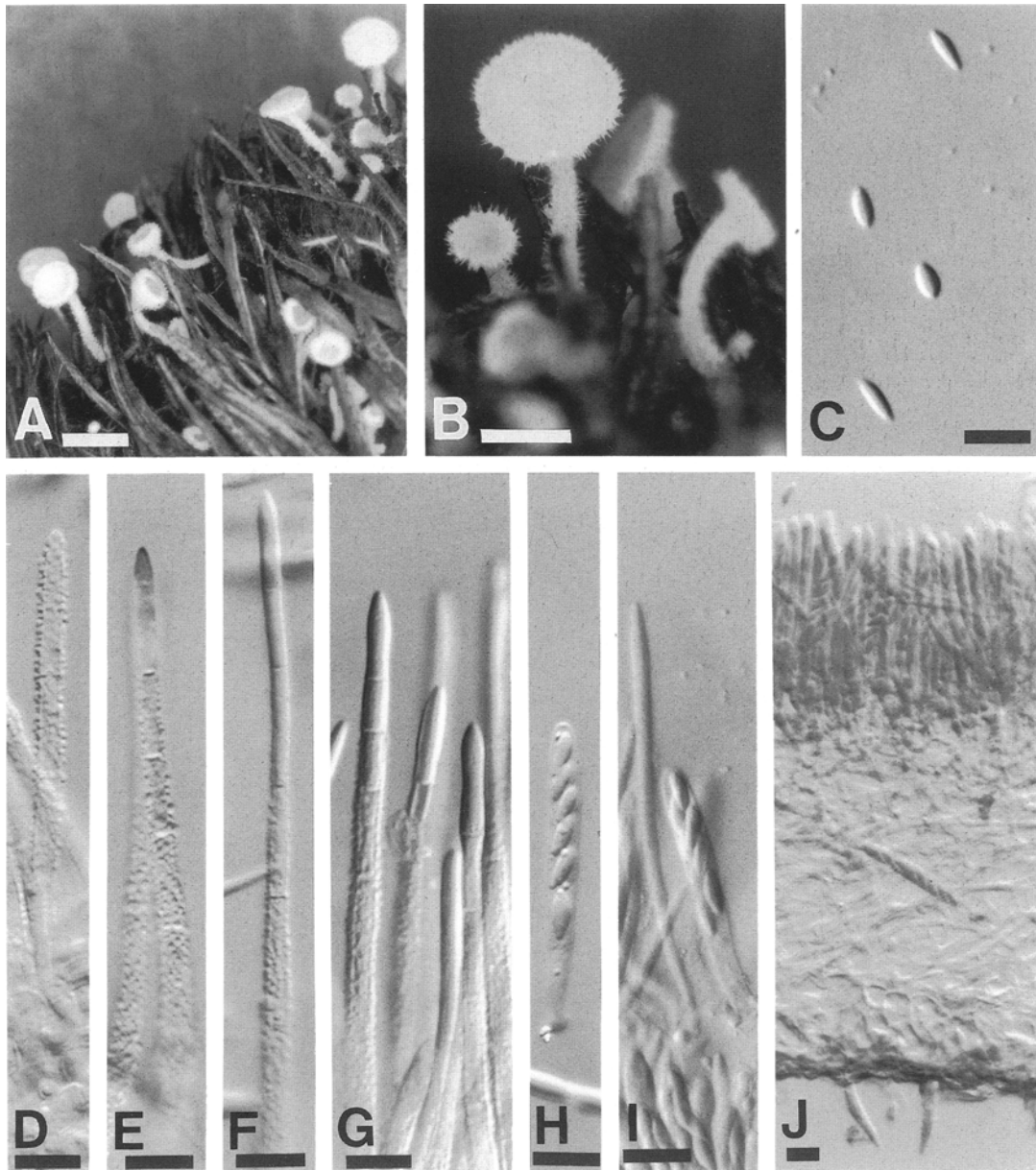


Fig. 3. *Dasyscyphella longistipitata* (A, B, TRL-989; C–J, TNS-F-7100).

A. Fresh apothecia arising among the spines of *Fagus* cupule. B. Close up of fresh apothecia. C. Ascospores. D. Primary hair. E–G. Secondary hairs of various stages of development. H. Ascus. I. Paraphysis and ascus. J. Vertical section of apothecium showing parts of hymenium, medullary and ectal excipulum. Note medullary excipulum composed of sparse hyphae. Scale bars: A=2 mm; B=1 mm; C–J=10 μ m.

when fresh, composed of elongate cells, 14–20 \times 3–4 μ m. Ectal excipulum “textura prismatica”, composed of rather thick-walled cells, 8–15 \times 4–7 μ m, becoming rounded toward the base. Medullary excipulum “textura intricata”, composed of 1.5–2 μ m wide hyphae, sparsely interwoven in larger apothecia. Hairs of two kinds. Primary hairs cylindrical, multiseptate, with obtuse apex, granulate all over, up to 50 μ m long, 3 μ m wide. Secondary hairs arising by protrusion at the apex of the primary hairs, granulate except for 1 or 2 apical cells, strongly granulate toward the base, covered by

granular layer up to 1.5 μ m, up to 200 μ m long, 3–4 μ m wide; apex smooth, gradually tapered or slightly enlarged. Asci 42–48 \times 4–5 μ m, cylindrical clavate, arising from croziers; apex conical with flattened top, pore MLZ+ without KOH pretreatment. Ascospores 6–9 \times 2–3 μ m, ellipsoid to lemon-shaped, occasionally flattened at one side, uniseriate in the asci. Paraphyses almost cylindrical with pointed apex to narrowly lanceolate, 2–2.5 μ m wide, aseptate or septate; in some specimens differentiated to hair-like structure.

Colonies on PDA 31 mm in diam (23°C, 3 wk), low

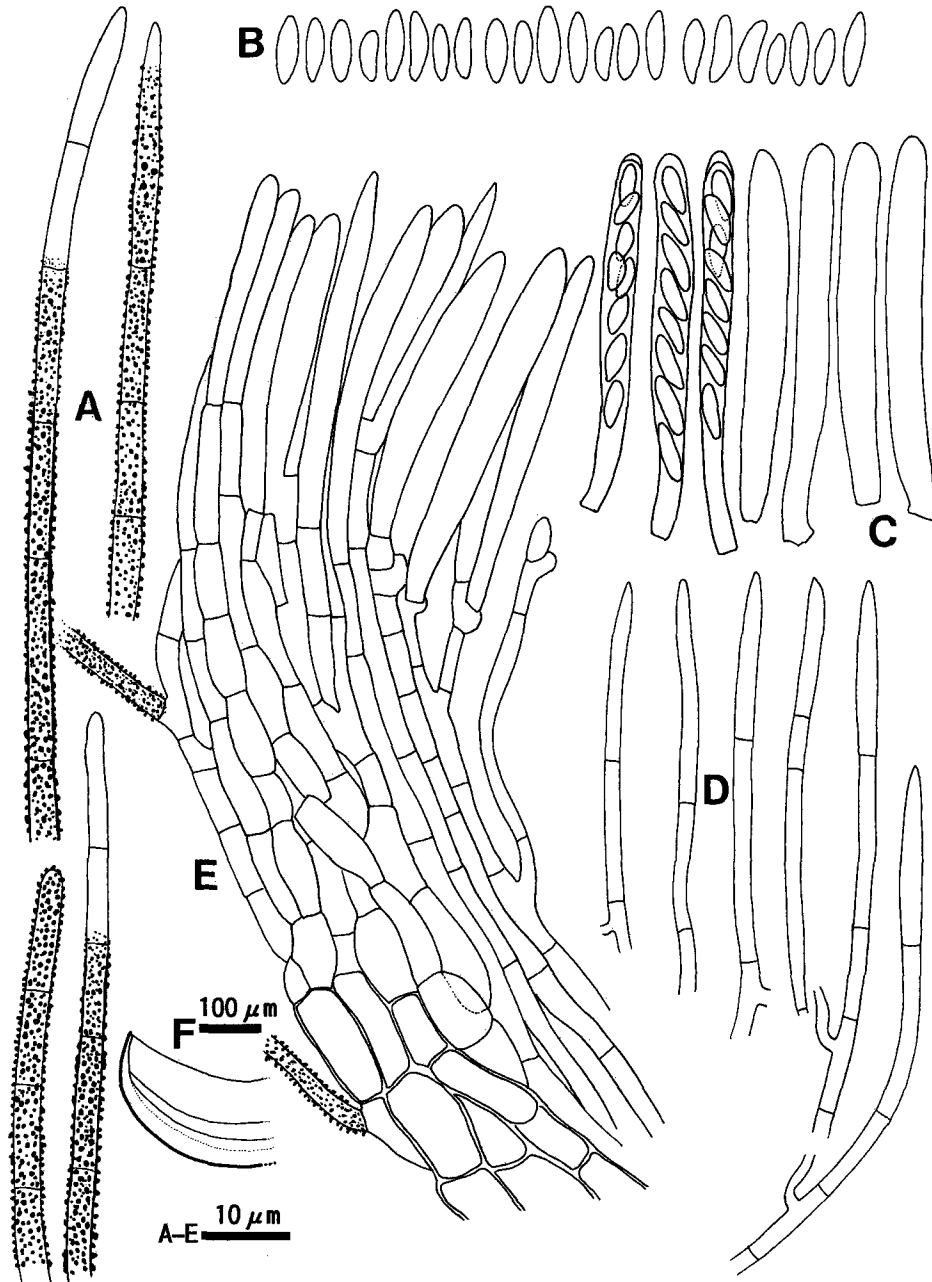


Fig. 4. *Dasyscyphella longistipitata* (A, C, D, TNS-F-7100; B, TRL-470, E, F, TRL-1465).

A. Primary and secondary hairs. B. Ascospores. C. Asci. Three at the right showing ascospores. D. Paraphyses. E. Vertical section showing the margin. F. Schematic drawing of the part of apothecium showing the outline of the structure. Hairs not drawn.

and dense, slightly convex at the center, floccose, Olive Brown (4E5) at the center, white near the margin; reverse Olive Brown (4F3) with white margin. Pale yellow exudates produced on the colony. Yellowish soluble pigment diffused into agar. Context soft fleshy. Aerial mycelium well developed, forming floccose cluster in part, Brownish Grey (4E2) to white. Sectors absent. Concentrical discoloration present. Margin distinct, entire, superficial.

Specimens examined. On cupules of *Fagus crenata*.

HONSHU: Gekko-no-taki, Aomori-shi, Aomori Pref., 7-V-94, TRL-989 (culture SANK 15297); Shizukuishi-cho, Iwate Pref., 10-V-94, TRL-999; Tazawa-lake, Akita Pref., 16-V-95, TRL-1173; Ogawa, Sekimoto, Kitabaraki-shi, Ibaraki Pref., col. R. Kaneko, 13-IV-95, TRL-1465. KYUSHU: Gokasho-mura, Oki, Nagasaki Pref., 12-IV-92, TRL-470 (culture SANK 17194).

Notes. *Dasyscyphella longistipitata* is easily recognized on *Fagus* cupules in spring, showing clear host specificity and wide distribution in Japan.

Dasyscyphella longistipitata seems to be close to *D. montana* Raitv. and *D. nivea* (Hedw.: Fr.) Raitv. in its dimension of hairs, ascospores and asci, but can be distinguished from them in its host, faded color when dry and larger apothecia with a markedly long stipe. *Dasyscyphella longistipitata* is also close to *D. patuloides* Raitv. & R. Galán (Galán and Raitviir, 1994) in hair characters and ascus dimension, but differs in smaller ascospores and habitat. The spores with acute ends in *D. longistipitata* resembles those in *D. conicola* (Rehm) Raitv. & Arendh. found on cones of *Pinus sylvestris* L. (Arendholz and Raitviir, 1988). As far as we know, there is no other member of *Dasyscyphella* Tranz. with

such large apothecia (Raitviir, 1977).

3. *Trichopeziza discolor* (Mouton) Raitv., Eesti NSV TA Toim. Biol. **363**: 317. 1987. Figs. 5, 6

Erinella discolor Mouton, Compt. Rend. Bull. Soc. Bot. Belg. **36**(2): 20. 1897.

Belonidium discolor (Mouton) Raitv., Scripta Mycol. **1**: 45. 1970.

Apothecia scattered, superficial, sessile to very short-stipitate; spherical to cupulate or funnel-shaped when dry; disc concealed by the hairs, Light Orange (5A4), 1 mm in diam, surrounded by Yellowish White (4A2) hairs tipped with Light Yellow (4A5) mass of amor-

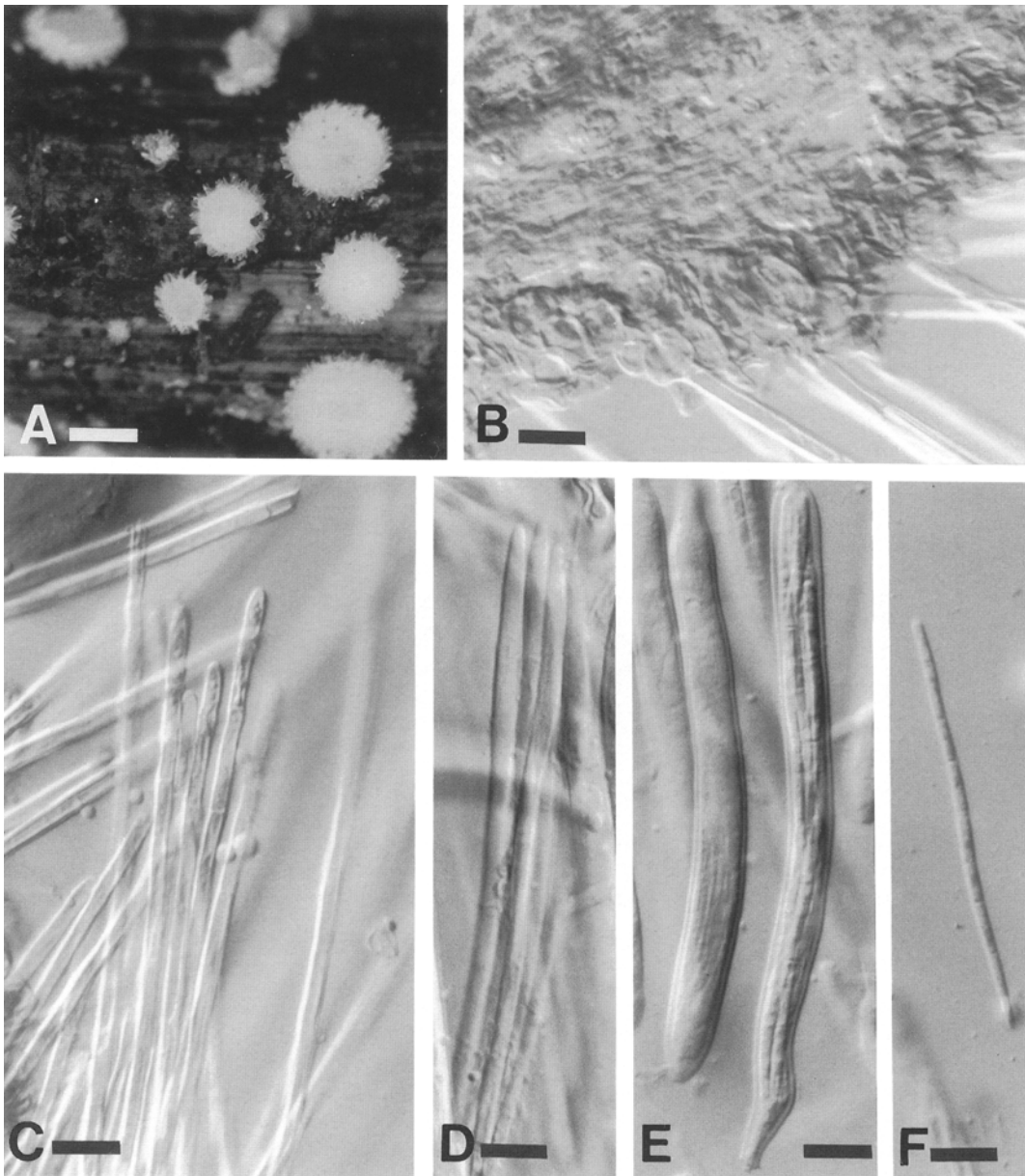


Fig. 5. *Trichopeziza discolor* (TRL-868).

A. Fresh apothecia. B. Vertical section showing outer and inner ectal excipulum. C. Hairs. D. Paraphyses. E. Asci containing ascospores. F. Ascospore. Scale bars: A=1 mm; B-F=10 μ m.

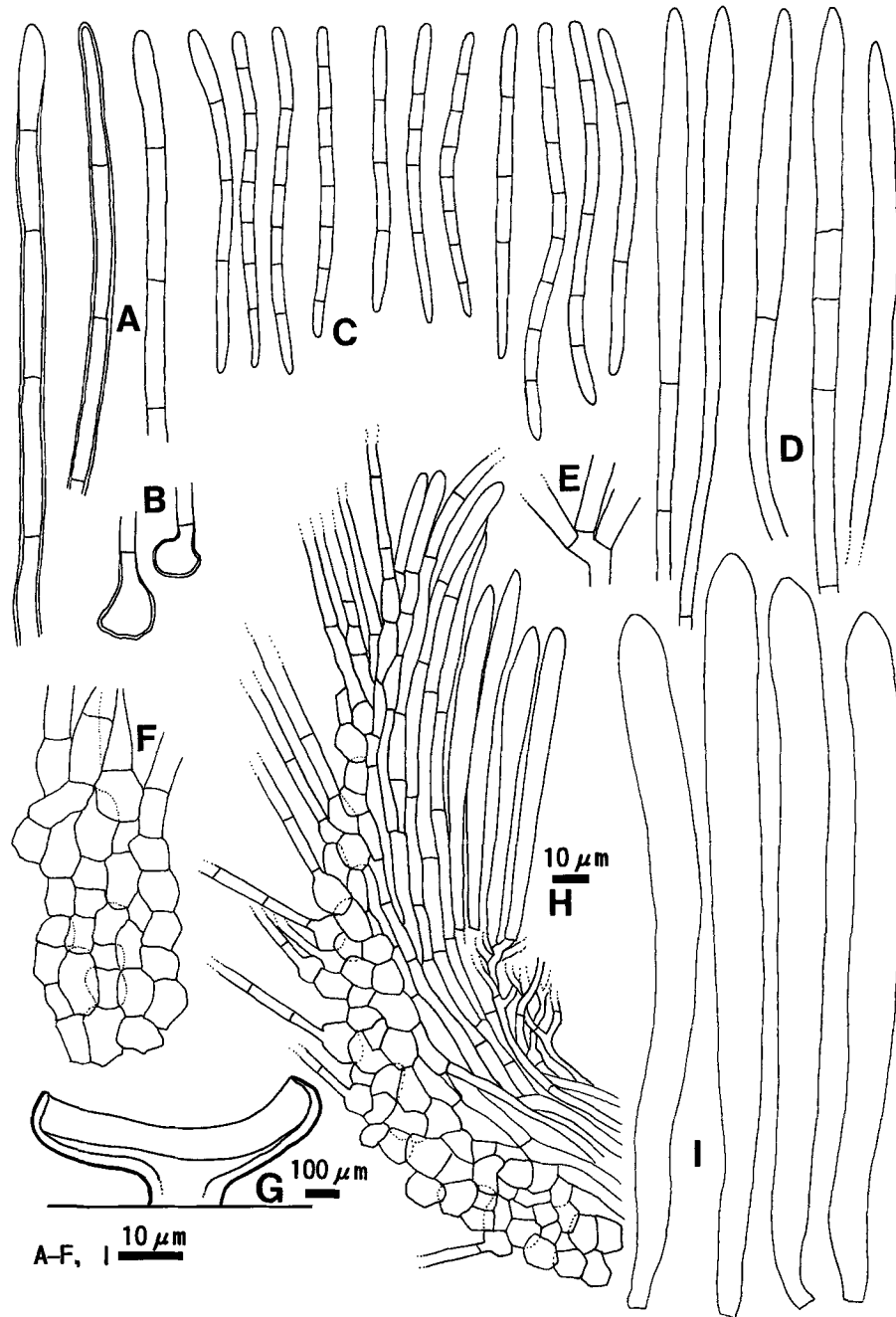


Fig. 6. *Trichopeziza discolor* (TRL-868).

A. Hairs. Note one at the left has thinner wall at the apex as a result of proliferation at the apex. B. Basal cells from which the hairs arise. C. Ascospores. D. Paraphyses. E. Ascus base with simple septa. F. Surface view of ectal excipulum near the margin. G. Schematic drawing of the apothecium showing the outline of the structure. Hairs not drawn. H. Vertical section showing the margin. I. Asci.

phous material when dry; rehydrating shallow cupulate to plane. Ectal excipulum two layered; outer layer 15–30 μm wide, “textura prismatica” at the margin, “textura angularis” to “textura globulosa” at the lower part of the receptacle, composed of thin-walled cells, 6.5–13.5 μm across, lined by inner layer of “textura intricata” of closely interwoven cells, 2–3 μm wide. Medullary excipulum “textura intricata”, of rather sparse hyphae

narrower than those of inner ectal excipulum, 1.5–2 μm wide. Hairs cylindrical, straight, multiseptate, relatively thick-walled with thin transverse septa, up to 400 μm long, 2–3 μm wide, frequently arising from a globular to ampuliform basal cells in ectal excipulum; distinction between primary and secondary hairs not clear; apex obtuse, occasionally acute due to proliferous elongation, extending at the same thickness to the blunt apex capped

with Light Yellow (4A5) crystal dissolved in CB or KOH, covered with grassy, dust-like particle of 1–2 μm , easily detached in CB or KOH. Asci 112–120 \times 7.5–8 μm , 8-spored, cylindrical clavate, arising from simple septa; apex conical with flattened top, pores stained as little point by MLZ without KOH pretreatment. Ascospores 52–63 \times 2–2.5 μm , hyaline, filiform, aseptate when immature, 3–6-septate when mature, straight or flexuous, borne in one fascicle in asci. Paraphyses narrowly lanceolate, occasionally septate, covered with scurfy resinous material, 4–5 μm wide at the widest point, exceeding the asci for about 10 μm .

Colony of SANK 25595 on PDA 6 mm (23°C, 3 wk), low and dense, plane, smooth to funiculous, Greyish Orange (5B3); reverse concolorous. Context tough and glutinous. Aerial mycelium little developed, forming short fascicles extending radially from the center. Sectors present, noticed by funiculous or smooth surface. Margin indistinct, entire, membranaceous, superficial.

Specimens examined. HONSHU: On grass (?) stem, Hananuki ravine, Ibaraki Pref., 3-XI-93, TRL-868 (culture SANK 25595).

Notes. Ascospores in TRL-868 were shorter than previously described (Raitviir, 1970). *Trichopeziza dis-*

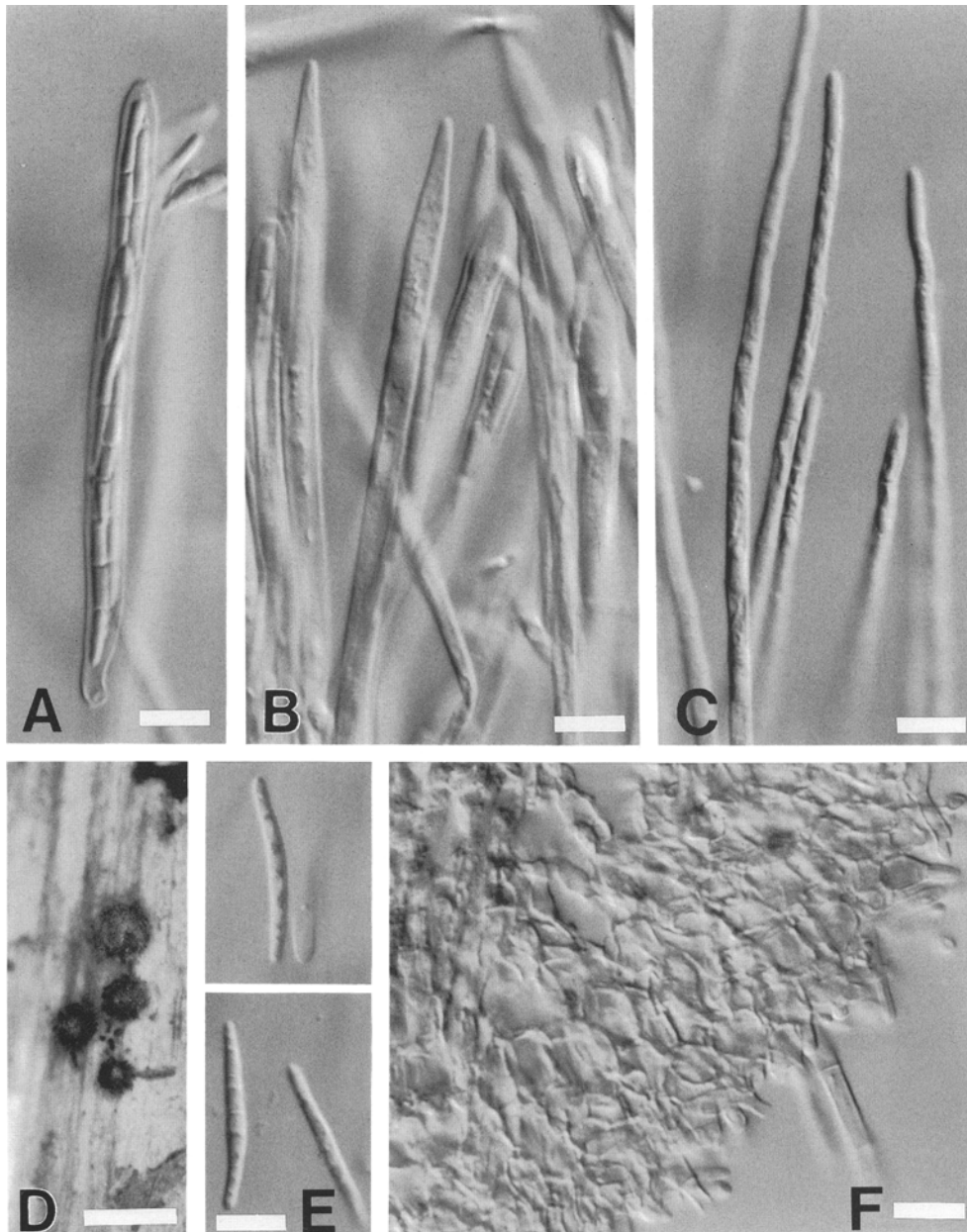


Fig. 7. *Trichopeziza sulphurea* (TRL-165).

A. Ascus with ascospores. B. Paraphyses. C. Hairs. D. Dry apothecia. E. Ascospores. F. Vertical section showing outer and inner ectal excipulum. Scale bars: A–C, E, F = 10 μm ; D = 1 mm.

color appears to be rare in literature, suggesting its rare occurrence in nature. Together with *T. vermiformis* (Raitv.) Raitv., *T. discolor* shares characteristic position in *Trichopeziza* Fuckel because of their filiform ascospores.

4. *Trichopeziza sulphurea* (Pers.: Fr.) Fuckel, Jahrb. Nass. Ver. Nat. 23/24: 296. 1870. Figs. 7, 8

Peziza sulphurea Pers.: Fr., Syst. Myc. 2: 104. 1822.

Lachnea sulphurea (Pers.: Fr.) P. Karst., Not. Sällsk. Fauna Fl. Fenn. Förh. 11: 51. 1870.

Lachnum sulfureum (Pers.: Fr.) P. Karst., Mycol. fenn. 1: 176. 1871.

Dasyscyphus sulfureus (Pers.: Fr.) Masee, Brit. Fungus Flora 4: 352. 1895.

Belonidium sulphureum (Pers.: Fr.) Raitv., Scripta Mycol. 1: 45. 1970.

Erinella nylanderii Rehm, Rabenh. Kryptogamenfl. 1: 910. 1893.

Apothecia scattered, sessile; discoid to shallow cupulate when fresh, spherical to cupulate when dry; disc 1 mm in diam, Light Orange (5A4), surrounded by Yellowish White (4A2) hairs tipped with Light Yellow (4A5) mass of amorphous material when fresh, concealed by the hairs becoming Reddish Brown (8E8) when dry. Ectal excipulum "textura angularis", composed of thin-walled, pale colored, polygonal to globular cells, 6–12 × 5–7 μm. Medullary excipulum "textura intricata", of hyphae of 1.5–2 μm wide. Hairs cylindrical, slender, straight, multiseptate, thin-walled, obtuse or occasionally acute at the tip, up to 400 μm long, 3 μm wide, containing yellowish cell content; surface smooth, covered with Reddish Brown (8E8) resinous materials; distinction between primary and secondary hairs not clear. Asci 95–100 × 5–6 μm, cylindrical clavate to almost cylindrical; apex conical with flattened top, pore MLZ+ without KOH pretreatment; arising from croziers. Ascospores 19–33 × 2 μm, filiform, straight or flexuous, aseptate

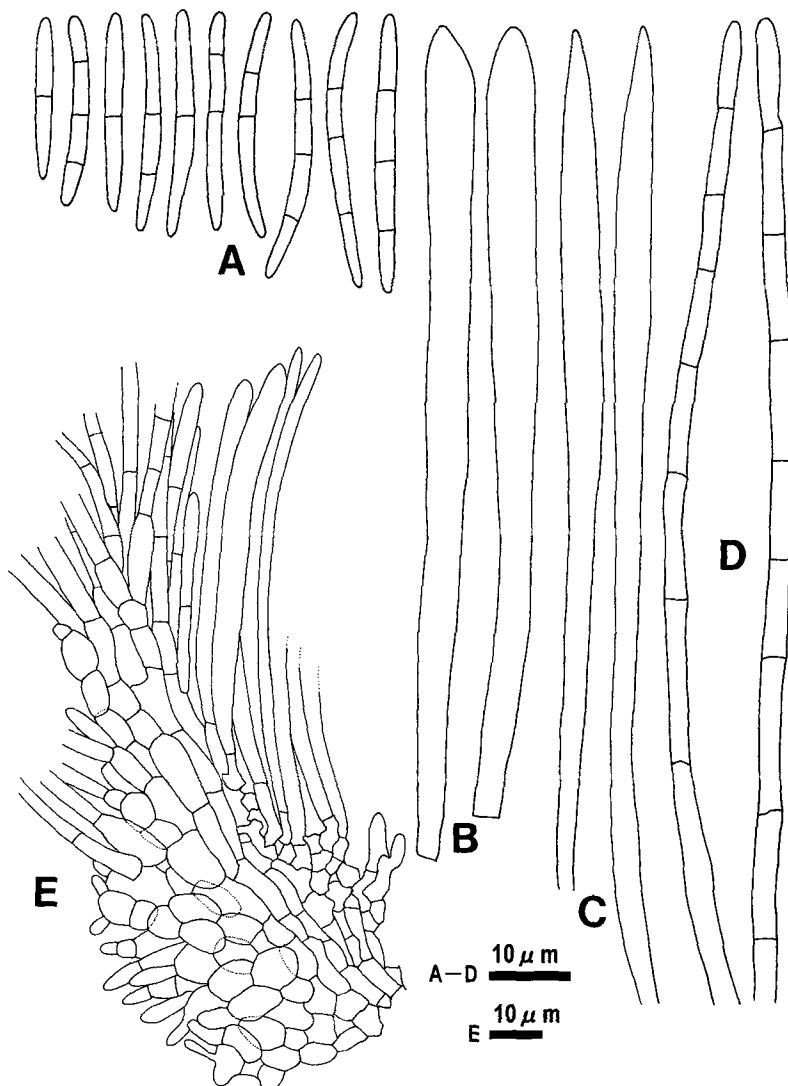


Fig. 8. *Trichopeziza sulphurea* (TRL-165).

A. Ascospores. B. Asci. C. Paraphyses. D. Hairs. E. Vertical section showing the ectal excipulum.

when immature, becoming 1-3-septate, borne in one fascicle in the asci. Paraphyses narrowly lanceolate, 3-5 μm wide at the widest point, exceeding the asci for

about 15 μm .

Colony of SANK 12298 on PDA 20 mm in diam (23°C, 3 wk), low and dense, slightly convex at the cen-

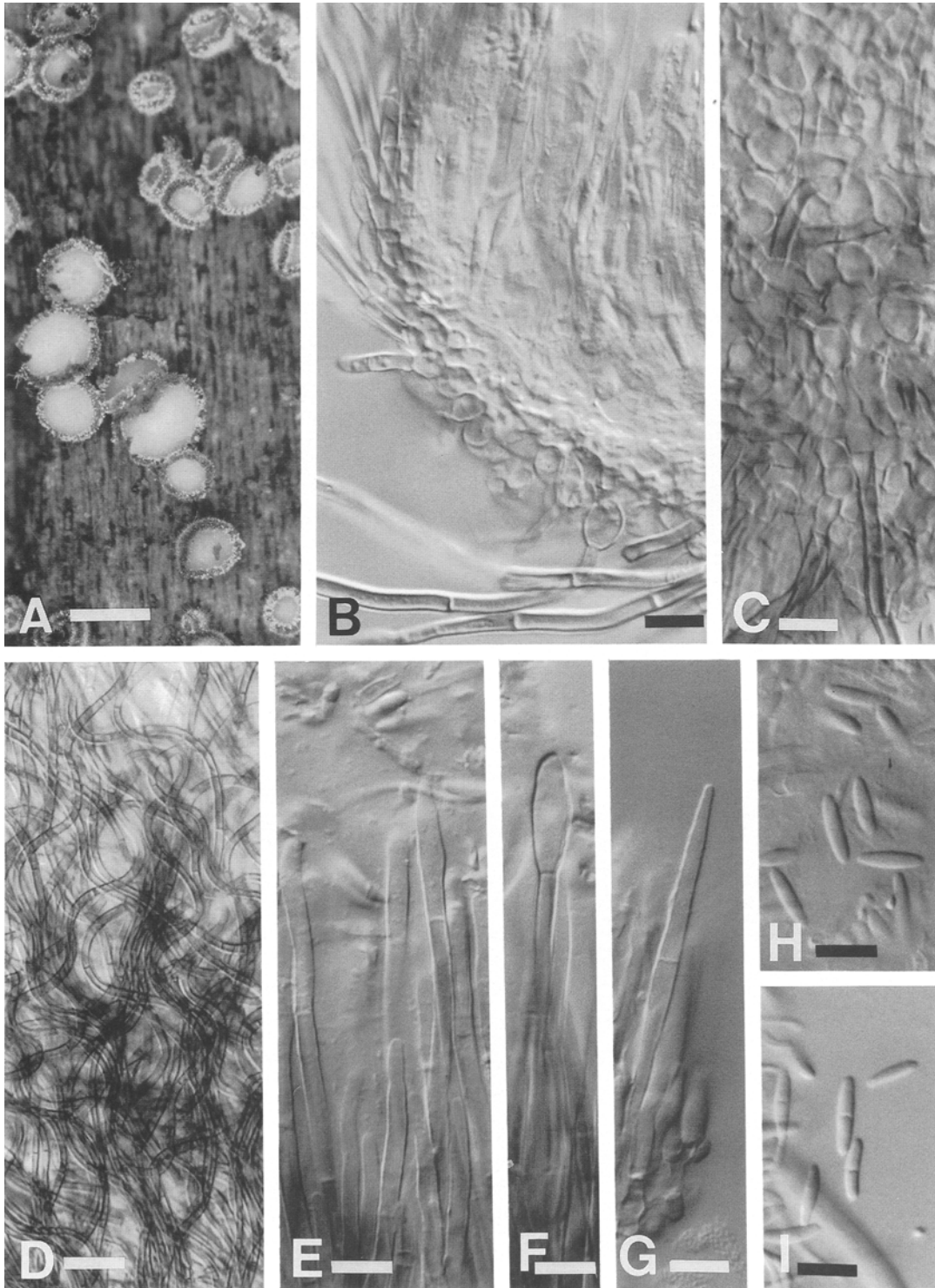


Fig. 9. *Trichopezizella barbata* (A, TRL-965; B-I, TRL-958).

A. Fresh apothecia. B. Vertical section showing ectal excipulum. C. Rounded ectal excipular cells from which hairs arise. D. Hairs. Note irregular curving. E, F. Apices of the hairs. Note apical protrusion and thin-walled apices. G. Paraphyses. H, I. Ascospores. One-septate ascospores shown in I. Scale bars: A = 1 mm; B-I = 10 μm .

ter, velvety to pruinose except for the center where white aerial mycelium developed to give floccose appearance, Brownish Orange (6C6); reverse Dark Brown (6F6). Context tough and glutinous. Margin indistinct, entire, superficial.

Specimen examined. HOKKAIDO: On herb stem, Numanosawa, Yubari-shi, Hokkaido, 29-VII-90, TRL-165 (culture SANK 12298).

Notes. *Trichopeziza sulphurea* very much resembles *T. mollissima* (Lasch) Fuckel in apothecial morpholo-

gy under dissecting microscope. However, *T. sulphurea* is easily distinguished from *T. mollissima* in having multi-septate ascospores.

5. *Trichopezizella barbata* (Kunze: Fr.) Raitv., Scripta Mycol. 1: 59. 1970. Figs. 9, 10

Peziza barbata Kunze: Fr., Syst. mycol. 2: 99. 1822.

Lachnella barbata (Kunze: Fr.) Fr. Summ. Veg. Scand. 1: 365. 1849.

Helotium barabatium (Kunze: Fr.) P. Karst., Bidrag.

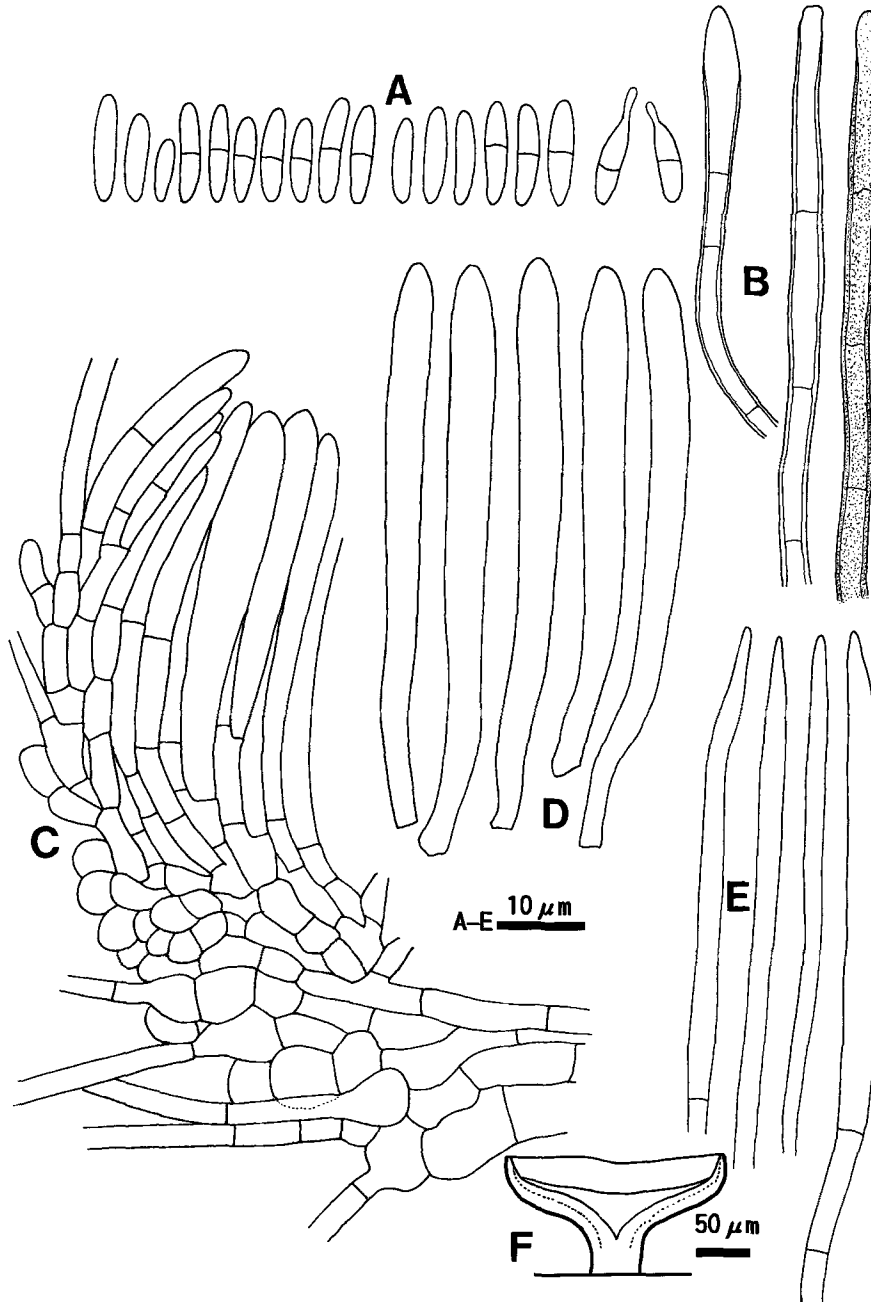


Fig. 10. *Trichopezizella barbata* (TRL-958).

A. Ascospores. Two at the right showing germination, often seen in ascospores discharged but remained on the apothecia. B. Hairs. Coloration indicated in one representative. C. Vertical section showing the ectal excipular structure. D. Asci. E. Paraphyses. F. Schematic drawing of the apothecium showing the outline of the structure. Hairs not drawn.

Kann. Finl. Nat. Folk **19**: 158. 1871.

Lachnea barbata (Kunze: Fr.) Gillet, Champ. de Fr. Discom. p. 82. 1886. [later homonym: *Lachnea barbata* (Kunze: Fr.) Masee, 1892]; non *L. barbata* Velenovsky, 1934.

Lachnum barbatum (Kunze: Fr.) J. Schröt. in Cohn, Krypt.-Fl. Schles. **3**(2): 92. 1893.

Dasyscyphus barabatus (Kunze: Fr.) Masee, Brit. Fung. Fl. **4**: 361. 1895.

Apothecia gregarious, superficial, sessile to shortly stipitate, globose or discoid to shrunk with incurving margin totally or partially covering the disc of up to 1 mm in diam when dry, often associated with decaying (degrading) apothecia previously produced, rehydrating discoid with Brown (7E5) hairs and Greyish Orange (6B3) disc. Ectal excipulum light to pale brown, two-layered; outer layer "textura angularis" to "textura globulosa", composed of cells of 5–8 μm across; inner layer lining the outer, of closely interwoven, "textura intricata" cells, 2–3 μm wide. Hairs of two kinds, secondary hairs mostly straight, often flexuous, undulate or strongly curved to even circinate, multiseptate, often embracing bubbles in each cells, Light Brown (7C7) in water or LPh, even in thickness, up to 250 μm long, 3–5 μm wide; walls becoming thinner and paler toward the apex; apex paler to completely hyaline, occasionally capped with resinous matter, blunt, rarely showing glandular expansion up to 5 μm , arising by proliferation of primary hairs; primary hairs similar to secondary hairs but shorter, with thicker-walled apex as the side walls. Asci 60–70.5 \times 4.5–5 μm , cylindrical clavate, arising from croziers, contents often stained brownish orange in MLZ; apex subconical, pore MLZ+ without KOH pretreatment. Ascospores (7–)10–13 \times 2–3 μm , elliptic to fusiform, occasionally slightly curved, mostly one septate; germination often observed for those discharged and remained on the apothecia; germ-tube occasionally produced from one end. Paraphyses narrowly lanceolate, 3–3.5 μm wide at the widest point, apex rather blunt, 10–15 μm exceeding the asci.

Colony of SANK 25395 on PDA 14 mm in diam (23°Cm 3 wk), low and dense, plane, velvety to pruinose, basically Brown (7E7), white at the margin; reverse Dark Brown (7F5) to almost black. Brownish soluble pigment diffused into agar. Context tough and glutinous. Aerial mycelium little developed, forming

short fascicles. Sectors absent. Concentric zonations present. Margin indistinct, membranaceous, entire.

Specimens examined. HONSHU: On unidentified wood (branch), Sugadaira, Sanada-machi, Nagano Pref., 27-VI-92, TRL-571 (culture SANK 12097); On unidentified plant (*Vitis* vein (?)), Suwa-no-sawa, Aomori-shi, Aomori Pref., 9-V-94, TRL-958 (culture SANK 25395), TRL-965.

Notes. *Trichopezizella barbata* is characterized by the presence of thin, waving hairs expanded at the colorless ends. The ectal structure, in particular the globular cells giving rise to hairs are very similar to those in *Trichopeziza* species suggesting the close relationship.

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