

## Enumeration of the Helotiales from the Sugadaira Montane Research Center and its environs\*

Tsuyoshi HOSOYA<sup>1)</sup>, Yoshio OTANI<sup>2)</sup>, and Kouhei FURUYA<sup>1)</sup>

<sup>1)</sup> Sankyo Tsukuba Research Laboratories, 33 Miyukigaoka,  
Tsukuba-shi, Ibaraki Pref. 305, Japan ;

<sup>2)</sup> 1-707 Okurayama Haimu, Futoo-cho, 946-1, Kouhoku-ku,  
Yokohama 222, Japan.

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### Synopsis

Three hitherto scarcely studied helotialean discomycetes from Japan are described and illustrated: *Lachnellula suecica* (de Bary ex Fuckel) Nannf. ; *Lachnum virgineum* (Batsch : Fr.) Karst. ; *Arachnopeziza aurata* Fuckel. All were collected on the grounds of the Sugadaira Montane Research Center, Central Japan.

### Introduction

The Helotiales (Leotiales) are those fungi with inoperculate asci, and generally minute apothecia. Although the order is very diverse, it has not been studied sufficiently so that its taxonomy at the generic and species levels is far from perfect.

Recently, our interest lies in taxonomy and the industrial use of this diverse group of fungi. In this paper three species of the family Hyaloscyphaceae, Helotiales are described and illustrated in detail. All were collected on the grounds of the Sugadaira Montane Research Center and its environs in which many excellent sites for collecting these fungi are distributed. The color indications are those of Kornerup and Wanscher (1963).

The specimens examined in the present study will be kept at Tsukuba Research Labs., Sankyo Co., Ltd.

### Descriptions

1. *Lachnellula suecica* (de BARY ex EUCKEL) NANNFELDT, Fungi exs. Suec. Praes. Upsal. Fasc. 41-42, 48. 1953. Dharne, Phytopath. Zeitschr. 53 : 118-119, Figs. 1, 7a-d, 1965.

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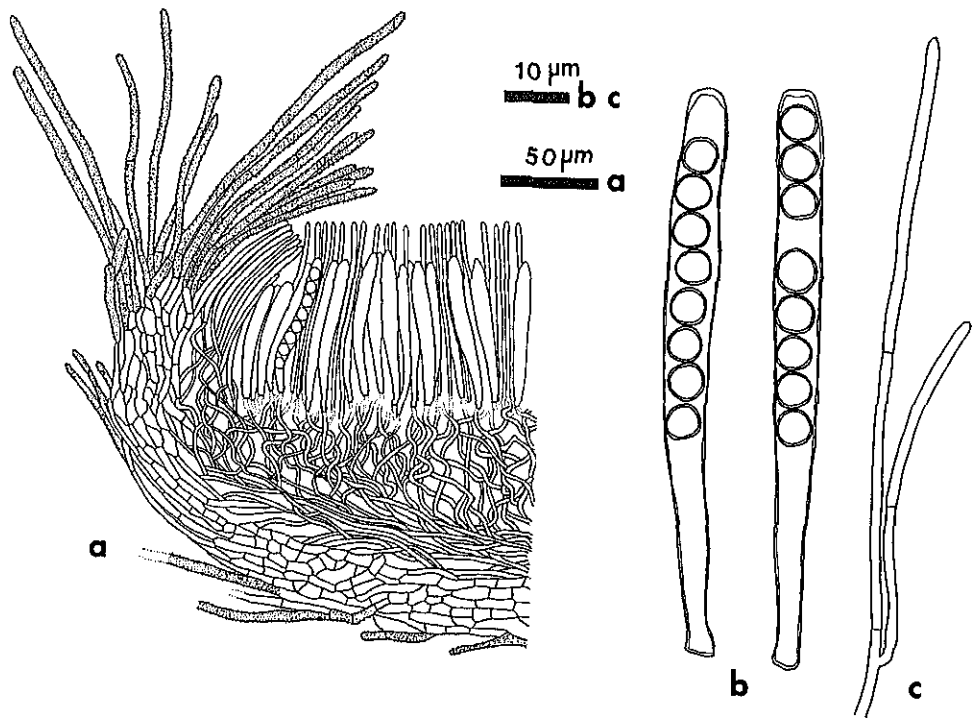


Fig. 1. *Lachnellula suecica*.

a; section of the receptacles showing hymenium, excipulum and hairs, b: asci, c: paraphysis.

*Pithya suecica* de BARY ex FÜCKEL, Symb. Mycol. Nacht. 3: 32, 1876.

Apothecia scattered on the host; erumpent, arising through the epidermis, initially spherical with white hairs covering the surface, later opening at the tip to expose hymenium; turbinate to goblet-shaped at maturity, short but stoutly stalked, up to 0.7 mm in diameter; receptacle flat, expanding, with distinct margin, up to 3 mm in diameter; when fresh, light yellow with deep yellow hymenium; when dried, white with deep orange hymenium, margins slightly involved inward; margins clothed with sterile hairs. Hairs at the margin filiform, 3-5  $\mu\text{m}$  in diameter, up to 160  $\mu\text{m}$ , straight or slightly curved, extending beyond the margin (Fig. 1a, 4h-i), septate, covered with fine granules (Fig. 4j). Hairs covering the receptacle rather curled, loosely interwoven to cover the receptacle surface (Fig. 4k-l), mostly encrusted with granules (Fig. 4m), partially with smooth surface.

Hymenium 60-70  $\mu\text{m}$  thick, densely crowded with asci and paraphyses. Asci cylindrical to cylindrical-clavate, 8-spored, 66.5-76.5  $\times$  6.5  $\mu\text{m}$ , stipitate, with slightly thickened tip stained with iodine (Fig. 1b). Paraphyses filiform, 2  $\mu\text{m}$  thick, thin septate, slightly swollen toward the tip but never rounded (Fig. 1c), exceeding the asci by ca. 10  $\mu\text{m}$  (Fig. 1a). Ascospores globose, 5  $\mu\text{m}$  in diameter, fairly thick-walled, hyaline, monoseriata in the asci (Fig. 1b). Subhymenium 20  $\mu\text{m}$  thick, of densely interwoven hyphae of 1-1.5  $\mu\text{m}$  thick, composed of

compactly interwoven hyphae ca.  $1\ \mu\text{m}$  thick.

Ectal excipulum two-layered; outer layer  $25\text{-}33\ \mu\text{m}$  thick, textura prismatica composed with rectangular cells of  $(8\text{-})\ 15 \times (5\text{-})\ 6\text{-}(8)\ \mu\text{m}$ ; inner layer  $35\text{-}50\ \mu\text{m}$  thick, composed of hyphae of  $1.5\text{-}2\ \mu\text{m}$  thick, loosely interwoven, running parallel to the outside of excipulum. Medullary excipulum textura intricata composed of ca.  $1.5\ \mu\text{m}$  thick hyphae (Fig. 1a).

SPECIMENS EXAMINED: TRL-115, on a decaying branch of *Larix leptolepis*, 07/22/90; TRL-347, on a decaying branch of *Larix leptolepis*, 06/22/91

This is one of the most frequently collected species within the Sugadaira Center grounds from summer to autumn. It is found on decaying branches of *Larix leptolepis* without exceptions. Because of its phytopathological importance, the fungus is well-known in Japan and has been described with a fair amount of detail by SAHO and TAKAHASHI (1973), OGUCHI (1981), TAKAHASHI (1979).

2. *Lachnum virgineum* (BATSCH ex FR.) KARST., Myc. Fenn. 1: 169, 1971

*Dasyscyphus virgineus* S.F. Gray, Nat. Arrang. Brit. pl. 1: 671, 1821.

*Dasyscypha virginea* (Batsch ex Fr.) Fuckel, Symb. Myc. 305, 1970.

*Lachnella virginea* (Batsch) Phill., Brit., Discom. 248, 1887.

Apothecia scattered on the substrate, superficial, initially clavate, goblet-shaped when young, nail-shaped with slender stalk and flat disc up to 1 mm in diameter when mature (Fig.

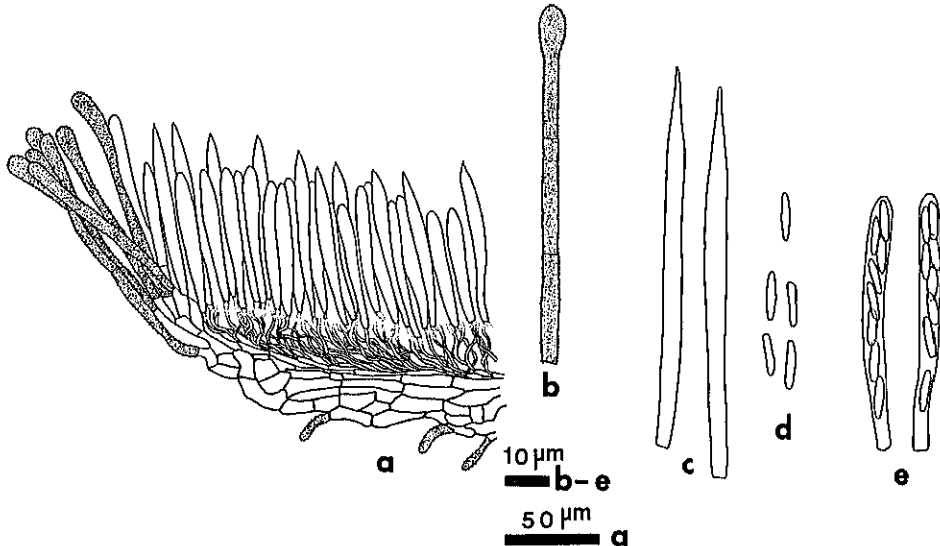


Fig. 2. *Lachnum virgineum*.

a: section of the receptacle showing hymenium, excipulum, hairlike projections, and hairs, b: hair, c: paraphyses, d: ascospores, e: asci.

4c). Height variable, up to 2 mm. White throughout when fresh, drying orange white, light yellow at the hymenium, with margins involving toward the center of the disc.

Hymenium 100  $\mu\text{m}$  thick, paraphyses lanceolate to narrowly lanceolate, 60-88 $\times$ 5-7  $\mu\text{m}$  (Fig. 2c), exceeding the asci by 20-25  $\mu\text{m}$  (Fig. 2a). Asci 8-spored, cylindrical-clavate, 30-36 $\times$ 2-3  $\mu\text{m}$ , tip slightly thickened, stained with iodine (Fig. 2e). Ascospores biseriate at the tip or irregularly seriate, fusiform to clavate, 8-12 $\times$ 1.5-2  $\mu\text{m}$ , non-septate, hyaline (Fig. 2d). Subhymenium rather indistinct.

Ectal excipulum textura prismatica, composed of thick-walled rectangular cells, mostly 5-9 $\times$ 16-30  $\mu\text{m}$ , variable in size, having small granulate hairs or projections, which are regarded as hair initials (Fig. 2a, 4e). Hairs obtuse, septate, slightly thick-walled, 3  $\mu\text{m}$  thick, up to 90  $\mu\text{m}$ , ornamented with fine granules all over, frequently swollen up to 7  $\mu\text{m}$  at the tip (Fig. 2b, 4g). Medullary excipulum textura intricata, densely interwoven, very scanty at the margin.

Stalk arising from the center of the disc, cylindrical, slender, composed of rectangular cells arranged parallel with the outermost layer, walls becoming thinner inward, modified with hairs similar to those at receptacle margins (Fig. 4d).

SPECIMENS EXAMINED: TRL-348, on a decaying branch of an unidentified tree, 06/22/91; TRL-114, on decorticated wood, TRL-116, on a decaying branch of an unidentified tree, 07/22/90; TRL-118, on rotten wood, 07/22/90; TRL-120, on decaying branch, 07/22/90; TRL-348, on a *Larix leptolepis* cone, 06/22/91; TRL-351, on petiole of a broad-leaved tree, 6/22/91; TRL-358, 361, 365, on a decaying branch of an unidentified tree, 06/22/91.

The above description is mainly based on material TRL-358. This is one of the most common discomycetes throughout the world (for example, see DENNIS, 1949, 1981; BREITENBACH & KRÄNZLIN, 1981), though it has been reported rather infrequently in Japan (OTANI, 1967, 1989). It occurs very frequently from spring to summer and apothecia are found on small decaying branches buried in litter. DENNIS (1949) noted that materials from larch cones have more slender and more tapering hairs than those from other substrata. Our specimens collected from a larch branch (TRL-348) were ordinary in morphology. The species can occur on diverse substrata and apparently shows wide variations in morphology as DENNIS (1949) predicted. The limits of this species will be necessary to re-examine.

### 3. *Arachnopeziza aurata* Fuckel, Symbol. Myc. 304, 1870.

Subiculum (Fig. 4a) inconspicuous to hardly visible, partially granulate (Fig. 4b). Apothecia superficial, sessile, scattered to gregarious, flat to shallow cupulate, saucer-shaped to somewhat convex, up to 0.5 mm in diameter, light orange to brownish orange; when dried, subiculum becoming distinctly copious, white with orangish hue.

Hymenium 90  $\mu\text{m}$  thick. Asci clavate (74.5-)79.5-89.5(-96) $\times$ 9-11.5  $\mu\text{m}$ , tip stained with iodine (Fig. 3b). Ascospores filiform, usually 7-septate, 46.5-58.1(-71) $\times$ 1.5-3.5  $\mu\text{m}$ ; apical cell sometimes swollen and rounded; basal cell somewhat acute (Fig. 3c). Paraphyses filiform, 1  $\mu\text{m}$  thick, septate, branched at the tip (Fig. 3d). Subhymenium rather indistinct, of closely

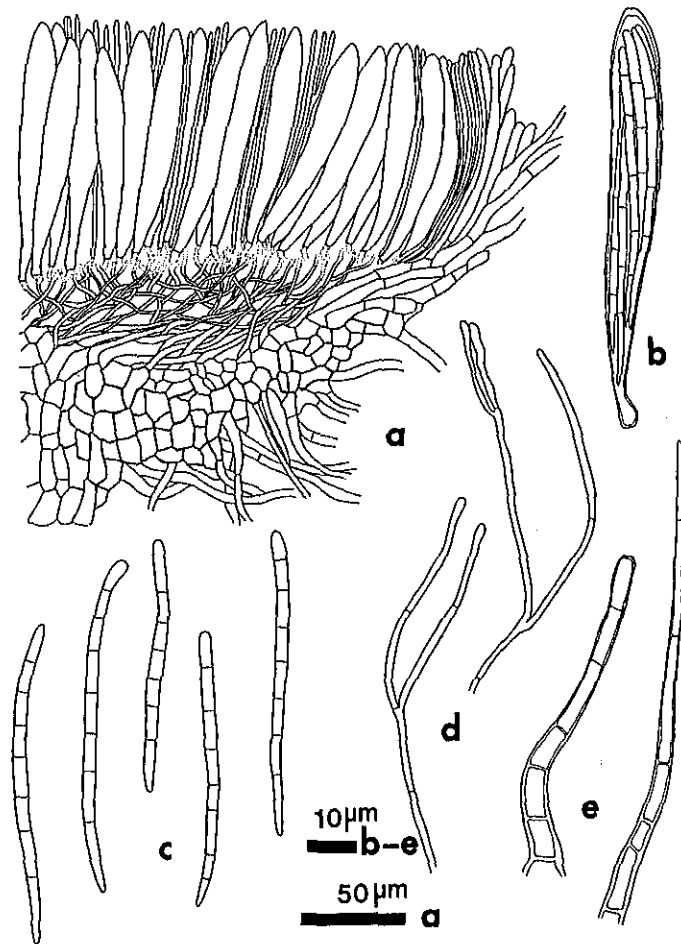


Fig. 3. *Arachnopeziza aurata*.

a : section of the receptacle showing hymenium, excipulum, part of subiculum hyphae and hairs, b : ascus, c : ascospores, d : paraphyses, e : hairs.

interwoven hyphae.

Hairs smooth, straight, slender, septate,  $5\ \mu\text{m}$  in diameter, thickwalled at the base, becoming narrower and thinner-walled toward the tip (Fig. 3e).

Ectal excipulum  $50\ \mu\text{m}$  thick, *textura angularis* to *textura prismatica*, outermost cells continuously connected to subiculum hyphae. Medullary excipulum *textura intricata*, very scanty, of hyphae  $1\text{--}1.5\ \mu\text{m}$  thick, densely interwoven (Fig. 3a).

SPECIMEN EXAMINED : TRL-367, on rotten wood, 06/22/91.

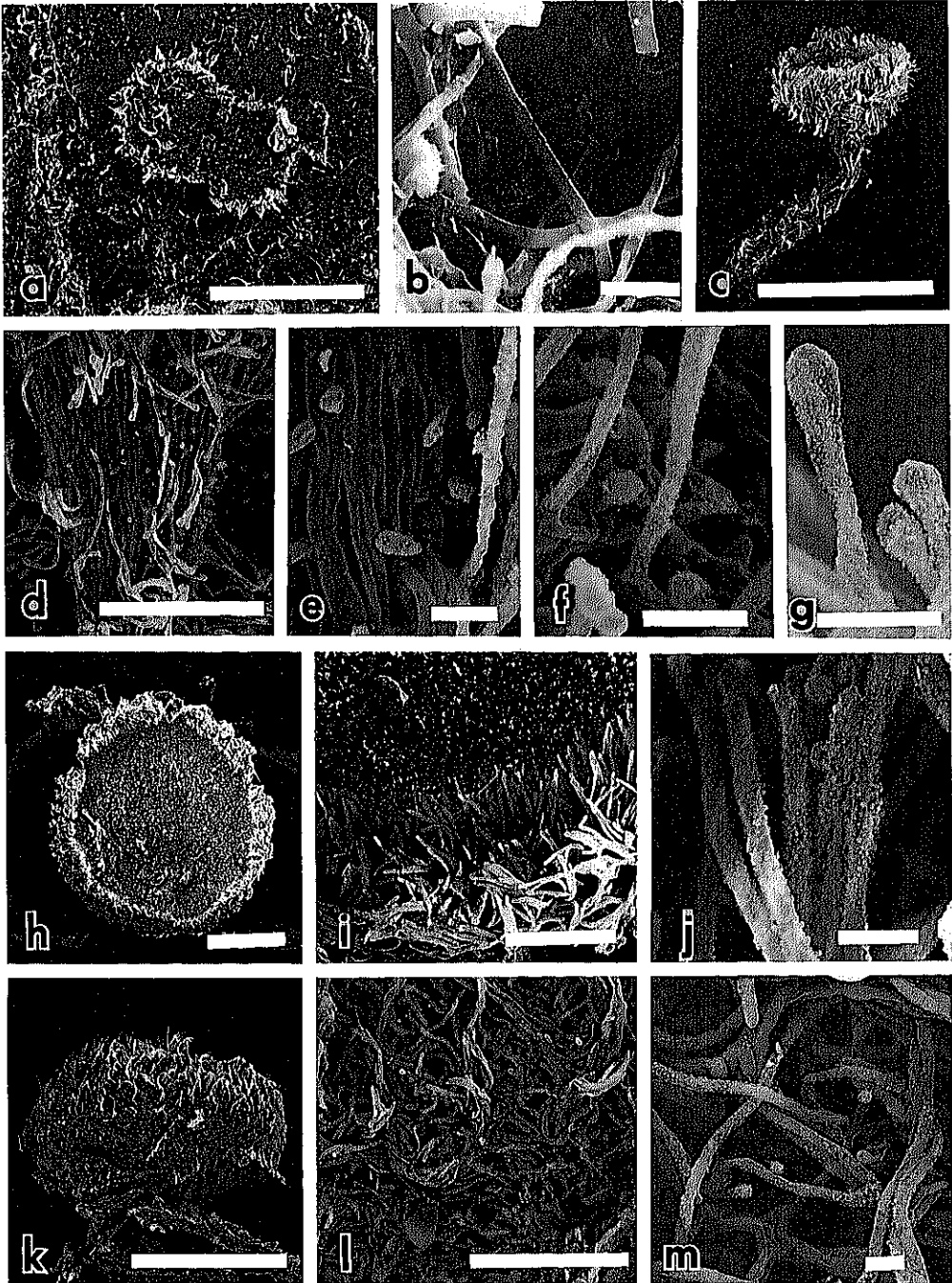


Fig. 4

Although apothecia observed were few, the characteristic subiculum of this species was very remarkable when dried. This species has been recorded many times (SEEVER, 1951 ; KORF, 1951 ; DENNIS, 1981 ; BREITENBACH and KRÄNZLIN, 1981), and probably not rare. KORF (1959) has first recorded this species in Japan from Chiba, Kanagawa and Nara and suggested that *Arachnopeziza* species are widely distributed in Japan as the climate is suited to this group.

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Fig. 4. SEM photographs of a-b : *Arachnopeziza aurata*, c-g : *Lachnum virgineum*, h-m : *Lachnellula suecica*.

a : two attached apothecia seated on subiculum on the substrate (scale : 0.5 mm), b : close up of subiculum hyphae partially encrusted with fine granules (scale : 10  $\mu$ m), c : receptacle with slender stalk both clothed with sterile hairs (scale : 0.5 mm), d : part of a stalk with hairs and hair-like projections both encrusted with fine granules (scale : 100  $\mu$ m), e : hair-like projections at higher magnifications. Note granulate surface (scale : 10  $\mu$ m), f : close up of the hair base, smooth walled expular cells and differentiations of the hair walls encrusted with fine granules (scale : 10  $\mu$ m), g : close up of the tip of the hair on a receptacle (scale : 10  $\mu$ m), h : apothecium on a substrate, showing hymenium and marginal hairs (scale : 0.5 mm), i : close up of marginal hairs extending straight (scale : 100  $\mu$ m), j : marginal hairs at higher magnification encrusted with granules (scale : 10  $\mu$ m), k : side view of the apothecium clothed with receptacle hairs (scale : 0.5 mm), l : close up of the receptacle hairs loosely interwoven (scale : 100  $\mu$ m), m : receptacle hairs (scale : 10  $\mu$ m), hairs partially smooth walled.

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