Introduction

This is the fourth part of the series on remarkable Japanese discomycetes following Hosoya (2009). Two inoperculate and one operculate discomycetes with minute apothecia, first reported from Japan are described and illustrated.

Materials and Methods

Collection and observation procedures follow Hosoya and Otani (1997) and Hosoya (2004). Color codes follow the Pantone color code adopting RGB system referring to a Pantone color bridge (Anonymous, 2005). For known distribution, the database of global biodiversity information facility (GBIF, http://data.gbif.org/welcome.htm) was searched, and counties with occurrence of the given species are shown with an asterisk (*). Distributions known only in literature are shown with double asterisks (**). Those with both information are shown with triple asterisks (***)

Descriptions

1. **Cheilymenia granulata**

   *Peziza granulata* Bull., Herb. Fr. 10: tab. 438, fig. 3 (1790)


   *Aleuria granulata* (Bull.) Gill., Champ. Fr., Discom. 56. 1879.


Cheilymenia granulata (Bull.) J. Moravec, Mycotaxon 38: 474. 1990. var. granulata
Peziza fulva Huds., Fl. Angl., Edn 2 2. 1778.
Humaria gollmeri P. Henn., Hedwigia 36: 233.

Apothecia gregarious, sessile, broadly attached to the substrate; 1–2 mm in diameter, patellate to turbinate when fresh, 0.5–1.5 mm in diameter when dry; disc slightly pruinose, drying more granular, orange (1505C=R255 G145 B51)

Fig. 1. Cheilymenia granulosa (TNS-F-35041). A. Apothecia occurring on the ground. B. Section of the apothecium showing the hymenium, ectal and medullary excipulum. Note orange granules are concentrated in the paraphyses at the hymenium. C. Close up of the section of the apothecium at the margin showing the ectal excipulum. D. Ascus. E. Ascal base with crosiers. F. Paraphyses containing carotenoid granules. G. Ascospores. Note either spumose or containing large oil drops. B-G, Mounted in lactic acid. Scales. B-G, 10 μm.
when fresh, paler orange (1485C=R255 G176 B122) when dried. **Ectal excipulum** textura globulosa, composed of globular to angular cells, 13–20×20–30 μm. **Asci** 180–230×12–14 μm, cylindrical, thin-walled, 8-spored, arising from crosiers; apex not stained by MLZ with or without KOH pretreatment. **Ascospores** (12)15–16×(8-)9–10 μm, ellipsoid, aseptate, spumose, smooth, some containing one to two large vacuoles surrounded by fine globules, hyaline, uniseriate in the asci. **Paraphyses** cylindrical, simple, irregularly enlarged at the apex up to 8 μm wide, 2 μm below, filled with orange, granular to acicular contents staining blue in MLZ.

Specimens examined. HONSHU: TNS-F-35041, Gokayama, Nanto-shi, Toyama Pref. (36°25′34.8″N, 137°1′7.9″E, alt. 719 m) on bear soil, 13-VI-2010, col. T. Hosoya; TNS-F-25566, 30887, Higashiagatsuma-cho, Agatsuma-gun, Gunma Pref. (36°33′20.3″N, 138°42′42.9″E, alt. 503 m), on plant debris compiled and decaying in abandoned human dunghill, 19-V-2009, col. T. Hosoya.

Notes. The present fungus was known as *Coprotus granulata* for a long time (Corner, 1929; Le Gal, 1953; Eckblad, 1968; Rifai, 1968; Breitenbach and Kränzlin, 1984). However, based on the presence of hairs in the ectal excipulum, the genus *Coprotus* was reduced to a section in *Cheilymenia* (Moravec, 1990).

*Cheilymenia granulata* is known as a widespread coprophilous fungus. It has been reported by various authors from various places (Le Gal, 1953; Seaver, 1942; Eckblad, 1968; Rifai, 1968; Breitenbach and Kränzlin, 1984). However, based on the presence of hairs in the ectal excipulum, the genus *Coprotus* was reduced to a section in *Cheilymenia* (Moravec, 1990).

The apothecia discharged the ascospores vigorously, but no discharged spores germinated.

Eckblad (1968) and Korf (1973) reported a pellicular sheath detached by heating in lactic acid for this fungus. In the Japanese specimens, however, no such pellicular sheath was observed.

2. *Mollisia amenticola*  

*Mollisia amenticola* (Sacc.) Rehm, in Rabenhorst, Rabenh. Krypt.-Fl. (Leipzig) 1: 540. 1891. [1896]

*Apothecia* gregarious to scattered, short stipitate; shallow cupulate when young, becoming irregularly undulate at the margin, 0.3 mm in diameter, up to 0.3 mm high when mature, totally white to grayish white, becoming brown toward the base when fresh; disc white to grayish white when fresh, grayish orange (Pantone 7401C=R 241 B 227 B 187), 0.25–0.75 mm in diameter.
when dried; margin well defined, often slightly elevated. **Ectal excipulum** textura globulosa, composed of two to three layers of brown-walled cells, globular in middle flank, becoming angular, arranged nearly right angle to the surface, becoming hyaline and hyphoid at the margin (marginal hairs), 8–10×5–8 μm in crush mount; marginal hairs 20–25×2.5–3.0 μm, hyaline. **Medullary excipulum** textura angularis, composed of thin-walled, elongated, pale brown-walled cells, 4–10×3–5 μm. **Asci** 42–55×4–6 μm (49.4±4.09×5.18±0.61 μm in average±SD, n=18 measured in lactic acid, based on 3 specimens), cylindrical-clavate, 8-spored, arising from crosiers; apex stained blue by MLZ without KOH pretreatment. **Ascospores** 5–8×2.5–3.0 (6.53±1.09×2.89±0.211 μm in average±SD, n=30 measured in lactic acid), ellipsoid, occasionally tapered to the bottom, aseptate, smooth, hyaline. **Paraphyses** cylindrical, 2–3 μm wide, even in width to the apex, septate at the base.


Notes. Two other species of discomycetes are
known to occur on *Alnus* fruit: *Pezizella alniella* (Nyl.) Dennis and *Ciboria viridifusca* (Fuckel) Höhn. *Mollisia amenticola* is distinguished from these fungi in shorter asci and brown colored, globular ectal cells. The color of ectal excipular cells varies from almost hyaline to brown, typical of Dermateaceae. Although it is not described in detail in the recent literature (Kanouse, 1947), it can be distinguished based on characteristic habitat and ectal excipular cells.

3. **Phialina pseudopuberula**

Figs. 5 and 6


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Fig. 5. *Phialina pseudopuberula* (TNS-F-31300). A. Fresh apothecia. B. Longitudinal section of the apothecium. C. Close up of the ectal excipulum and the hymenium. Note short hairs protruding from the outermost cells of the ectal excipulum. D. Various aspects of hairs. The left two shows longer hairs while the right two shows the shorter hairs. Note some parts of the hairs are stained blue in cotton blue in lactic acid. E. Ascal apex stained by Melzer’s reagent. F. Asci. G. Hair contents stained golden yellow in Melzer’s reagent. H. Paraphyses. I. Ascospores. B-D, H, I. Mounted in lactic acid stained by cotton blue. E-G. Mounted in Melzer’s reagent. Scales. A, 1 mm; B, 100 μm; C-I, 10 μm.
Apothecia gregarious, superficial, short stalked; pure white to pale brown (720C = R233 G191 B155 or paler) when fresh, similar color when dried; 0.15–0.25 mm in diameter, 0.1 mm in height when dry; disc flat to shallow concave; margin slightly incurved when dry. Ectal excipulum textura prismatica, composed of several layers of prismatic cells, 6–11 × 2.5–5.0 μm. Hairs of various shape; longer hairs straight, gradually tapered to apex of 0.5–1.0 μm wide, multi-septate, up to 100 μm long, c. 4 μm at the base, protruding from the margin to the outside; shorter hairs straight to curved or circinate, simple to irregularly branched, aseptate to few septate, 13–30 μm long, gradually tapered or not tapered to the apex; long, septate hairs less frequently observed than shorter, branched hairs; cellular contents partially strongly stained by CB/LA, stained golden yellow in MLZ. Asci 40–50(-57) × 5.0–7.0 μm (44.8 ± 3.80 × 5.85 ± 0.56 μm in average ± SD, n = 20, measured in MLZ without KOH pretreatment), cylindrical clavate, eight spored; apex stained blue in MLZ without KOH pretreatment; arising from croziers. Ascospores (11-)15–19 × 1.5–2.5 μm (15.8 ± 2.7 × 2 ± 0.25 μm in average ± SD, n = 18 measured in lactic acid), elongate-ellipsoid, straight or slightly curved, aseptate. Paraphyses straight, simple, cylindrical, gradually enlarged toward the apex, up to 3.5 μm wide, 2–3 μm below, septate; terminal cells 25–50 μm long.

Colony on PDA in 20 days at 18°C 12 mm in...
diameter, low and dense, irregularly wrinkled, radially sulcate with umbonate elevation at the center, brown (483C=R103 G51 B39) at the center, becoming reddish brown (486C=R231 G143 B119) and paler toward the margin, dark brown (476C=R76 G51 B39) from the reverse. Pale brown soluble pigment excreted into the agar. Margin distinct, filmy. Aerial mycelium little developed, velvety, hyaline. No anamorph observed.


Notes. Because of its distinctive features of the hairs, having various shapes in particular short, aseptate to few septate hairs, and foliicolous habitat, this fungus was easily identified. Phialina pseudopuberula has been reported on Quercus, but also on Acer, Betula, Castanea, and Fagus (Huhtinen, 1989).

The genus Phialina seems to be rather rare in Japan. So far only P. lachnobrachya (Desm.) Raitv. and P. lachnobrachyoides have been previously reported (Huhtinen, 1989; Hosoya, 2005).

Huhtinen (1989) recognized various ascospore shapes including septate, equipped with cilia, but such variation depends on the collection. The specimen reported here did not show any of those variations.

Cultural characteristics is reported for the first time.

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References


