

Anisomeridium japonicum (Lichenized Ascomycota, Monoblastiaceae), a New Pyrenolichen Species from Chiba-ken, Central Japan

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Abstract *Anisomeridium japonicum* H. Harada sp. nov. is described as new from Chiba-ken, central Japan. It is characterized by having greenish gray thin thallus, small perithecia (0.15–0.2 mm diam.), and 1-septate, relatively small ascospores (9–16 × 4–6 μm), and by growing on non-calcareous rocks in semi-freshwater habitats.

Key words: lichens, lichenized Ascomycota, Monoblastiaceae, *Anisomeridium*, taxonomy, new species, Japan.

The genus *Arthopyrenia* A. Massal., as defined by many authors such as Zahlbruckner (1921, 1926), was an assemblage of lichenized and non-lichenized ascomycetes with perithecioid ascomata and bitunicate asci. After Harris (1973) pointed out the heterogeneity of this genus, many species have been transferred to other genera such as *Strigula*, and smaller genera have been introduced (Coppins, 1988; Harris, 1995; etc.). Among these genera, *Anisomeridium* (Müll. Arg.) Choisy is circumscribed by having (1) thallus crustose, with *Trentepohlia*-phycobiont, (2) ascomata perithecioid, usually with dark involucrellum, (3) pseudoparaphyses composed of elongated long cells, branched and anastomosing, (4) asci bitunicate, with broad and short ocular chamber, lacking meniscus, (5) ascospores transversely 1- or 3-septate, colorless or brown, lacking ornamented episporangia, and (6) macroconidia and microconidia borne in pycnidia (not in campylidia) (Coppins, 1988; Harris, 1995). About 50 species are so far known, mainly from the tropics. In Japan, only a single corticolous species has been recorded: *A. nyssaegenum* (Ellis et Everh.) R. C. Harris (Kashiwadani and Thor 1995). Recently, however, a saxicolous specimen of this genus was collected during a field survey for a floristic work in Chiba-ken, central Japan. A careful examination has revealed that it belongs to an un-

described species, which is described as new in this paper.

Materials and Methods

Description of external morphology is based on air-dried material observed under a dissecting stereoscope. Sections were made with a razor blade under a dissecting stereoscope, mounted in lactophenol cotton-blue (LPCB), and used for anatomical description except for the color description which was based on the GAW (glycerol : ethanol : water = 1 : 1 : 1) preparations. For observing ascus in more detail, sections of perithecia were mounted in Congo Red and gently squashed. The I and KI tests were conducted on sections of perithecia by using a diluted Lugol's solution and 10% aqueous solution of KOH. Specimen used in this study is deposited in the herbarium of Natural History Museum and Institute, Chiba (CBM).

Taxonomy

Anisomeridium japonicum

H. Harada sp. nov.

(Figs. 1 & 2)

Thallus epilithicus ad rupes non-calcareas et semiaquaticas, tenuis, continuus, ±viridicinereus. Perithecia semiglobosa, 0.15–0.2 mm diametro, nigricantia, cum ostioliis apicalibus. Pseudoparaphyses ca. 1 μm diametro. Asci

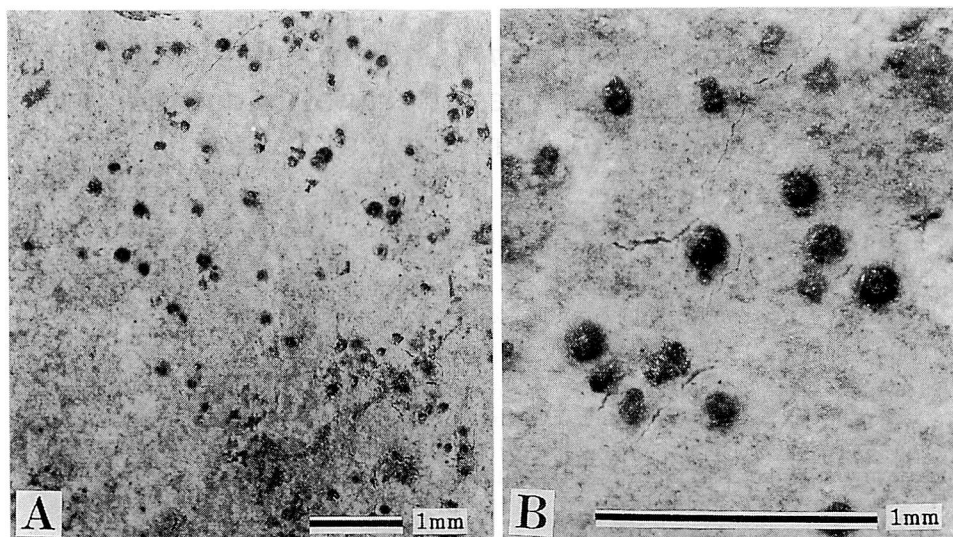


Fig. 1. Habit of *Anisomeridium japonicum*. (A–B, air-dried material, holotype).

clavati, ca. $40 \times 10 \mu\text{m}$; *locellus ocularis brevis et latus*; *meniscus nullus*. *Ascosporae* $9\text{--}16 \times 4\text{--}6 \mu\text{m}$, *ellipsoidales vel ovaes, incolores, 1-septatae, cum apicibus rotundatis, epispora destitutus*.

Typus. JAPAN. Honshu. Chiba-ken, Futtsu-shi, Toyooka, Matsubushi, 130 m alt., on rock, 14 Dec. 1997, Harada 18687 (CBM-FL-10743—*holotypus*).

External Morphology. Thallus crustose, epilithic, spreading, continuous, thin, greenish gray, dull, smooth, lacking prominent hypothallus and marginal structure. Perithecia exposed, \pm hemispherical, 0.15–0.2 mm diam., rather abruptly delimited at base, lacking thalline cover or with thin thalline cover up nearly to ostioles, very dark brown or almost black, somewhat glossy, with rounded apices; ostioles apical, indistinct. Pycnidia not seen.

Anatomy. Thallus $20\text{--}40 \mu\text{m}$ thick, lacking prominent cortex, homoeomerous, colorless (excl. phycobiont), composed of variously orientated, short hyphae (lumina ca. $1.5 \mu\text{m}$ wide), lacking massive matrix between hyphae. Involucrellum extending below to the level of the exciple base or $2/3$, contiguous with the exciple, ca. $25 \mu\text{m}$ thick in the upper part, very dark purplish brown. Exciple colorless, $10\text{--}15 \mu\text{m}$ thick in the sides and bottom. Subhymenium $5\text{--}10 \mu\text{m}$ thick, concave above. Hymenium ca. $100 \mu\text{m}$ high $\times 125 \mu\text{m}$ wide; pseudoparaphyses (lumina of

hyphae ca. $1 \mu\text{m}$ diam.) branched and anastomosing to form a network. Asci clavate, ca. $40 \times 10 \mu\text{m}$, with tholus, I–, KI–; ocular chamber short and broad; meniscus lacking (in Congo Red). Ascospores $9\text{--}16 \times 4\text{--}6 \mu\text{m}$, ellipsoidal to oval, colorless, transversely 1-septate, with rounded apices, lacking epispore.

Distribution. Known only by the type specimen.

Habitat. On non-calcareous rocks in semi-freshwater habitats.—The type specimen was collected in the bottom of waterway consisting of friable sandstone rocks, on the border between a forested slope and paddy fields. The rocks are usually moist, and seem to be inundated with water in rainy days. In the specimen, the thallus is partly covered by mosses and microscopic algae. *Strigula aquatica* H. Harada is the dominant lichen species in this place.

Remarks. In the genus *Anisomeridium*, *A. japonicum* H. Harada is characterized by having (1) greenish gray thin thallus, (2) small perithecia (0.15–0.2 mm diam.), and (3) 1-septate, relatively small ascospores ($9\text{--}16 \times 4\text{--}6 \mu\text{m}$), and by (4) growing on non-calcareous rocks in semi-freshwater habitats.

Among saxicolous species of this genus, *Anisomeridium carinthiacum* (Steiner) R. C. Harris and *A. distans* (Willey) R. C. Harris resemble the present new species in growing

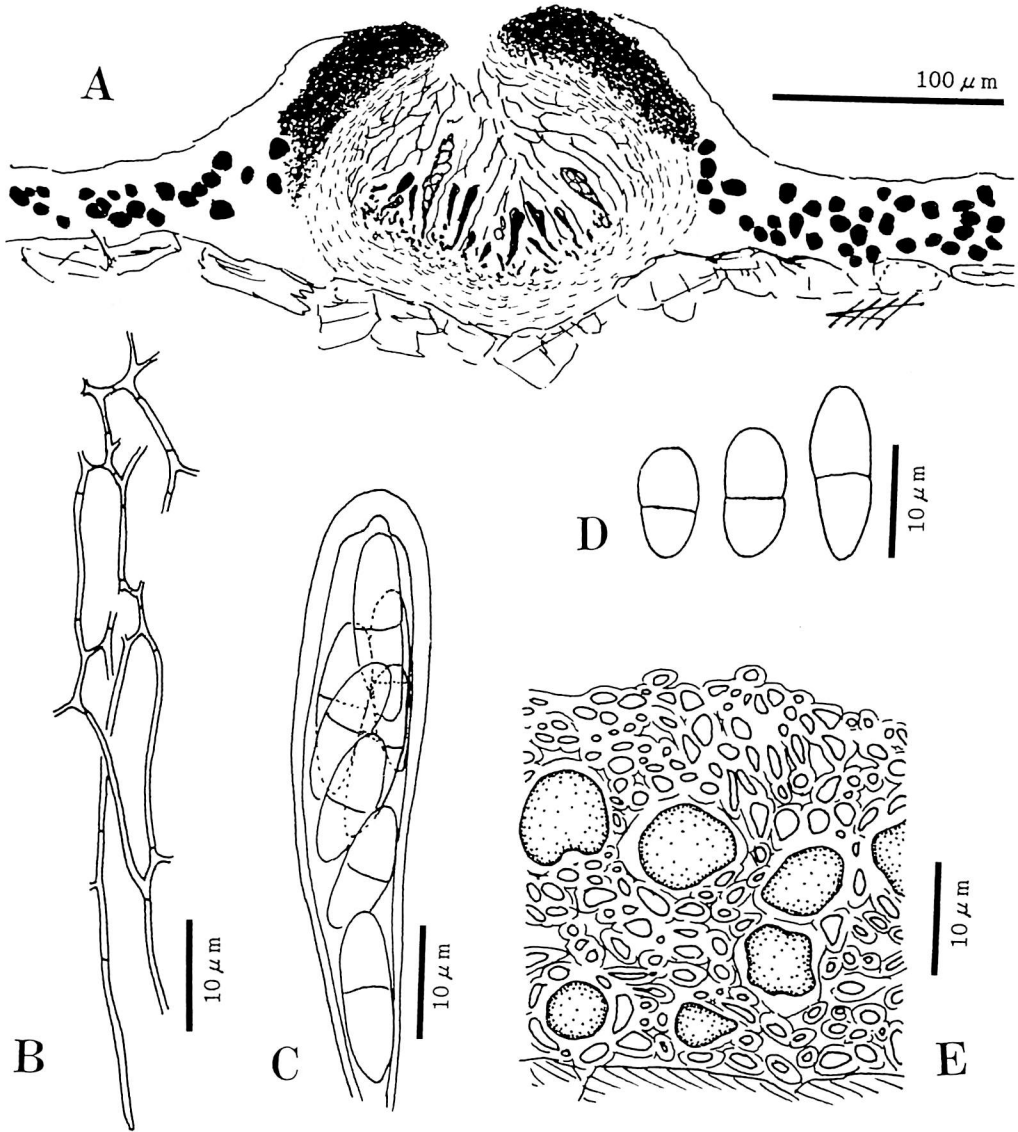


Fig. 2. Anatomy of *Anisomeridium japonicum*. A, vertical section of perithecium and thallus. B, pseudoparaphyses. C, ascus with ascospores. D, ascospores. E, vertical section of thallus. (A-B, D-E, LPCB preparations; C, squash-preparation in Congo Red. A-E, from holotype).

on non-calcareous rocks in freshwater or semi-freshwater habitats (Harris, 1995). However, *A. carinthiacum* has larger ascospores ($13-18 \times 5.5-7 \mu\text{m}$), and *A. distans* has 3-septate ones (Harris, 1995).

Anisomeridium albisedum (Nyl.) R. C. Harris and *A. biforme* (Borrer) R. C. Harris also resemble *A. japonicum* in having (1) perithecia with apical ostioles, and (2) ascospores colorless, 1-septate, small ($9-13 \times 4-5 \mu\text{m}$ in the first species, $10-18 \times 4.5-7 \mu\text{m}$ in the second;

in Harris, 1995). However, they are corticolous species rather than saxicolous and have a whitish thallus and usually larger perithecia ($0.2-0.3 \text{ mm}$ diam. in *A. albisedum*, $0.3-0.4 \text{ mm}$ in *A. biforme*) (Harris, 1995; Purvis *et al.*, 1992).

Anisomeridium gregale R. C. Harris is similar to *A. japonicum* in having short ascospores ($11-13 \mu\text{m}$ long) and growing on rocks (Harris, 1995). However, it grows on calcareous rocks, and the ascospores are fusiform

and narrow (3.5–4.5 μm wide; Harris, 1995).

Anisomeridium nyssaegenum (Ellis et Everhart) R. C. Harris, the only previously known species of this genus from Japan (Kashiwadani & Thor, 1995), differs from *A. japonicum* by its whitish thallus, larger ascospores (14–20 \times 4.5–5 μm), and corticolous habit (Harris, 1995; Purvis *et al.*, 1992).

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千葉県産地衣類の 1 新種, *Anisomeridium japonicum*

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地衣類の 1 新種, *Anisomeridium japonicum* H. Harada sp. nov. を記載する。本種の属する *Anisomeridium* 属は以下の形質によって特徴づけられる: (1) 地衣体は痂状, スミレモ属を共生藻とする; (2) 被子器には暗色の involucrellum を有す; (3) 擬側糸は長く伸びた細胞からなり, 明瞭に分枝・癒合する; (4) 子嚢は 2 重壁, 先端部には広く短い ocular chamber を形成し, 半月状の構造を欠く; (5) 子嚢胞子は無色または褐色, 平行 2 室ないし 4 室で, 外膜を欠く; (6) 粉子器に, 大分生子と小分生子を生ずる。本新種は, 属内では次のとおり特徴づけられる: (1) 地衣体の厚さは薄く, 灰緑色; (2) 被子器は小さい (直径 0.15–0.2 mm); (3) 子嚢胞子は 2 室で, 小さい (9–16 \times 4–6 μm); (4) 半ば淡水性の環境にある, 非石灰質の岩上に生育する。基準産地は千葉県南部の富津市の丘陵部であり, 山林と水田の境界を流れる水路の底部より得られた。日本産 *Anisomeridium* 属としては, 従来は *A. nyssaegenum* (Ellis et Everh.) R. C. Harris (樹皮着生種) のみが知られていたが, 本新種を加え 2 種となった。