



中国壳状地衣3新记录种 (英文)

熊雨洁, 秦起龙, 任强

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中国壳状地衣 3 新记录种

熊雨洁, 秦起龙, 任强*

(山东师范大学生命科学学院, 济南 250014)

摘要: 报道了中国地衣 3 新记录种: *Porina byssophila*、*Sarcogyne privigna* 和 *Trimmatothelopsis versipellis*, 提供了形态学、解剖学、化学特征描述以及地理分布相关信息。

关键词: 地衣型真菌; 污核衣科; 微孢衣科

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Three Species of Crustose Lichens New to China

XIONG Yu-jie, QIN Qi-long, REN Qiang*

(College of Life Sciences, Shandong Normal University, Ji'nan 250014, China)

Abstract: *Porina byssophila*, *Sarcogyne privigna* and *Trimmatothelopsis versipellis* collected from Mt. Kunyu in Shandong Province, are reported as new record species to China. The detailed description of morphology, anatomy, chemistry and the distribution are also given.

Key words: Lichenized fungi; Porinaceae; Acarosporaceae

Mt. Kunyu is a group of scenic mountains in Shandong Peninsula, with warm temperate monsoon climate. The highest point is Taibo Peak, at a height of 923 meters above sea level. Due to a variety of comprehensive factors such as topography and climate, Mt. Kunyu is rich in vegetation resources as well as lichen species^[1].

Since the 1970s, some experts have come to Mt. Kunyu for research, but paid less attention to lichens. Only thirteen species belonging to 10 genera and 7 families were reported from Mt. Kunyu up to now^[2].

The lichen genus *Porina* Ach. (Porinaceae) contains more than 400 species, and grows on bark, rock or leaves in relatively sheltered habitats of the subtropical and tropical regions^[3-5]. It is characterized by the presence of paraphyses, immersed perithecia, thin-walled and unitunicate asci with a truncate or

rounded apical ring, 3 to more septate or submuriform to muriform ascospores^[6-8]. In China, 46 species of *Porina* have been reported^[9].

The genus *Sarcogyne* (Acarosporaceae) contains 34 species, and grows on rocky substrata in temperate and semi-arid regions^[8-11]. It is characterized by a crustose and usually poorly developed thallus, reddish brown to black apothecia, lecideine exciple, simple paraphyses, red to dark brown epithecium, polysporous asci and ellipsoid to globose ascospores 3–6 μm in length^[8,10]. In China, nine species of *Sarcogyne* have been reported^[12-15].

The genus *Trimmatothelopsis* (Acarosporaceae) contains 9 species, and grows on rocks in Europe^[16]. It is characterized by carbonaceous thallus, small-opening apothecia, multispored asci and saxicolous-calcifugous substrate^[17].

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XIONG Yu-jie (Born in 1995), female, graduate student, interesting in plant systematics and resource taxonomy. E-mail: yujie.xiong@163.com

* Corresponding author. E-mail: 251593836@qq.com

1 Materials and methods

Specimens examined are deposited in SDNU (Lichen Section of Botanical Herbarium, Shandong Normal University). Morphology and anatomy were examined under a stereomicroscope (Olympus SZ) and a compound microscope (Olympus CX21). Morphological and anatomical photographs were taken under Olympus SZX16 and BX61 with a digital camera DP72. Thallus and medulla were spot-tested with K (a 10% aqueous solution of potassium hydroxide), C (a saturated solution of aqueous sodium hypochlorite) and I (Lugol's iodine). The lichen substances were identified using thin layer chromatography (TLC) with solvent system C^[18].

2 Taxonomic descriptions

2.1 *Porina byssophila* (Körb. ex Hepp) Zahlbr., Nat. Pflanzenfam: **66**(1903) (Fig. 1)

Thallus epilithic, olive-green to dark green,

vivid green in water, rough, continuous, ecorticate. Prothallus invisible. Perithecia intensive, hemispherical, covered by the thallus, 0.25–0.45 mm diam, with a rounded or mildly pointed top. Ostiole unspectacular or minutely papular. Involucrellum apical, purple-brown, K+ dark brown. Hyphae layer beside involucrellum dark greenish grey to green-black, 20–25 μm thick, containing algae. Centrum subglobose. Excipulum dark gray, 12.5–25 μm thick. Paraphyses simple, slender, 0.8 μm wide. Periphyses absent. Asci unitunicate, fusiform, 8-spored, 62–70 μm \times 13–15 μm , rounded to subacute at the apex. Ascospores hyaline, 3 or 5-septate, fusiform, usually with rounded ends, randomly arranged in the asci, (20–)23–30(–35) μm \times 4.5–5 μm . Conidia fusiform, 2.0–3.5 μm \times 0.8 μm .

Chemistry: Thallus and medulla K–, C–, KC–. Involucrellum K+ dark brown. No lichen products detected by TLC.

Substrate and ecology: On the aquatic and semi-aquatic calcareous or siliceous rocks.

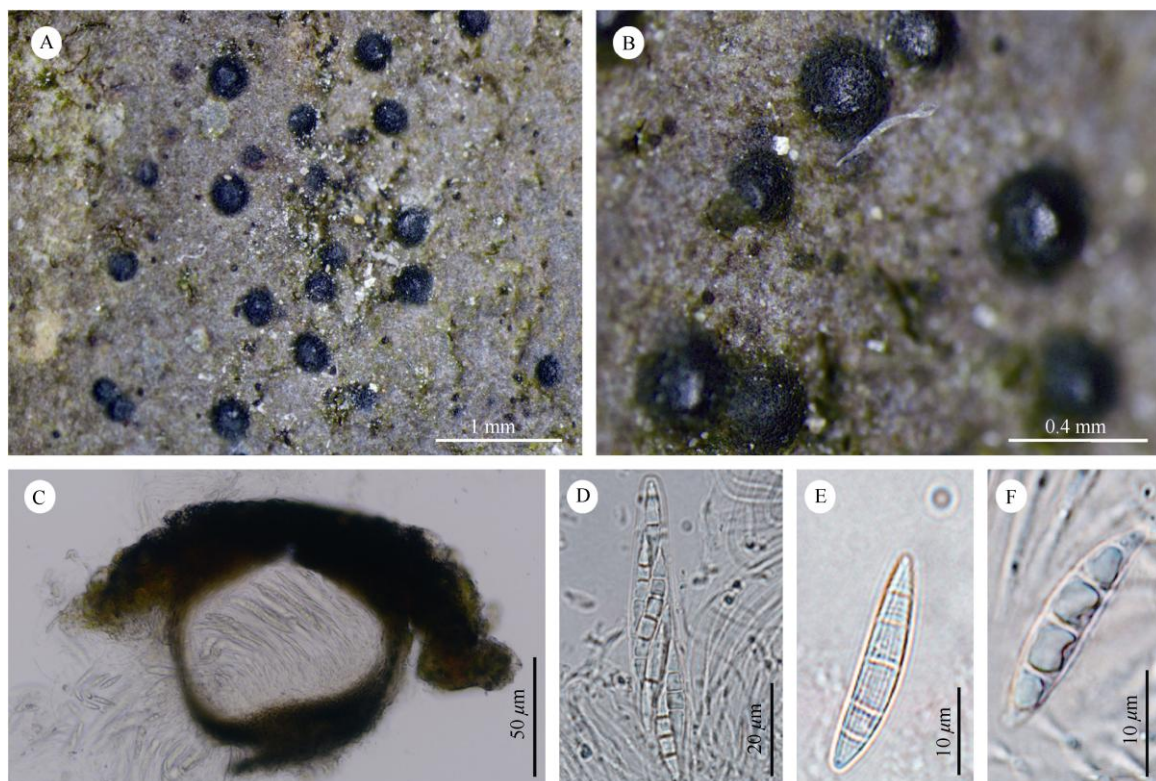


Fig. 1 *Porina byssophila* (Q. Ren 5324). A: Epilithic thallus with hemispherical perithecia; B: Black perithecia, with a rounded or mildly pointed top; C: Section of perithecium; D: Ascus 8-spored; E–F: Ascospores hyaline, 3- or 5-septate, fusiform.

Distribution: Great Britain, Ireland, Central Europe^[19]. New to China.

Specimens Examined: China. Shandong: Muping County, Mt. Kuniyu, 326 m, 16 Oct. 2017, Q. Ren 5324, 5327 (SDNU).

Note: *Porina fluminea* P. M. McCarthy & P. N. Johnson resembles *P. byssophila* but differs in having only 3-septate ascospores, presence of the purple-violet to purple-brown pigment in the involucrellum, and growing on the siliceous rocks^[20]. Another similar species *P. linearis* Leight. differs in the endolithic thallus^[21].

2.2 *Sarcogyne privigna* (Ach.) A. Massal., Geneac. lich. (Verona): 10(1854) (Fig. 2)

Thallus saxicolous, endolithic, inconspicuous.

Photobiont chlorococcoid, 13 μm in diam. Apothecia round to \pm irregular, 0.3–1.1 mm diam, disk red brown to purple, flat or concave. Pruina absent. Disk margin obviously raised, thick, black. True exciple carbonized, containing abundant crystals. Apothecium lecideine, epithecium yellow-brown, 10–12 μm high; hymenium colorless, 60–85 μm high; hypothecium pale brown, 20–30 μm high; proper exciple colorless, 15–20 μm wide. Paraphyses simple, long-celled, 2 μm wide, Asci 50–57 μm \times 10–16 μm , mostly 200-spored. Ascospores simple, hyaline, cylindrical to oblong, 4–5 μm \times 1–1.5 μm . Conidia not observed.

Chemistry: Medulla and apothecia K–, C–, KC–, Pd–. No lichen products detected by TLC.

Substrate and ecology: On the siliceous rock near the stream.

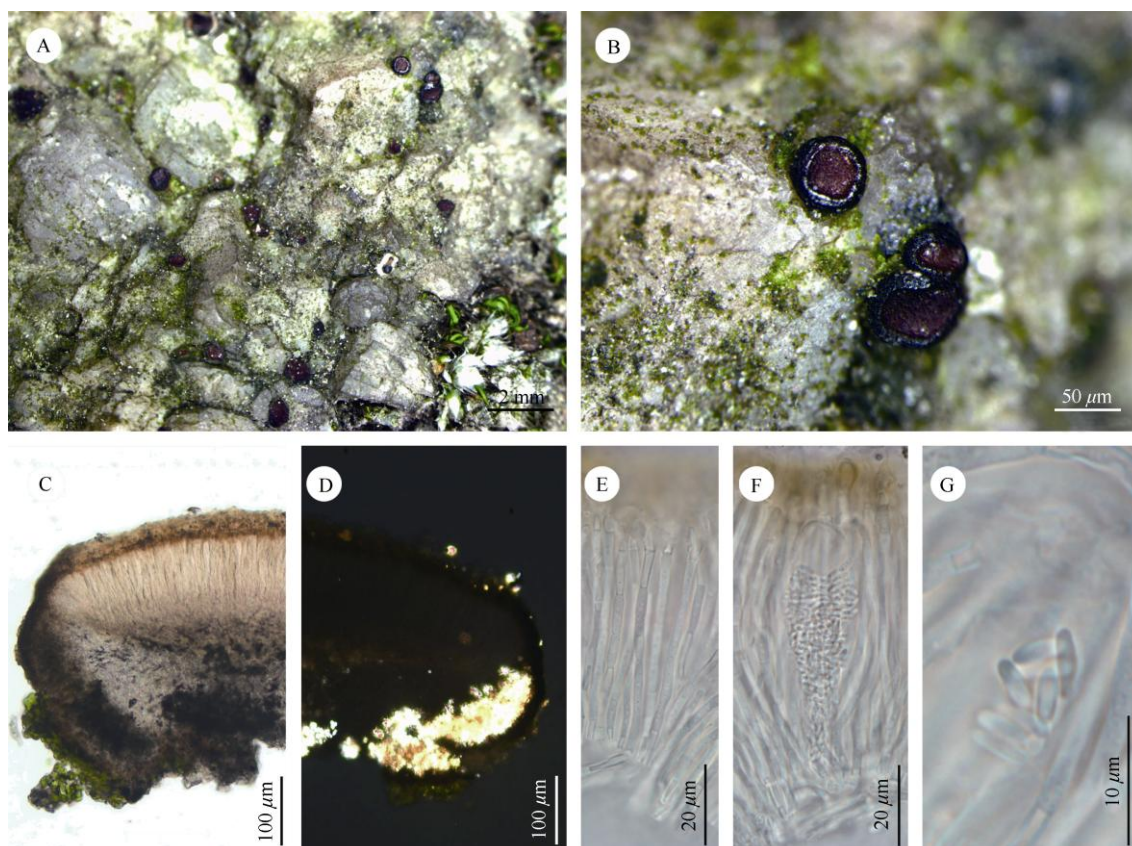


Fig. 2 *Sarcogyne privigna* (Q. Ren 5202). A: Thallus with apothecia; B: Purplish brown apothecia with black margin; C: Section of apothecium; D: Amphithecium with crystals; E: Simple paraphyses; F: Polysporous ascus; G: Mature hyaline ascospores.

Distribution: Europe, North America, Asia, Africa, Australia^[11]. New to China.

Specimen examined: China. Shandong: Muping

County, Mt. Kuniyu, 210 m, 16 Oct. 2017, Q. Ren 5202 (SDNU).

Note: *Sarcogyne clavus* DC. differs *S. privigna* in

its larger apothecia (up to 6 mm diam), taller hymenium (85–115 μm), dark brown hypothecium, thicker and crenulate exciple, and longer ascospores (4–6 μm)^[8,10,22].

2.3 *Trimmatothelopsis versipellis* (Nyl.) Zschacke, Rabenh. Krypt.-Fl., Edn 2 (Leipzig) 9.1(1): 593 (1934) (Fig. 3)

Thallus crustose, epilithic, red-brown. Cortex pale brown, 30–40 μm high. Photobiont chlorococcoid.

Medulla gray, 20–25 μm high. Ascomata first perithecioid then aspicilioid. Apothecia reddish brown to black, initially immersed, erumpent when mature, 0.3–0.5 mm diam, with a carbonized external wall and a small-opening disk. Epithecium colorless, 10–15 μm high; hymenium colorless, 100–130 μm high, KOH/I+ blue; hypothecium inconspicuous. Paraphyses simple, slender, 1.5–2 μm wide. Asci 65–100 μm \times 17.5–25 μm , with a non-amyloid tholus. Ascospores simple, 4.5–6.25 μm \times 2.5–3 μm .

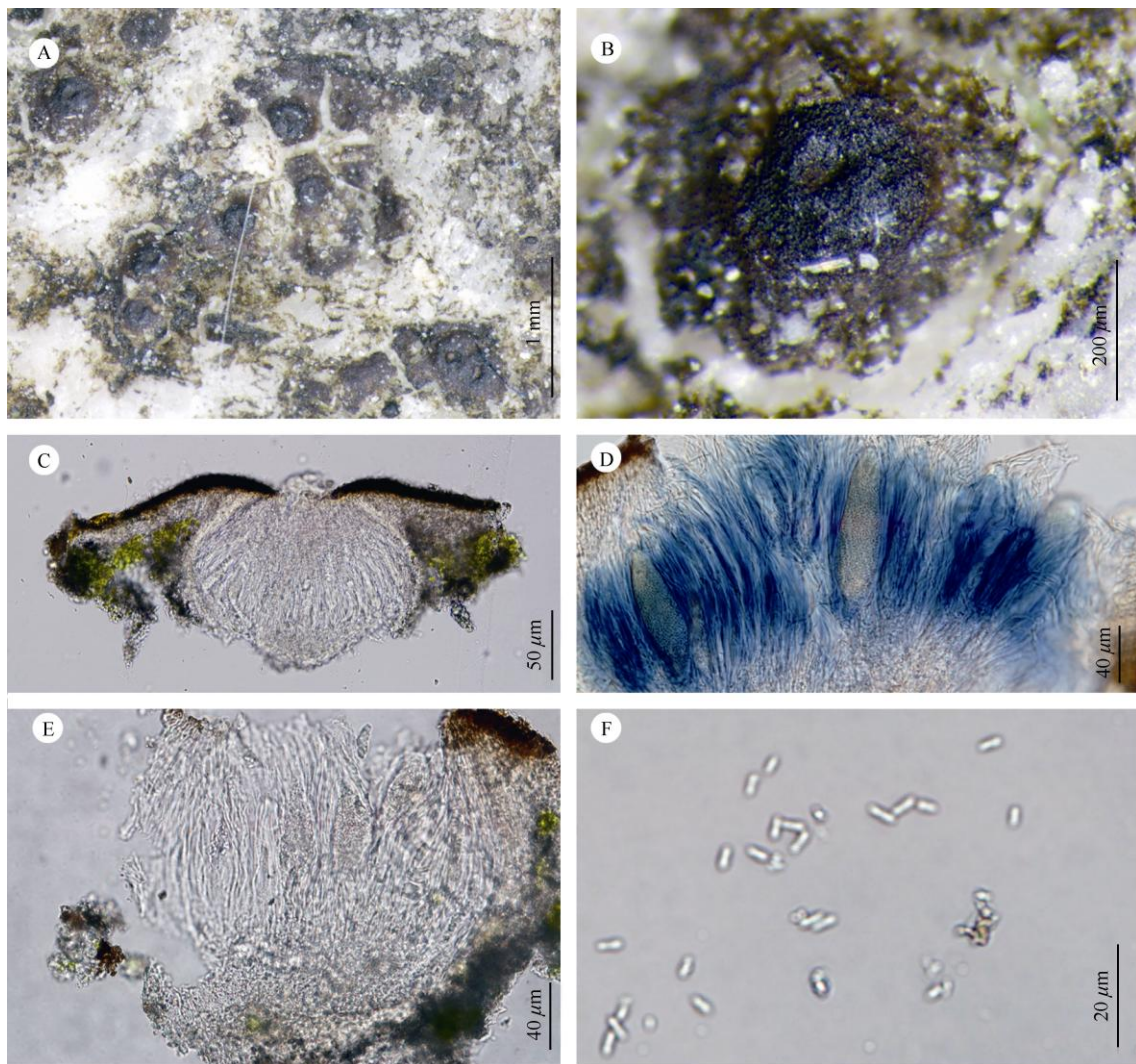


Fig. 3 *Trimmatothelopsis versipellis* (Q. Ren 5389). A: Thallus with apothecia; B: Reddish brown to black apothecium; C: Section of apothecium; D: K/I+ blue Hymenium; E: Polysporous ascus; F: Mature hyaline ascospores.

Chemistry: Thallus K–, C–, KC–. Hymenium KOH/I+ blue. No lichen products detected by TLC.

Substrate and ecology. Siliceous rocks beside streams.

Distribution. France^[23]. New to China.

Specimen examined: China. Shandong: Muping, Mt. Kunyu, 280 m, 16 Oct. 2017, Q. Ren 5389 (SDNU).

Note: It is a new genus to China. *Trimmatothelopsis rhizobola* Nyl. differs in a brown squamulose thallus with rhizines. *T. gordensis* Nav.-Ros. & Cl. Rouxare differs in an endolithic thallus and perithecia with a prominent ostiole^[16–17].

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